HSBC Holdings plc

Capital and Risk Management
Pillar 3 Disclosures at 31 December 2015

HSBC

Capital and Risk Management Pillar 3 Disclosures at 31 December 2015

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.

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Introduction

Purpose

This document comprises HSBC's Pillar 3 disclosures on capital and risk management at 31 December 2015. It has two principal purposes:

- to provide useful information on the capital and risk profile of the HSBC Group, and
- to meet the regulatory disclosure requirements under the Capital Requirements Regulation (EU) No 575/2013, Part 8 – Disclosure by institutions and the rules of the PRA set out in the Public Disclosure section of the PRA Rulebook and as the PRA has otherwise directed.

Additional relevant information may be found in the HSBC Holdings plc *Annual Report and Accounts 2015*.

Abbreviations

The following abbreviated terms are used throughout this document.

Abbreviation	Brief description
A	
ABCP	Asset-backed commercial paper
ABS[1]	Asset-backed Security
AFS[1]	Available-for-sale
ALCM	Asset, Liability and Capital Management
ALCO	Asset and Liability Management Committee
AT1 capital	Additional Tier 1 capital
B	
Basel Committee	Basel Committee on Banking Supervision
BoCom	Bank of Communications Co., Limited
BSM	Balance Sheet Management
C	
CCB[1]	Capital conservation buffer
CCF[1]	Credit conversion factor
CCP	Central counterparty
CCR[1]	Counterparty credit risk
CCyB[1]	Countercyclical capital buffer
CDS[1]	Credit default swap
CET1[1]	Common equity tier 1
CIU	Collective investment undertakings
CML[1]	Consumer and Mortgage Lending (US)
CRA[1]	Credit risk adjustment
CRD[1]	Capital Requirements Directive
CRE[1]	Commercial real estate
CRR[1]	Customer risk rating
CSA[1]	Credit Support Annex
CVA	Credit valuation adjustment
E	
EAD[1]	Exposure at default
EBA	European Banking Authority
ECAI[1]	External Credit Assessment Institutions
EEA	European Economic Area
EL[1]	Expected loss
EU	European Union
EVE[1]	Economic value of equity
F	
Fitch	Fitch Group
FPC[1]	Financial Policy Committee (UK)
FSB	Financial Stability Board
G	
GAC	Group Audit Committee
GB&M	Global Banking and Markets, a global business
GMB	Group Management Board
GPB	Global Private Banking, a global business
GRC	Group Risk Committee
Group	HSBC Holdings together with its subsidiary undertakings
G-SIB[1]	Global systemically important bank
G-SII	Global systemically important institution
H	
HKMA	Hong Kong Monetary Authority
Hong Kong	The Hong Kong Special Administrative Region of the People's Republic of China
HSBC	HSBC Holdings together with its subsidiary undertakings
I	
IAA[1]	Internal Assessment Approach
ICAAP[1]	Internal Capital Adequacy Assessment Process
ICG	Individual capital guidance
IFRSs	International Financial Reporting Standards
IMM[1]	Internal Model Method
IRB[1]	Internal ratings-based approach
IRC[1]	Incremental risk charge
ITS	Implementing Technical Standards
L	
LGD[1]	Loss given default
Libor	London Interbank Offered Rate
M	
MDB[1]	Multilateral Development Bank
MENA	Middle East and North Africa
MOC	Model Oversight Committee
Moody's	Moody's Investor Service
MREL	Minimum requirements for own funds and eligible liabilities
N	
NCOA	Non-credit obligation asset
O	
ORMF	Operational risk management framework
OTC[1]	Over-the-counter
P	
PD[1]	Probability of default
PFE[1]	Potential future exposure
PIT[1]	Point-in-time
PRA[1]	Prudential Regulation Authority (UK)
PVA[1]	Prudent valuation adjustment
R	
RBM[1]	Ratings Based Method
Retail IRB[1]	Retail Internal Ratings Based approach
RMM	Risk Management Meeting of the GMB
RNIV	Risks not in VaR
RTS	Regulatory Technical Standards
RWA[1]	Risk-weighted asset
S	
S&P	Standard and Poor's rating agency
SFM[1]	Supervisory Formula Method
SFT[1]	Securities Financing Transactions
SIC	Securities Investment Conduit
SME	Small and medium-sized enterprise
SPE[1]	Special Purpose Entity
SRB[1]	Systemic Risk Buffer
STD[1]	Standardised approach
T	
TLAC[1]	Total Loss Absorbing Capacity
TTC[1]	Through-the-cycle
T2 capital	Tier 2 capital
U	
UK	United Kingdom
$	United States dollar
US	United States of America
V	
VaR[1]	Value at risk

1 *Full definition included in Glossary in Appendix VI.*

We are more than 250,000 employees working around the world to provide over 47 million customers with a broad range of banking products and services to meet their financial needs.

Our values

Our values define who we are as an organisation and make us distinctive.

Open

We are open to different ideas and cultures, and value diverse perspectives.

Connected

We are connected to our customers, communities, regulators and each other, caring about individuals and their progress.

Dependable

We are dependable, standing firm for what is right and delivering on commitments.

150-year heritage

These values reflect the best aspects of our 150-year heritage. They are critical to fulfilling our purpose to help businesses to thrive, economies to prosper and people to realise their ambitions.

Our role in society

How we do business is as important as what we do.

We seek to build trusting and lasting relationships with our many stakeholders to generate value in society and deliver long-term shareholder returns.

Further details on how we do business can be found on page 34 of the *Annual Report and Accounts 2015*

Key metrics

CRD IV

Common equity tier 1 ratio[1]
(end point)

11.9%

2014: 11.1%

Tier 1 ratio
(transitional)

13.9%

2014: 12.5%

Total capital ratio
(transitional)

17.2%

2014: 15.6%

Common equity tier 1 capital[1]
(end point)

$130.9bn

– *down 4%*

2014: $136.0bn

Tier 1 capital
(transitional)

$153.3bn

– *unchanged*

2014: $152.7bn

Total regulatory capital
(transitional)

$189.8bn

– *unchanged*

2014: $190.7bn

Total RWAs

$1,103bn

– *down 10%*

2014: $1,220bn

Credit risk[2] *EAD*

$2,147bn

– *down 3%*

2014: $2,210bn

Credit risk[2] *RWA density*

41%

2014: 43%

Leverage ratio

5.0%

2014: 4.8%

1 *From 1 January 2015 the CRD IV transitional CET1 and end point CET1 capital ratios became aligned for HSBC Holdings plc due to the recognition of unrealised gains on investment property and AFS securities.*
2 *'Credit risk', here and in all tables and metrics where the term is used, excludes counterparty credit risk.*

Table 1: Pillar 1 overview

	RWAs		Capital required[1]	
	2015 $bn	2014 $bn	**2015 $bn**	2014 $bn
Credit risk	**875.9**	955.3	**70.1**	76.4
– standardised approach	**332.7**	356.9	**26.6**	28.6
– IRB foundation approach	**27.4**	16.8	**2.2**	1.3
– IRB advanced approach	**515.8**	581.6	**41.3**	46.5
Counterparty credit risk	**69.2**	90.7	**5.5**	7.3
– standardised approach	**19.1**	25.2	**1.5**	2.0
– advanced approach	**50.1**	65.5	**4.0**	5.3
Market risk	**42.5**	56.0	**3.4**	4.5
Operational risk	**115.4**	117.8	**9.2**	9.4
At 31 December	**1,103.0**	1,219.8	**88.2**	97.6
Of which:				
Run-off portfolios	**69.3**	99.2	**5.6**	7.9
– legacy credit in GB&M	**29.8**	44.1	**2.4**	3.5
– US CML and Other[2]	**39.5**	55.1	**3.2**	4.4

1 *'Capital required', here and in all tables where the term is used, represents the Pillar I capital charge at 8% of RWAs.*
2 *'Other' includes treasury services related to the US CML business and operations in run-off.*

Tables 2 and 3 following summarise RWAs by global business and risk type across our five geographical regions.

Table 2: Risk-weighted assets – by global business and region

	Europe $bn	**Asia $bn**	**MENA $bn**	**North America $bn**	**Latin America $bn**	**Total RWAs $bn**	**Capital required $bn**
Retail Banking and Wealth Management[1]	**38.9**	**63.7**	**7.7**	**57.3**	**21.9**	**189.5**	**15.2**
Commercial Banking[1]	**114.3**	**201.1**	**26.1**	**55.3**	**24.2**	**421.0**	**33.7**
Global Banking and Markets[2]	**170.4**	**167.3**	**24.7**	**70.6**	**27.1**	**440.6**	**35.2**
Global Private Banking	**10.7**	**3.9**	**0.3**	**4.2**	**0.2**	**19.3**	**1.5**
Other[3]	**3.1**	**23.7**	**1.6**	**4.2**	**–**	**32.6**	**2.6**
At 31 December 2015	**337.4**	**459.7**	**60.4**	**191.6**	**73.4**	**1,103.0**	**88.2**
Retail Banking and Wealth Management[1]	42.4	59.1	7.7	73.5	24.5	207.2	16.6
Commercial Banking[1]	106.3	208.6	26.0	58.2	31.2	430.3	34.4
Global Banking and Markets[2]	209.8	193.0	27.8	81.2	32.9	516.1	41.3
Global Private Banking	11.9	3.5	0.3	4.9	0.2	20.8	1.7
Other[3]	5.0	35.6	1.2	3.6	–	45.4	3.6
At 31 December 2014	375.4	499.8	63.0	221.4	88.8	1,219.8	97.6

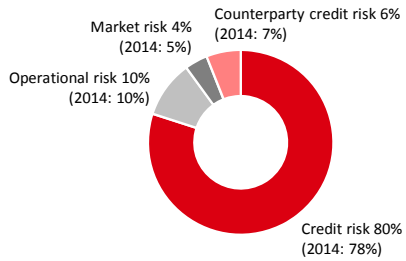
1 *In the first half of 2015, a portfolio of customers was transferred from CMB to RBWM in Latin America in order to better align the combined banking needs of the customers with our established global businesses. Comparative data have been re-presented accordingly.*
2 *RWAs are non-additive across regions due to market risk diversification effects within the Group.*
3 *Includes HSBC's holding company and financing operations, unallocated investment activities, centrally held investment companies and certain property transactions.*

Table 3: Risk-weighted assets – by risk type and region

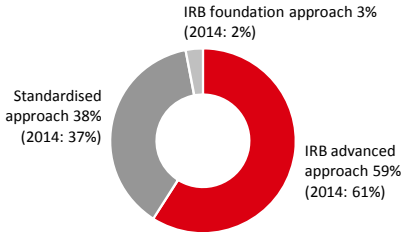
	Europe $bn	Asia $bn	MENA $bn	North America $bn	Latin America $bn	Total RWAs $bn	Capital required $bn
Credit risk	**239.4**	**373.6**	**51.4**	**156.4**	**55.1**	**875.9**	**70.1**
Counterparty credit risk	**32.1**	**17.1**	**1.8**	**14.6**	**3.6**	**69.2**	**5.5**
Market risk[1]	**31.0**	**21.9**	**1.0**	**6.5**	**1.6**	**42.5**	**3.4**
Operational risk	**34.9**	**47.1**	**6.2**	**14.1**	**13.1**	**115.4**	**9.2**
At 31 December 2015	**337.4**	**459.7**	**60.4**	**191.6**	**73.4**	**1,103.0**	**88.2**
Credit risk	263.2	399.1	54.6	171.6	66.8	955.3	76.4
Counterparty credit risk	40.6	21.9	1.2	23.0	4.0	90.7	7.3
Market risk[1]	36.1	33.0	1.0	11.6	2.9	56.0	4.5
Operational risk	35.5	45.8	6.2	15.2	15.1	117.8	9.4
At 31 December 2014	375.4	499.8	63.0	221.4	88.8	1,219.8	97.6

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

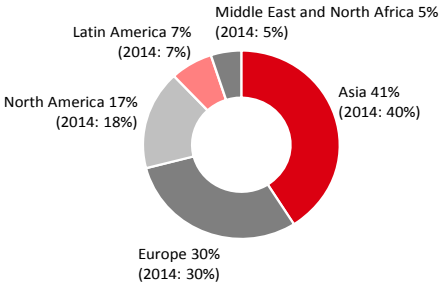
All RWAs by risk type



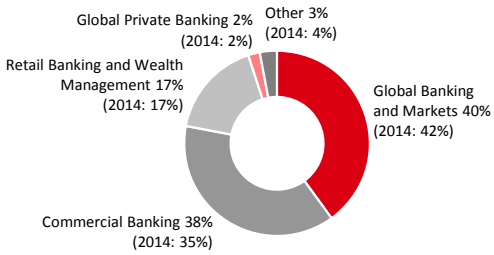
Credit risk RWAs by Basel approach



RWAs by region



RWAs by global business



Regulatory framework for disclosures

HSBC is supervised on a consolidated basis in the UK by the 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 2015 using the Basel III framework of the Basel Committee as implemented by the EU in the amended Capital Requirements Directive, known as 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 2015 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 which 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. Notwithstanding this, and other major developments in regulation during 2015, important elements of the capital adequacy framework have yet to be clarified. In particular, in December 2015, the FPC published its view of the capital framework as applicable to UK banks, which set out expectations in relation to Tier 1 capital across the industry. However, requirements applicable to individual banks are subject to

PRA determination. While there is emerging clarity around the interaction of capital buffers and the PRA's Pillar 2 framework, uncertainty remains around the broader capital framework, including Basel Committee's revisions to the RWA framework and capital floors. Furthermore, there remains a number of draft and unpublished EBA RTSs due in 2016. Details of the major continuing regulatory reforms are set out under 'Regulatory developments' on page 28.

Pillar 3 Disclosures 2015

The *Pillar 3 Disclosures 2015* 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, supplemented by any specific additional requirements of the PRA and discretionary disclosures on our part.

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. However, where disclosures have been enhanced or are new we do not generally re-state or provide prior year comparatives. The capital resources tables track the position from a CRD IV transitional to an end point basis. Specific changes to our Pillar 3 disclosures are set out below.

The principal changes in our *Pillar 3 Disclosures 2015,* compared with 2014, are:

- **enhanced capital and leverage disclosures:**
  - additional disclosure on the impact of the CCyB
  - disclosures on the leverage ratio now follow the EBA disclosure templates
- **more granular risk disclosures:**
  - the tables on wholesale IRB exposure by obligor grade and retail IRB exposure by PD band have been expanded to show average exposure value and undrawn commitments by grade/band
  - new section and tables on past due but not impaired, impaired exposures and CRA
  - new tables showing PD, LGD, RWA and exposure by country
- **other items:**
  - new appendix summarising disclosures withheld due to their immateriality, confidentiality or proprietary nature

In 2015, the PRA adopted EBA Guidelines on frequency, materiality and the confidential or proprietary nature of Pillar 3 disclosures. HSBC implemented these guidelines by integrating them into Group policy and process for the governance of disclosures after approval by the GAC, which exercises oversight of controls over disclosures.

Information relating to the rationale for withholding certain disclosures is provided in Appendix V.

We publish comprehensive Pillar 3 disclosures annually on the HSBC internet site www.hsbc.com, simultaneously with the release of our *Annual Report and Accounts 2015*. Our G-SIB Indicator disclosure is also published in the same location. Our *Interim Reports* and *Earnings Releases* 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 2015* 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.

Linkage to the *Annual Report and Accounts 2015*

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 2015*, differs from that used for regulatory purposes as described in 'Structure of the regulatory group' on page 12. Table 4 provides a reconciliation of the balance sheet from the financial accounting basis to the regulatory scope of consolidation.

The regulatory balance sheet forms the basis for the calculation of regulatory capital requirements.

The alphabetic references in this table link to the corresponding references in table 7: 'Composition of Regulatory Capital', identifying those balances which form part of that calculation.

Table 4: 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		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	*i*	(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	*h*	1,680	(219)	–	1,461
– impairment allowances		(1,454)	–	–	(1,454)
of which:					
– IRB portfolios	*i*	(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	*g*	5,272	–	–	5,272
Interests in associates and joint ventures		19,139	–	(18,571)	568
of which:					
– positive goodwill on acquisition	*h*	593	–	(579)	14
Goodwill and intangible assets	*h*	24,605	(6,068)	623	19,160
Deferred tax assets	*n*	6,051	195	518	6,764
Total assets at 31 December 2015		2,409,656	(94,900)	213,083	2,527,839

	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	*m*	**21,168**	**–**	**–**	**21,168**
– hybrid capital securities included in tier 1 capital	*j*	**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	*i*	**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:					
– hybrid capital securities included in tier 1 capital	*j*	**1,929**	**–**	**–**	**1,929**
– perpetual subordinated debt included in tier 2 capital	*l*	**2,368**	**–**	**–**	**2,368**
– term subordinated debt included in tier 2 capital	*m*	**18,405**	**–**	**–**	**18,405**
Total shareholders' equity	*a*	**188,460**	**(7,562)**	**–**	**180,898**
of which:					
– other equity instruments included in tier 1 capital	*c, j*	**15,112**	**–**	**–**	**15,112**
– preference share premium included in tier 1 capital	*b*	**1,405**	**–**	**–**	**1,405**
Non-controlling interests	*d*	**9,058**	**(933)**	**–**	**8,125**
of which:					
– non-cumulative preference shares issued by subsidiaries included in tier 1 capital	*e*	**2,077**	**–**	**–**	**2,077**
– non-controlling interests included in tier 2 capital, cumulative preferred stock	*f*	**–**	**–**	**–**	**–**
– non-controlling interests attributable to holders of ordinary shares in subsidiaries included in tier 2 capital	*f, m*	**–**	**–**	**–**	**–**
Total liabilities and equity at 31 December 2015		**2,409,656**	**(94,900)**	**213,083**	**2,527,839**

Table 4: 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		129,957	–	30,731	160,688
Items in the course of collection from other banks		4,927	–	80	5,007
Hong Kong Government certificates of indebtedness		27,674	–	–	27,674
Trading assets		304,193	(720)	2,357	305,830
Financial assets designated at fair value		29,037	(28,791)	3,312	3,558
Derivatives		345,008	(94)	353	345,267
Loans and advances to banks		112,149	(2,727)	7,992	117,414
Loans and advances to customers		974,660	(10,809)	116,484	1,080,335
of which:					
– impairment allowances on IRB portfolios	*i*	(6,942)	–	–	(6,942)
– impairment allowances on standardised portfolios		(5,395)	–	(2,744)	(8,139)
Reverse repurchase agreements – non-trading		161,713	(30)	7,510	169,193
Financial investments		415,467	(50,420)	33,123	398,170
Capital invested in insurance and other entities		–	2,542	–	2,542
Current tax assets		1,309	(16)	–	1,293
Prepayments, accrued income and other assets		75,176	(5,295)	8,501	78,382
of which:					
– goodwill and intangible assets of disposal groups held for sale	*h*	8	–	–	8
– retirement benefit assets	*g*	5,028	–	–	5,028
– impairment allowances on assets held for sale		(16)	–	–	(16)
of which:					
– IRB portfolios	*i*	(16)	–	–	(16)
– standardised portfolios		–	–	–	–
Interests in associates and joint ventures		18,181	–	(17,479)	702
of which:					
– positive goodwill on acquisition	*h*	621	–	(606)	15
Goodwill and intangible assets	*h*	27,577	(5,593)	571	22,555
Deferred tax assets	*n*	7,111	163	474	7,748
Total assets at 31 December 2014		2,634,139	(101,790)	194,009	2,726,358

	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		27,674	–	–	27,674
Deposits by banks		77,426	(21)	40,530	117,935
Customer accounts		1,350,642	(535)	141,858	1,491,965
Repurchase agreements – non-trading		107,432	–	–	107,432
Items in course of transmission to other banks		5,990	(3)	–	5,987
Trading liabilities		190,572	(42)	50	190,580
Financial liabilities designated at fair value		76,153	(6,317)	–	69,836
of which:					
– term subordinated debt included in tier 2 capital	*m*	21,822	–	–	21,822
– hybrid capital securities included in tier 1 capital	*j*	1,495	–	–	1,495
Derivatives		340,669	37	331	341,037
Debt securities in issue		95,947	(7,797)	3,720	91,870
Current tax liabilities		1,213	(138)	317	1,392
Liabilities under insurance contracts		73,861	(73,861)	–	–
Accruals, deferred income and other liabilities		53,396	(3,659)	5,145	54,882
of which:					
– retirement benefit liabilities		3,208	(2)	56	3,262
Provisions		4,998	(63)	–	4,935
of which:					
– contingent liabilities and contractual commitments		234	–	–	234
of which:					
– credit-related provisions on IRB portfolios	*i*	132	–	–	132
– credit-related provisions on standardised portfolios		102	–	–	102
Deferred tax liabilities		1,524	(1,009)	2	517
Subordinated liabilities		26,664	–	2,056	28,720
of which:					
– hybrid capital securities included in tier 1 capital	*j*	2,761	–	–	2,761
– perpetual subordinated debt included in tier 2 capital	*l*	2,773	–	–	2,773
– term subordinated debt included in tier 2 capital	*m*	21,130	–	–	21,130
Total shareholders' equity	*a*	190,447	(7,531)	–	182,916
of which:					
– other equity instruments included in tier 1 capital	*c, j*	11,532	–	–	11,532
– preference share premium included in tier 1 capital	*b*	1,405	–	–	1,405
Non-controlling interests	*d*	9,531	(851)	–	8,680
of which:					
– non-cumulative preference shares issued by subsidiaries included in tier 1 capital	*e*	2,127	–	–	2,127
– non-controlling interests included in tier 2 capital, cumulative preferred stock	*f*	300	–	–	300
– non-controlling interests attributable to holders of ordinary shares in subsidiaries included in tier 2 capital	*f, m*	173	–	–	173
Total liabilities and equity at 31 December 2014		2,634,139	(101,790)	194,009	2,726,358

The references (a) – (n) identify balance sheet components which are used in the calculation of regulatory capital on page 20.

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 I.

Interests in banking associates are equity accounted in the financial accounting consolidation, whereas their exposures 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. The principal associates subject to proportional regulatory consolidation at 31 December 2015 are shown in table 5, representing 99% of our associates' total assets as shown in table 4.

Subsidiaries engaged in insurance activities are excluded from the regulatory consolidation by excluding assets, liabilities and post-acquisition reserves, leaving the investment of these insurance subsidiaries to be recorded at cost and deducted from CET1 (subject to thresholds). In the column 'Deconsolidation of insurance/other entities' in the table above the amount of $2.4bn (2014: $2.5bn) 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 5.

The regulatory consolidation also excludes 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 5 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 39 of the *Annual Report and Accounts 2015* and on page 85.

Table 5: Principal entities with a different regulatory and accounting scope of consolidation

		At 31 December 2015		At 31 December 2014	
	Principal activities	**Total assets $m**	**Total equity $m**	Total assets $m	Total equity $m
Principal associates					
Bank of Communications Co., Limited[1]	**Banking services**	**1,110,088**	**80,657**	1,001,995	74,094
The Saudi British Bank	**Banking services**	**50,189**	**7,356**	50,161	6,807
Principal insurance entities excluded from the regulatory consolidation					
HSBC Life (UK) Ltd	**Life insurance manufacturing**	**1,941**	**390**	9,113	520
HSBC Assurances Vie (France)	**Life insurance manufacturing**	**23,713**	**663**	26,260	714
HSBC Life (International) Ltd	**Life insurance manufacturing**	**34,808**	**2,805**	32,578	2,778
Hang Seng Insurance Company Ltd	**Life insurance manufacturing**	**14,455**	**1,154**	13,353	1,323
HSBC Insurance (Singapore) Pte Ltd	**Life insurance manufacturing**	**3,102**	**315**	2,843	379
HSBC Life Insurance Company Ltd	**Life insurance manufacturing**	**764**	**109**	560	87
HSBC Amanah Takaful (Malaysia) SB	**Life insurance manufacturing**	**302**	**27**	349	31
HSBC Seguros (Brasil) S.A.	**Life insurance manufacturing**	**484**	**283**	619	357
HSBC Vida e Previdência (Brasil) S.A.	**Life insurance manufacturing**	**3,418**	**155**	5,044	119
HSBC Seguros de Vida (Argentina) S.A.	**Life insurance manufacturing**	**203**	**42**	225	55
HSBC Seguros de Retiro (Argentina) S.A.	**Life insurance manufacturing**	**563**	**102**	633	74
HSBC Seguros S.A. (Mexico)	**Life insurance manufacturing**	**870**	**182**	1,013	199
Principal SPEs excluded from the regulatory consolidation[2]					
Regency Assets Ltd	**Securitisation**	**15,183**	**–**	10,984	–
Mazarin Funding Ltd	**Securitisation**	**1,879**	**(9)**	3,913	(26)
Barion Funding Ltd	**Securitisation**	**1,132**	**68**	1,970	90
Malachite Funding Ltd	**Securitisation**	**442**	**26**	1,403	63

1 *Total assets and total equity at 30 September 2015.*
2 *These SPEs hold 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 5 also presents as closely as possible the total assets and total equity, on a standalone IFRSs 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 insurance entities, the present value of in-force long-term insurance business asset of $5.7bn 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 5. In addition, these figures exclude any deferred acquisition cost assets that may be recognised in the entities' stand-alone financial reporting.

For associates, table 5 shows the total assets and total equity of the entity as a whole rather than HSBC's share in the entities' balance sheets.

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 2015*.

The *Pillar 3 Disclosures 2015* are prepared in accordance with regulatory capital adequacy concepts and rules, while the *Annual Report and Accounts 2015* are prepared in accordance with IFRSs. The purpose of the regulatory balance sheet is to provide a point in time 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 as shown in table 6a, and the credit risk and CCR exposure values shown in table 6b below, is principally attributable to the following factors:

Credit risk and CCR exposures

Various assets on the regulatory balance sheet, such as intangible goodwill and assets, are excluded from the calculation of the credit risk exposure value as they are deducted from capital. The regulatory balances are adjusted for the effect of the differences in the basis for regulatory and accounting netting, and in the treatment of financial collateral.

Credit risk exposures only

When assessing credit risk exposures within the regulatory balance sheet, the Basel Committee's approach used to report the asset in question determines the calculation method for EAD. Using the STD approach, the regulatory exposure value is based on the regulatory balance sheet amount, applying a number of further regulatory adjustments. Using IRB approaches, the regulatory EAD is either determined using supervisory (foundation) or internally modelled (advanced) methods.

EAD takes account of off-balance sheet items, such as the undrawn portion of committed facilities, various trade finance commitments and guarantees, by applying CCFs to these items.

Assets on the regulatory balance sheet, as shown in table 4, are net of impairments. EAD, however, is only reduced for impairments under the standardised approach. Impairments under the IRB approach are not used to reduce the EAD amount.

CCR exposures only

For regulatory purposes, trading book items, derivatives and securities financing items in the banking book are treated under the rules for CCR. CCR exposures express the risk that the counterparty to a transaction may default before completing the satisfactory settlement of the transaction. See table 48 for a comparison of derivative accounting balances and CCR exposure for derivatives.

HSBC uses the mark-to-market method and the IMM approach to calculate CCR EAD. Under the mark-to-market method EAD is based on the balance sheet fair value of the instrument plus an add-on for PFE. Under the IMM approach, modelled exposure value replaces the fair value on the balance sheet.

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 EAD.

In a first step, table 6a below shows a breakdown of the accounting balances into the risk types that form the basis for regulatory capital requirements. Table 6b then shows the main differences between the accounting balances and regulatory exposures by regulatory risk type.

Table 6a: Mapping of financial statement categories with regulatory risk categories

		Carrying value of items:				
	Regulatory balance sheet[1] $bn	Subject to credit risk framework $bn	Subject to CCR framework[2] $bn	Subject to securitisation framework[3] $bn	Subject to the market risk framework $bn	Subject to deduction from capital or not subject to regulatory capital requirements $bn
Assets						
Cash and balances at central banks	**127.7**	**127.7**	**–**	**–**	**–**	**–**
Items in the course of collection from other banks	**5.8**	**5.8**	**–**	**–**	**–**	**–**
Hong Kong Government certificates of indebtedness	**28.4**	**28.4**	**–**	**–**	**–**	**–**
Trading assets	**229.5**	**4.4**	**17.4**	**–**	**225.1**	**–**
Financial assets designated at fair value	**2.4**	**2.4**	**–**	**–**	**–**	**–**
Derivatives	**288.8**	**0.3**	**287.5**	**0.9**	**288.5**	**–**
Loans and advances to banks	**103.8**	**103.8**	**–**	**–**	**–**	**–**
Loans and advances to customers	**1,037.0**	**1,027.5**	**–**	**9.5**	**–**	**–**
Reverse repurchase agreements – non-trading	**152.9**	**5.9**	**147.0**		**–**	**–**
Financial investments	**420.0**	**408.7**	**–**	**11.3**	**–**	**–**
Assets held for sale	**39.8**	**32.8**	**5.3**	**–**	**–**	**1.7**
Capital invested in insurance and other entities	**2.4**	**2.4**	**–**	**–**	**–**	**–**
Current tax assets	**1.2**	**1.2**	**–**	**–**	**–**	**–**
Prepayments, accrued income and other assets	**61.5**	**44.9**	**–**	**–**	**11.5**	**5.1**
Interests in associates and joint ventures	**0.6**	**–**	**–**	**–**	**–**	**0.6**
Goodwill and intangible assets	**19.2**	**–**	**–**	**–**	**–**	**19.2**
Deferred tax assets	**6.8**	**7.8**	**–**	**–**	**–**	**(1.0)**
Total assets at 31 December 2015	**2,527.8**	**1,804.0**	**457.2**	**21.7**	**525.1**	**25.6**
Cash and balances at central banks	160.7	160.7	–	–	–	–
Items in the course of collection from other banks	5.0	5.0	–	–	–	–
Hong Kong Government certificates of indebtedness	27.7	27.7	–	–	–	–
Trading assets	305.8	–	23.1	–	305.8	1.1
Financial assets designated at fair value	3.6	3.6	–	–	–	–
Derivatives	345.3	–	344.6	0.7	345.3	–
Loans and advances to banks	117.4	115.3	–	2.1	–	–
Loans and advances to customers	1,080.3	1,078.1	–	2.2	–	–
Reverse repurchase agreements – non-trading	169.2	7.5	161.7	–	–	–
Financial investments	398.2	385.8	–	12.4	–	–
Capital invested in insurance and other entities	2.5	2.5	–	–	–	–
Current tax assets	1.3	1.3	–	–	–	–
Prepayments, accrued income and other assets	78.4	57.6	–	–	15.7	5.0
Interests in associates and joint ventures	0.7	0.7	–	–	–	–
Goodwill and intangible assets	22.6	–	–	–	–	22.6
Deferred tax assets	7.7	6.7	–	–	–	1.0
Total assets at 31 December 2014	2,726.4	1,852.5	529.4	17.4	666.8	29.7

1 *The amounts shown in the column 'Regulatory balance sheet' 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 banking book and trading book.*

3 *The amounts shown in the column 'Subject to securitisation framework' only include banking book. Trading book securitisation positions are included in the market risk column.*

Table 6b: Main sources of differences between regulatory exposure values and carrying values in financial statements

	Items subject to:		
	Credit risk $bn	**CCR $bn**	**Securitisation framework $bn**
Asset carrying value amount under scope of regulatory consolidation	**1,804.0**	**457.2**	**21.7**
– differences due to reversal of IFRSs netting	**31.7**	**–**	**–**
– 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	**–**	**(285.5)**	**–**
– differences due to free deliveries and sundry balances	**–**	**6.9**	**–**
Exposure values considered for regulatory purposes at 31 December 2015	**2,104.9**	**178.6**	**41.6**
Asset carrying value amount under scope of regulatory consolidation	1,852.5	529.4	17.4
– differences due to reversal of IFRSs netting	37.5	–	–
– differences due to financial collateral on standardised approach	(13.9)	–	–
– differences due to consideration of provisions on IRB approach	7.3	–	–
– differences due to modelling and standardised CCFs for credit risk and other differences[1]	289.6	–	21.4
– differences due to credit risk mitigation and potential exposures for counterparty risk	–	(336.8)	–
– differences due to free deliveries and sundry balances	–	8.5	–
Exposure values considered for regulatory purposes at 31 December 2014	2,173.0	201.1	38.8

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

Capital and risk

Capital management

Approach and policy

Our approach to capital management is designed to ensure that we exceed 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, exceeding 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.

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. During 2015, none of the Group's subsidiaries experienced significant restrictions on paying dividends or repaying loans and advances. Also, there are no foreseen restrictions envisaged by our subsidiaries, with the exception of HSBC North America Holdings Inc., on paying dividends or repaying loans and advances. None of our subsidiaries which are excluded from the regulatory consolidation have capital resources below their minimum regulatory requirement.

For further details of our approach to capital management, please see page 243 of the Annual Report and Accounts 2015.

Risks to capital

Our top and emerging risks are regularly evaluated to assess the impact on our businesses and core capital position. This evaluation extends to a number of risks not technically within the scope of our top and emerging risks, but which are identified as presenting risks to capital due to their potential to impact the Group's RWAs and/or capital supply position. The downside or upside scenarios are assessed against the Group's capital management objectives and mitigating actions are assigned to senior management as necessary.

Stress testing

Our stress testing and scenario analysis programme enables us to understand the sensitivities of the core assumptions in our capital plans and assessment of our internal and regulatory capital requirements to the adverse effect of extreme, but plausible events. Stress testing allows us to formulate our response and mitigate risk in advance of actual conditions exhibiting the stresses identified in the scenarios and is closely aligned to our monitoring of top and emerging risks.

The governance and management of enterprise-wide stress testing is overseen by the Stress Testing Management Board, chaired by the Group Finance Director, to ensure appropriate senior management oversight and governance of the stress test programmes. Models used within stress testing are approved through functional MOCs, with expert stress testing support during development. Updates are provided regularly to meetings of the RMM. The GRC is informed and consulted on the Group's stress testing activities, as appropriate, and approves the key elements of the Bank of England concurrent stress test, including final results.

We are subject to regulatory stress testing in many jurisdictions. These exercises are designed to assess the resilience of banks to adverse economic or political developments and ensure that they have robust, forward-looking capital planning processes that account for their unique risks. They include the programmes of the Bank of England, the Federal Reserve Board, the Office of the Comptroller of the Currency, the EBA, HKMA and other regulators. Assessment by regulators is on both a quantitative and qualitative basis, the latter focusing on our portfolio quality, data provision, stress testing capability and internal management processes.

In addition, we have conducted an internal stress test, which incorporated the latest portfolio developments and business plan. For this exercise, management considered that the Bank of England 2015 scenario reflected key risks which merited examination at that time. The results of this exercise are used for internal risk and capital management processes, including the ICAAP.

Further details of the Group's regulatory stress tests are given on page 116 of the Annual Report and Accounts 2015.

Overview of regulatory capital framework

Introduction

Capital and RWAs are calculated and presented on the Group's interpretation of CRD IV legislation and the PRA's rules as set out in the PRA Rulebook.

The section below sets out details of the capital that is eligible for regulatory purposes, and the composition of the Group's regulatory capital. It describes our Pillar 1 capital requirements as well as the Pillar 2 and capital buffers framework. Finally, it discusses the leverage ratio, which has assumed increasing importance for the FPC and the PRA as a non-risk-based measure supplementing the Basel Committee's risk-based methodology.

Eligible regulatory capital

The capital position presented on a CRD IV transitional basis follows the Group's interpretation of CRD IV legislation and the PRA's rules as set out in the PRA Rulebook.

The effects of draft EBA technical standards are not generally captured in our numbers.

While CRD IV allows for the majority of regulatory adjustments and deductions from CET1 to be implemented on a gradual basis from 1 January 2014 to 1 January 2018, the PRA has largely decided not to make use of these transitional provisions. From 1 January 2015, unrealised gains on investment property and AFS securities were recognised in CET1 capital. As a result, our end point and transitional CET1 capital and ratios are now aligned.

For additional tier 1 and tier 2 capital, the PRA has followed the transitional provisions timing as set out in CRD IV to apply the necessary regulatory adjustments and deductions. The effect of these adjustments is being phased in at 20% per annum from 1 January 2014 to 1 January 2018.

Non-CRD IV compliant additional tier 1 and tier 2 instruments also benefit from a grandfathering period. This progressively reduces the eligible amount by 10% annually, following an initial reduction of 20% on 1 January 2014, until they are fully phased out by 1 January 2022.

Under CRD IV, as implemented in the UK, banks are required to meet a minimum CET1 ratio of 4.5% of RWAs, a minimum tier 1 ratio of 6% of RWAs, and a total capital ratio of 8% of RWAs. In addition to the Pillar 1 minimum ratios, the PRA sets Pillar 2A capital requirements, which together are considered the minimum level of regulatory capital to be maintained at all times. Pillar 2A is to be met with at least 56% CET1 capital and the remaining with non-common equity capital.

In addition to minimum requirements, CRD IV establishes a number of capital buffers to be met with CET1 capital, which largely phase-in from 1 January 2016. To the extent our CET1 capital is not enough to meet these buffer requirements, the Group would suffer automatic restrictions on capital distributions.

Going forward, as the grandfathering provisions fall away, we intend to meet our overall regulatory minima in an economically efficient manner by issuing non-common equity capital as necessary. At 31 December 2015, the Group had $25.1bn of CRD IV compliant non-common equity capital instruments, of which $3.2bn of tier 2 and $3.6bn of additional tier 1 were issued during the year (for details on the additional tier 1 instruments issued during the year see Note 35 of the *Annual Report and Accounts 2015*). At 31 December 2015, the Group also had $32.8bn of non-common equity capital instruments qualifying as eligible capital under CRD IV by virtue of the application of the grandfathering provisions, after applying a 30% reduction as outlined above.

For a full disclosure of the CET1, tier 1 and total capital position on a 'transitional basis' at 31 December 2015, see Appendix III of this report.

Pillar 1

Pillar 1 covers the capital resources requirements for credit risk, market risk and operational risk. Credit risk includes CCR and securitisation requirements. 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 PD, but subjects their quantified estimates of EAD and 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. Further information on our IRB roll-out plan may be found on page 46.
Counterparty credit risk	Three approaches to calculating CCR and determining exposure values are defined by the Basel Committee: mark-to-market, standardised and IMM. These exposure values are used to determine capital requirements under one of the credit risk approaches; standardised, IRB foundation and IRB advanced.	We use the mark-to-market and IMM approaches for CCR. Details of the IMM permission we have received from the PRA can be found in the Financial Services Register on the PRA website. Our aim is to increase the proportion of positions on IMM over time.
Equity	For banking 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 banking book: the standardised approach and the IRB approach, which incorporates the RBM, the IAA and the SFM.	For the majority of the securitisation non-trading book 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 market risk, using the PRA's standard rules.
Market risk	Market risk capital requirements can be determined under either the standard rules or the IMA. The latter involves the use of internal VaR models to measure market risks and determine the appropriate capital requirement. The IRC also applies.	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 are in the process of implementing an operational risk model which we will use for economic capital calculation purposes.

Capital buffers

CRD IV establishes a number of capital buffers, to be met by CET1 capital, broadly aligned with the Basel III framework. In the UK, with the exception of the CCyB which applied with immediate effect, the remaining CRD IV capital buffers are phased in from 1 January 2016.

For more details on capital buffers, see page 28.

Pillar 2

We conduct an annual 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. A range of stress tests are applied to our base capital plan. These, coupled with our economic capital framework and other risk management practices, are 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 examined by the PRA as part of its supervisory review and evaluation process, which occurs periodically to enable the regulator to define the ICG or minimum capital requirements for HSBC and our PRA buffer where required. Under the revised Pillar 2 PRA regime, which came into effect from 1 January 2016, the capital planning buffer was 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.

For more details on Pillar 2, see pages 25 and 29.

Leverage ratio

The leverage ratio was introduced into the Basel III framework as a non-risk-based limit, to supplement risk-based capital requirements. It aims to constrain the build-up of excess leverage in the banking sector, introducing additional safeguards against model risk and measurement errors. The Basel III leverage ratio is a volume-based measure calculated as tier 1 capital divided by total on- and off-balance sheet exposures. This ratio has been implemented in the EU for reporting and disclosure purposes but, at this stage, has not been set as a binding requirement.

The PRA has implemented a UK framework for the leverage ratio with effect from 1 January 2016, setting minimum requirements.

For more details on the leverage ratio, see pages 27 and 30.

Composition of regulatory capital

Capital and RWAs are calculated and presented on the Group's interpretation of final CRD IV legislation and the PRA's final rules as set out in the PRA Rulebook.

For a table of the movement in total regulatory capital during the year to 31 December 2015, see page 233 of the Annual Report and Accounts 2015.

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 and tier 2 capital, are set out on the HSBC internet site 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. The composition of capital under the current regulatory requirements is provided in the table below. The alphabetic references link back to table 4: 'Reconciliation of balance sheets – financial accounting to regulatory scope of consolidation', which shows where these items are presented in the respective balance sheets. Not all items are reconcilable, due to regulatory adjustments that are applied, for example to non-common equity capital securities before they can be included in the Group's regulatory capital base.

Table 7: Composition of regulatory capital

		At 31 December	
	Ref[1]	**2015**	2014
		$m	$m
Common equity tier 1 capital			
Shareholders' equity		**160,664**	166,617
– shareholders' equity per balance sheet[2]	*a*	**188,460**	190,447
– foreseeable interim dividend[3]		**(3,717)**	(3,362)
– preference share premium	*b*	**(1,405)**	(1,405)
– other equity instruments	*c*	**(15,112)**	(11,532)
– deconsolidation of special purpose entities[4]	*a*	**(91)**	(323)
– deconsolidation of insurance entities	*a, h*	**(7,471)**	(7,208)
Non-controlling interests		**3,519**	4,640
– non-controlling interests per balance sheet	*d*	**9,058**	9,531
– preference share non-controlling interests	*e*	**(2,077)**	(2,127)
– non-controlling interests transferred to tier 2 capital	*f*	**–**	(473)
– non-controlling interests in deconsolidated subsidiaries	*d*	**(933)**	(851)
– surplus non-controlling interests disallowed in CET1		**(2,529)**	(1,440)
Regulatory adjustments to the accounting basis		**(4,556)**	(3,556)
– own credit spread[5]		**(159)**	767
– debit valuation adjustment		**(336)**	(197)
– defined benefit pension fund adjustment	*g*	**(4,009)**	(4,069)
– cash flow hedging reserve		**(52)**	(57)
Deductions		**(28,764)**	(31,748)
– goodwill and intangible assets	*h*	**(20,650)**	(22,475)
– deferred tax assets that rely on future profitability (excludes those arising from temporary differences)	*n*	**(1,204)**	(1,036)
– additional valuation adjustment (referred to as PVA)		**(1,151)**	(1,341)
– investments in own shares through the holding of composite products of which HSBC is a component (exchange traded funds, derivatives and index stock)		**(839)**	(1,083)
– negative amounts resulting from the calculation of expected loss amounts	*i*	**(4,920)**	(5,813)
Common equity tier 1 capital on an end point basis		**130,863**	135,953
Tier 1 and tier 2 capital on a transitional basis			
Common equity tier 1 capital on an end point basis		**130,863**	135,953
Transitional adjustments			(2,753)
– unrealised gains arising from revaluation of property			(1,375)
– unrealised gains in available-for-sale debt and equities			(1,378)
Common equity tier 1 capital on a transitional basis		**130,863**	133,200
Additional tier 1 capital on a transitional basis			
Other tier 1 capital before deductions		**22,621**	19,687
– preference share premium	*b*	**1,015**	1,160
– preference share non-controlling interests	*e*	**1,711**	1,955
– allowable non-controlling interest in AT1	*d*	**1,546**	884
– hybrid capital securities	*j*	**18,349**	15,688
Deductions		**(181)**	(148)
– unconsolidated investments[6]		**(121)**	(148)
– holding of own additional tier 1 instruments		**(60)**	–
Tier 1 capital on a transitional basis		**153,303**	152,739
Tier 2 capital on a transitional basis			
Total qualifying tier 2 capital before deductions		**36,852**	38,213
– allowable non-controlling interest in tier 2	*d*	**14**	99
– perpetual subordinated debt	*l*	**1,941**	2,218
– term subordinated debt	*m*	**34,897**	35,656
– non-controlling interests in tier 2 capital	*f*	**–**	240
Total deductions other than from tier 1 capital		**(322)**	(222)
– unconsolidated investments[6]		**(282)**	(222)
– holding of own tier 2 instruments		**(40)**	–
Total regulatory capital on a transitional basis		**189,833**	190,730

1 *The references (a) – (n) identify balance sheet components on page 8 which are used in the calculation of regulatory capital.*
2 *Includes externally verified profits for the year ended 31 December 2015.*
3 *This includes dividends on ordinary shares, quarterly dividends on preference shares and coupons on capital securities, classified as equity.*
4 *Mainly comprise unrealised gains/losses in AFS debt securities related to SPEs.*
5 *Includes own credit spread on trading liabilities.*
6 *Mainly comprise investments in insurance entities.*

Table 8: Reconciliation of regulatory capital from transitional basis to an estimated CRD IV end point basis

	At 31 December	
	2015	2014
	$m	$m
Common equity tier 1 capital on a transitional basis	**130,863**	133,200
Unrealised gains arising from revaluation of property		1,375
Unrealised gains in available-for-sale debt and equities		1,378
Common equity tier 1 capital on an end point basis	**130,863**	135,953
Additional tier 1 capital on a transitional basis	**22,440**	19,539
Grandfathered instruments:		
Preference share premium	**(1,015)**	(1,160)
Preference share non-controlling interests	**(1,711)**	(1,955)
Hybrid capital securities	**(9,088)**	(10,007)
Transitional provisions:		
Allowable non-controlling interest in AT1	**(1,377)**	(487)
Unconsolidated investments[1]	**121**	148
Additional tier 1 capital end point basis	**9,370**	6,078
Tier 1 capital on an end point basis	**140,233**	142,031
Tier 2 capital on a transitional basis	**36,530**	37,991
Grandfathered instruments:		
Perpetual subordinated debt	**(1,941)**	(2,218)
Term subordinated debt	**(19,034)**	(21,513)
Transitional provisions:		
Non-controlling interest in tier 2 capital	**–**	(240)
Allowable non-controlling interest in tier 2	**21**	396
Unconsolidated investments[1]	**(121)**	(148)
Tier 2 capital on an end point basis	**15,455**	14,268
Total regulatory capital on an end point basis	**155,688**	156,299

1 *Mainly comprise investments in insurance entities.*

Pillar 1 requirements and RWA flow

This section describes our Pillar 1 capital requirements, with a high-level view of the related RWAs.

Table 9 shows total RWAs by risk type. Tables 10 to 17 with accompanying narratives set out, for credit, counterparty credit and market risks, first RWAs by Basel approach and then the movements during the year in IRB/model-based RWAs.

Table 9: Total RWAs by risk type

	At 31 December	
	2015	2014
	$bn	$bn
Credit risk	**875.9**	955.3
Counterparty credit risk	**69.2**	90.7
Market risk	**42.5**	56.0
Operational risk	**115.4**	117.8
	1,103.0	1,219.8

The following comments describe the key RWA movements excluding foreign currency translation differences.

RWA initiatives

The main drivers were:

- $38bn as a result of reduced exposures, the partial disposal of our investment in Industrial Bank, a decrease in trading positions subject to the Incremental Risk Charge, client facility reductions and trade compressions;
- $30bn from refining our calculations, including the further application of the SME supporting factor, a more refined application of CCF, increased usage of 'IRB' models and the move of certain exposures from residual to cash flow weighted maturity;
- $25bn from process improvements such as better linking of collateral and guarantees to facilities, enhanced risk parameters and the use of more granular data resulting in lower CCFs for off-balance sheet items; and
- $30bn through the continued reduction in the GB&M legacy credit and US run-off portfolios.

Business growth

Business growth increased RWAs by $49bn, principally in:

- CMB, from higher term lending to corporate customers, principally in Europe, North America and Asia, $23bn;
- our associates, Bank of Communications and Saudi British Bank, $14bn; and
- GB&M, from higher general lending to corporates which increased RWAs by $10bn, mainly in Europe.

Credit Risk RWAs

Table 10: Credit risk – RWAs by region and approach

	Europe $bn	Asia $bn	MENA $bn	North America $bn	Latin America $bn	Total $bn
IRB approach	**192.6**	**195.9**	**19.4**	**122.5**	**12.8**	**543.2**
– IRB advanced approach	**175.1**	**195.9**	**9.5**	**122.5**	**12.8**	**515.8**
– IRB foundation approach	**17.5**	**–**	**9.9**	**–**	**–**	**27.4**
Standardised approach	**46.8**	**177.7**	**32.0**	**33.9**	**42.3**	**332.7**
At 31 December 2015	**239.4**	**373.6**	**51.4**	**156.4**	**55.1**	**875.9**
IRB approach	216.1	213.1	15.6	142.0	11.6	598.4
– IRB advanced approach	203.3	213.1	11.6	142.0	11.6	581.6
– IRB foundation approach	12.8	–	4.0	–	–	16.8
Standardised approach	47.1	186.0	39.0	29.6	55.2	356.9
At 31 December 2014	263.2	399.1	54.6	171.6	66.8	955.3

Table 11: Credit risk – RWAs by global business and approach

	Principal RBWM[1] $bn	RBWM (US run-off) $bn	Total RBWM $bn	CMB[1] $bn	GB&M $bn	GPB $bn	Other $bn	Total $bn
IRB approach	**59.0**	**33.2**	**92.2**	**218.0**	**214.8**	**8.5**	**9.7**	**543.2**
– IRB advanced approach	**59.0**	**33.2**	**92.2**	**199.0**	**207.5**	**8.4**	**8.7**	**515.8**
– IRB foundation approach	**–**	**–**	**–**	**19.0**	**7.3**	**0.1**	**1.0**	**27.4**
Standardised approach	**57.6**	**3.8**	**61.4**	**172.0**	**69.7**	**7.2**	**22.4**	**332.7**
At 31 December 2015	**116.6**	**37.0**	**153.6**	**390.0**	**284.5**	**15.7**	**32.1**	**875.9**
IRB approach	56.1	47.3	103.4	217.2	255.6	10.2	12.0	598.4
– IRB advanced approach	56.1	47.3	103.4	209.2	248.1	10.0	10.9	581.6
– IRB foundation approach	–	–	–	8.0	7.5	0.2	1.1	16.8
Standardised approach	61.2	4.8	66.0	181.0	70.1	6.6	33.2	356.9
At 31 December 2014	117.3	52.1	169.4	398.2	325.7	16.8	45.2	955.3

1 *In the first half of 2015, a portfolio of customers was transferred from CMB to RBWM in Latin America in order to better align the combined banking needs of the customers with our established global businesses. Comparative data have been re-presented accordingly.*

Credit risk RWAs are calculated using three approaches, as permitted by the PRA. For consolidated Group reporting, we have adopted the advanced IRB approach for the majority of our business, with a small proportion being on the foundation IRB approach and the remaining portfolios on the standardised approach.

Standardised approach

For portfolios treated under the standardised approach, credit risk RWAs decreased by $24bn, which included a reduction of $27bn due to foreign exchange movements.

- RWAs increased by $23bn across all regions as a result of higher lending. Growth in our associate, BoCom, accounted for $15bn.
- This was offset by RWA initiatives reducing RWAs by $29bn, mainly comprising portfolios moving to an IRB approach (reducing the standardised approach by $10.2bn and increasing the IRB approach by $7.2bn) and partial disposal of our investment in Industrial Bank reducing RWAs by $12.4bn.

Table 12: RWA movement by region by key driver – credit risk – IRB only

	Europe $bn	Asia $bn	MENA $bn	North America $bn	Latin America $bn	Total $bn
RWAs at 1 January 2015	**216.1**	**213.1**	**15.6**	**142.0**	**11.6**	**598.4**
Foreign exchange movement	**(10.4)**	**(7.2)**	**(0.6)**	**(4.7)**	**(3.4)**	**(26.3)**
Acquisitions and disposals	**(14.1)**	**–**	**(0.1)**	**(4.9)**	**–**	**(19.1)**
Book size	**11.4**	**2.9**	**(0.5)**	**(2.8)**	**0.4**	**11.4**
Book quality	**(8.0)**	**(6.9)**	**(1.4)**	**0.7**	**3.9**	**(11.7)**
Model updates	**1.2**	**(2.6)**	**4.7**	**0.2**	**0.1**	**3.6**
– portfolios moving onto IRB approach	**(0.1)**	**–**	**4.7**	**0.2**	**0.1**	**4.9**
– new/updated models	**1.3**	**(2.6)**	**–**	**–**	**–**	**(1.3)**
Methodology and policy	**(3.6)**	**(3.4)**	**1.7**	**(8.0)**	**0.2**	**(13.1)**
– internal updates	**(6.2)**	**(5.4)**	**1.6**	**(8.0)**	**0.2**	**(17.8)**
– external updates – regulatory	**2.6**	**2.0**	**0.1**	**–**	**–**	**4.7**
Total RWA movement	**(23.5)**	**(17.2)**	**3.8**	**(19.5)**	**1.2**	**(55.2)**
RWAs at 31 December 2015	**192.6**	**195.9**	**19.4**	**122.5**	**12.8**	**543.2**
RWAs at 1 January 2014 on Basel 2.5 basis	166.9	182.9	15.0	161.5	8.5	534.8
Foreign exchange movement	(11.6)	(4.0)	(0.2)	(2.4)	(1.9)	(20.1)
Acquisitions and disposals	(3.5)	–	(0.7)	(4.2)	(0.1)	(8.5)
Book size	11.4	19.5	1.8	2.9	2.0	37.6
Book quality	(1.5)	–	(0.8)	(10.3)	1.4	(11.2)
Model updates	19.4	0.3	–	(6.1)	–	13.6
Methodology and policy	35.0	14.4	0.5	0.6	1.7	52.2
– internal updates	(11.7)	(5.2)	(0.2)	(6.4)	(0.1)	(23.6)
– external updates – regulatory	2.2	8.5	(0.2)	0.7	0.1	11.3
– CRD IV impact	37.0	5.7	0.4	4.9	0.2	48.2
– NCOA moving from STD to IRB	7.5	5.4	0.5	1.4	1.5	16.3
Total RWA movement	49.2	30.2	0.6	(19.5)	3.1	63.6
RWAs at 31 December 2014 on CRD IV basis	216.1	213.1	15.6	142.0	11.6	598.4

Table 13: RWA movement by global business by key driver – credit risk – IRB only

	Principal RBWM[1] $bn	RBWM (US run-off) $bn	Total RBWM $bn	CMB[1] $bn	GB&M $bn	GPB $bn	Other $bn	Total $bn
RWAs at 1 January 2015	**56.1**	**47.3**	**103.4**	**217.2**	**255.6**	**10.2**	**12.0**	**598.4**
Foreign exchange movement	**(2.9)**	**–**	**(2.9)**	**(11.7)**	**(11.0)**	**(0.3)**	**(0.4)**	**(26.3)**
Acquisitions and disposals	**–**	**(4.9)**	**(4.9)**	**–**	**(14.2)**	**–**	**–**	**(19.1)**
Book size	**3.7**	**(5.6)**	**(1.9)**	**15.8**	**(0.8)**	**(0.5)**	**(1.2)**	**11.4**
Book quality	**(2.8)**	**(3.7)**	**(6.5)**	**6.0**	**(10.5)**	**(0.1)**	**(0.6)**	**(11.7)**
Model updates	**0.4**	**–**	**0.4**	**5.6**	**(2.3)**	**(0.1)**	**–**	**3.6**
– portfolios moving onto IRB approach	**–**	**–**	**–**	**4.1**	**0.9**	**(0.1)**	**–**	**4.9**
– new/updated models	**0.4**	**–**	**0.4**	**1.5**	**(3.2)**	**–**	**–**	**(1.3)**
Methodology and policy	**4.5**	**0.1**	**4.6**	**(14.9)**	**(2.0)**	**(0.7)**	**(0.1)**	**(13.1)**
– internal updates	**2.5**	**0.1**	**2.6**	**(14.9)**	**(4.7)**	**(0.7)**	**(0.1)**	**(17.8)**
– external updates – regulatory	**2.0**	**–**	**2.0**	**–**	**2.7**	**–**	**–**	**4.7**
Total RWA movement	**2.9**	**(14.1)**	**(11.2)**	**0.8**	**(40.8)**	**1.7**	**(2.3)**	**(55.2)**
RWAs at 31 December 2015	**59.0**	**33.2**	**92.2**	**218.0**	**214.8**	**8.5**	**9.7**	**543.2**
RWAs at 1 January 2014 on Basel 2.5 basis	58.5	72.6	131.1	189.4	198.5	10.6	5.2	534.8
Foreign exchange movement	(2.6)	–	(2.6)	(8.7)	(8.1)	(0.2)	(0.5)	(20.1)
Acquisitions and disposals	–	–	–	–	(8.2)	–	(0.3)	(8.5)
Book size	1.9	(6.9)	(5.0)	23.1	21.1	(0.5)	(1.1)	37.6
Book quality	(5.7)	(8.6)	(14.3)	2.8	(0.2)	(0.3)	0.8	(11.2)
Model updates	0.6	(6.2)	(5.6)	12.2	7.0	–	–	13.6
Methodology and policy	3.4	(3.6)	(0.2)	(1.6)	45.5	0.6	7.9	52.2
– internal updates	(3.0)	(3.9)	(6.9)	(5.0)	(11.2)	(0.5)	–	(23.6)
– external updates – regulatory	1.8	–	1.8	2.5	6.3	0.5	0.2	11.3
– CRD IV impact	–	–	–	(0.7)	48.6	0.2	0.1	48.2
– NCOA moving from STD to IRB	4.6	0.3	4.9	1.6	1.8	0.4	7.6	16.3
Total RWA movement	(2.4)	(25.3)	(27.7)	27.8	57.1	(0.4)	6.8	63.6
RWAs at 31 December 2014 on CRD IV basis	56.1	47.3	103.4	217.2	255.6	10.2	12.0	598.4

1 *In the first half of 2015, a portfolio of customers was transferred from CMB to RBWM in Latin America in order to better align the combined banking needs of the customers with our established global businesses. Comparative data have been re-presented accordingly.*

Internal ratings-based approach

For portfolios treated under the IRB approach, credit risk RWAs decreased by $55bn, which included a reduction of $26bn due to foreign exchange movements.

Acquisitions and disposals

- The disposal of US mortgage portfolios reduced RWAs by $4.9bn.
- The sale of securitisation positions in the GB&M legacy credit portfolio resulted in a RWA decrease of $14bn.

Book size

- The book size grew from higher corporate lending, including term and trade-related lending which increased RWAs by $16bn, mainly in Europe and Asia for CMB.
- In North America, in RBWM, continued run-off of the US CML retail mortgage portfolios resulted in an RWA reduction of $5.6bn.

Book quality

- RWAs reduced by $3.7bn in the US run-off portfolio, primarily due to continued run-off which led to an improvement in the book quality of the residual portfolio;
- book quality improvements in the Principal RBWM business of $2.8bn mainly related to credit quality improvements in Europe;
- in CMB, RWAs increased by $6.0bn, primarily as a result of corporate downgrades in Europe;
- in GB&M, a decrease in RWAs of $10bn was mainly due to the implementation of netting agreements to new corporate counterparties in Europe, the securitisation of corporate loans and rating upgrades of institutions in Asia; and
- the downgrade of Brazil's rating increased RWAs by $3.7bn across businesses.

Methodology and policy changes

- RWA initiatives were the main driver for the reduction of RWAs driven by changes in 'internal updates'. Further details are provided on page 21.
- They were offset by the change in RWA calculation on defaulted exposures in RBWM increasing RWAs by $2.0bn, the implementation of a risk-weight floor on mortgages in Hong Kong with an RWA impact of $2.0bn, and the implementation of a 1.06 scaling factor on securitisation positions risk-weighted at 1,250% which increased RWAs by $2.1bn.

Counterparty credit risk RWAs

Table 14: Counterparty credit risk RWAs

	2015 $bn	2014 $bn
Advanced approach	**50.1**	65.5
– CCR IRB approach	**46.8**	62.0
– Credit valuation adjustment	**3.3**	3.5
Standardised approach	**19.1**	25.2
– CCR standardised approach	**4.7**	4.4
– Credit valuation adjustment	**12.2**	18.0
– Central counterparty	**2.2**	2.8
At 31 December	**69.2**	90.7

Table 15: RWA movement by key driver – counterparty credit risk – advanced approach

	2015 $bn	2014 $bn
RWAs at 1 January	**65.5**	42.2
Book size	**(10.2)**	1.6
Book quality	**(0.8)**	(0.6)
Model updates	**–**	0.1
Methodology and policy	**(4.4)**	22.2
– internal updates	**(4.4)**	(3.8)
– external updates – regulatory	**–**	9.0
– CRD IV impact	**–**	17.0
Total RWA movement	**(15.4)**	23.3
RWAs at 31 December	**50.1**	65.5

Counterparty credit risk RWAs reduced by $21bn during 2015.

Standardised approach

A reduction of $6.1bn in RWAs in the standardised portfolio was mostly due to the impact of market movements and position reductions for derivatives held with counterparties eligible for the standardised CVA charge.

Advanced approach

The book size reduced by $10bn, mainly driven by market movements, particularly in foreign exchange derivatives, trade compression and portfolio management activities.

Further reductions in 'Methodology and policy' were mainly driven by savings from RWA initiatives.

Market risk RWAs

Table 16: Market risk RWAs

	2015 $bn	2014 $bn
Internal model based	**34.9**	44.6
– VaR	**7.7**	7.3
– stressed VaR	**9.8**	10.4
– incremental risk charge	**11.4**	20.1
– other VaR and stressed VaR	**6.0**	6.8
Standardised approach	**7.6**	11.4
Year to 31 December	**42.5**	56.0

Table 17: RWA movement by key driver – market risk – internal model based

	2015 $bn	2014 $bn
RWAs at 1 January	**44.6**	52.2
Acquisitions and disposals	**–**	(2.2)
Movement in risk levels	**(5.5)**	(4.2)
Methodology and policy	**(4.2)**	(1.2)
– internal updates	**(4.2)**	(3.8)
– external updates – regulatory	**–**	2.6
Total RWA movement	**(9.7)**	(7.6)
RWAs at 31 December	**34.9**	44.6

Total market risk RWAs decreased by $13bn in 2015.

Standardised approach

The market risk RWAs in the standardised portfolio fell by $3.8bn, mainly driven by the reduction in the legacy credit portfolio.

Internal model based

The reduction in RWAs due to movements in risk levels of $5.5bn was driven by a combination of active management of the book and market movements, in particular within the incremental risk charge. In addition to these movements, there were savings of $4.2bn in 'Methodology and policy' due to the refinement of models used for the calculation of the incremental risk charge and risks not in VaR.

Operational risk RWAs

The reduction in operational risk RWAs of $2.4bn was mainly the result of currency exchange differences and decline of income in Latin America.

Pillar 2 and ICAAP

Pillar 2

The processes of internal capital adequacy assessment and supervisory review, lead to a final determination by the PRA of 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 a 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 set 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, 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;
- exceed 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 which we deem necessary to support the risks to which we are exposed. The economic capital assessment is a more risk-sensitive measure than the regulatory **minimum**, as it covers a wider range of risks 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, non-trading book interest rate risk, insurance risk, pension risk, residual risk and structural foreign exchange risk.

Leverage ratio

Table 18: Summary reconciliation of accounting assets and leverage ratio exposures

Ref[1]		At 31 December 2015 $bn
1	Total assets as per published financial statements	2,410
2	Adjustment for entities which are consolidated for accounting purposes but are outside the scope of regulatory consolidation	112
3	Adjustment for fiduciary assets recognised on the balance sheet pursuant to the applicable accounting framework but excluded from the leverage ratio exposure measure	–
4	Adjustments for derivative financial instruments	(141)
5	Adjustments for securities financing transactions	13
6	Adjustment for off-balance sheet items (i.e. conversion to credit equivalent amounts of off-balance sheet exposures)	401
	(Adjustment for intragroup exposures excluded from the leverage ratio exposure measure)	–
	(Adjustment for exposures excluded from the leverage ratio exposure measure)	–
7	Other adjustments	(1)
8	**Total leverage ratio exposure**	2,794

Table 19: Leverage ratio common disclosure

Ref[1]		At 31 December 2015 $bn
	On-balance sheet exposures (excluding derivatives and SFTs)	
1	On-balance sheet items (excluding derivatives, SFTs and fiduciary assets, but including collateral)	2,104
2	(Asset amounts deducted in determining Tier 1 capital)	(33)
3	**Total on-balance sheet exposures (excluding derivatives, SFTs and fiduciary assets)**	2,071
	Derivative exposures	
4	Replacement cost associated with *all* derivatives transactions (i.e. net of eligible cash variation margin)	31
5	Add-on amounts for PFE associated with *all* derivatives transactions (mark-to-market method)	125
EU-5a	Exposure determined under Original Exposure Method	–
6	Gross-up for derivatives collateral provided where deducted from the balance sheet assets pursuant to the applicable accounting framework	4
7	(Deductions of receivables assets for cash variation margin provided in derivatives transactions)	(31)
8	(Exempted CCP leg of client-cleared trade exposures)	–
9	Adjusted effective notional amount of written credit derivatives	20
10	(Adjusted effective notional offsets and add-on deductions for written credit derivatives)	–
11	**Total derivative exposures**	149
	Securities financing transaction exposures	
12	Gross SFT assets (with no recognition of netting), after adjusting for sales accounting transactions	243
13	(Netted amounts of cash payables and cash receivables of gross SFT assets)	(78)
14	Counterparty credit risk exposure for SFT assets	8
EU-14a	Derogation for SFTs: Counterparty credit risk exposure	–
15	Agent transaction exposures	–
EU-15a	(Exempted CCP leg of client-cleared SFT exposure)	–
16	**Total securities financing transaction exposures**	173
	Other off-balance sheet exposures	
17	Off-balance sheet exposures at gross notional amount	906
18	(Adjustments for conversion to credit equivalent amounts)	(505)
19	**Total off-balance sheet exposures**	401
	Exempted exposures	
EU-19a	(Exemption of intragroup exposures (solo basis))	–
EU-19b	(Exposures exempted)	–
	Capital and total exposures	
20	**Tier 1 capital**	140
21	**Total leverage ratio exposures**	2,794
	Leverage ratios	
22	Leverage ratio	5.0%
	Choice on transitional arrangements and amount of derecognised fiduciary items	
EU-23	Choice on transitional arrangements for the definition of the capital measure	Fully phased in
EU-24	Amount of derecognised fiduciary items	–

Table 20: Leverage ratio – Split of on-balance sheet exposures (excluding derivatives, SFTs and exempted exposures)

Ref[1]		At 31 December 2015 $bn
EU-1	Total on-balance sheet exposures (excluding derivatives, SFTs, and exempted exposures)	
	of which:	2,104
EU-2	Trading book exposures	225
EU-3	Banking book exposures	
	of which:	1,879
EU-4	– covered bonds	1
EU-5	– exposures treated as sovereigns	521
EU-6	– exposures to regional governments, MDB, international organisations and PSE NOT treated as sovereigns	1
EU-7	– institutions	129
EU-8	– secured by mortgages of immovable properties	292
EU-9	– retail exposures	113
EU-10	– corporate	677
EU-11	– exposures in default	15
EU-12	– other exposures (e.g. equity, securitisations, and other non-credit obligation assets)	130

1 *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.*

Leverage ratio: disclosure on qualitative items:

- The leverage exposure measure is calculated on a regional and global business basis each month and presented to Group ALCO, which monitors the risk of excessive leverage.
- The increase in the leverage ratio to 5.0% (2014: 4.8%) was mainly as a result of the reduction in the size of the balance sheet.

Further details can be found on page 30.

Regulatory developments

The regulatory capital requirements comprise a Pillar 1 minimum, the ICG set by the PRA in the form of Pillar 2A, a number of capital buffers established by CRD IV and any PRA buffer that the PRA may set in addition to ICG.

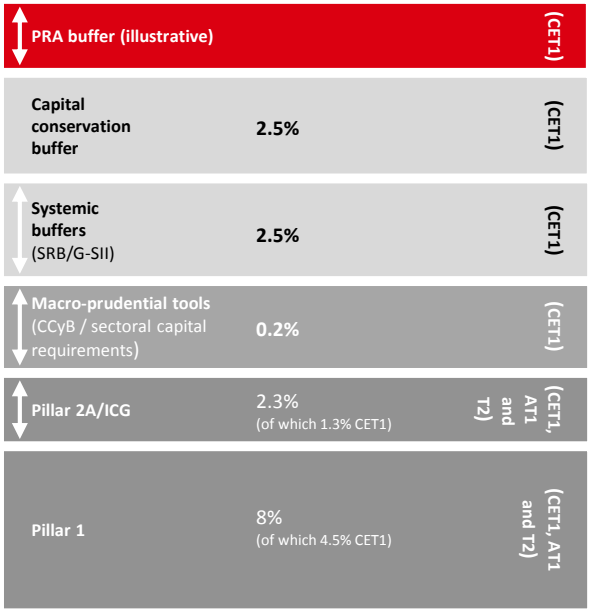
The Pillar 1 minimum ratio and the CCB rates are certain. The macro-prudential tools, Pillar 2A, the PRA buffer and the systemic buffers are time-varying elements. This uncertainty is reflected in the regulatory and management buffer we have included in the 12% to 13% CET1 range that is used to model our medium-term target for return on equity of more than 10% by 2017. This buffer is currently in the range of 1% to 2%.

In December 2015, the FPC published its end point view of the calibration of the capital framework as applicable to UK banks. This set out the FPC's final expectations in relation to the levels of capital across the industry, while specific requirements for individual banks will vary at the PRA's determination. These expectations do not include time-varying additional requirements such as the CCyB and are based on the assumption that existing deficiencies in the definition and measurement of RWAs under Pillar 1 requirements will be addressed over time. These deficiencies in Pillar 1 are currently compensated through additional Pillar 2 requirements. The FPC stated its expectation that by 2019, once such deficiencies were corrected, Pillar 2A requirements would reduce.

In addition to the above, consideration of the finalised FSB proposals in relation to TLAC requirements, and the UK implementation of the EU minimum requirement for own funds and eligible liabilities will also be required.

Based on the known and quantifiable requirements to date, including the announced CCyB rates and current ICG, the overall capital requirements applicable to the Group on an end-point basis (at 1 January 2019) are presented in the table below.

Capital requirements framework (end point)



CRD IV capital buffers

CRD IV established a number of capital buffers, to be met with CET1 capital, broadly aligned with the Basel III framework. In the UK, with the exception of the CCyB which applied with immediate effect, CRD IV capital buffers are being phased in from 1 January 2016.

Automatic restrictions on capital distributions apply if a bank's CET1 capital falls below the level of its CRD IV combined buffer. The CRD IV combined buffer is defined as the total of the CCB, the CCyB, the G-SII's buffer and the SRB, as these become applicable.

At 31 December 2015, the applicable CCyB rates in force were 1% set by Norway and Sweden. Relevant credit exposures located in Norway and Sweden were $2.4bn and $1.5bn, respectively. At 31 December 2015, this resulted in an immaterial Group institution-specific CCyB requirement.

The HKMA CCyB rate of 0.625% was implemented on 27 January 2016 in respect of Hong Kong exposures, following communication from the FPC. The impact of the HKMA CCyB rate on our Group institution-specific CCyB rate is expected to be 7bps (based on RWAs at 31 December 2015).

The CCyB rates introduced by Norway and Sweden will increase to 1.5% from June 2016. In January 2016, the HKMA also announced that the CCyB rate applied to exposures in Hong Kong will be increased to 1.25% from 1 January 2017.

In December 2015, the FPC maintained a 0% CCyB rate for UK exposures. At the same time, the FPC published the final calibration of the capital framework for UK banks. Within this, the FPC indicated that going forward it would apply a more active use of the CCyB and stated that it intends to publish a revised policy statement on the use of the CCyB in March 2016. The FPC also noted that it expects to set a countercyclical buffer rate for UK exposures in the region of 1%, when risks are judged to be neither subdued nor elevated. The CCyB rate will be informed by the annual UK concurrent stress test of major UK banks. If a rate change is introduced it is expected to come into effect 12 months later.

In December 2015, the PRA confirmed our applicable G-SII buffer as 2.5%. The G-SII buffer together with the CCB of 2.5%, came into effect on 1 January 2016. These are being phased in until 2019 in increments of 25% of the end point buffer requirement. Therefore, as of 1 January 2016, the requirement for each buffer is 0.625% of RWAs.

Alongside CRD IV requirements, since 2014, the PRA has expected major UK banks and building societies to meet a 7% CET1 ratio using the CRD IV end point definition. At 1 January 2016, with the introduction of the G-SII buffer and the CCB, our minimum CET1 capital requirements and combined buffer requirement taken together amount to 7.1% (based on RWAs at 31 December 2015), effectively superseding the previous PRA guidance on the CET1 ratio.

In January 2016, the FPC published a consultation on its proposed framework for the SRB. It is proposed that it will apply to ring-fenced banks and large building societies and will be implemented from 1 January 2019. The buffer to be applied to HSBC's ring-fenced bank has yet to be determined.

Pillar 2 and the 'PRA buffer'

The Pillar 2 framework requires banks to hold capital in respect of risks not captured in the Pillar 1 framework and to assess risks which banks may become exposed to over a forward-looking planning horizon. The PRA's assessment results in the determination of ICG/Pillar 2A and Pillar 2B, respectively.

Pillar 2A was previously required to be met by total capital but, since 1 January 2015, must be met with at least 56% CET1. Furthermore, the PRA expects firms not to meet the CRD IV buffers with any CET1 required to meet its ICG.

The Pillar 2A requirement is a point in time assessment of the amount of capital the PRA considers that a bank should hold to meet the overall financial adequacy rule. It is therefore subject to change as part of the PRA's supervisory review process. In November 2015, our Pillar 2A requirement was set at 2.3% of RWAs, of which 1.3% of RWAs is met by CET1.

In July 2015, the PRA published a final policy statement PS17/15, setting out amendments to the PRA Rulebook and Supervisory Statements in relation to the Pillar 2 framework. The revised framework became effective on 1 January 2016. The PRA's Statement of Policy sets out the methodologies that it will use to inform its setting of firms' Pillar 2 capital requirements, including new approaches for determining Pillar 2 requirements for credit risk, operational risk, credit concentration risk and pension obligation risk.

In parallel, in July 2015, the PRA also issued its supervisory statement SS31/15 in which it introduced a PRA buffer to replace the capital planning buffer determined under Pillar 2B from 1 January 2016. This is to be met in the form of CET1 capital.

The statement sets out that the PRA buffer is intended to avoid duplication with CRD IV buffers and will be set for a particular firm depending on its vulnerability in a stress scenario. In order to address significant weaknesses in risk management and governance, a scalar may be applied to firms' CET1 Pillar 1 and Pillar 2A capital requirements. This will also form part of the PRA Buffer.

Where the PRA considers there is overlap between the CRD IV buffers and the PRA buffer assessment, the PRA buffer will be set as the excess capital required over and above the CRD IV combined buffer. From 1 January 2016, the CCB and the systemic buffers are permitted to offset against the PRA buffer with the exception of any risk management and governance scalar where applicable. The use of the PRA buffer will not result in automatic restrictions to distributions.

Regulatory stress testing

The Group is subject to supervisory stress testing in many jurisdictions. These requirements are increasing in frequency and granularity. As such, stress testing represents a key focus for the Group.

The Bank of England published the results of the 2015 UK stress test in December 2015 confirming that these tests did not reveal any capital inadequacies for HSBC. At the European level, the EBA did not undertake a stress testing exercise in 2015 but instead carried out a transparency exercise, the results of which were published in November 2015.

In July 2015, the EBA also disclosed a timeline for the 2016 EU wide stress test exercise. The EBA expects to publish the 2016 stress test scenario and methodology in the first quarter of 2016, with results published in the third quarter of 2016.

In October 2015, the Bank of England published its approach to stress testing in the UK. This set out that the outcome of the UK stress testing exercise will be considered by the FPC when determining the UK CCyB rate, and will also inform the PRA buffer. Furthermore, from 2016, the applicable hurdle rate, which is the amount of capital that banks are expected to maintain under a stress, is to include Pillar 1, Pillar 2A and G-SII buffer requirements.

RWA developments

Throughout 2015, UK, EU and international regulators issued a series of consultations designed to revise the various components of the RWA regime and increase related reporting and disclosures. In particular, the Basel Committee published proposals relating to certain Pillar 1 risk types to update standardised, non-modelled approaches for calculating capital requirements. Details of the most significant consultations are set out below.

In December 2015, the Basel Committee published its second consultation paper on a revised standardised approach for credit risk. This included proposals to reintroduce external credit ratings, moderated by internal due diligence, as the basis for calculating risk weights for banks and corporates. The risk weights for other assets are to be determined by a variety of treatments tailored for each exposure class, which are designed to increase risk sensitivity and comparability.

In January 2016, the Basel Committee published the final rules arising from the Fundamental Review of the Trading Book, with implementation planned for 2019. The new regime includes amendments to the trading book boundary and new market risk capital calculations for both the modelled and standardised approaches. The Basel Committee acknowledges that there is considerable ongoing work which could require further revisions to the framework.

The final changes to the CVA capital charge are expected to be published in 2016. Following the finalisation of the CVA capital regime, the EU is expected to review the exemptions to the CVA charge currently applied to corporates, sovereigns and intragroup exposures. In the interim, the EU has consulted upon a methodology for calculating a Pillar 2 charge for excessive CVA risk resulting from exempted transactions.

The revised consultations for standardised operational risk and the design and calibration of a capital floor based on the standardised approaches, are expected by the end of 2016.

All of the Basel Committee's consultations will need to be transposed into EU law before coming into effect. This includes the finalised changes that relate to the counterparty risk and securitisation regimes.

UK leverage ratio framework

Following consultations in 2014, secondary legislation came into force in April 2015 to provide the FPC with direction powers in relation to the UK leverage ratio framework. In July 2015, the FPC published its final policy statement setting out its intention to use its new powers of direction. As a result the PRA issued a consultation paper to introduce requirements for the UK leverage ratio framework. This established a minimum tier 1 leverage ratio of 3%, an additional leverage ratio buffer for G-SIIs and a countercyclical leverage ratio buffer, and was implemented on 1 January 2016. The additional leverage ratio buffer and countercyclical leverage ratio buffer are to be met entirely with CET1 capital and will be set at 35% of the relevant buffers in the risk-weighted capital framework. At 1 January 2016, our minimum leverage ratio requirement of 3% was supplemented with an additional leverage ratio buffer of 0.2% and a countercyclical leverage ratio buffer which rounds to 0%. We comfortably exceed these leverage requirements.

It is anticipated that a minimum leverage ratio requirement, including potential buffers for G-SIBs, will be consulted upon by the Basel Committee in 2016 and a formal Pillar 1 measure finalised by 1 January 2018.

Total loss absorbing capacity proposals

As part of Recovery and Resolution frameworks both in the EU and internationally, there have been various developments in relation to TLAC. In the EU, the Bank Recovery and Resolution Directive introduces an MREL.

In July 2015, the EBA published a final draft RTS for MREL which seeks to provide additional clarity on the criteria that resolution authorities should take into account when setting a firm specific MREL requirement. The EBA notes that it aims to implement the MREL in a way which is consistent with the finalised international standard on TLAC.

In November 2015, the FSB published finalised proposals on TLAC for G-SIBs to be applied in accordance with individual bank resolution strategies. This set out a requirement of 16% of RWAs and a TLAC leverage ratio of 6% to be met from 1 January 2019, increasing to 18% and a 6.75% respectively, from 1 January 2022. Existing regulatory capital buffers will need to be met in addition to the minimum TLAC requirement. A breach of TLAC will be treated as severely as a breach of minimum capital requirements.

In November 2015, the Basel Committee also published a consultation on the treatment of banks' holdings of TLAC instruments issued by a G-SIB, which proposed new deductions from regulatory capital. Once finalised, any additional requirements in relation to TLAC are expected to be reflected in MREL and to be implemented in the UK.

In December 2015, the Bank of England published a consultation paper on the UK's implementation of MREL. The Bank of England stated that it intends to set MREL consistent with both TLAC and the final EBA RTS expected to be published later this year. The MREL is expected to comprise a loss absorption amount which reflects existing regulatory capital requirements and a recapitalisation amount which reflects the capital that a firm is likely to need post resolution. The latter can be met with both regulatory capital and eligible liabilities.

While MREL is to be set on an individual basis, the Bank of England generally expects MREL for banks whose appropriate resolution strategy is bail-in, to be equivalent to twice the current minimum capital requirements. A

finalised Statement of Policy is expected by mid-2016. The Bank of England is also expected to provide firms with an indication of their prospective 2020 MREL during 2016, and will set MREL on a transitional basis until then. For G-SIBs, MREL is proposed to apply from 2019, consistent with FSB timelines.

In parallel to the above, the PRA separately published a consultation paper on the interaction between MREL and capital buffers and how it would treat a breach of MREL requirements. This proposed that banks should not be able to meet MREL requirements with CET1 used to meet existing capital and leverage ratio buffers.

Structural reform and recovery and resolution planning

Globally there have been a number of developments relating to banking structural reform and the introduction of recovery and resolution regimes. As part of recovery and resolution planning, some regulators and national authorities have also required changes to the corporate structures of banks. These include requiring the local incorporation of banks or ring-fencing of certain businesses.

In 2013 and 2014, UK legislation was enacted requiring large banking groups to ring-fence UK retail and SME banking activity in a separately incorporated banking subsidiary (a 'ring-fenced bank') that is prohibited from engaging in significant trading activity. Ring-fencing is to be completed by 1 January 2019. The legislation also detailed the applicable individual customers to be transferred to the ring-fenced bank. In addition, the legislation places restrictions on the activities and geographical scope of ring-fenced banks. Throughout 2015, the PRA published a number of consultations on the implementation of ring-fencing requirements and the finalisation of rules is expected to continue in 2016.

The key proposals included near final rules published in May 2015 on legal structure, corporate governance, and continuity of services and facilities. Additionally, in October 2015 the PRA issued a consultation on the application of capital and liquidity rules for ring-fenced banks, management of intra-group exposures, and use of financial market infrastructures.

The PRA intends to undertake a further consultation in 2016 in respect of reporting and disclosure, and publish finalised rules and supervisory statements thereafter, with implementation by 1 January 2019.

We are working with our primary regulators to develop and agree a resolution strategy for HSBC. It is our view that a strategy by which the Group breaks up at a subsidiary bank level at the point of resolution (referred to as a Multiple Point of Entry) is the optimal approach, as it is aligned to our existing legal and business structure. Similarly to all G-SIBs, we are working with our regulators to mitigate or remove critical inter-dependencies between our subsidiaries to further facilitate the resolution of the Group. In particular, in order to remove operational dependencies (where one subsidiary bank provides critical services to another), we are in the process of transferring critical services from our subsidiary banks to a separate internal group of service companies.

During 2015, more than 18,000 employees performing shared services in the UK were transferred to the service companies. Further transfers of employees, critical shared services and assets in the UK, Hong Kong and other jurisdictions will occur in due course.

Risk management

Overview

All our activities involve, to varying degrees, the measurement, evaluation, acceptance and management of risk or a combination of risks, which we assess on a Group-wide basis. Our risk management framework, employed at all levels of the organisation, ensures that our risk profile remains conservative and aligned to our risk appetite and strategy by fostering continuous monitoring of the risk environment and an integrated evaluation of risks and their interactions. It also ensures that we have a robust and consistent approach to risk management at all levels of the organisation and across all risk types.

Risk management is embedded through:

- a strong risk culture, with personal accountability for decisions;
- a formal risk governance framework, with clear and well understood risk ownership, standards and policies;
- the alignment of risk and business objectives, with integration of risk appetite into business planning and capital management;
- the alignment of remuneration with our risk framework and risk outcomes; and
- an independent, expert global risk function ('Global Risk').

Our approach to risk management, including risk appetite, is set out on page 42 of the *Annual Report and Accounts 2015*.

Risk culture

HSBC has long recognised the importance of a strong risk culture, the fostering of which is a key responsibility of senior executives. It is reinforced by HSBC Values and our Global Standards. Our risk management framework is underpinned by our risk culture which is instrumental in aligning the behaviours of individuals with the Group's risk profile and our attitude to assuming and managing risk.

The risk culture is reinforced by our approach to remuneration. Individual awards, including those for executives, are based on compliance with HSBC Values and the achievement of financial and non-financial objectives which are aligned to our risk appetite and strategy. For further information on risk and remuneration, see page 285 of the *Annual Report and Accounts 2015*.

Risk governance and risk appetite

Our strong risk governance reflects the importance placed by the Board and the GRC on shaping the Group's risk strategy and managing risks effectively. The activities of the GRC are discussed further on page 266 of the *Annual Report and Accounts 2015.*

Strong risk governance is supported by:

- a clear policy framework of risk ownership;
- a globally consistent risk appetite framework through which the types and quantum of risk that we are prepared to accept in executing our strategy are articulated and monitored;
- performance scorecards cascaded from the GMB that align business and risk objectives; and
- the accountability of all staff for identifying, assessing and managing risks in accordance with the three lines of defence model.

This personal accountability, reinforced by the governance structure, documented standards, policy and procedures, and experience and mandatory learning, helps to foster a disciplined and constructive culture of risk management and control throughout HSBC.

Our risk management framework is described on page 101 of the *Annual Report and Accounts 2015*. The executive and non-executive risk governance structures for the management of risk are set out on page 193 of the *Annual Report and Accounts 2015.*

Information on directorships held by Board members, their skills and experience is set out in their biographies from page 249 of the *Annual Report and Accounts 2015*. Information on board recruitment and diversity policies is set out from page 256 of the *Annual Report and Accounts 2015*.

Risk appetite is a key component in our management of risk. It describes the types and quantum of risks that we are willing to accept in achieving our medium to long-term strategic objectives. Within HSBC, risk appetite is managed through the Global Risk Appetite Framework and articulated in a risk appetite statement, which is annually approved by the Board on the advice of the GRC.

The risk appetite statement guides the annual planning process by defining the desired forward looking risk profile of the Group in achieving our strategic objectives and plays an important role in our six filters process. Our risk appetite may be revised in response to our assessment of the top and emerging risks we have identified and the stressed view of our business plan.

Diversification is an important aspect of our management of risk. The diversification of our lending portfolio across global businesses and regions, together with our broad range of products, ensures that we are not overly dependent on a limited number of countries or markets to generate income and growth.

Global Risk

Global Risk, headed by the GRCO, is responsible for enterprise-wide risk oversight including the establishment of global policy, the monitoring of risk profiles, and forward looking risk identification and management. Global Risk also has functional responsibility for risk management in support of HSBC's global businesses and regions through an integrated network of Risk sub-functions which are independent from the sales and trading functions of our businesses. This independence ensures the necessary balance in risk/return decisions.

Global Risk:

- forms part of the second line of defence, with responsibility for setting policy and for providing oversight and challenge of the activities conducted by the first line;
- supports our global businesses, regions, countries and global functions in the development and achievement of strategic objectives;
- fosters development of a conservative but constructive Group risk culture;
- works with global businesses, regions and global functions in the setting and monitoring of risk appetite;
- carries out central approvals, controls, risk systems design and the analysis and reporting of management information;
- addresses risk issues in dealings with external stakeholders including regulators and analysts;
- is jointly responsible with Global Finance for the delivery of enterprise-wide stress testing; and
- in addition to 'business as usual' operations, engages with business development activities such as new product approval and post-implementation review, and acquisition due diligence.

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 nature and extent of the significant risks they are willing to take in achieving the Group's strategic objectives. On behalf of the Board, the GAC has responsibility for oversight of risk management and internal controls over financial reporting, and the GRC has responsibility for oversight of risk management and internal controls other than over financial reporting, including enterprise-wide stress testing.

HSBC's key risk management and internal control procedures are described on page 275 of the *Annual Report and Accounts 2015,* where the Directors' Report on the effectiveness of internal controls can also be found.

Annually, the Directors, through the GRC and the GAC, conduct a review of the effectiveness of our system of risk management and internal control covering all material controls, including financial, operational and compliance controls, risk management systems, the adequacy of resources, qualifications and experience of staff of the accounting and financial reporting function and the risk function, and their training programmes and budget. The review does not extend to joint ventures or associates.

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.

Risk measurement and reporting systems

The purpose of our risk measurement and reporting systems is to ensure that, as far as possible, 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 way 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 that they are functioning properly. Risk information technology 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 enable 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, monitoring 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

Global Risk 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 MOC. Global MOC is supported by specific global functional MOCs for wholesale credit risk ('Wholesale MOC') and market risk ('Markets MOC') and RBWM, and has regional and entity-level counterparts with comparable terms of reference. The Global MOC meets bi-monthly and reports to RMM. It is chaired by the Risk function, and its membership is drawn from Risk, Finance and global businesses. Its primary responsibilities are to 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 wholesale, markets and RBWM 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.

The development and use of data and models to meet local requirements are the responsibility of regional and/or local entities under the governance of their own management, subject to overall Group policy and oversight.

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 at the highest level. For this, 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 Security and Fraud Risk on the enhancement of protection against retail product fraud, 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 195 of the Annual Report and Accounts 2015.

Group-wide, the credit risk functions comprise a network of credit risk management offices reporting within regional, integrated 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, not committee structures. 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, and for monitoring and controlling all credit risks in those portfolios in accordance with Group standards. Above these thresholds of delegated personal credit limited approval authorities, approval or concurrence must be sought from the regional and, as appropriate, global credit risk function before facilities are advised to the customer.

Moreover, 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. Each major subsidiary typically has some exposures across this range, and requirements may differ according to the jurisdictions in which it operates.

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 46.

Whatever the nature of the exposure, 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, informing judgemental decisions for which individual approvers are ultimately accountable.

In the case of automated decision-making processes, as used in retail credit origination where risk decisions may be taken 'at the point of sale' with no management intervention, that accountability rests with those responsible for the parameters built into those processes/systems and the governance and controls surrounding their use.

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, and any consequent amendments to risk ratings must be promptly implemented.

We constantly seek to improve the quality of our risk management. For central management and reporting purposes, Group IT systems are deployed to process credit risk data. A central database is used which covers substantially all of our direct lending exposures and holds the output of risk rating systems Group-wide. This continues to be enhanced in order to deliver both comprehensive management information in support of business strategy and solutions to evolving regulatory reporting requirements. The latter continue to present major challenges in view of the number and scope of concurrent initiatives, requiring more frequent and faster provision of regulatory, risk and financial data at an increasingly granular level. Given the global nature of

our business we typically need to generate this granular information both at local and Group level, but often in materially different ways. The new stress testing and G-SIB reporting requirements are prime examples of significant data requirements and related processes that are in the process of being embedded into existing or enhanced systems architecture at various levels in the Group.

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 66.

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 46, 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 EBA and the Bank of England.

The global functional MOCs are responsible for defining the thresholds above which models require their approval, supporting both internal governance and the PRA approval process, for example if they cover exposures generating credit risk capital requirements exceeding a prescribed threshold or are otherwise deemed material on grounds of risk, portfolio size, or business type.

Wholesale MOC requires all credit risk models for which it is responsible to be approved by delegated senior managers with notification to the committee which retains the responsibility for oversight. RBWM MOC applies different thresholds for approval at the committee depending on model type. For models falling below these thresholds final approval is delegated to regional committees or Regional Heads of RBWM Risk. Where approval has been delegated the RBWM MOC is kept notified of any material model decisions and issues.

The RBWM MOC model materiality thresholds are:

- all new IRB models as part of the IRB roll-out from standardised to advanced approach;
- existing IRB models exceeding, or estimated to exceed, $2bn in RWAs;
- all significant changes to approved IRB models which will require notification to the PRA prior to implementation;
- stress testing models being used in portfolios with EAD exceeding $20bn for secured lending and $5bn for unsecured lending;
- application models with annual proposed value of new business sourced through the model exceeding $2bn for secured lending and $0.5bn for unsecured lending;
- behavioural models that are used to inform globally material IRB or provisioning models; and
- provisioning models (IAS 39 and IFRS 9) used in portfolios with loan impairment charges exceeding $100m or EAD exceeding $20bn for secured lending and $5bn for unsecured lending.

Global Risk utilises HSBC standards for the development, validation, independent review, approval, implementation and performance monitoring of credit risk rating models, and oversight of respective local standards for local models. All models are reviewed as frequently as the need arises, but at least annually.

Compliance with Group standards is subject to examination both by Risk oversight and review from within the Risk function itself, and by Internal Audit. While the standards set out minimum general requirements, Global Risk has discretion to approve dispensations on an exceptional basis, and fosters best practice between offices.

The following tables set out credit risk exposure values, RWAs and regulatory capital requirements calculated at 8% of RWAs. Table 22 presents exposure values analysed across geographical regions and tables 23 and 24, respectively, RWAs and RWA density by geographical region. Exposure values are allocated to a region based on the country of incorporation of the HSBC subsidiary or associate where the exposure was originated. In table 25, allocation to industry sectors is based on the Standard Industrial Classification codes. Table 26 shows exposures by period outstanding from the reporting date to the maturity date. The full exposure value is allocated to a residual maturity band based on the contractual end date.

In these tables, and in others in the Credit Risk section of this document unless stated otherwise, the data is presented according to a 'guarantor view', i.e. assigning exposures to the exposure class of the protection provider where applicable. This is to align our disclosure with our supervisory reporting.

Table 21: Credit risk – summary

	Exposure value $bn	Average exposure value[4] $bn	RWAs $bn	Capital required $bn
IRB advanced approach	**1,510.8**	**1,564.0**	**515.8**	**41.3**
Retail:				
– 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**
– total retail	**404.5**	**412.4**	**93.2**	**7.4**
– 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**
– securitisation positions	**40.9**	**36.6**	**28.4**	**2.3**
– 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 December 2015	**2,146.5**	**2,192.5**	**875.9**	**70.1**
IRB advanced approach	1,593.8	1,679.5	581.6	46.5
Retail:				
– secured by mortgages on immovable property SME	3.1	2.6	0.6	–
– secured by mortgages on immovable property non-SME	288.9	302.8	71.6	5.7
– qualifying revolving retail	66.2	66.6	15.3	1.2
– other SME	13.9	15.9	6.2	0.5
– other non-SME	47.3	46.8	12.4	1.0
– total retail	419.4	434.7	106.1	8.4
– central governments and central banks	327.4	332.1	54.1	4.3
– institutions	130.4	139.0	38.7	3.1
– corporates[1]	625.8	675.0	328.5	26.3
– securitisation positions	38.3	42.4	40.7	3.3
– non-credit obligation assets	52.5	56.3	13.5	1.1
IRB foundation approach	25.8	24.7	16.8	1.3
– central governments and central banks	0.1	0.1	–	–
– institutions	0.1	–	–	–
– corporates	25.6	24.6	16.8	1.3
Standardised approach	590.5	606.5	356.9	28.6
– central governments and central banks	189.3	207.7	19.7	1.6
– institutions	30.1	34.2	11.2	0.9
– corporates	240.1	235.3	224.7	18.0
– retail	47.9	46.6	35.2	2.8
– secured by mortgages on immovable property	38.6	42.0	13.8	1.1
– exposures in default	4.7	5.6	6.1	0.5
– regional governments or local authorities	1.1	1.1	0.6	–
– equity[2]	13.2	5.8	26.9	2.2
– other[3]	25.5	28.2	18.7	1.5
At 31 December 2014	2,210.1	2,310.7	955.3	76.4

1 *Corporates includes specialised lending exposures subject to supervisory slotting approach of $24.9bn (2014: $30.5bn) and RWAs of $18.2bn (2014: $23.0bn).*
2 *This includes investment in Insurance companies which are risk weighted at 250%.*
3 *In 2014, this included the exposure class 'Other items' with an exposure value of $17.0bn, average exposure value of $19.7bn and RWAs of $11.3bn as well as other less material standardised exposure classes not individually shown above. In 2015, all exposure classes are disclosed separately.*
4 *Average exposures are calculated by aggregating exposure value of the last five quarters and dividing by five to get the average.*

Table 22: Credit risk exposure – by region

	Exposure value						
	Europe $bn	Asia $bn	MENA $bn	North America $bn	Latin America $bn	Total $bn	RWAs $bn
IRB advanced approach	**543.7**	**659.5**	**23.7**	**261.4**	**22.5**	**1,510.8**	**515.8**
Retail:							
– secured by mortgages on immovable property SME	**2.0**	**0.6**	**–**	**0.3**	**–**	**2.9**	**0.6**
– secured by mortgages on immovable property non-SME	**136.7**	**88.6**	**–**	**50.1**	**–**	**275.4**	**60.0**
– qualifying revolving retail	**33.2**	**30.6**	**–**	**4.0**	**–**	**67.8**	**15.3**
– other SME	**11.6**	**0.1**	**–**	**0.4**	**–**	**12.1**	**5.8**
– other non-SME	**34.3**	**6.5**	**–**	**5.5**	**–**	**46.3**	**11.5**
– total retail	**217.8**	**126.4**	**–**	**60.3**	**–**	**404.5**	**93.2**
– central governments and central banks	**38.7**	**189.3**	**15.9**	**66.1**	**17.4**	**327.4**	**49.4**
– institutions	**26.2**	**52.4**	**0.9**	**9.0**	**2.0**	**90.5**	**18.4**
– corporates [1]	**215.4**	**254.4**	**6.1**	**120.8**	**0.6**	**597.3**	**314.3**
– securitisation positions	**36.9**	**0.3**	**–**	**3.7**	**–**	**40.9**	**28.4**
– non-credit obligation assets	**8.7**	**36.7**	**0.8**	**1.5**	**2.5**	**50.2**	**12.1**
IRB foundation approach	**27.7**	**–**	**16.0**	**–**	**–**	**43.7**	**27.4**
– central governments and central banks	**–**	**–**	**0.1**	**–**	**–**	**0.1**	**–**
– institutions	**–**	**–**	**0.3**	**–**	**–**	**0.3**	**0.2**
– corporates	**27.7**	**–**	**15.6**	**–**	**–**	**43.3**	**27.2**
Standardised approach	**172.0**	**302.0**	**43.6**	**30.8**	**43.6**	**592.0**	**332.7**
– central governments and central banks	**121.8**	**65.9**	**4.8**	**5.3**	**2.1**	**199.9**	**20.0**
– institutions	**0.2**	**36.6**	**2.0**	**0.1**	**–**	**38.9**	**14.7**
– corporates	**27.2**	**132.2**	**23.8**	**18.6**	**24.6**	**226.4**	**210.6**
– retail	**4.9**	**21.6**	**6.1**	**1.7**	**9.9**	**44.2**	**32.5**
– secured by mortgages on immovable property	**5.7**	**27.3**	**3.0**	**1.0**	**3.3**	**40.3**	**14.4**
– exposures in default	**1.2**	**0.4**	**0.9**	**0.8**	**1.6**	**4.9**	**6.4**
– regional governments or local authorities	**–**	**–**	**2.1**	**–**	**0.7**	**2.8**	**1.0**
– equity [2]	**2.0**	**2.8**	**0.2**	**1.5**	**0.5**	**7.0**	**12.2**
– items associated with particularly high risk	**2.7**	**–**	**0.1**	**1.0**	**0.6**	**4.4**	**6.6**
– securitisation positions	**–**	**0.7**	**–**	**–**	**–**	**0.7**	**0.7**
– claims in the form of CIU	**0.3**	**–**	**0.2**	**–**	**–**	**0.5**	**0.5**
– international organisations	**2.6**	**–**	**–**	**–**	**–**	**2.6**	**–**
– other items	**3.4**	**14.5**	**0.4**	**0.8**	**0.3**	**19.4**	**13.1**
At 31 December 2015	**743.4**	**961.5**	**83.3**	**292.2**	**66.1**	**2,146.5**	**875.9**
IRB advanced approach	592.6	649.7	29.3	292.5	29.7	1,593.8	581.6
Retail:							
– secured by mortgages on immovable property SME	2.4	0.7	–	–	–	3.1	0.6
– secured by mortgages on immovable property non-SME	144.1	88.2	–	56.6	–	288.9	71.6
– qualifying revolving retail	34.9	27.3	–	4.0	–	66.2	15.3
– other SME	13.2	0.1	–	0.6	–	13.9	6.2
– other non-SME	34.6	6.0	–	6.7	–	47.3	12.4
– total retail	229.2	122.3	–	67.9	–	419.4	106.1
– central governments and central banks	37.4	166.0	19.3	81.4	23.3	327.4	54.1
– institutions	32.8	74.0	8.8	11.7	3.1	130.4	38.7
– corporates [1]	247.7	250.8	0.4	126.9	–	625.8	328.5
– securitisation positions	34.9	0.4	–	3.0	–	38.3	40.7
– non-credit obligation assets	10.6	36.2	0.8	1.6	3.3	52.5	13.5
IRB foundation approach	19.2	–	6.6	–	–	25.8	16.8
– central governments and central banks	–	–	0.1	–	–	0.1	–
– institutions	0.1	–	–	–	–	0.1	–
– corporates	19.1	–	6.5	–	–	25.6	16.8
Standardised approach	177.6	279.0	49.1	27.5	57.3	590.5	356.9
– central governments and central banks	127.0	50.3	4.9	5.2	1.9	189.3	19.7
– institutions	0.2	28.6	1.3	–	–	30.1	11.2
– corporates	25.8	132.9	31.6	15.2	34.6	240.1	224.7
– retail	5.8	22.2	5.7	1.9	12.3	47.9	35.2
– secured by mortgages on immovable property	5.9	24.1	3.1	1.0	4.5	38.6	13.8
– exposures in default	1.1	0.3	1.2	0.6	1.5	4.7	6.1
– regional governments or local authorities	–	–	0.3	–	0.8	1.1	0.6
– equity [2]	2.4	8.1	0.2	1.9	0.6	13.2	26.9
– other [3]	9.4	12.5	0.8	1.7	1.1	25.5	18.7
At 31 December 2014	789.4	928.7	85.0	320.0	87.0	2,210.1	955.3

For footnotes, see page 36.

Key points

- The total Credit risk exposure value has decreased by $63.6bn over the year. Overall foreign exchange movements have decreased exposure value by $110.3bn across approaches.
- Exposures in Retail secured by mortgages on immovable property non-SME have reduced under the IRB advanced approach. The movement on a constant currency basis across approaches is insignificant, there are offsetting movements between Asia and North America. There is continued growth in mortgage lending within Asia, offset by a decrease in North America due to continued US run-offs and disposals in the US CML portfolio.
- In Asia, exposures to institutions decreased as a result of reduced balances with correspondent banks, money market term placements and debt securities.
- A change in EEA equivalence rules resulted in a reclassification of some exposures from institutions to corporates.
- Corporate exposures have decreased under both the IRB advanced and standardised approaches due to foreign exchange movements. This is offset by an increase largely from growth in term lending to corporate customers within Asia.
- Standardised institution exposures increase is mainly driven by BoCom resulting from growth in treasury bills, other eligible bills and debt securities.
- Equity exposures under the standardised approach decreased in Asia as a result of the partial sale of our investment in Industrial Bank.

Table 23: Credit risk – RWAs by region

	RWAs					
	Europe $bn	Asia $bn	MENA $bn	North America $bn	Latin America $bn	Total $bn
IRB advanced approach	**175.1**	**195.9**	**9.5**	**122.5**	**12.8**	**515.8**
Retail:						
– 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**
– total retail	**25.2**	**21.8**	**–**	**46.2**	**–**	**93.2**
– central governments and central banks	**5.2**	**19.2**	**6.9**	**8.5**	**9.6**	**49.4**
– institutions	**4.8**	**9.0**	**0.2**	**2.5**	**1.9**	**18.4**
– corporates[1]	**107.7**	**140.4**	**2.1**	**63.8**	**0.3**	**314.3**
– securitisation positions	**27.9**	**0.1**	**–**	**0.4**	**–**	**28.4**
– non-credit obligation assets	**4.3**	**5.4**	**0.3**	**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	**46.8**	**177.7**	**32.0**	**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	**27.0**	**117.9**	**22.4**	**18.3**	**25.0**	**210.6**
– retail	**3.5**	**16.2**	**4.5**	**1.2**	**7.1**	**32.5**
– secured by mortgages on immovable property	**2.2**	**9.5**	**1.1**	**0.4**	**1.2**	**14.4**
– exposures in default	**1.5**	**0.5**	**1.2**	**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 December 2015	**239.4**	**373.6**	**51.4**	**156.4**	**55.1**	**875.9**

	RWAs					
	Europe $bn	Asia $bn	MENA $bn	North America $bn	Latin America $bn	Total $bn
IRB advanced approach	203.3	213.1	11.6	142.0	11.6	581.6
Retail:						
– secured by mortgages on immovable property SME	0.6	–	–	–	–	0.6
– secured by mortgages on immovable property non-SME	8.0	9.3	–	54.3	–	71.6
– qualifying revolving retail	6.9	7.1	–	1.3	–	15.3
– other SME	5.9	–	–	0.3	–	6.2
– other non-SME	5.7	1.3	–	5.4	–	12.4
– total retail	27.1	17.7	–	61.3	–	106.1
– central governments and central banks	5.8	23.4	8.9	7.9	8.1	54.1
– institutions	12.4	18.8	2.4	3.0	2.1	38.7
– corporates[1]	112.5	147.8	–	68.2	–	328.5
– securitisation positions	40.1	0.2	–	0.4	–	40.7
– non-credit obligation assets	5.4	5.2	0.3	1.2	1.4	13.5
IRB foundation approach	12.8	–	4.0	–	–	16.8
– central governments and central banks	–	–	–	–	–	–
– institutions	–	–	–	–	–	–
– corporates	12.8	–	4.0	–	–	16.8
Standardised approach	47.1	186.0	39.0	29.6	55.2	356.9
– central governments and central banks	3.3	2.7	0.5	8.9	4.3	19.7
– institutions	0.2	10.4	0.6	–	–	11.2
– corporates	25.2	119.2	30.0	15.2	35.1	224.7
– retail	4.2	16.7	4.3	1.3	8.7	35.2
– secured by mortgages on immovable property	2.1	8.4	1.3	0.4	1.6	13.8
– exposures in default	1.4	0.5	1.4	0.8	2.0	6.1
– regional governments or local authorities	–	–	–	–	0.6	0.6
– equity[2]	4.6	19.1	0.3	1.9	1.0	26.9
– other[3]	6.1	9.0	0.6	1.1	1.9	18.7
At 31 December 2014	263.2	399.1	54.6	171.6	66.8	955.3

For footnotes, see page 36.

Key points

- See commentary on RWA movement for IRB and Standardised on pages 24 and 22, respectively.

Table 24: Credit risk – RWA density by region

	RWA density					
	Europe %	Asia %	MENA %	North America %	Latin America %	Total %
IRB advanced approach	**32**	**30**	**40**	**47**	**57**	**34**
Retail:						
– secured by mortgages on immovable property SME[1]	**24**	**–**	**–**	**32**	**–**	**21**
– secured by mortgages on immovable property non-SME	**5**	**14**	**–**	**80**	**–**	**22**
– qualifying revolving retail	**18**	**26**	**–**	**29**	**–**	**23**
– other SME	**48**	**–**	**–**	**46**	**–**	**48**
– other non-SME	**16**	**20**	**–**	**86**	**–**	**25**
– total retail	**12**	**17**	**–**	**77**	**–**	**23**
– central governments and central banks	**13**	**10**	**44**	**13**	**56**	**15**
– institutions	**18**	**17**	**19**	**28**	**96**	**20**
– corporates[1]	**50**	**55**	**34**	**53**	**44**	**53**
– securitisation positions	**77**	**45**	**–**	**10**	**–**	**70**
– non-credit obligation assets	**50**	**15**	**43**	**69**	**39**	**24**
IRB foundation approach	**63**	**–**	**62**	**–**	**–**	**63**
– central governments and central banks	**–**	**–**	**–**	**–**	**–**	**–**
– institutions	**–**	**–**	**53**	**–**	**–**	**53**
– corporates	**63**	**–**	**62**	**–**	**–**	**63**
Standardised approach	**27**	**59**	**74**	**110**	**97**	**56**
– central governments and central banks	**2**	**4**	**12**	**176**	**216**	**10**
– institutions	**81**	**37**	**40**	**67**	**–**	**38**
– corporates	**99**	**89**	**95**	**98**	**101**	**93**
– retail	**71**	**75**	**75**	**72**	**71**	**74**
– secured by mortgages on immovable property	**39**	**35**	**35**	**42**	**36**	**36**
– exposures in default	**127**	**128**	**127**	**145**	**129**	**131**
– regional governments or local authorities	**–**	**–**	**25**	**–**	**67**	**35**
– equity[2]	**205**	**194**	**129**	**100**	**171**	**174**
– items associated with particularly high risk	**150**	**–**	**150**	**150**	**150**	**150**
– securitisation positions	**–**	**87**	**–**	**–**	**–**	**104**
– claims in the form of CIU	**100**	**–**	**100**	**–**	**–**	**100**
– international organisations	**–**	**–**	**–**	**–**	**–**	**–**
– other items	**41**	**74**	**65**	**51**	**90**	**67**
At 31 December 2015	**32**	**39**	**62**	**54**	**83**	**41**

	RWA density					
	Europe %	Asia %	MENA %	North America %	Latin America %	Total %
IRB advanced approach	34	33	40	49	39	36
Retail:						
– secured by mortgages on immovable property SME	24	–	–	–	–	21
– secured by mortgages on immovable property non-SME	6	10	–	96	–	25
– qualifying revolving retail	20	26	–	31	–	23
– other SME	45	–	–	50	–	45
– other non-SME	17	22	–	80	–	26
– total retail	12	14	–	90	–	25
– central governments and central banks	16	14	46	10	35	17
– institutions	38	25	28	26	67	30
– corporates[1]	45	59	–	54	–	52
– securitisation positions	115	46	–	12	–	106
– non-credit obligation assets	51	14	40	77	41	26
IRB foundation approach	67	–	60	–	–	65
– central governments and central banks	–	–	–	–	–	–
– institutions	–	–	–	–	–	–
– corporates	67	–	60	–	–	65
Standardised approach	27	67	79	108	96	60
– central governments and central banks	3	5	10	174	226	10
– institutions	76	37	43	–	–	37
– corporates	98	90	95	99	102	94
– retail	72	75	75	72	71	74
– secured by mortgages on immovable property	36	35	41	36	37	36
– exposures in default	126	128	118	143	134	129
– regional governments or local authorities	–	–	–	–	72	57
– equity[2]	192	236	126	100	172	204
– other[3]	65	72	89	64	160	74
At 31 December 2014	33	43	64	54	77	43

For footnotes, see page 36.

Key points

- Higher IRB density in Latin America resulted from higher risk weights applied to institutional exposures as a result of Brazil's CRR downgrades. Additionally the corporate IRB exposure density increased due to migration of a Project Finance portfolio from standardised to IRB approach.
- North America Retail IRB density has improved as a result of disposals and continued run-off of the US CML retail mortgage portfolio.
- A change in EEA equivalence rules resulted in a reclassification of some exposures from institutions to corporates with a corresponding decrease in institutions RWA density under IRB approach.
- Reduction in securitisation density is primarily the result of the disposal of highly risk weighted positions and a newly issued HSBC synthetic securitisation carrying a lower risk-weight in Europe.
- The decrease in RWA density in Asia equity exposure class results from the sale of our investment in Industrial Bank.

Table 25: Credit risk exposure – by industry sector

	Exposure value								
	Personal $bn	Manu-facturing $bn	Inter-national trade and services $bn	Property and other business activities $bn	Government and public administration $bn	Other commercial $bn	Financial $bn	Non-customer assets $bn	Total $bn
IRB advanced approach	**390.2**	**125.3**	**136.6**	**158.7**	**137.3**	**87.3**	**425.2**	**50.2**	**1,510.8**
Retail:									
– 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	–	–	–	–	–	–	–	275.4
– 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
– total retail	389.8	0.4	1.1	12.3	0.3	0.5	0.1	–	404.5
– central governments and central banks	–	–	0.1	–	119.9	–	207.4	–	327.4
– 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	–	597.3
– securitisation positions	–	–	–	–	–	–	40.9	–	40.9
– 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**	**592.0**
– central governments or central banks	–	0.1	–	–	70.2	–	121.9	7.7	199.9
– institutions	–	–	–	–	–	–	38.9	–	38.9
– corporates	1.5	56.2	43.5	46.1	21.9	40.2	17.0	–	226.4
– 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
– other items	–	–	–	0.1	–	–	16.0	3.3	19.4
At 31 December 2015	**473.7**	**195.1**	**192.6**	**216.8**	**235.2**	**137.0**	**631.4**	**64.7**	**2,146.5**

	Exposure value								
	Personal $bn	Manu-facturing $bn	International trade and services $bn	Property and other business activities $bn	Government and public administration $bn	Other commercial $bn	Financial $bn	Non-customer assets $bn	Total $bn
IRB advanced approach	404.2	140.4	149.2	181.1	113.1	88.4	464.9	52.5	1,593.8
Retail:									
– secured by mortgages on immovable property SME	0.5	–	0.2	2.4	–	–	–	–	3.1
– secured by mortgages on immovable property non-SME	288.7	–	–	0.1	–	–	0.1	–	288.9
– qualifying revolving retail	66.2	–	–	–	–	–	–	–	66.2
– other SME	–	0.9	2.5	7.3	0.8	2.1	0.3	–	13.9
– other non-SME	47.1	–	–	–	0.2	–	–	–	47.3
– total retail	402.5	0.9	2.7	9.8	1.0	2.1	0.4	–	419.4
– central governments and central banks	–	–	0.1	–	94.7	–	232.6	–	327.4
– institutions	–	–	–	–	0.7	–	129.7	–	130.4
– corporates[1]	1.7	139.5	146.4	171.3	16.7	86.3	63.9	–	625.8
– securitisation positions	–	–	–	–	–	–	38.3	–	38.3
– non-credit obligation assets	–	–	–	–	–	–	–	52.5	52.5
IRB foundation approach	0.2	8.9	6.0	1.5	0.5	4.9	3.8	–	25.8
– central governments and central banks	–	–	–	–	–	–	0.1	–	0.1
– institutions	–	–	–	–	–	–	0.1	–	0.1
– corporates	0.2	8.9	6.0	1.5	0.5	4.9	3.6	–	25.6
Standardised approach	88.0	63.0	52.0	46.2	89.0	44.0	187.7	20.6	590.5
– central governments or central banks	–	–	–	–	62.4	–	119.3	7.6	189.3
– institutions	–	–	–	–	–	–	30.1	–	30.1
– corporates	5.4	61.6	49.4	42.3	22.2	41.9	17.3	–	240.1
– retail	43.9	0.7	1.5	1.0	0.2	0.4	0.2	–	47.9
– secured by mortgages on immovable property	36.8	0.1	0.1	1.5	–	0.1	–	–	38.6
– exposures in default	1.9	0.6	0.8	0.6	0.1	0.6	0.1	–	4.7
– regional governments or local authorities	–	–	–	–	0.8	–	0.3	–	1.1
– equity[2]	–	–	–	0.4	–	–	3.8	9.0	13.2
– other[3]	–	–	0.2	0.4	3.3	1.0	16.6	4.0	25.5
At 31 December 2014	492.4	212.3	207.2	228.8	202.6	137.3	656.4	73.1	2,210.1

For footnotes, see page 36.

Key points

- There is an overall decrease in manufacturing sector exposures. The decrease is primarily in the North America region resulting from client facility reductions driven by RWA initiatives.
- A decrease International trade and services is driven mainly by the reduced exposures in telecommunications, energy and large food retailers in Europe following a reduction in collateralised exposures.
- The increase in Government and public administration sector is due to a rise in treasury bills and government debt securities in Asia.

Table 26: Credit risk exposure – by residual maturity

	Exposure value					
	Less than 1 year $bn	Between 1 and 5 years $bn	More than 5 years $bn	Undated $bn	Total $bn	RWAs $bn
IRB advanced approach	**654.2**	**376.1**	**430.4**	**50.1**	**1,510.8**	**515.8**
Retail:						
– secured by mortgages on immovable property SME	**0.2**	**0.4**	**2.3**	**–**	**2.9**	**0.6**
– secured by mortgages on immovable property non-SME	**2.4**	**4.2**	**268.8**	**–**	**275.4**	**60.0**
– qualifying revolving retail	**67.8**	**–**	**–**	**–**	**67.8**	**15.3**
– other SME	**2.4**	**6.4**	**3.3**	**–**	**12.1**	**5.8**
– other non-SME	**13.9**	**12.8**	**19.6**	**–**	**46.3**	**11.5**
– total retail	**86.7**	**23.8**	**294.0**	**–**	**404.5**	**93.2**
– central governments and central banks	**200.9**	**75.6**	**50.9**	**–**	**327.4**	**49.4**
– institutions	**66.9**	**20.1**	**3.5**	**–**	**90.5**	**18.4**
– corporates[1]	**289.8**	**246.0**	**61.5**	**–**	**597.3**	**314.3**
– securitisation positions	**9.9**	**10.5**	**20.5**	**–**	**40.9**	**28.4**
– non-credit obligation assets	**–**	**0.1**	**–**	**50.1**	**50.2**	**12.1**
IRB foundation approach	**20.0**	**19.1**	**4.6**	**–**	**43.7**	**27.4**
– central governments and central banks	**–**	**–**	**0.1**	**–**	**0.1**	**–**
– institutions	**0.1**	**0.2**	**–**	**–**	**0.3**	**0.2**
– corporates	**19.9**	**18.9**	**4.5**	**–**	**43.3**	**27.2**
Standardised approach	**230.0**	**207.5**	**120.8**	**33.7**	**592.0**	**332.7**
– central governments and central banks	**126.2**	**48.0**	**18.0**	**7.7**	**199.9**	**20.0**
– institutions	**22.4**	**0.5**	**16.0**	**–**	**38.9**	**14.7**
– corporates	**60.1**	**136.7**	**29.6**	**–**	**226.4**	**210.6**
– retail	**11.9**	**14.1**	**18.2**	**–**	**44.2**	**32.5**
– secured by mortgages on immovable property	**2.3**	**2.6**	**35.4**	**–**	**40.3**	**14.4**
– exposures in default	**2.6**	**1.2**	**1.1**	**–**	**4.9**	**6.4**
– regional governments or local authorities	**1.2**	**1.2**	**0.4**	**–**	**2.8**	**1.0**
– equity[2]	**–**	**–**	**–**	**7.0**	**7.0**	**12.2**
– items associated with particularly high risk	**0.4**	**1.6**	**0.7**	**1.7**	**4.4**	**6.6**
– securitisation positions	**–**	**–**	**0.7**	**–**	**0.7**	**0.7**
– claims in the form of CIU	**0.4**	**–**	**–**	**0.1**	**0.5**	**0.5**
– international organisations	**0.4**	**1.6**	**0.6**	**–**	**2.6**	**–**
– other items	**2.1**	**–**	**0.1**	**17.2**	**19.4**	**13.1**
At 31 December 2015	**904.2**	**602.7**	**555.8**	**83.8**	**2,146.5**	**875.9**

	Exposure value					
	Less than 1 year $bn	Between 1 and 5 years $bn	More than 5 years $bn	Undated $bn	Total $bn	RWAs $bn
IRB advanced approach	729.1	382.5	429.8	52.4	1,593.8	581.6
Retail:						
– secured by mortgages on immovable property SME	0.1	0.2	2.8	–	3.1	0.6
– secured by mortgages on immovable property non-SME	2.9	4.1	281.9	–	288.9	71.6
– qualifying revolving retail	66.2	–	–	–	66.2	15.3
– other SME	3.3	7.0	3.6	–	13.9	6.2
– other non-SME	13.8	12.7	20.8	–	47.3	12.4
– total retail	86.3	24.0	309.1	–	419.4	106.1
– central governments and central banks	212.7	80.2	34.5	–	327.4	54.1
– institutions	100.9	25.4	4.1	–	130.4	38.7
– corporates[1]	318.6	247.1	60.1	–	625.8	328.5
– securitisation positions	10.6	5.7	22.0	–	38.3	40.7
– non-credit obligation assets	–	0.1	–	52.4	52.5	13.5
IRB foundation approach	10.5	12.9	2.4	–	25.8	16.8
– central governments and central banks	–	0.1	–	–	0.1	–
– institutions	–	0.1	–	–	0.1	–
– corporates	10.5	12.7	2.4	–	25.6	16.8
Standardised approach	242.1	201.6	116.8	30.0	590.5	356.9
– central governments and central banks	123.5	37.7	20.5	7.6	189.3	19.7
– institutions	16.2	0.9	13.0	–	30.1	11.2
– corporates	70.2	142.6	27.2	0.1	240.1	224.7
– retail	17.1	12.8	18.0	–	47.9	35.2
– secured by mortgages on immovable property	1.9	3.0	33.7	–	38.6	13.8
– exposures in default	2.2	1.3	1.2	–	4.7	6.1
– regional governments or local authorities	0.4	0.3	0.4	–	1.1	0.6
– equity[2]	–	–	–	13.2	13.2	26.9
– other[3]	10.6	3.0	2.8	9.1	25.5	18.7
At 31 December 2014	981.7	597.0	549.0	82.4	2,210.1	955.3

For footnotes, see page 36.

Key points

- The decrease in 'Less than 1 year' banding is driven by a reduction in corporate customers exposures in Europe which are fully cash collateralised. This has no impact on RWAs.
- The increase under IRB approach in 'More than 5 years' banding in central government or central bank exposures is largely driven by a decline in deposits in central banks with shorter maturity as well as an increase in exposures with longer maturity.

Application of the IRB approach

The narrative explanations that follow relate to the IRB approaches: advanced and foundation IRB for distinct customers and advanced IRB for the portfolio-managed retail business.

Details of our use of the standardised approach can be found on page 76.

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 purpose of credit approval and many other management decisions.

Use of internal estimates

PDs, LGDs, and EAD applied in the calculation of regulatory capital requirements are also extensively used for 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 2015, 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, or under exemptions or exclusions from the IRB treatment. Additionally, in some instances, regulators have allowed us to transition from advanced to standardised approaches for a limited number of immaterial portfolios.

Under the advanced IRB approach, banks are allowed to develop their own empirical models to quantify required capital for credit risk. All such models developed by us, and any material changes to those models, must be approved by the PRA, subject to *de minimis* exceptions. Material changes are those that individually have a high impact, or where a number of small changes in aggregate have a high impact. Quantitative and qualitative materiality thresholds for these model changes are determined by CRD IV, which also requires us to obtain the PRA's approval before implementation where these thresholds are breached.

The effectiveness of this process is monitored by the PRA through an annual review of IRB usage, focusing on the proportion of total credit risk assets for which IRB approaches are used.

Banks have experienced difficulties in adopting advanced IRB in some cases, for example in portfolios which have very low levels of default, such that the PD, LGD and EAD cannot be assessed to a sufficiently high degree of confidence due to a lack of default or loss data. Difficulties also arise in countries where the rules and requirements of the local regulator's implementation of the Basel Committee's requirements are different from those of the PRA, or where the regulators have introduced capital floors and overlays to mitigate perceived model deficiencies. Tables 27 and 31 detail several material regulatory thresholds and overlays. While recognising the complexity of adopting IRB in some situations, we remain committed to working constructively with our regulators to achieve acceptable roll-out plans.

The wholesale risk rating system

This section describes how we build and 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 all relevant information, such as the most recent events and market data, where available, makes the final decision on the rating. The rating assigned therefore reflects the approver's overall view of the obligor's credit standing and propensity to default.

The finally assigned CRR determines the applicable master-scale PD range from which the reference PD, generally the arithmetical mid-point, is used in the regulatory capital calculation.

Reviewing the initial model score, relationship managers may propose a different CRR from that indicated, where they believe this is more appropriate. Such amendments may only be made through an override process and must be approved by the Credit function. Overrides for each model are recorded, and override levels are reviewed, as part of the model management process.

The CRR is assigned at an obligor level, which means that separate exposures to the same obligor are generally subject to a single, consistent rating. Unfunded credit risk mitigants such as guarantees, where they apply, 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 43 and for the standardised approach in table 44.

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.

Thus, over the economic cycle, a cycle will also appear in CRR migration. The influence of longer-term economic cycle factors implied by the model's calibration, combined with the effect of ongoing credit reviews, will result in long-term PDs generally above the actual default frequency during benign economic periods, but not changing so fast in a downturn. In practice, under a hybrid approach, ratings tend to be more volatile than would be the case in a pure TTC system, but less volatile than in a pure PIT one.

Moreover, our policy requires approvers to downgrade ratings on expectations but to upgrade them only on performance. Therefore, ratings will typically migrate during a downturn in response to higher perceived risks, but be upgraded more slowly in an upswing. This leads to expected defaults typically exceeding actual defaults, overall.

For EAD and LGD estimation, operating entities are permitted, subject to overview by Group Risk, to use their own modelling approaches for those parameters to suit conditions in their jurisdictions. Group Risk provides co-ordination, benchmarks, and the sharing 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, taking into account such factors as available but undrawn facilities, 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, many different models and scorecards are used for PD, LGD, and EAD; there are over 100 wholesale IRB models in use or under development within HSBC. 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, typically those which 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 most material local corporate PD models are the UK mid-market PD model, and the Hong Kong and Asia-Pacific mid-market models.

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. By contrast, 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, taking into account legal and procedural differences in the recovery and workout processes. However, 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.

In addition, the PRA has published guidance on the appropriateness of LGD models for low default portfolios generally. The PRA has determined that 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 2015, 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 are calculated using the supervisory slotting approach and our US income producing CRE portfolio is on the standardised 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. The global LGD models for sovereigns and for banks reflect the expected increase in observed losses during an economic downturn period.

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 27 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 27: Wholesale IRB credit risk models

Regulatory asset classes measured	RWAs for associated asset class $bn	Com-ponent	Number of significant models	Model description and methodology	Number of years loss data
Central governments and central banks	**49.4**	PD	1	A shadow rating approach constrained with expert judgement which includes macroeconomic and political factors.	8
		LGD	1	An unsecured model built on assessment of structural factors that influence the country's long-term economic performance. As required by the PRA, the model is floored at 45%.	8
		EAD	1	A cross-classification model which uses both internal data and expert judgement as well as information on similar exposure types from other asset classes.	8
Institutions	**18.6**	PD	1	A statistical model which combines quantitative analysis on financial information with expert inputs and macroeconomic factors.	10
		LGD	1	A quantitative model which produces both downturn and expected LGD. Several securities types are included in the model to recognise collateral in the LGD calculation. As required by the PRA, a floor of 45% is applied.	10
		EAD	1	A quantitative model which predicts credit conversion factors taking into account current utilisation, available headroom, product types, and committed/uncommitted indicator.	10
Corporates[1]	**323.3**				
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.	>10
Other corporates		PD	5	Corporates that fall below the global large corporate threshold are rated through local PD models, which reflect regional circumstances. These models use balance sheet data, behavioural data and qualitative information to derive a statistically built PD.	>10
All corporates		LGD	3	Local statistical models covering all corporates including global large corporates developed using various data inputs, including collateral information, recoveries and geography.	>7
		EAD	3	Local statistical models developed using various data inputs, including product type and geography.	>7

1 *Excludes specialised lending exposures subject to supervisory slotting approach (see table 29).*

Table 28 sets out risk metrics broken down by region. Table 30 shows the same metrics broken down by CRR band. Table 29 sets out an analysis of those exposures to which a supervisory slotting approach is applied. An analysis of PD, LGD, RWAs and exposure by country is provided in Appendix IV.

Table 28: Wholesale IRB portfolio analysis

	Europe %	Asia %	MENA %	North America %	Latin America %	Total %
At 31 December 2015						
Exposure weighted average PD						
IRB advanced approach						
Central governments and central banks	**0.08**	**0.06**	**0.88**	**0.01**	**0.90**	**0.14**
Institutions	**0.34**	**0.08**	**0.11**	**0.16**	**0.86**	**0.18**
Corporates[1]	**2.92**	**1.52**	**0.79**	**1.65**	**17.83**	**2.04**
IRB foundation approach						
Central governments and central banks	**–**	**–**	**0.04**	**–**	**–**	**0.04**
Institutions	**–**	**–**	**0.29**	**–**	**–**	**0.29**
Corporates	**1.45**	**–**	**2.10**	**–**	**–**	**1.68**
Exposure weighted average LGD						
IRB advanced approach						
Central governments and central banks	**45.0**	**45.0**	**45.0**	**45.1**	**45.0**	**45.0**
Institutions	**24.5**	**43.3**	**45.4**	**38.4**	**45.3**	**37.4**
Corporates[1]	**30.2**	**43.0**	**34.4**	**36.0**	**40.3**	**37.0**
At 31 December 2014						
Exposure weighted average PD						
IRB advanced approach						
Central governments and central banks	0.09	0.09	1.23	0.01	0.57	0.17
Institutions	0.66	0.22	0.55	0.13	0.76	0.36
Corporates[1]	2.62	1.44	0.09	1.26	–	1.85
IRB foundation approach						
Central governments and central banks	–	–	0.04	–	–	0.04
Institutions	0.13	–	0.03	–	–	0.10
Corporates[1]	1.36	–	2.86	–	–	1.74
Exposure weighted average LGD						
IRB advanced approach						
Central governments and central banks	45.0	45.0	45.0	45.4	45.0	45.1
Institutions	35.3	45.3	39.8	40.6	45.4	42.0
Corporates[1]	25.8	44.3	13.7	36.6	–	35.6

1 *Excludes specialised lending exposures subject to supervisory slotting approach (see table 29).*

Table 29: Wholesale IRB exposures under the slotting approach

	Remaining maturity less than 2.5 years		Remaining maturity greater than 2.5 years		Total	
	Exposure value $bn	RWAs $bn	Exposure value $bn	RWAs $bn	Exposure value $bn	RWAs $bn
Supervisory Category						
Category 1 – Strong	**6.4**	**3.1**	**8.3**	**5.8**	**14.7**	**8.9**
Category 2 – Good	**2.8**	**2.0**	**3.2**	**2.9**	**6.0**	**4.9**
Category 3 – Satisfactory	**0.9**	**1.0**	**1.2**	**1.3**	**2.1**	**2.3**
Category 4 – Weak	**0.7**	**1.6**	**0.2**	**0.5**	**0.9**	**2.1**
Category 5 – Default	**1.0**	**–**	**0.2**	**–**	**1.2**	**–**
At 31 December 2015	**11.8**	**7.7**	**13.1**	**10.5**	**24.9**	**18.2**
Supervisory Category						
Category 1 – Strong	7.0	3.4	9.7	6.7	16.7	10.1
Category 2 – Good	4.4	3.1	3.7	3.2	8.1	6.3
Category 3 – Satisfactory	1.4	1.7	1.5	1.7	2.9	3.4
Category 4 – Weak	0.9	2.4	0.3	0.8	1.2	3.2
Category 5 – Default	1.4	–	0.2	–	1.6	–
At 31 December 2014	15.1	10.6	15.4	12.4	30.5	23.0

Table 30 and the graphs below set out IRB exposures by obligor grade for central governments and central banks, institutions and corporates, all of which are assessed using our 23-grade CRR master scale. We benchmark the master scale against the ratings of external rating agencies. Each CRR band is associated with an external rating grade by reference to long-run default rates for that grade, represented by the average of issuer-weighted historical default rates.

The correspondence between the agency long-run default rates and the PD ranges of our master scale is obtained by matching a smoothed curve based on those default rates with our master scale reference PDs. This association between internal and external ratings is indicative and may vary over time. In these tables, the ratings of S&P are cited for illustration purposes, though we also benchmark against other agencies' ratings in an equivalent manner.

For further details of the Group's approach to credit quality classification, see the definition of 'obligor grade' in the glossary and page 196 of the Annual Report and Accounts 2015.

Table 30a: Wholesale IRB exposure – by obligor grade[1] – Central governments and central banks

	CRR	PD range %	Exposure value $bn	Average exposure value[5] $bn	Undrawn commit-ments $bn	Average PD[2] %	Average LGD[2] %	RWA density[2] %	RWAs $bn	Mapped external rating
Default risk										
Minimal	0.1	0.000 to 0.010	**139.8**	**131.3**	**0.6**	**0.01**	**45.0**	**8**	**11.3**	AAA
	1.1	0.011 to 0.028	**101.9**	**86.6**	**1.0**	**0.02**	**45.0**	**7**	**6.7**	AA+ to AA
	1.2	0.029 to 0.053	**38.8**	**54.0**	**0.4**	**0.04**	**45.0**	**15**	**5.7**	AA– to A+
Low	2.1	0.054 to 0.095	**10.5**	**25.9**	**–**	**0.07**	**45.0**	**28**	**2.9**	A
	2.2	0.096 to 0.169	**11.6**	**6.7**	**–**	**0.13**	**45.0**	**30**	**3.5**	A–
Satisfactory	3.1	0.170 to 0.285	**3.6**	**10.6**	**–**	**0.22**	**45.0**	**36**	**1.3**	BBB+
	3.2	0.286 to 0.483	**9.2**	**4.6**	**–**	**0.37**	**45.0**	**54**	**5.0**	BBB
	3.3	0.484 to 0.740	**2.2**	**2.0**	**–**	**0.63**	**45.0**	**64**	**1.4**	BBB–
Fair	4.1	0.741 to 1.022	**0.1**	**1.0**	**–**	**0.87**	**45.1**	**100**	**0.1**	BB+
	4.2	1.023 to 1.407	**1.1**	**0.5**	**–**	**1.20**	**45.0**	**91**	**1.0**	BB
	4.3	1.408 to 1.927	**1.1**	**0.5**	**–**	**1.65**	**45.0**	**100**	**1.1**	BB–
Moderate	5.1	1.928 to 2.620	**4.7**	**2.9**	**0.3**	**2.25**	**45.0**	**106**	**5.0**	BB–
	5.2	2.621 to 3.579	**0.7**	**0.5**	**0.2**	**3.05**	**45.2**	**129**	**0.9**	B+
	5.3	3.580 to 4.914	**1.0**	**3.5**	**0.1**	**4.20**	**45.0**	**130**	**1.3**	B
Significant	6.1	4.915 to 6.718	**0.1**	**0.4**	**–**	**5.75**	**45.0**	**100**	**0.1**	B
	6.2	6.719 to 8.860	**0.3**	**0.3**	**–**	**7.85**	**45.0**	**200**	**0.6**	B–
High	7.1	8.861 to 11.402	**0.8**	**0.6**	**–**	**10.00**	**45.0**	**188**	**1.5**	CCC+
	7.2	11.403 to 15.000	**–**	**–**	**–**	**–**	**–**	**–**	**–**	CCC+
Special management	8.1	15.001 to 22.000	**–**	**–**	**–**	**–**	**–**	**–**	**–**	CCC+
	8.2	22.001 to 50.000	**–**	**–**	**–**		**–**	**–**	**–**	CCC+
	8.3	50.001 to 99.999	**–**	**–**	**–**	**–**	**–**	**–**	**–**	CCC to C
Default[3]	9/10	100.000	**–**	**–**	**–**	**–**	**–**	**–**	**–**	Default
At 31 December 2015			**327.5**	**331.9**	**2.6**	**0.14**	**45.0**	**15**	**49.4**	

	CRR	PD range %	Exposure value $bn	Average PD[2] %	Average LGD[2] %	RWA density[2] %	RWAs $bn	Mapped external rating
Default risk								
Minimal	0.1	0.000 to 0.010	122.8	0.01	45.2	7	8.7	AAA
	1.1	0.011 to 0.028	60.3	0.02	45.0	7	4.4	AA+ to AA
	1.2	0.029 to 0.053	59.2	0.04	45.4	13	7.4	AA– to A+
Low	2.1	0.054 to 0.095	51.6	0.07	45.0	20	10.4	A
	2.2	0.096 to 0.169	6.0	0.13	45.2	25	1.5	A–
Satisfactory	3.1	0.170 to 0.285	11.3	0.22	45.0	43	4.9	BBB+
	3.2	0.286 to 0.483	3.6	0.37	45.0	53	1.9	BBB
	3.3	0.484 to 0.740	1.6	0.63	45.0	63	1.0	BBB–
Fair	4.1	0.741 to 1.022	1.7	0.87	45.0	81	1.4	BB+
	4.2	1.023 to 1.407	0.4	1.16	45.0	125	0.5	BB
	4.3	1.408 to 1.927	0.2	1.65	43.3	100	0.2	BB–
Moderate	5.1	1.928 to 2.620	0.9	2.25	45.0	111	1.0	BB–
	5.2	2.621 to 3.579	0.7	3.05	45.0	129	0.9	B+
	5.3	3.580 to 4.914	5.6	4.20	45.0	130	7.3	B
Significant	6.1	4.915 to 6.718	0.7	5.75	45.2	157	1.1	B
	6.2	6.719 to 8.860	0.1	7.85	45.0	200	0.2	B–
High	7.1	8.861 to 11.402	0.7	10.00	45.0	186	1.3	CCC+
	7.2	11.403 to 15.000	–	–	–	–	–	CCC+
Special management	8.1	15.001 to 22.000	–	–	–	–	–	CCC+
	8.2	22.001 to 50.000	–	–	–	–	–	CCC+
	8.3	50.001 to 99.999	–	–	–	–	–	CCC to C
Default[3]	9/10	100.000	–	–	–	–	–	Default
At 31 December 2014			327.4	0.17	45.1	17	54.1	

For footnotes, see page 53.

Table 30b: Wholesale IRB exposure – by obligor grade[1] – Institutions (continued)

	CRR	PD range %	Exposure value $bn	Average exposure value[5] $bn	Undrawn commit-ments $bn	Average PD[2] %	Average LGD[2] %	RWA density[2] %	RWAs $bn	Mapped external rating
Default risk										
Minimal	0.1	0.000 to 0.010	**2.0**	**2.2**	**0.1**	**0.03**	**45.4**	**20**	**0.4**	AAA
	1.1	0.011 to 0.028	**12.5**	**15.0**	**1.3**	**0.03**	**35.1**	**10**	**1.2**	AA+ to AA
	1.2	0.029 to 0.053	**35.5**	**28.8**	**3.8**	**0.04**	**42.6**	**13**	**4.5**	AA–
Low	2.1	0.054 to 0.095	**20.0**	**36.4**	**5.0**	**0.07**	**22.3**	**12**	**2.3**	A+ to A
	2.2	0.096 to 0.169	**9.5**	**11.9**	**3.5**	**0.13**	**45.4**	**33**	**3.1**	A–
Satisfactory	3.1	0.170 to 0.285	**3.9**	**7.8**	**1.4**	**0.22**	**42.2**	**44**	**1.7**	BBB+
	3.2	0.286 to 0.483	**4.6**	**4.9**	**0.4**	**0.37**	**41.8**	**67**	**3.1**	BBB
	3.3	0.484 to 0.740	**1.1**	**3.3**	**0.5**	**0.63**	**44.5**	**73**	**0.8**	BBB–
Fair	4.1	0.741 to 1.022	**0.5**	**0.9**	**0.2**	**0.87**	**44.5**	**67**	**0.4**	BB+
	4.2	1.023 to 1.407	**0.6**	**1.7**	**0.2**	**1.20**	**43.1**	**83**	**0.5**	BB
	4.3	1.408 to 1.927	**0.1**	**0.4**	**–**	**1.65**	**44.7**	**100**	**0.1**	BB–
Moderate	5.1	1.928 to 2.620	**0.1**	**0.3**	**0.1**	**2.25**	**50.0**	**100**	**0.1**	BB–
	5.2	2.621 to 3.579	**0.1**	**0.1**	**–**	**3.05**	**45.1**	**100**	**0.1**	B+
	5.3	3.580 to 4.914	**0.1**	**0.3**	**–**	**4.20**	**33.5**	**100**	**0.1**	B
Significant	6.1	4.915 to 6.718	**0.1**	**0.3**	**–**	**5.75**	**45.1**	**100**	**0.1**	B–
	6.2	6.719 to 8.860	**–**	**–**	**–**	**–**	**–**	**–**	**–**	B–
High	7.1	8.861 to 11.402	**0.1**	**0.2**	**–**	**10.00**	**45.1**	**100**	**0.1**	CCC+
	7.2	11.403 to 15.000	**–**	**–**	**–**	**–**	**–**	**–**	**–**	CCC+
Special management	8.1	15.001 to 22.000	**–**	**–**	**–**	**–**	**–**	**–**	**–**	CCC
	8.2	22.001 to 50.000	**–**	**–**	**–**	**–**	**–**	**–**	**–**	CCC– to CC
	8.3	50.001 to 99.999	**–**	**–**	**–**	**–**	**–**	**–**	**–**	C
Default[3]	9/10	100.000	**–**	**–**	**–**	**–**	**–**	**–**	**–**	Default
At 31 December 2015			**90.8**	**114.5**	**16.5**	**0.18**	**37.4**	**20**	**18.6**	

	CRR	PD range %	Exposure value $bn	Average PD[2] %	Average LGD[2] %	RWA density[2] %	RWAs $bn	Mapped external rating
Default risk								
Minimal	0.1	0.000 to 0.010	1.8	0.02	50.2	22	0.4	AAA
	1.1	0.011 to 0.028	15.3	0.03	41.0	12	1.8	AA+ to AA
	1.2	0.029 to 0.053	27.4	0.04	31.7	11	3.0	AA–
Low	2.1	0.054 to 0.095	44.0	0.07	45.2	20	8.5	A+ to A
	2.2	0.096 to 0.169	14.3	0.13	45.4	34	4.8	A–
Satisfactory	3.1	0.170 to 0.285	9.3	0.22	44.7	42	3.9	BBB+
	3.2	0.286 to 0.483	6.1	0.37	45.1	56	3.4	BBB
	3.3	0.484 to 0.740	4.2	0.63	46.7	74	3.1	BBB–
Fair	4.1	0.741 to 1.022	1.9	0.87	48.3	100	1.8	BB+
	4.2	1.023 to 1.407	2.3	1.20	31.3	65	1.5	BB
	4.3	1.408 to 1.927	0.9	1.65	45.8	133	1.2	BB–
Moderate	5.1	1.928 to 2.620	0.3	2.25	54.3	167	0.5	BB–
	5.2	2.621 to 3.579	0.3	3.05	47.6	167	0.5	B+
	5.3	3.580 to 4.914	0.6	4.20	55.7	180	0.9	B
Significant	6.1	4.915 to 6.718	0.3	5.75	76.0	267	0.8	B–
	6.2	6.719 to 8.860	0.4	7.85	28.8	100	0.4	B–
High	7.1	8.861 to 11.402	0.6	10.00	57.4	250	1.5	CCC+
	7.2	11.403 to 15.000	0.3	13.00	51.2	233	0.7	CCC+
Special management	8.1	15.001 to 22.000	–	–	–	–	–	CCC
	8.2	22.001 to 50.000	–	–	–	–	–	CCC– to CC
	8.3	50.001 to 99.999	–	–	–	–	–	C
Default[3]	9/10	100.000	0.1	100.00	64.7	–	–	Default
At 31 December 2014			130.4	0.36	42.0	30	38.7	

For footnotes, see page 53.

Table 30c: Wholesale IRB exposure – by obligor grade[1] – Corporates[4] (continued)

	CRR	PD range %	Exposure value $bn	Average exposure value[5] $bn	Undrawn commit-ments $bn	Average PD[2] %	Average LGD[2] %	RWA density[2] %	RWAs $bn	Mapped external rating
Default risk										
Minimal	0.1	0.000 to 0.010	–	–	–	–	–	–	–	
	1.1	0.011 to 0.028	**11.5**	**11.8**	**15.9**	**0.03**	**39.4**	**11**	**1.3**	AAA to AA
	1.2	0.029 to 0.053	**51.7**	**48.1**	**37.9**	**0.04**	**34.6**	**14**	**7.4**	AA–
Low	2.1	0.054 to 0.095	**66.1**	**69.5**	**57.8**	**0.07**	**38.4**	**22**	**14.7**	A+ to A
	2.2	0.096 to 0.169	**84.3**	**89.4**	**68.3**	**0.13**	**36.3**	**28**	**23.7**	A–
Satisfactory	3.1	0.170 to 0.285	**75.5**	**79.7**	**59.5**	**0.22**	**39.3**	**40**	**30.3**	BBB+
	3.2	0.286 to 0.483	**74.8**	**73.1**	**54.4**	**0.37**	**39.0**	**51**	**38.4**	BBB
	3.3	0.484 to 0.740	**70.0**	**70.5**	**44.8**	**0.63**	**36.3**	**61**	**42.4**	BBB–
Fair	4.1	0.741 to 1.022	**43.3**	**45.9**	**26.2**	**0.87**	**38.3**	**73**	**31.6**	BB+
	4.2	1.023 to 1.407	**39.9**	**37.4**	**23.7**	**1.20**	**34.8**	**75**	**30.1**	BB
	4.3	1.408 to 1.927	**28.4**	**31.6**	**18.7**	**1.65**	**39.6**	**96**	**27.3**	BB–
Moderate	5.1	1.928 to 2.620	**26.2**	**24.0**	**17.3**	**2.24**	**37.5**	**98**	**25.7**	BB–
	5.2	2.621 to 3.579	**12.1**	**12.5**	**8.6**	**3.07**	**39.5**	**112**	**13.6**	B+
	5.3	3.580 to 4.914	**11.9**	**11.9**	**8.0**	**4.15**	**35.1**	**108**	**12.9**	B
Significant	6.1	4.915 to 6.718	**5.9**	**5.3**	**4.4**	**5.73**	**38.4**	**134**	**7.9**	B–
	6.2	6.719 to 8.860	**2.4**	**3.0**	**1.4**	**7.85**	**42.2**	**167**	**4.0**	B–
High	7.1	8.861 to 11.402	**2.1**	**2.1**	**1.2**	**10.02**	**33.1**	**138**	**2.9**	CCC+
	7.2	11.403 to 15.000	**1.0**	**0.9**	**0.5**	**13.00**	**32.3**	**160**	**1.6**	CCC+
Special management	8.1	15.001 to 22.000	**0.7**	**0.8**	**0.5**	**19.00**	**36.1**	**200**	**1.4**	CCC
	8.2	22.001 to 50.000	**0.5**	**0.4**	**0.2**	**35.85**	**33.0**	**180**	**0.9**	CCC– to CC
	8.3	50.001 to 99.999	**0.2**	**0.3**	**0.1**	**75.00**	**35.5**	**100**	**0.2**	C
Default[3]	9/10	100.000	**7.2**	**6.8**	**1.0**	**100.00**	**42.8**	**70**	**5.0**	Default
At 31 December 2015			**615.7**	**625.0**	**450.4**	**2.01**	**37.5**	**53**	**323.3**	

	CRR	PD range %	Exposure value $bn	Average PD[2] %	Average LGD[2] %	RWA density[2] %	RWAs $bn	Mapped external rating
Default risk								
Minimal	0.1	0.000 to 0.010	–	–	–	–	–	
	1.1	0.011 to 0.028	11.5	0.03	43.6	16	1.8	AAA to AA
	1.2	0.029 to 0.053	43.0	0.04	30.4	13	5.6	AA–
Low	2.1	0.054 to 0.095	70.7	0.07	32.8	18	12.5	A+ to A
	2.2	0.096 to 0.169	91.3	0.13	32.8	25	22.9	A–
Satisfactory	3.1	0.170 to 0.285	82.9	0.22	37.0	38	31.5	BBB+
	3.2	0.286 to 0.483	71.9	0.37	39.7	53	38.2	BBB
	3.3	0.484 to 0.740	71.1	0.63	35.0	60	42.7	BBB–
Fair	4.1	0.741 to 1.022	47.4	0.87	36.1	70	33.1	BB+
	4.2	1.023 to 1.407	33.0	1.20	37.9	81	26.7	BB
	4.3	1.408 to 1.927	32.6	1.65	40.3	101	32.8	BB–
Moderate	5.1	1.928 to 2.620	22.6	2.24	38.0	100	22.6	BB–
	5.2	2.621 to 3.579	12.8	3.07	40.8	116	14.9	B+
	5.3	3.580 to 4.914	11.6	4.16	38.7	121	14.0	B
Significant	6.1	4.915 to 6.718	4.7	5.74	36.9	123	5.8	B–
	6.2	6.719 to 8.860	3.6	7.85	39.7	158	5.7	B–
High	7.1	8.861 to 11.402	1.7	10.03	32.9	139	2.5	CCC+
	7.2	11.403 to 15.000	0.9	13.00	38.0	178	1.6	CCC+
Special management	8.1	15.001 to 22.000	0.7	19.01	34.5	175	1.4	CCC
	8.2	22.001 to 50.000	0.3	36.00	31.2	167	0.5	CCC– to CC
	8.3	50.001 to 99.999	0.3	75.00	45.1	133	0.4	C
Default[3]	9/10	100.000	6.3	100.00	40.8	81	5.1	Default
At 31 December 2014			620.9	1.85	36.0	52	322.3	

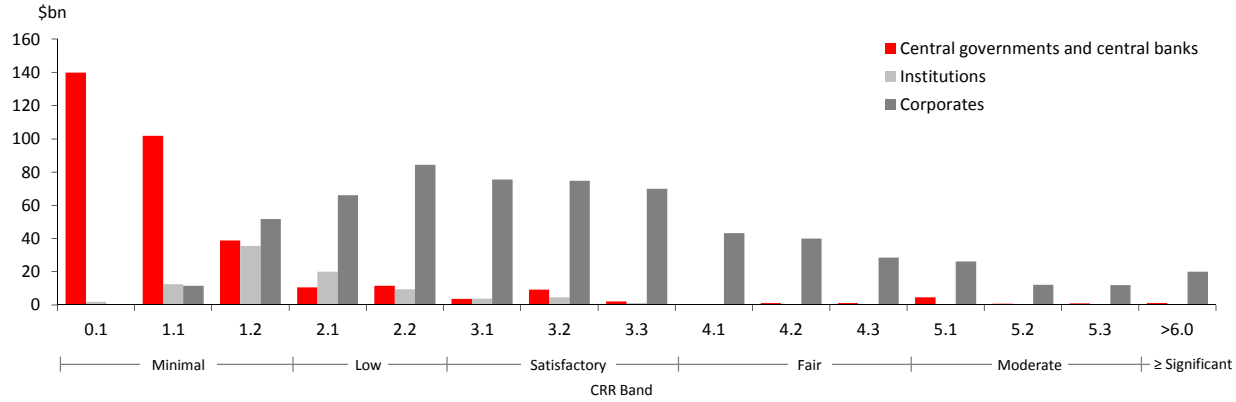
1 *See glossary for definition of obligor grade.*
2 *Average PD, average LGD and RWA density percentages represent an exposure weighted average.*
3 *There is a requirement to hold additional capital for unexpected losses on defaulted exposures where LGD exceeds our best estimate of EL. As a result, in some cases, RWAs arise for exposures in default.*
4 *Excludes specialised lending exposures subject to the supervisory slotting approach (EAD: $24.9bn; RWA: $18.2bn).*
5 *Average exposures are calculated by aggregating exposure value of the last five quarters and dividing by five to get the average.*

Key points

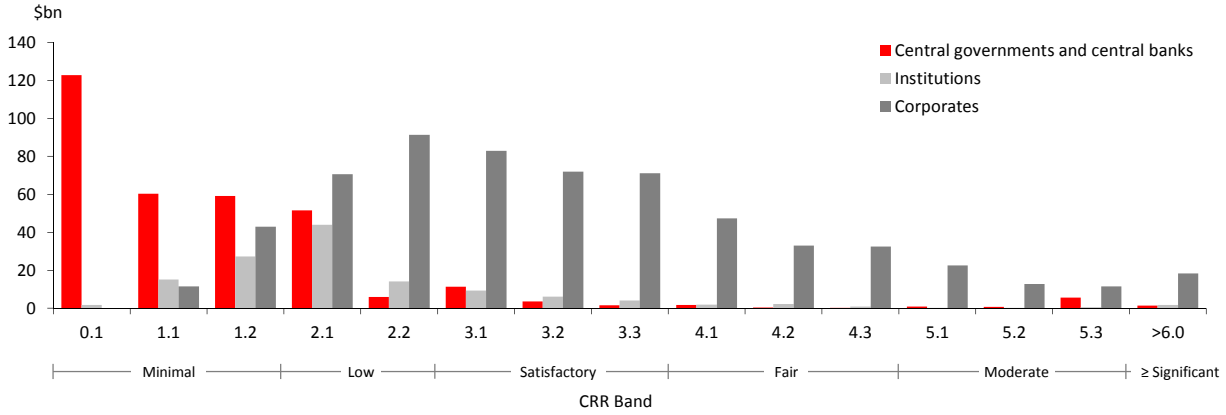
- The increases in central governments and central banks in CRR0.1 and CRR1.1 are primarily driven by rise in central bank balances, debt securities and treasury bills in Asia and North America, along with the purchase of government guaranteed mortgage backed securities as part of interest rate risk management.
- The decrease in central governments and central banks exposure class in CRR2.1 is primarily driven a model update changing China rating to CRR1.2 and local currency downgrade of Brazil to CRR3.2.
- The decrease in institution exposure class in CRR2.1 has been primarily driven by upgrades in Asia to CRR1.2.

Wholesale exposures by CRR Band

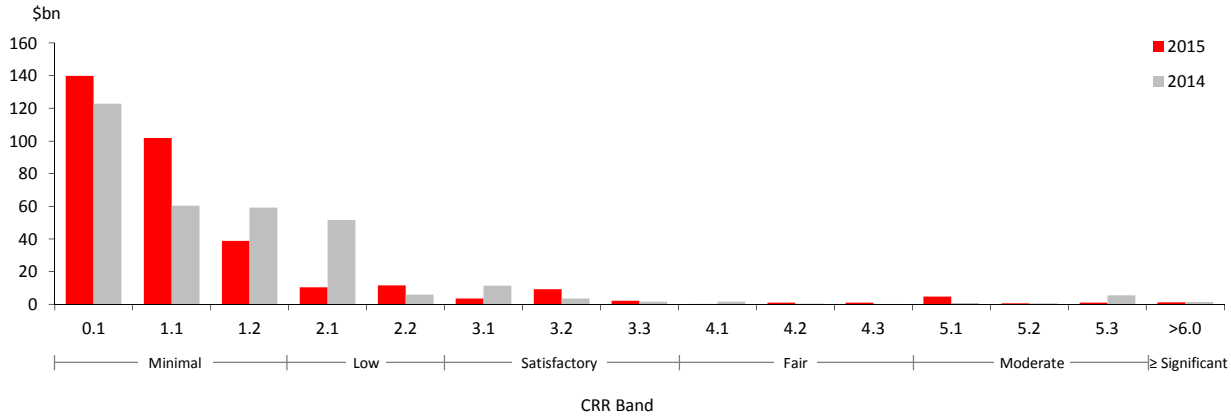
Wholesale 2015



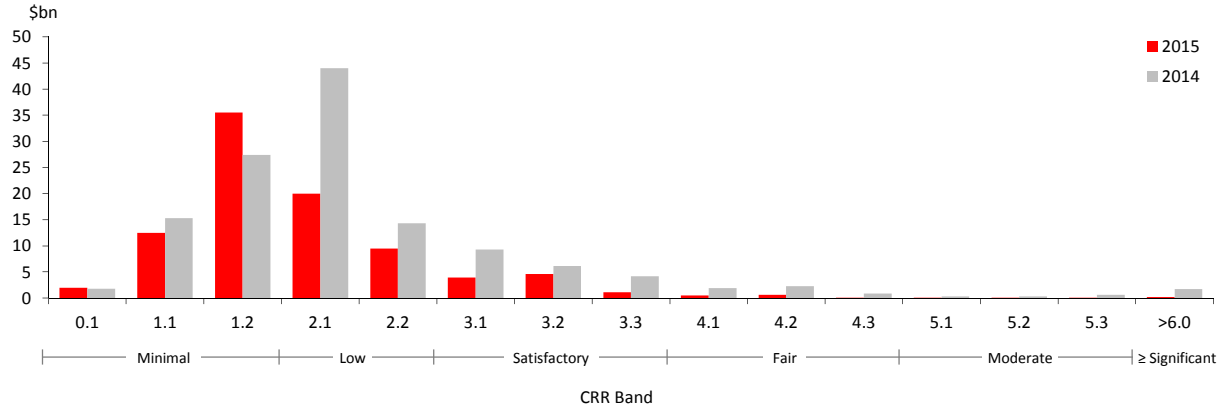
Wholesale 2014



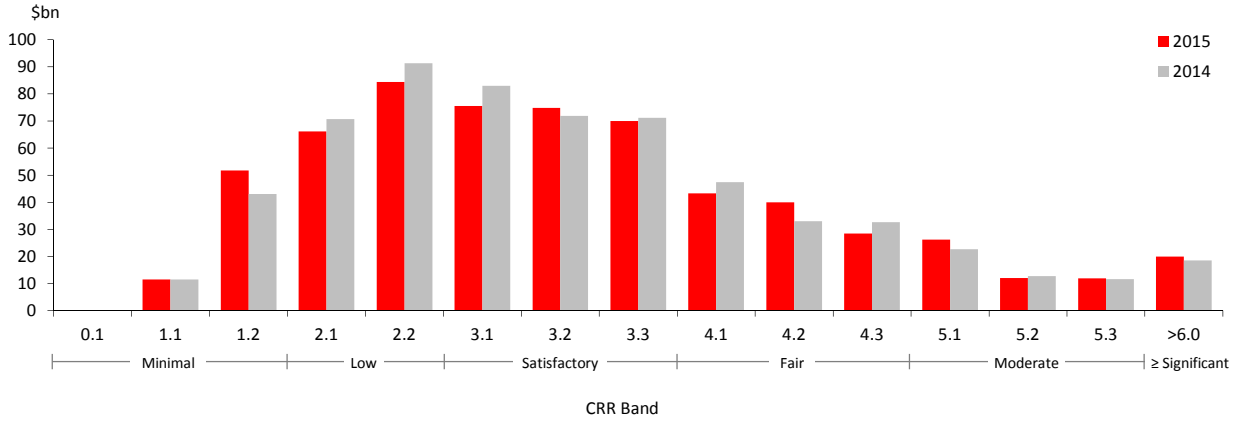
Central governments and central banks



Institutions



Corporates



Retail risk rating systems

Owing to the different country-level portfolio performance characteristics and loss history, there are no global models for our retail portfolios. Our retail models are developed at a local level, based on portfolio behaviour and observed defaults. Across the Group, we maintain over 1,000 retail risk predictive scorecards and models. Of these, over 170 are used with the PRA's approval under our IRB permission, the remainder being application scorecards, behavioural scorecards, or forecasting models.

We classify approximately 70% of the total number of retail IRB models as constituting globally or regionally material risk rating systems, taking account of their strategic importance to the Group. These material risk rating systems represented approximately 87% of our total retail IRB RWAs of $93bn at 31 December 2015.

The ten most material risk rating systems based on the above criteria, for which we disclose details of modelling methodology in table 31 and performance data in table 38, represented RWAs of approximately $62bn or 67% of the total retail IRB RWAs, the majority being attributable to the five risk rating systems for residential mortgages, our most material retail exposure class.

All newly adopted IRB models for retail portfolios, irrespective of size, require the PRA's approval. For changes to existing IRB models, a PRA approval process applies to all but a list of *de minimis* exemptions representing an immaterial percentage of total Group credit risk RWAs. This approval process sets various quantitative and qualitative thresholds to ensure that all significant model changes go forward for approval.

When developing retail models, segmentation based on risk characteristics is often adopted to enhance the models' discrimination and accuracy. The majority of our retail models are designed for a particular product or group of products in a specific country. We have developed and issued global internal model governance, development, validation and monitoring standards to ensure that locally developed models adhere, as far as possible, to consistent global standards. These permit specific variances in model approach, depending on local regulatory, legal or data requirements, which are used to determine and predict the risks in these portfolios.

Our models incorporate conservatism where required under regulatory rules. Additional levels of conservatism, varying from region to region, may arise from a methodological choice of ours or from a specific regulatory intervention, depending on the local assessment of the risk factors by us and the regulatory authorities. Regulators may additionally impose 'floor' values for various metrics where data is scarce.

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

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

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

Our approach to LGD estimates has more variation, particularly in respect of the downturn period calculation that they generally include. For instance, UK mortgage models use a regulatory-defined downturn based on a minimum 40% decline in house prices from peak to trough.

In Hong Kong, the downturn LGD for the mortgage model is defined to be the period when historical default rates and property price declines were at their most severe. This was observed in 2003 to 2004, when Hong Kong experienced the Severe Acute Respiratory Syndrome.

In the US, the downturn period is established by identifying the period where default rates were at their most severe and selecting the surrounding 12 months. This was observed between 2008 and 2010.

Table 31: Material retail IRB risk rating systems

Portfolio	CRD IV asset class	RWA $bn	Component model	Number of material component models	Model description and methodology	Number of years loss data[1]	Applicable Pillar 1 regulatory thresholds and overlays
UK HSBC residential mortgages	Retail – secured by mortgages on immovable property non-SME	4.97	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	7–10	PD floor of 0.03%
			LGD	1	Statistical estimates of loss and probability of possession in combination with the workout process and using the 1990's recession in benchmarking the downturn LGD.	> 10	LGD floor of 10% at portfolio level
			EAD	1	Statistical model based on historical data and uses balance at observation and expected number of months to default.	7–10	EAD must at least be equal to current balance
UK HSBC credit cards	Retail – qualifying revolving	1.85	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	7–10	PD floor of 0.03%
			LGD	1	Statistical model based on forecasting the amount of expected future recoveries.	7–10	
			EAD	1	Statistical model which derives a credit conversion factor to determine the proportion of undrawn limit to be added to the balance at observation.	7–10	EAD must at least be equal to current balance
UK HSBC personal loans	Retail – other non-SME	2.44	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	7–10	PD floor of 0.03%
			LGD	1	Statistical model based on forecasting the amount of expected future recoveries.	7–10	
			EAD	1	Rule-based calculation based on current balance which continues to be a conservative estimate for EAD.	7–10	EAD must at least be equal to current balance
UK business banking	Retail – other SME	4.63	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	7–10	PD floor of 0.03%
			LGD	2	Two sets of models – one for secured and another for unsecured exposures. The secured model uses the value to loan as a key component for estimation while the unsecured model estimates the amount of future recoveries and undrawn portion.	7–10	
			EAD	1	Statistical model using segmentation according to limit and utilisation and estimation of the undrawn exposure.	7–10	EAD must at least be equal to current balance
Hong Kong HSBC personal residential mortgages[2]	Retail – secured by mortgages on immovable property non-SME	5.60	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	> 10	PD floor of 0.03%
			LGD	1	Statistical model based on estimate of loss incurred over a recovery period derived from historical data with downturn LGD based on the worst observed default rate.	> 10	LGD floor of 10% at portfolio level
			EAD	1	Rule-based calculation based on current balance which continues to be a conservative estimate for EAD.	> 10	EAD must at least be equal to current balance
Hong Kong HSBC credit cards	Retail – qualifying revolving	3.27	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	> 10	PD floor of 0.03%
			LGD	1	Statistical model based on forecasting the amount of expected future recoveries.	> 10	
			EAD	1	Statistical model which derives a credit conversion factor to determine the proportion of undrawn limit to be added to the balance at observation.	> 10	EAD must at least be equal to current balance

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Portfolio	CRD IV asset class	RWA $bn	Component model	Number of material component models	Model description and methodology	Number of years loss data[1]	Applicable Pillar 1 regulatory thresholds and overlays
Hong Kong HSBC personal instalment loans	Retail – other non-SME	1.34	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	> 10	PD floor of 0.03%
			LGD	1	Statistical model based on forecasting the amount of expected future recoveries.	> 10	
			EAD	1	Rule-based calculation based on current balance which continues to be a conservative estimate for EAD.	> 10	EAD must at least be equal to current balance
US Consumer Lending first lien[3]	Retail – secured by mortgages on immovable property non-SME	21.24	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	> 10	PD floor of 0.03%
			LGD	1	Statistical model based on identifying the main risk drivers of loss and recovery and grouping them into homogeneous pools. Downturn LGD is derived based on the peak default rate observed while additional assumptions and estimations are done on incomplete workouts.	> 10	LGD floor of 10% at portfolio level 10% uplift on the total LGD for first lien portfolio LGD floor at the segment level based on the value notified to the PRA and ranges from circa 60% to circa 98%
			EAD	1	Rule-based calculation based on current balance which continues to be a conservative estimate for EAD.	> 10	EAD must at least be equal to current balance
US Mortgage Services first lien[3]	Retail – secured by mortgages on immovable property non-SME	8.34	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	> 10	PD floor of 0.03%
			LGD	1	Statistical model based on identifying the main risk drivers of loss and recovery and grouping them into homogeneous pools. Downturn LGD is derived based on the peak default rate observed while additional assumptions and estimations are done on incomplete workouts.	> 10	LGD floor of 10% at portfolio level 10% uplift on the total LGD for first lien portfolio LGD floor at the segment level based on the value notified to the PRA and ranges from circa 60% to circa 98%
			EAD	1	Rule-based calculation based on current balance which continues to be a conservative estimate for EAD.	> 10	EAD must at least be equal to current balance
US HSBC Mortgage Corporation first lien[3]	Retail – secured by mortgages on immovable property non-SME	8.61	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	> 10	PD floor of 0.03% Uplift in RWA and EL based on comparison of outputs between existing and new models
			LGD	1	Statistical model based on identifying the main risk drivers of loss and recovery and grouping them into homogeneous pools. Downturn LGD is derived based on the peak default rate observed while additional assumptions and estimations are done on incomplete workouts.	> 10	LGD floor of 10% at portfolio level Uplift in RWA and EL based on comparison of outputs between existing and new models
			EAD	1	Rule-based calculation based on current balance which continues to be a conservative estimate for EAD.	> 10	EAD must at least be equal to current balance Uplift in RWA and EL based on comparison of outputs between existing and new models

1 *Defined as the number of years from the data period used for model development up to the present.*

2 *The Hong Kong Monetary Authority introduced a 15% risk weight floor for all residential mortgages granted after 22 February 2013 in Hong Kong. In 2015, it extended the floor to residential mortgages granted on or before 22 February 2013 with a phased implementation (10% by June 2015 increasing to 15% by June 2016). This risk weight floor is also reflected in Group reported numbers.*

3 *In US mortgage business, first lien is a primary claim on a property which takes precedence over all subsequent claims and will be paid first from the proceeds in case of the property's foreclosure sale.*

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The approval of the models that are currently used for the CML portfolios was subject to certain conditions with regard to LGD floors and regular assessment of the capital difference in applying the US instead of the PRA rules, mainly on the definition of default used for modelling.

For the HSBC Mortgage Corporation first lien portfolio, we continue to include agreed adjustments to the current model outputs based on a new set of models which are yet to be approved by the PRA.

Table 32 sets out the exposure-weighted average PDs and LGDs by retail exposure class. An analysis by country is provided in Appendix IV. Table 33 provides the exposure value, exposure-weighted average PDs and LGDs, RWA density and RWAs for our most material residential mortgages risk rating systems.

In table 33, the regulatory LGD and PD floors of 10% and 0.03%, respectively, are included. In this table, the UK HSBC residential mortgages include the HSBC branded portfolios of HSBC Bank plc but not those of First Direct. Hong Kong residential mortgages consist of HSBC and Hang Seng portfolios, and the US residential mortgages cover the CML and the US HSBC Mortgage Corporation portfolios. The PD and LGD values in the US residential mortgages are stated before the quantitative adjustment due to the existing deficiencies of the current US HSBC Mortgage Corporation models. This quantitative adjustment is applied at the total portfolio RWA and EL levels.

Within table 33, the RWAs and other metrics have decreased in 2015 due to the increasing house prices in most regions of the UK and the continued sale of assets and improving house prices in the US. The extension of the risk-weight floor to all residential mortgages in June 2015, not just those granted after 22 February 2013, increased the RWAs and RWA density in Hong Kong. A floor of 10% was implemented in June 2015 for those granted on or before 22 February 2013. This will increase to 15% in June 2016.

Tables 34 and 35 show IRB exposures by exposure sub-class and portfolio quality bands: at Group level by internal PD band and by geographical region using a composite EL measure, respectively.

In table 34, band seven has lower RWAs because, as assets approach and go into default, our capital requirements are increasingly reflected in an EL deduction from capital, rather than a direct RWA impact.

Table 32: Retail IRB portfolio analysis[1]

	Europe %	Asia %	North America %	Total %
At 31 December 2015				
Exposure-weighted average PD				
Retail – secured by mortgages on immovable property non-SME	**1.43**	**0.99**	**9.66**	**2.78**
Retail – secured by mortgages on immovable property SME	**8.06**	**0.99**	**2.21**	**5.91**
Retail – qualifying revolving	**1.17**	**1.11**	**1.62**	**1.17**
Retail – other SME	**9.90**	**0.13**	**3.40**	**9.62**
Retail – other non-SME	**1.93**	**1.85**	**6.39**	**2.44**
Exposure-weighted average LGD				
Retail – secured by mortgages on immovable property non-SME	**12.5**	**11.4**	**45.3**	**18.1**
Retail – secured by mortgages on immovable property SME	**19.0**	**11.1**	**30.7**	**18.6**
Retail – qualifying revolving	**85.2**	**100.1**	**90.8**	**92.2**
Retail – other SME	**54.1**	**10.8**	**65.1**	**54.1**
Retail – other non-SME	**23.8**	**21.1**	**71.8**	**29.1**
At 31 December 2014				
Exposure-weighted average PD				
Retail – secured by mortgages on immovable property non-SME	0.98	1.00	11.54	3.06
Retail – secured by mortgages on immovable property SME	8.81	0.76	–	7.06
Retail – qualifying revolving	1.41	1.09	1.74	1.30
Retail – other SME	10.09	0.12	3.75	9.73
Retail – other non-SME	1.90	1.76	7.54	2.68
Exposure-weighted average LGD				
Retail – secured by mortgages on immovable property non-SME	13.5	12.1	51.5	20.5
Retail – secured by mortgages on immovable property SME	19.0	11.1	–	17.5
Retail – qualifying revolving	84.5	100.2	90.1	91.3
Retail – other SME	48.7	9.1	61.0	49.0
Retail – other non-SME	22.0	22.8	77.7	30.0

1 *The MENA and Latin America regions are not included in this table as retail exposures in these regions are calculated under the standardised approach.*

Table 33: Retail IRB exposures secured by mortgages on immovable property (non-SME)

	Exposure value $bn	Average PD %	Average LGD %	RWA density %	RWAs $bn
At 31 December 2015					
Total Retail IRB exposures secured by mortgages on immovable property (non-SME)	**275.4**	**2.78**	**18.1**	**22**	**60.0**
Of which:					
– US first lien residential mortgages	**34.2**	**12.66**	**52.0**	**112**	**38.2**
– UK HSBC residential mortgages	**94.0**	**1.49**	**11.1**	**5**	**5.0**
– Hong Kong residential mortgages	**60.4**	**0.76**	**10.0**	**15**	**9.0**
At 31 December 2014					
Total Retail IRB exposures secured by mortgages on immovable property (non-SME)	288.9	3.06	20.5	25	71.6
Of which:					
– US first lien residential mortgages	37.3	14.83	56.4	136	50.9
– UK HSBC residential mortgages	98.3	0.93	15.5	6	5.9
– Hong Kong residential mortgages	56.3	0.78	10.1	10	5.8
At 31 December 2013					
Total Retail IRB exposures secured on real estate property	310.7	4.02	20.1	34	105.4
Of which:					
– US first lien residential mortgages	42.8	18.13	59.6	176	75.3
– UK HSBC residential mortgages	104.4	1.11	16.4	7	7.3
– Hong Kong residential mortgages	52.1	0.74	10.1	7	3.8

Table 34: Retail IRB exposure – by internal PD band

	PD range %	Exposure value $bn	Average exposure value[2] $bn	Undrawn commit-ments $bn	Average PD[1] %	Average LGD[1] %	RWA density[1] %	RWAs $bn
At 31 December 2015								
Secured by mortgages on immovable property								
SME								
Band 1	0.000 to 0.483	0.6	0.6	–	0.15	12.6	–	–
Band 2	0.484 to 1.022	0.4	0.5	–	0.76	19.6	25	0.1
Band 3	1.023 to 4.914	1.4	1.4	–	2.36	19.8	29	0.4
Band 4	4.915 to 8.860	0.2	0.2	–	6.56	21.9	50	0.1
Band 5	8.861 to 15.000	0.1	0.1	–	11.27	27.2	–	–
Band 6	15.001 to 50.000	0.1	0.1	–	24.94	20.9	–	–
Band 7	50.001 to 100.000	0.1	0.1	–	100.00	18.4	–	–
		2.9	3.0	–	5.91	18.6	21	0.6
Secured by mortgages on immovable property								
Non-SME								
Band 1	0.000 to 0.483	215.5	218.9	16.2	0.11	14.5	7	15.0
Band 2	0.484 to 1.022	22.4	24.1	0.8	0.67	23.1	28	6.3
Band 3	1.023 to 4.914	22.4	23.1	0.3	1.95	32.5	76	17.1
Band 4	4.915 to 8.860	5.8	6.1	–	5.77	36.6	153	8.9
Band 5	8.861 to 15.000	1.1	1.5	0.1	11.94	29.4	200	2.2
Band 6	15.001 to 50.000	2.3	2.9	–	24.40	49.0	330	7.6
Band 7	50.001 to 100.000	5.9	6.4	–	97.97	43.1	49	2.9
		275.4	283.0	17.4	2.78	18.1	22	60.0
Qualifying revolving retail exposures								
Band 1	0.000 to 0.483	49.1	48.7	85.2	0.12	92.9	7	3.2
Band 2	0.484 to 1.022	7.1	6.8	6.7	0.71	92.3	28	2.0
Band 3	1.023 to 4.914	9.1	9.0	5.7	2.23	90.0	64	5.8
Band 4	4.915 to 8.860	1.3	1.3	0.5	6.62	89.2	131	1.7
Band 5	8.861 to 15.000	0.5	0.4	0.1	11.09	91.1	180	0.9
Band 6	15.001 to 50.000	0.5	0.5	0.1	23.56	91.1	280	1.4
Band 7	50.001 to 100.000	0.2	0.3	0.1	89.41	67.6	150	0.3
		67.8	67.0	98.4	1.17	92.2	23	15.3
Other SME								
Band 1	0.000 to 0.483	1.6	1.7	1.1	0.29	64.7	31	0.5
Band 2	0.484 to 1.022	2.1	2.2	1.0	0.74	52.6	33	0.7
Band 3	1.023 to 4.914	5.6	6.0	1.5	2.58	53.6	55	3.1
Band 4	4.915 to 8.860	1.2	1.4	0.2	6.65	50.0	67	0.8
Band 5	8.861 to 15.000	0.5	0.5	0.2	10.89	59.2	80	0.4
Band 6	15.001 to 50.000	0.3	0.3	0.1	25.79	60.6	100	0.3
Band 7	50.001 to 100.000	0.8	0.8	0.1	99.47	39.8	–	–
		12.1	12.9	4.2	9.62	54.1	48	5.8
Other non-SME								
Band 1	0.000 to 0.483	26.5	26.4	11.5	0.18	26.7	12	3.2
Band 2	0.484 to 1.022	6.7	6.7	1.3	0.66	30.5	27	1.8
Band 3	1.023 to 4.914	10.7	10.7	1.4	1.91	27.4	40	4.3
Band 4	4.915 to 8.860	0.9	0.9	–	7.05	53.3	89	0.8
Band 5	8.861 to 15.000	0.5	0.6	–	11.88	64.8	120	0.6
Band 6	15.001 to 50.000	0.3	0.5	–	27.58	67.8	200	0.6
Band 7	50.001 to 100.000	0.7	0.7	–	96.40	57.7	29	0.2
		46.3	46.5	14.2	2.44	29.1	25	11.5
Total retail								
Band 1	0.000 to 0.483	293.3	296.3	114.0	0.12	29.0	7	21.9
Band 2	0.484 to 1.022	38.7	40.3	9.8	0.68	38.5	28	10.9
Band 3	1.023 to 4.914	49.2	50.2	8.9	2.07	44.1	62	30.7
Band 4	4.915 to 8.860	9.4	9.9	0.7	6.14	46.8	131	12.3
Band 5	8.861 to 15.000	2.7	3.1	0.4	11.58	51.2	152	4.1
Band 6	15.001 to 50.000	3.5	4.3	0.2	24.72	57.2	283	9.9
Band 7	50.001 to 100.000	7.7	8.3	0.2	97.74	44.5	44	3.4
		404.5	412.4	134.2	2.70	32.9	23	93.2

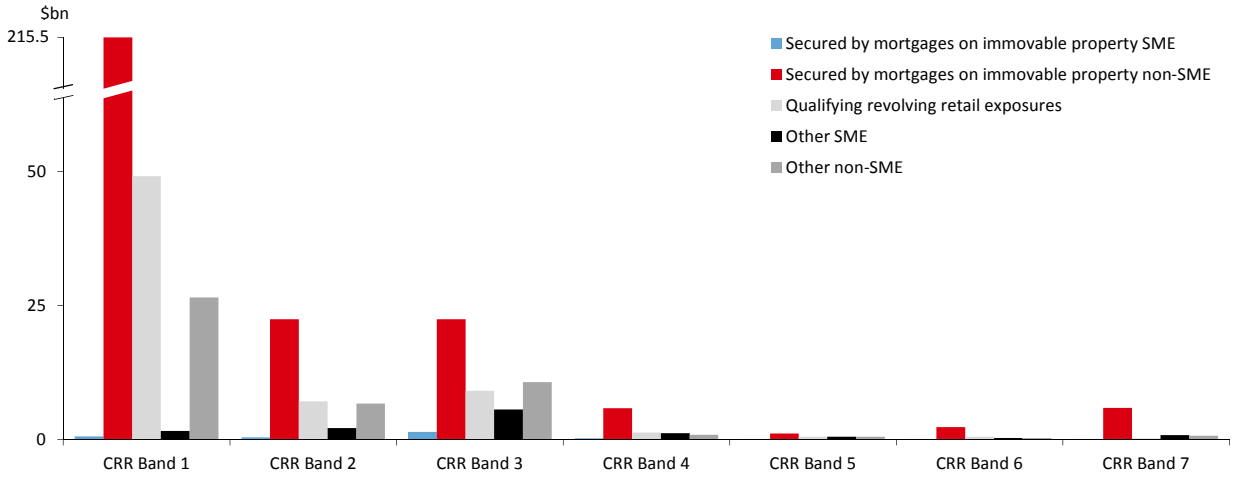
	PD range %	Exposure value $bn	Average PD[1] %	Average LGD[1] %	RWA density[1] %	RWAs $bn
At 31 December 2014						
Secured by mortgages on immovable property						
SME						
Band 1	0.000 to 0.483	0.5	0.10	11.9	0	0.0
Band 2	0.484 to 1.022	0.6	0.80	16.8	17	0.1
Band 3	1.023 to 4.914	1.5	2.45	18.3	20	0.3
Band 4	4.915 to 8.860	0.2	6.94	23.0	50	0.1
Band 5	8.861 to 15.000	0.1	11.25	26.4	0	0.0
Band 6	15.001 to 50.000	0.1	25.01	18.8	100	0.1
Band 7	50.001 to 100.000	0.1	100.00	16.8	0	0.0
		3.1	7.06	17.5	21	0.6
Secured by mortgages on immovable property						
Non-SME						
Band 1	0.000 to 0.483	219.7	0.12	15.2	6	12.1
Band 2	0.484 to 1.022	27.2	0.69	27.5	31	8.5
Band 3	1.023 to 4.914	24.1	2.01	36.2	82	19.8
Band 4	4.915 to 8.860	5.8	5.89	52.0	221	12.8
Band 5	8.861 to 15.000	2.2	12.31	36.7	200	4.4
Band 6	15.001 to 50.000	3.2	23.72	57.7	378	12.1
Band 7	50.001 to 100.000	6.7	97.17	59.4	28	1.9
		288.9	3.06	20.5	25	71.6
Qualifying revolving retail exposures						
Band 1	0.000 to 0.483	47.8	0.12	91.9	6	3.1
Band 2	0.484 to 1.022	6.6	0.71	91.3	29	1.9
Band 3	1.023 to 4.914	9.1	2.26	89.8	65	5.9
Band 4	4.915 to 8.860	1.4	6.64	87.8	136	1.9
Band 5	8.861 to 15.000	0.5	11.06	89.1	200	1.0
Band 6	15.001 to 50.000	0.5	24.44	90.3	260	1.3
Band 7	50.001 to 100.000	0.3	89.52	64.5	67	0.2
		66.2	1.30	91.3	23	15.3
Other SME						
Band 1	0.000 to 0.483	1.8	0.29	57.1	17	0.3
Band 2	0.484 to 1.022	2.3	0.74	46.0	30	0.7
Band 3	1.023 to 4.914	6.3	2.56	49.4	52	3.3
Band 4	4.915 to 8.860	1.5	6.68	45.7	60	0.9
Band 5	8.861 to 15.000	0.6	11.00	52.7	67	0.4
Band 6	15.001 to 50.000	0.5	24.99	54.1	100	0.5
Band 7	50.001 to 100.000	0.9	99.27	37.9	11	0.1
		13.9	9.73	49.0	45	6.2
Other non-SME						
Band 1	0.000 to 0.483	27.0	0.19	25.7	11	3.0
Band 2	0.484 to 1.022	6.3	0.71	33.3	30	1.9
Band 3	1.023 to 4.914	11.3	1.98	30.1	42	4.7
Band 4	4.915 to 8.860	0.9	7.24	60.6	100	0.9
Band 5	8.861 to 15.000	0.5	12.25	71.2	160	0.8
Band 6	15.001 to 50.000	0.6	28.20	63.4	150	0.9
Band 7	50.001 to 100.000	0.7	95.81	66.5	29	0.2
		47.3	2.68	30.0	26	12.4
Total retail						
Band 1	0.000 to 0.483	296.8	0.13	28.8	6	18.5
Band 2	0.484 to 1.022	43.0	0.70	39.0	30	13.1
Band 3	1.023 to 4.914	52.3	2.13	45.2	65	34.0
Band 4	4.915 to 8.860	9.8	6.27	56.2	169	16.6
Band 5	8.861 to 15.000	3.9	11.91	51.0	169	6.6
Band 6	15.001 to 50.000	4.9	24.47	60.7	304	14.9
Band 7	50.001 to 100.000	8.7	97.05	57.3	28	2.4
		419.4	2.99	33.7	25	106.1

1 *Average PD, average LGD and RWA density percentages represent exposure-weighted averages.*

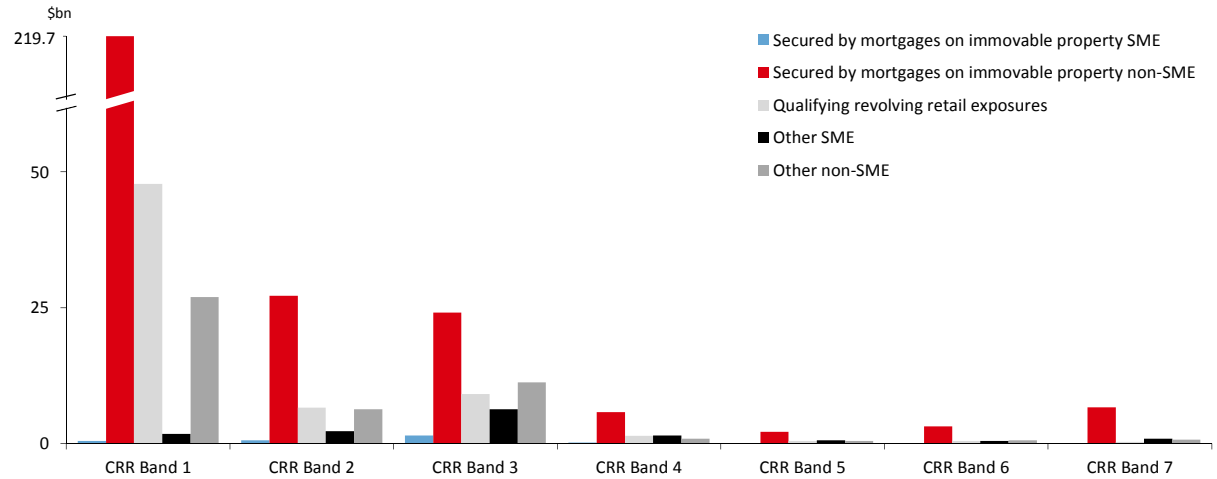
2 *Average exposures are calculated by aggregating exposure value of the last five quarters and dividing by five to get the average.*

Retail exposures by internal PD band

2015



2014



Key points

- The general decrease in Retail bands is mainly driven by foreign exchange effects.
- Continued non-core portfolio run-off and disposals in the US CML portfolio improved the quality of the residual portfolio.

The possibility of variations between jurisdictions' definitions underlying retail PD and LGD diminishes the usefulness of these measures as comparators for the purposes of global retail portfolio management. To address this shortcoming, we maintain an EL scale for retail business, combining obligor and facility/product risk factors in a composite measure of PD and LGD. This scale, summarised in table 35, enables the diverse risk profiles of retail portfolios across the Group to be assessed using a common denominator instead of their disparate PD and LGD measures.

Table 35: Retail IRB exposure – by region[1]

	Exposure value			
	Europe $bn	Asia $bn	North America $bn	Total exposure $bn
Secured by mortgages on immovable property SME				
Expected loss band				
– less than 1%	1.5	0.6	0.2	2.3
– greater than or equal to 1% and less than 5%	0.4	–	0.1	0.5
– greater than or equal to 5% and less than 10%	–	–	–	–
– greater than or equal to 10% and less than 20%	–	–	–	–
– greater than or equal to 20% and less than 40%	–	–	–	–
– greater than or equal to 40% or exposures in default	0.1	–	–	0.1
	2.0	0.6	0.3	2.9
Secured by mortgages on immovable property non-SME				
Expected loss band				
– less than 1%	134.3	88.1	34.7	257.1
– greater than or equal to 1% and less than 5%	0.7	0.2	8.6	9.5
– greater than or equal to 5% and less than 10%	0.1	–	1.2	1.3
– greater than or equal to 10% and less than 20%	0.2	–	1.1	1.3
– greater than or equal to 20% and less than 40%	–	–	0.5	0.5
– greater than or equal to 40% or exposures in default	1.4	0.3	4.0	5.7
	136.7	88.6	50.1	275.4
Qualifying revolving retail exposures				
Expected loss band				
– less than 1%	28.4	26.2	3.2	57.8
– greater than or equal to 1% and less than 5%	3.9	3.5	0.7	8.1
– greater than or equal to 5% and less than 10%	0.4	0.5	0.1	1.0
– greater than or equal to 10% and less than 20%	0.2	0.3	–	0.5
– greater than or equal to 20% and less than 40%	0.1	0.1	–	0.2
– greater than or equal to 40% or exposures in default	0.2	–	–	0.2
	33.2	30.6	4.0	67.8
Other SME				
Expected loss band				
– less than 1%	5.3	0.1	0.3	5.7
– greater than or equal to 1% and less than 5%	4.7	–	0.1	4.8
– greater than or equal to 5% and less than 10%	0.5	–	–	0.5
– greater than or equal to 10% and less than 20%	0.2	–	–	0.2
– greater than or equal to 20% and less than 40%	0.1	–	–	0.1
– greater than or equal to 40% or exposures in default	0.8	–	–	0.8
	11.6	0.1	0.4	12.1
Other non-SME				
Expected loss band				
– less than 1%	32.6	5.8	3.2	41.6
– greater than or equal to 1% and less than 5%	1.2	0.5	1.4	3.1
– greater than or equal to 5% and less than 10%	0.1	0.1	0.3	0.5
– greater than or equal to 10% and less than 20%	–	–	0.3	0.3
– greater than or equal to 20% and less than 40%	–	–	0.1	0.1
– greater than or equal to 40% or exposures in default	0.4	0.1	0.2	0.7
	34.3	6.5	5.5	46.3
Total retail				
Expected loss band				
– less than 1%	202.1	120.8	41.6	364.5
– greater than or equal to 1% and less than 5%	10.9	4.2	10.9	26.0
– greater than or equal to 5% and less than 10%	1.1	0.6	1.6	3.3
– greater than or equal to 10% and less than 20%	0.6	0.3	1.4	2.3
– greater than or equal to 20% and less than 40%	0.2	0.1	0.6	0.9
– greater than or equal to 40% or exposures in default	2.9	0.4	4.2	7.5
At 31 December 2015	217.8	126.4	60.3	404.5

	Exposure value			
	Europe $bn	Asia $bn	North America $bn	Total exposure $bn
Secured by mortgages on immovable property SME				
Expected loss band				
– less than 1%	1.8	0.7	–	2.5
– greater than or equal to 1% and less than 5%	0.5	–	–	0.5
– greater than or equal to 5% and less than 10%	–	–	–	–
– greater than or equal to 10% and less than 20%	–	–	–	–
– greater than or equal to 20% and less than 40%	–	–	–	–
– greater than or equal to 40% or exposures in default	0.1	–	–	0.1
	2.4	0.7	–	3.1
Secured by mortgages on immovable property non-SME				
Expected loss band				
– less than 1%	142.2	87.6	35.9	265.7
– greater than or equal to 1% and less than 5%	0.7	0.2	10.7	11.6
– greater than or equal to 5% and less than 10%	0.2	–	1.9	2.1
– greater than or equal to 10% and less than 20%	0.1	–	2.0	2.1
– greater than or equal to 20% and less than 40%	–	–	0.7	0.7
– greater than or equal to 40% or exposures in default	0.9	0.4	5.4	6.7
	144.1	88.2	56.6	288.9
Qualifying revolving retail exposures				
Expected loss band				
– less than 1%	29.4	23.4	3.2	56.0
– greater than or equal to 1% and less than 5%	4.4	3.1	0.7	8.2
– greater than or equal to 5% and less than 10%	0.6	0.4	0.1	1.1
– greater than or equal to 10% and less than 20%	0.2	0.3	–	0.5
– greater than or equal to 20% and less than 40%	0.1	0.1	–	0.2
– greater than or equal to 40% or exposures in default	0.2	–	–	0.2
	34.9	27.3	4.0	66.2
Other SME				
Expected loss band				
– less than 1%	6.3	0.1	0.4	6.8
– greater than or equal to 1% and less than 5%	5.1	–	0.2	5.3
– greater than or equal to 5% and less than 10%	0.6	–	–	0.6
– greater than or equal to 10% and less than 20%	0.2	–	–	0.2
– greater than or equal to 20% and less than 40%	0.1	–	–	0.1
– greater than or equal to 40% or exposures in default	0.9	–	–	0.9
	13.2	0.1	0.6	13.9
Other non-SME				
Expected loss band				
– less than 1%	32.6	5.4	3.9	41.9
– greater than or equal to 1% and less than 5%	1.5	0.5	1.6	3.6
– greater than or equal to 5% and less than 10%	0.2	0.1	0.3	0.6
– greater than or equal to 10% and less than 20%	–	–	0.4	0.4
– greater than or equal to 20% and less than 40%	–	–	0.2	0.2
– greater than or equal to 40% or exposures in default	0.3	–	0.3	0.6
	34.6	6.0	6.7	47.3
Total retail				
Expected loss band				
– less than 1%	212.3	117.2	43.4	372.9
– greater than or equal to 1% and less than 5%	12.2	3.8	13.2	29.2
– greater than or equal to 5% and less than 10%	1.6	0.5	2.3	4.4
– greater than or equal to 10% and less than 20%	0.5	0.3	2.4	3.2
– greater than or equal to 20% and less than 40%	0.2	0.1	0.9	1.2
– greater than or equal to 40% or exposures in default	2.4	0.4	5.7	8.5
At 31 December 2014	229.2	122.3	67.9	419.4

1 *The MENA and Latin America regions are not included in this table as retail exposures in these regions are calculated under the standardised approach.*

Model performance

Model validation within HSBC is subject to global internal standards. All material models whose outputs are used in calculations of IRB capital requirements fall under this governance framework. These arrangements are designed to support a comprehensive quantitative and qualitative process within a cycle of model monitoring and validation that includes:

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

The purpose of periodic monitoring and validation is therefore:

- to determine that the model continues to produce accurate outputs, suitable for the intended purposes;
- to confirm that the model remains conceptually sound, that the model design is still appropriate and the assumptions made at development remain valid;
- to ensure that the model is used for its intended purpose and for appropriate exposures only (use test); and
- to prompt corrective actions when the model outputs move away from the expected levels. These actions would include redevelopment of the model and, where appropriate, mitigating capital overlays until implementation of the revised model.

Models are validated against a series of metrics and triggers approved by the governance committee. The metrics and quantitative checks for periodic validation include a review of the data inputs and overall population stability, and an assessment of the model's discriminatory power or rank order capability, its calibration accuracy and its performance against available benchmarks. The qualitative checks include and reconfirm all elements assessed at design phase, including the model's conceptual soundness.

The results of periodic in-depth validation must be presented to a model governing committee at least annually. A subset of the key performance metrics is produced and reviewed as part of the ongoing monitoring process.

A large number of models are used within the Group, and data at individual model level is, in most cases, immaterial in the context of the overall Group. We therefore disclose data covering most wholesale models including corporate models on an aggregated basis, and on our individually most material retail models as set out in table 31. The tables below show estimated values at the beginning of the relevant observation periods and subsequent actual experienced values for key regulatory calculation metrics. Values for wholesale models are shown in tables 36 and 37 and for retail models in table 38. The basis of preparation of each table is set out below and in footnotes.

Wholesale credit models

For wholesale portfolios, we disclose the performance of models covering sovereign obligors, banks and corporates. As explained on page 47, we operate global models for the first two of these customer groups. In the case of corporates, we have aggregated data on models covering a customer population ranging from large multinational companies to medium-sized and smaller corporates. The PD analysis for this group includes mainly advanced IRB exposures but also a small element of foundation IRB.

In table 36, the data for sovereigns and banks are based on such a small number of defaults that the comparison of estimated with actual results, even where these are available, is not fully reflective of a model's performance. To mitigate this characteristic of low-default portfolios, additional analysis is carried out on these models at annual validation. This analysis shows that they discriminate risk well and are appropriately calibrated. The latter reflects both a prudent modelling approach and the conservatism required by regulations. As noted in table 27, sovereign and institutions exposures are subject to an explicit LGD floor applied for the calculation of regulatory capital.

Within table 36, for back-testing purposes, a customer's CRR/PD is observed at a point in time and then their default or non-default status in the following one-year period is recorded against that PD grade. The PD presentation in table 36 is expressed for all exposure classes on an obligor basis, as model performance is judged on this basis in validation. The LGD and EAD refer to observations for the defaulted population, being the appropriate focus of an assessment of these models' performance.

Table 36: IRB models – estimated and actual values (wholesale)[1]

	PD[2]		LGD[3]		EAD[4]	
	Estimated %	Actuals %	Estimated[5] %	Actuals[5] %	Estimated %	Actuals %
2015						
Sovereigns model[6]	**1.72**	**1.12**	**45.00**	**–**	**0.07**	**–**
Banks model	**2.22**	**–**	**–**	**–**	**–**	**–**
Corporates models[7]	**1.89**	**1.26**	**37.74**	**21.52**	**0.60**	**0.55**
2014						
Sovereigns model[6]	2.27	–	–	–	–	–
Banks model	3.28	–	–	–	–	–
Corporates models[7]	1.88	1.16	36.83	16.06	0.47	0.34
2013						
Sovereigns model[6]	4.14	–	–	–	–	–
Banks model	3.18	0.20	40.01	–	0.06	0.04
Corporates models[7]	2.63	1.20	33.09	18.69	0.54	0.48

1 *Data represents an annual view, analysed at 30 September.*
2 *Estimated PD for all models is average PD calculated on the number of obligors covered by the model(s).*
3 *Average LGD values are EAD-weighted.*
4 *Expressed as a percentage of total EAD which includes all defaulted and non-defaulted exposures for the relevant population.*
5 *For sovereigns and banks models, estimated and actual LGD represents the average LGD for customers that defaulted in the year. For corporates models, they represent the average LGD for customers that have defaulted and which have been resolved in the period.*
6 *There was one sovereign default in 2015 (Greece) but no actual loss was incurred. In both 2015 and 2014, the estimated PD excludes inactive sovereign obligors.*
7 *Covers the combined populations of the global large corporates model, all regional IRB models for large, medium and small corporates and non-bank financial institutions. In 2015 and 2014, the estimated and observed PDs were calculated only for unique obligors.*

Table 37 expands upon the estimated and actual corporate PD in table 36, as sufficient defaults in this population make analysis at this level meaningful. This analysis is conducted as part of regular validation to ensure that, throughout the entire population, there is a satisfactory degree of conservative performance at all grades. Table 37 is not comparable with table 30c, mainly because table 37 is a distribution of facility limits, rather than exposure value, and for a back-testing population that does not exactly match the exposure class population of tables 28 and 30.

Table 37: IRB models – corporate PD models – performance by CRR grade

	Corporates[1]				
	Facility[2] %	Defaulted[3] %	Estimated PD[4] %	Actual PD[5] %	Diff. in PD %
2015					
CRR 0.1[6]	**0.00**	**0.00**	**0.01**	**0.00**	**0.01**
CRR 1.1	**5.72**	**0.00**	**0.02**	**0.00**	**0.02**
CRR 1.2	**5.25**	**0.00**	**0.04**	**0.00**	**0.04**
CRR 2.1	**16.48**	**0.00**	**0.07**	**0.00**	**0.07**
CRR 2.2	**14.17**	**0.00**	**0.13**	**0.01**	**0.12**
CRR 3.1	**11.92**	**0.17**	**0.22**	**0.15**	**0.07**
CRR 3.2	**11.00**	**0.10**	**0.37**	**0.30**	**0.07**
CRR 3.3	**9.35**	**0.14**	**0.63**	**0.47**	**0.16**
CRR 4.1	**6.52**	**0.64**	**0.87**	**0.97**	**(0.10)**
CRR 4.2	**5.07**	**0.45**	**1.20**	**1.06**	**0.14**
CRR 4.3	**4.38**	**0.62**	**1.65**	**1.55**	**0.10**
CRR 5.1	**3.52**	**0.99**	**2.25**	**1.24**	**1.01**
CRR 5.2	**2.19**	**0.61**	**3.05**	**1.44**	**1.61**
CRR 5.3	**2.24**	**1.74**	**4.20**	**1.89**	**2.31**
CRR 6.1	**0.89**	**4.66**	**5.75**	**5.05**	**0.70**
CRR 6.2	**0.66**	**3.58**	**7.85**	**6.46**	**1.39**
CRR 7.1	**0.31**	**10.79**	**10.00**	**7.13**	**2.87**
CRR 7.2	**0.09**	**7.27**	**13.00**	**9.48**	**3.52**
CRR 8.1	**0.14**	**11.33**	**19.00**	**11.11**	**7.89**
CRR 8.2	**0.07**	**16.97**	**36.00**	**23.61**	**12.39**
CRR 8.3	**0.03**	**16.66**	**75.00**	**17.10**	**57.90**
Total	**100.00**				

	Corporates[1]				
	Facility[2] %	Defaulted[3] %	Estimated PD[4] %	Actual PD[5] %	Diff. in PD %
2014					
CRR 0.1[6]	0.01	0.00	0.01	0.00	0.01
CRR 1.1	6.32	0.00	0.02	0.00	0.02
CRR 1.2	6.68	0.00	0.04	0.00	0.04
CRR 2.1	16.71	0.01	0.07	0.04	0.03
CRR 2.2	13.07	0.00	0.13	0.00	0.13
CRR 3.1	10.38	0.06	0.22	0.10	0.12
CRR 3.2	12.50	0.11	0.37	0.23	0.14
CRR 3.3	6.62	0.25	0.63	0.54	0.09
CRR 4.1	10.41	0.28	0.87	0.54	0.33
CRR 4.2	4.12	0.79	1.20	0.81	0.39
CRR 4.3	3.49	0.83	1.65	0.91	0.74
CRR 5.1	2.50	0.53	2.25	0.97	1.28
CRR 5.2	2.09	0.54	3.05	1.24	1.81
CRR 5.3	1.47	1.74	4.20	2.70	1.50
CRR 6.1	0.59	3.02	5.75	4.11	1.64
CRR 6.2	0.30	1.12	7.85	4.27	3.58
CRR 7.1	0.29	14.59	10.00	11.35	(1.35)
CRR 7.2	0.08	2.78	13.00	10.11	2.89
CRR 8.1	2.31	1.17	19.00	13.77	5.23
CRR 8.2	0.04	32.32	36.00	22.33	13.67
CRR 8.3	0.02	4.85	75.00	14.89	60.11
Total	100.00				
2013					
CRR 0.1[6]	0.00	0.00	0.01	0.00	0.01
CRR 1.1	4.83	0.00	0.02	0.00	0.02
CRR 1.2	7.47	0.00	0.04	0.00	0.04
CRR 2.1	20.85	0.00	0.07	0.00	0.07
CRR 2.2	10.38	0.01	0.13	0.03	0.10
CRR 3.1	10.79	0.07	0.22	0.16	0.06
CRR 3.2	9.49	0.13	0.37	0.22	0.15
CRR 3.3	8.33	0.15	0.63	0.27	0.36
CRR 4.1	6.40	0.35	0.87	0.48	0.39
CRR 4.2	5.84	0.93	1.20	0.80	0.40
CRR 4.3	4.22	0.47	1.65	0.67	0.98
CRR 5.1	4.18	0.72	2.25	0.76	1.49
CRR 5.2	3.07	0.97	3.05	1.03	2.02
CRR 5.3	1.85	2.77	4.20	1.89	2.31
CRR 6.1	0.98	4.37	5.75	3.28	2.47
CRR 6.2	0.46	5.74	7.85	3.77	4.08
CRR 7.1	0.44	12.69	10.00	7.95	2.05
CRR 7.2	0.15	7.84	13.00	8.68	4.32
CRR 8.1	0.15	9.48	19.00	11.44	7.56
CRR 8.2	0.07	14.94	36.00	13.70	22.30
CRR 8.3	0.05	13.12	75.00	13.64	61.36
Total	100.00				

1 *Covers the combined populations of the global large corporates model, all regional IRB models for large, medium and small corporates and non-bank financial institutions.*

2 *Total facility limits for each CRR grade, expressed as a percentage of total limits granted.*

3 *Defaulted facilities as a percentage of total facility limits at that grade.*

4 *The estimated PD is before application of the 0.03% regulatory floor.*

5 *Actual PD is based on the number of defaulted obligors covered by the model(s), without taking into account the size of the facility granted or the exposures to the obligor.*

6 *The top band of the wholesale CRR master scale is not available to entities in the corporates exposure class, but restricted to the strongest central governments, central banks and institutions.*

Retail credit models

In the case of retail portfolios, we do not operate global models due to the different country-level portfolio performance characteristics and loss history. Given the large number of retail IRB models globally, we disclose information on our most material local models.

The actual and estimated values are derived from the model monitoring and calibration processes performed at a local level. Within the discipline of our global modelling policies, our analytics teams adopt back-testing criteria specific to local conditions in order to assess the accuracy of their models.

Table 38 contains the estimated and actual values from the back-testing of our material IRB models covering the HSBC brand portfolios in the UK, the HSBC portfolios under the Area Management Office in Hong Kong, and the residential mortgage portfolios in the US.

The PD, LGD and EAD estimated values here were calculated to compare with the reported actual values and have a different basis of preparation to the estimates reported in tables 32 and 33.

Within table 38, for back-testing purposes, a customer's PD is observed at a point in time and their default or non-default status in the following one-year period is recorded against that PD grade. The PD presentation here is expressed on an obligor count basis consisting of non-defaulted obligors at the time of observation. The LGD and EAD refer to observations for the defaulted population, being the appropriate focus of an assessment of these models' performance. The LGD values represent the amount of loss as a percentage of EAD and are calculated based on defaulted accounts that were fully resolved or have completed the modelled recovery outcome period at the reporting date. The EAD values of the defaulted exposures are presented as a percentage of the total EAD which includes all defaulted and non-defaulted exposures for the relevant population. The regulatory PD and LGD floors of 0.03% and 10%, respectively, are applied during final capital calculation and hence are not reflected in the estimates below.

The UK estimated values in table 38 are based on model outputs including required regulatory downturn adjustments.

In conducting the back-testing, our UK HSBC residential mortgage LGD model uses a recovery outcome period of 24 months starting at the date of default. The significant proportion of defaulted population, which has not reached a fully resolved outcome at the reporting date, contributed to the low actual LGD while the estimated LGD increased as a result of the required downturn adjustments. Overall, UK estimates in table 38 remain conservative and higher than calculated actual values.

The Hong Kong estimated PD and LGD values in table 38 include required stressed factors to reflect downturn conditions, especially in the case of the residential mortgage model. The LGD model for our Hong Kong HSBC residential mortgage portfolio uses a recovery outcome period of 24 months starting at the date of default. The estimates for our Hong Kong HSBC residential mortgage LGD remain higher than the calculated actual values but significantly below the 10% regulatory floor. The Hong Kong credit card EAD model currently underestimates exposure values at the point of default; however, this is mitigated by a temporary adjustment to RWAs. An updated model is expected to be implemented by the end of 2016.

The US estimates in table 38 include downturn adjustments and model overlays agreed with the PRA. The LGD models for our Consumer Lending and Mortgage Services portfolios use a recovery outcome period of 30 months, and for HSBC Mortgage Corporation portfolio 36 months, reflecting the longer recovery process due to foreclosure moratoria.

The LGD estimates for our Consumer Lending and Mortgage Services portfolios remained stable in 2015; however, actual LGD values are decreasing due to the continuing sale of assets and improving house prices in the US.

For the HSBC Mortgage Corporation portfolio, we report the estimates from the current models whilst we await approval from the PRA for the new models and continue to make the agreed quantitative adjustment to the amount of capital we hold against this portfolio to reflect the underperformance of the current models. The quantitative adjustment is performed at the portfolio RWA and EL levels and hence is not reflected in table 38.

Table 38: IRB models – estimated and actual values (retail)

	PD		LGD		EAD	
	Estimated %	Actuals %	Estimated %	Actuals %	Estimated %	Actuals %
2015						
UK						
HSBC residential mortgage	**0.45**	**0.22**	**16.43**	**3.54**	**0.17**	**0.17**
HSBC credit card	**1.06**	**0.86**	**91.54**	**88.42**	**1.23**	**1.19**
HSBC personal loans	**1.93**	**1.23**	**82.10**	**78.46**	**1.18**	**1.13**
Business Banking (Retail SME)	**2.26**	**2.21**	**76.06**	**71.78**	**1.57**	**1.47**
Hong Kong						
HSBC personal residential mortgage	**0.79**	**0.03**	**1.90**	**0.03**	**0.04**	**0.03**
HSBC credit card	**0.67**	**0.32**	**90.40**	**81.75**	**0.52**	**0.58**
HSBC personal instalment loans	**2.40**	**2.02**	**89.43**	**69.59**	**1.69**	**1.51**
US						
Consumer Lending real estate first lien	**5.92**	**5.47**	**75.98**	**51.60**	**5.37**	**5.31**
Mortgage Services real estate first lien	**6.96**	**5.96**	**69.59**	**54.09**	**7.97**	**7.88**
HSBC Mortgage Corporation first lien	**4.66**	**2.08**	**29.63**	**37.19**	**0.70**	**0.69**
2014						
UK						
HSBC residential mortgage	0.50	0.31	15.82	4.68	0.24	0.23
HSBC credit card	1.37	1.07	91.11	86.30	1.83	1.78
HSBC personal loans	2.28	1.57	81.56	80.45	1.52	1.46
Business Banking (Retail SME)	2.83	2.57	73.04	68.17	2.00	1.88
Hong Kong						
HSBC personal residential mortgage	0.72	0.04	1.26	0.35	0.03	0.03
HSBC credit card	0.62	0.32	92.91	88.13	0.55	0.59
HSBC personal instalment loans	2.37	2.04	89.69	87.66	1.77	1.63
US						
Consumer Lending real estate first lien	7.31	7.72	77.16	60.29	7.83	7.72
Mortgage Services real estate first lien	9.43	8.12	71.40	60.17	7.51	7.43
HSBC Mortgage Corporation first lien	5.24	2.28	29.63	39.36	1.00	1.00
2013						
UK						
HSBC residential mortgage	0.55	0.38	17.30	6.40	0.32	0.31
HSBC credit card	1.54	1.27	88.10	84.10	1.70	1.67
HSBC personal loans	3.57	2.35	85.40	73.00	2.19	2.11
Business Banking (Retail SME)	2.39	2.61	78.00	70.00	2.03	1.99
Hong Kong						
HSBC personal residential mortgage	0.71	0.03	1.84	0.43	0.03	0.03
HSBC credit card	0.63	0.33	91.41	84.58	0.56	0.59
HSBC personal instalment loans	2.20	1.99	90.07	96.16	1.69	1.55
US						
Consumer Lending real estate first lien	7.74	8.22	67.13	64.93	7.08	6.72
Mortgage Services real estate first lien	10.15	9.68	60.04	62.92	6.12	5.88
HSBC Mortgage Corporation first lien	4.64	4.43	49.85	37.17	2.40	2.40

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

Table 39 and 40 analyse past due but not impaired exposures, impaired 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 354 of the Annual Report and Accounts 2015*, and the Group's definitions for accounting purposes of 'past due' and 'impaired' are set out on pages 127 and 128 respectively.*

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

Table 39: Past due but not impaired exposures, impaired exposures and impairment allowances and other credit risk provisions by counterparty and by geographical region

	Europe $m	Asia $m	MENA $m	North America $m	Latin America $m	Total $m
Past due but not impaired exposures	1,928	4,925	1,159	5,466	1,252	14,730
– personal	1,152	2,935	329	3,332	790	8,538
– corporate and commercial	762	1,948	732	1,868	460	5,770
– financial	14	42	98	266	2	422
Impaired exposures	11,209	4,095	1,977	9,135	3,151	29,567
– personal	2,533	817	230	8,130	857	12,567
– corporate and commercial	6,873	3,267	1,629	1,003	2,285	15,057
– financial	1,803	11	118	2	9	1,943
Impairment allowances and other credit risk provisions	(3,895)	(4,087)	(1,643)	(2,235)	(2,168)	(14,028)
– personal	(948)	(735)	(267)	(1,232)	(872)	(4,054)
– corporate and commercial	(2,752)	(3,339)	(1,182)	(971)	(1,296)	(9,540)
– financial	(195)	(13)	(194)	(32)	–	(434)

Table 40: Movement in specific credit risk adjustments by counterparty and by geographical region

	Europe $m	Asia $m	MENA $m	North America $m	Latin America $m	Total $m
Specific credit risk adjustments at 1 January 2015	4,430	3,883	1,633	2,764	2,621	15,331
Amounts written off	(1,295)	(595)	(336)	(662)	(1,306)	(4,194)
– personal	(626)	(416)	(114)	(554)	(997)	(2,707)
– corporate and commercial	(657)	(179)	(222)	(106)	(309)	(1,473)
– financial	(12)	–	–	(2)	–	(14)
Recoveries of amounts written off in previous years	388	165	33	76	146	808
– personal	340	135	30	57	119	681
– corporate and commercial	46	30	3	18	27	124
– financial	2	–	–	1	–	3
Charge to income statement	734	1,392	336	547	1,450	4,459
– personal	263	334	127	157	983	1,864
– corporate and commercial	457	1,058	199	397	467	2,578
– financial	14	–	10	(7)	–	17
Exchange and other movements	(362)	(758)	(23)	(490)	(743)	(2,376)
Specific credit risk adjustments at 31 December 2015	3,895	4,087	1,643	2,235	2,168	14,028

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 41 and 42 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 which occurred during the financial year and changes in estimates of losses arising on events which occurred prior to the current year. EL represents the one-year regulatory expected loss accumulated in the book and is calculated at a point in time.

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 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;
- the LGD and EAD used for the EL calculation in the foundation IRB approach is set by regulations and may differ significantly from the accounting assumptions about estimated cash flows used;
- 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.

Table 41: IRB expected loss and CRAs – by exposure class[1]

		CRA	
	Expected loss $bn	Balances $bn	Charge for the year $bn
IRB exposure classes			
Central governments and central banks	**0.2**	**–**	**–**
Institutions	**0.1**	**–**	**–**
Corporates	**5.5**	**4.5**	**1.0**
Retail	**5.5**	**2.1**	**0.4**
– secured by mortgages on immovable property SME	**–**	**–**	**–**
– secured by mortgages on immovable property non-SME	**3.5**	**1.2**	**–**
– qualifying revolving retail	**0.7**	**0.2**	**0.2**
– other SME	**0.7**	**0.3**	**–**
– other non-SME	**0.6**	**0.4**	**0.2**
At 31 December 2015	**11.3**	**6.6**	**1.4**
IRB exposure classes			
Central governments and central banks	0.3	–	–
Institutions	0.3	–	–
Corporates	5.2	4.2	1.1
Retail	7.2	3.1	0.2
– secured by mortgages on immovable property SME	–	–	–
– secured by mortgages on immovable property non-SME	5.1	1.9	(0.1)
– qualifying revolving retail	0.7	0.3	0.1
– other SME	0.7	0.4	–
– other non-SME	0.7	0.5	0.2
At 31 December 2014	13.0	7.3	1.3
IRB exposure classes			
Central governments and central banks	0.3	–	–
Institutions	0.3	0.1	–
Corporates	5.8	4.4	1.5
Retail	9.3	5.1	1.2
– secured on real estate property	7.2	3.6	0.8
– qualifying revolving retail	0.7	0.4	0.3
– SMEs	0.9	0.7	–
– other retail	0.5	0.4	0.1
At 31 December 2013	15.7	9.6	2.7

1 *Excludes securitisation exposures because EL is not calculated for this exposure class.*

Table 42: IRB expected loss and CRAs – by region[1]

		CRA	
	Expected loss $bn	Balances $bn	Charge for the year $bn
Europe	**4.3**	**2.9**	**0.4**
Asia	**2.3**	**1.3**	**0.5**
Middle East and North Africa	**0.2**	**0.3**	**0.1**
North America	**4.4**	**2.0**	**0.4**
Latin America	**0.1**	**0.1**	**–**
At 31 December 2015	**11.3**	**6.6**	**1.4**
Europe	4.8	3.5	0.7
Asia	2.2	1.1	0.4
Middle East and North Africa	0.2	0.1	–
North America	5.7	2.6	0.2
Latin America	0.1	–	–
At 31 December 2014	13.0	7.3	1.3

1 *Excludes securitisation exposures because EL is not calculated for this exposure class.*

Key points

- EL and impairments decreased in North America, primarily due to the continued run-off of the US CML retail mortgage portfolio and a lower level of newly impaired loans as well as overall lower loan balances due to portfolio sales. This was partially offset by some new defaults.

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 nevertheless a key aspect of effective risk management and, in a diversified financial services organisation such as HSBC, takes many forms.

Our general policy is to promote the use of credit risk mitigation, justified by commercial prudence and good practice as well as capital efficiency. Specifically, detailed policies cover the acceptability, structuring and terms of various types of business 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 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. Guarantees from third parties can arise where the Group extends facilities without the benefit of any alternative form of security, e.g. where it issues a bid or performance bond in favour of a non-customer at the request of another bank.

For credit risk mitigants comprising immovable property the key determinant of concentration at Group level is geographic, which, in the majority of cases, is the same as the reported geographical location of the related exposures. 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 139 and 147, respectively, of the Annual Report and Accounts 2015.

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 SFTs 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 banking 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 which are monitored and the relevant customer agreements are subject to review and update, as necessary, to ensure the legal right of offset remains appropriate. At 31 December 2015 in the region of $67bn of customer accounts were treated as cash collateral, mainly in the UK.

Other forms of credit risk mitigation

Our 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 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. Corporates would normally provide guarantees as part of a parent/subsidiary or common parent relationship and would span a number of credit grades. The Export Credit Agencies 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 OTC derivatives and SFTs, we typically carry out daily valuations in support of margining arrangements. In the residential mortgage business, Group policy prescribes re-valuation 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. Re-valuations are sought where, for

example, as part of the regular credit assessment of the obligor, material concerns arise in relation to the performance of the collateral. CRE re-valuation 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. Where such concerns exist the re-valuation method selected will depend upon the loan to value relationship, the direction in which the local CRE market has moved since the last valuation and, most importantly, the specific characteristics of the underlying CRE which is of concern.

Recognition of risk mitigation under the IRB approach

Within an IRB approach, risk mitigants are considered in two broad categories: first, those which reduce the intrinsic PD of an obligor and therefore operate as determinants of PD; and second, those which affect the estimated recoverability of obligations and require adjustment of LGD or, in certain limited circumstances, EAD.

The first typically include full parental guarantees – where one obligor within a group of companies guarantees another. This is usually factored into the estimate of the latter's PD, as it is assumed that the guarantor's performance materially informs the PD of the guaranteed entity. PD estimates are also subject to supplementary methodologies in respect of a 'sovereign ceiling', constraining the risk ratings assigned to obligors in countries of higher risk, and where only partial parental support exists. In addition, in certain jurisdictions, certain types of third party guarantee are recognised by substituting the guarantor's PD for the obligor'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 taken into consideration 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 latter typically in support of subsidiaries of their company group. Across HSBC, the nature of such customers and transactions is very diverse and the creditworthiness of guarantors accordingly spans a wide spectrum. The creditworthiness of providers of unfunded credit risk mitigation is taken into consideration as part of the guarantor's risk profile when, for example, assessing the risk of other exposures such as direct lending to the guarantor. 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 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 and processing, including performance of calculations to apply the relevant regulatory rules and approach. 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 (as a significant factor in grade determination) or LGD, or both;
- eligible financial collateral under the IRB advanced approach is taken into account 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 43 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 2015.

Table 43: IRB exposure – credit risk mitigation

	At 31 December 2015		At 31 December 2014	
	Exposure value covered by credit derivatives or guarantees[1] $bn	**Total exposure value $bn**	Exposure value covered by credit derivatives or guarantees[1] $bn	Total exposure value $bn
Exposures under the IRB advanced approach				
Central governments and central banks	**0.5**	**327.4**	0.3	327.4
Institutions	**0.4**	**90.5**	0.8	130.4
Corporates	**86.4**	**597.3**	82.3	625.8
Retail	**20.3**	**404.5**	21.3	419.4
Securitisation positions	**–**	**40.9**	–	38.3
Non-credit obligation assets	**–**	**50.2**	–	52.5
		1,510.8		1,593.8
Exposures under the IRB foundation approach				
Central governments and central banks	**–**	**0.1**	–	0.1
Institutions	**–**	**0.3**	–	0.1
Corporates[2]	**0.5**	**43.3**	0.5	25.6

1 *Figures presented in an 'obligor basis'.*
2 *The value of exposures under the IRB foundation approach covered by eligible financial and other collateral was $7.9bn (2014: $0.5bn).*

Application of the standardised approach

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 ECAIs or Export Credit Agencies 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, S&P and Fitch. We have not nominated any Export Credit Agencies.

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 EEA States are risk-weighted at 0% using the standardised approach, provided they would be eligible under that approach for a 0% risk weighting.

Associates' exposures are calculated under the standardised approach and, at 31 December 2015, represented approximately 18% (2014: 16%) of Group credit risk RWAs.

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.

Table 44 sets out the credit risk mitigation for exposures under the standardised approach, expressed as the exposure value covered by the credit risk mitigant, and table 45 sets out the distribution of standardised exposures across credit quality steps. This analysis excludes regional governments or local authorities, short-term claims, securitisation positions, CIUs and MDBs, as these exposures continue to be immaterial as a percentage of total standardised exposures. Also excluded, because the credit quality step methodology does not apply, are retail, equity, exposures in default and exposures secured by mortgages on immovable property.

Table 44: Standardised exposure – credit risk mitigation

	2015			2014		
	Exposure value covered by eligible financial and other collateral[1] $bn	**Exposure value covered by credit derivatives or guarantees[1] $bn**	**Total exposure value $bn**	Exposure value covered by eligible financial and other collateral[1] $bn	Exposure value covered by credit derivatives or guarantees[1] $bn	Total Exposure value $bn
Exposures under the standardised approach						
Central governments and central banks	**–**	**0.2**	**199.9**	–	–	189.3
Institutions	**–**	**4.3**	**38.9**	–	2.5	30.1
Corporates	**14.5**	**5.0**	**226.4**	14.8	4.8	240.1
Retail	**0.7**	**0.1**	**44.2**	0.8	0.1	47.9
Secured by mortgages on immovable property	**–**	**–**	**40.3**	0.2	–	38.6
Exposures in default	**–**	**–**	**4.9**	–	–	4.7
Regional governments or local authorities	**–**	**–**	**2.8**	–	–	1.1
Equity	**–**	**–**	**7.0**	–	–	13.2
Other[2]	**–**		**27.6**	–	–	25.5
At 31 December			**592.0**			590.5

1 *Figures presented on an 'obligor basis'.*

2 *This includes the exposure class 'other items' with an exposure value of $19.4bn as well as other less material standardised exposure classes not individually shown above.*

Table 45: Standardised exposure – by credit quality step

	At 31 December 2015			At 31 December 2014		
	Original exposure[1] $bn	**Exposure value $bn**	**RWAs $bn**	Original exposure[1] $bn	Exposure value $bn	RWAs $bn
Central governments and central banks						
Credit quality step 1	**138.1**	**145.5**		171.0	177.1	
Credit quality step 2	**1.4**	**1.9**		0.7	0.8	
Credit quality step 3	**2.5**	**2.8**		0.6	0.9	
Credit quality step 4	**0.4**	**0.1**		0.5	0.5	
Credit quality step unrated	**49.6**	**49.6**		9.9	10.0	
	192.0	**199.9**	**20.0**	182.7	189.3	19.7
Institutions						
Credit quality step 1	**1.6**	**0.7**		1.2	0.6	
Credit quality step 2	**4.7**	**1.4**		2.1	1.1	
Credit quality step 5	**0.1**	**0.1**		–	–	
Credit quality step unrated	**36.8**	**36.7**		28.7	28.4	
	43.2	**38.9**	**14.7**	32.0	30.1	11.2
Corporates						
Credit quality step 1	**1.6**	**0.8**		2.3	1.3	
Credit quality step 2	**6.2**	**4.2**		7.3	4.8	
Credit quality step 3	**2.7**	**1.4**		2.7	1.6	
Credit quality step 4	**2.1**	**1.6**		2.7	1.7	
Credit quality step 5	**1.3**	**0.8**		1.6	1.0	
Credit quality step 6	**2.8**	**2.0**		3.1	2.3	
Credit quality step unrated	**330.6**	**215.6**		345.9	227.4	
	347.3	**226.4**	**210.6**	365.6	240.1	224.7

1 *Figures presented on an 'obligor basis'.*

Counterparty credit risk

CCR risk arises for derivatives and SFTs. It is calculated in both the trading and non-trading books, and is the risk that a counterparty may default before settlement of the transaction. An economic loss occurs if the transaction or portfolio of transactions with the counterparty has a positive economic value at the time of default. CCR is generated primarily in our wholesale global businesses.

Three approaches may be used under CRD IV to calculate exposure values for CCR: mark-to-market, standardised and IMM. Exposure values calculated under these approaches are used to determine RWAs. Across the Group, we use the mark-to-market and IMM approaches. Under the mark-to-market approach, the EAD is calculated as current exposure plus regulatory add-ons. We use this approach for all products not covered by our IMM permission. Under the IMM approach, EAD is calculated by multiplying the effective expected positive exposure with a multiplier called 'alpha'.

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

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

The effective expected exposure is derived from simulation, pricing and aggregation internal models approved by regulators. These models cover a range of asset classes including interest rate products, foreign exchange products, credit derivatives and equity derivatives.

The IMM model is subject to on-going model validation including monthly model performance monitoring. We also perform quarterly backtesting of the model's risk measures on a set of hypothetical portfolios as well as the market risk factor predictions. Calibration is performed using a minimum of three years historical data.

The only IMM site is London where approximately 88% of the trade population falls under the IMM approach.

From a risk management perspective, including daily monitoring of credit limit utilisation, products not covered by IMM are subject to conservative asset class add-on tables calculated outside of the IMM framework.

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

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

The models and methodologies used in the calculation of CCR are approved by the Markets MOC. Models are subject to ongoing monitoring and validation. Additionally, they are subject to independent review at inception and annually thereafter.

Credit valuation adjustment

CRD IV introduced a regulatory capital charge to cover CVA risk, the risk of adverse moves in the credit valuation adjustments taken for expected credit losses on derivative transactions. Where we have both specific risk VaR approval and internal model method approval for a product, the CVA VaR approach has been used to calculate the CVA capital charge. Where we do not hold both approvals, the standardised approach has been applied. Certain counterparty exposures are exempt from CVA, such as non-financial counterparties and sovereigns.

Collateral arrangements

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

Eligible collateral types are controlled under a policy to ensure price transparency, price stability, liquidity, enforceability, independence, reusability and eligibility for regulatory purposes. A valuation 'haircut' policy reflects the fact that collateral may fall in value between the date the collateral was called and the date of liquidation or enforcement. At least 96% of collateral held as credit risk mitigation under CSA's is either cash or liquid government securities.

Credit ratings downgrade

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

We control the inclusion of credit ratings downgrade language in a Master Agreement or a CSA by requiring each Group office to obtain the endorsement of the relevant credit authority together with the approval of the Regional Global Markets Chief Operating Officer via a Documentation Approval Committee.

Relevant management information is in place to enable us to identify any additional collateral requirements, where the threshold levels for these are affected by a credit ratings downgrade clause within a collateral agreement.

At 31 December 2015, the potential value of the additional collateral pertaining to International Swaps and Derivatives Association CSA downgrade thresholds that we would need to post with counterparties in the event of a one-notch downgrade of our rating was $0.3bn (2014: $0.5bn) and for a two-notch downgrade was $0.5bn (2014: $1.2bn).

Counterparty credit risk exposures

The following tables analyse CCR exposures and RWAs.

Table 46: Counterparty credit risk exposure – credit derivative transactions[1]

	2015			2014		
	Protection bought $bn	**Protection sold $bn**	**Total $bn**	Protection bought $bn	Protection sold $bn	Total $bn
Credit derivative products used for own credit portfolio						
Credit default swaps	**3.5**	**0.7**	**4.2**	1.9	0.1	2.0
Total notional value	**3.5**	**0.7**	**4.2**	1.9	0.1	2.0
Credit derivative products used for intermediation[2]						
Credit default swaps	**222.5**	**217.7**	**440.2**	263.3	262.5	525.8
Total return swaps	**11.2**	**7.7**	**18.9**	7.2	15.2	22.4
Total notional value	**233.7**	**225.4**	**459.1**	270.5	277.7	548.2
Total credit derivative notional value at 31 December	**237.2**	**226.1**	**463.3**	272.4	277.8	550.2

1 *This table provides a further breakdown of totals reported on page 396 of the* Annual Report and Accounts 2015 *on an accounting consolidation basis.*
2 *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.*

Table 47: Counterparty credit risk – net derivative credit exposure[1]

	2015 $bn	2014 $bn
Counterparty credit risk[2]		
Gross total fair values	**394.3**	595.5
Accounting offset arrangements	**(105.9)**	(250.5)
Total gross derivatives	**288.4**	345.0
Less: netting benefits[3]	**(215.8)**	(263.4)
Netted current credit exposure	**72.6**	81.6
Less: collateral held	**(43.0)**	(49.9)
Net derivative credit exposure at 31 December	**29.6**	31.7

1 *This table provides a further breakdown of totals reported on page 395 in the* Annual Report and Accounts 2015 *on an accounting consolidation basis.*
2 *Excludes add-on for potential future credit exposure.*
3 *This is the netting benefit available for regulatory capital purposes which is not recognised under accounting rules.*

Under IFRSs, 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.

Table 48 shows how the total OTC derivative regulatory exposures in table 49 are derived from the gross total fair values reported in table 47.

Table 48: Comparison of derivative accounting balances and counterparty credit risk exposure

	Accounting balances $bn	Regulatory exposures $bn
Gross total fair values		
OTC derivatives	**381.3**	**381.3**
Spot transactions[1]	**10.3**	**–**
Exchange traded derivatives	**2.7**	**2.7**
Derivatives Held for sale[5]	**–**	**1.8**
	394.3	**385.8**
Initial margin posted to central counterparties[2]	**–**	**8.8**
Derivatives under the securitisation framework		**(0.9)**
Accounting offset arrangements		
IFRSs basis	**(105.9)**	**–**
Mark-to-market method		
Potential future credit exposure	**–**	**147.2**
Legal right of offset[3]	**–**	**(201.2)**
IMM method		
Modelling impact[4]	**–**	**(212.2)**
Total derivative exposures at 31 December 2015	**288.4**	**126.6**
Gross total fair values		
OTC derivatives	578.0	578.0
Spot transactions[1]	13.7	–
Exchange traded derivatives	3.8	3.8
	595.5	581.8
Initial margin posted to central counterparties[2]	–	9.9
Accounting offset arrangements		
IFRSs basis	(250.5)	–
Mark-to-market method		
Potential future credit exposure	–	157.5
Legal right of offset[3]	–	(314.3)
IMM method		
Modelling impact[4]	–	(286.8)
Total derivative exposures at 31 December 2014	345.0	148.1

1 *Spot transactions attract a zero risk-weight under CRD IV rules.*
2 *Under CRD IV rules, in addition to derivatives transacted with CCPs, initial margin posted to CCPs is included in the regulatory exposures when calculating RWAs.*
3 *Legal right of offset derivative netting is a component of the $258.8bn derivatives offset in the 'Maximum exposure to credit risk' table on page 123 of the* Annual Report and Accounts 2015.
4 *The modelling impact for IMM exposures represents the difference between fair value and the EAD (calculated as 1.4 times the Effective Expected Potential Exposure) resulting from the model; the model incorporates offsets for netting benefits, correlation impacts and collateral as well as simulating the impact of potential market movements.*
5 *Derivatives in entities held for sale are not reported as derivatives in the balance sheet, however continue to be included in the calculation of regulatory EAD for counterparty credit risk until the point of sale.*

Table 49: Counterparty credit risk exposure – by exposure class, product and method

	Modelled approaches		Non-modelled approaches		Total CCR	
	Exposure value $bn	RWAs $bn	Exposure value $bn	RWAs $bn	Exposure value $bn	RWAs $bn
By exposure class						
IRB advanced approach	**24.4**	**10.9**	**104.8**	**33.8**	**129.2**	**44.7**
– central governments and central banks	**2.0**	**0.3**	**11.3**	**1.0**	**13.3**	**1.3**
– institutions	**6.7**	**2.5**	**53.7**	**13.2**	**60.4**	**15.7**
– corporates	**15.7**	**8.1**	**39.8**	**19.6**	**55.5**	**27.7**
IRB foundation approach	**–**	**–**	**5.4**	**2.1**	**5.4**	**2.1**
– corporates	**–**	**–**	**5.4**	**2.1**	**5.4**	**2.1**
Standardised approach	**2.4**	**–**	**6.7**	**4.7**	**9.1**	**4.7**
– central governments and central banks	**2.4**	**–**	**1.7**	**–**	**4.1**	**–**
– institutions	**–**	**–**	**0.5**	**0.1**	**0.5**	**0.1**
– corporates	**–**	**–**	**4.5**	**4.6**	**4.5**	**4.6**
CVA advanced[2]	**–**	**3.3**	**–**	**–**	**–**	**3.3**
CVA standardised[2]	**–**	**–**	**–**	**12.2**	**–**	**12.2**
CCP standardised	**0.1**	**–**	**34.8**	**2.2**	**34.9**	**2.2**
At 31 December 2015	**26.9**	**14.2**	**151.7**	**55.0**	**178.6**	**69.2**
By product						
Derivatives (OTC and Exchange traded derivatives)	**26.9**	**10.9**	**99.7**	**32.3**	**126.6**	**43.2**
SFTs	**–**	**–**	**45.1**	**7.0**	**45.1**	**7.0**
Other[1]	**–**	**–**	**6.9**	**2.2**	**6.9**	**2.2**
CVA advanced[2]	**–**	**3.3**	**–**	**–**	**–**	**3.3**
CVA standardised[2]	**–**	**–**	**–**	**12.2**	**–**	**12.2**
CCP default funds[3]	**–**	**–**	**–**	**1.3**	**–**	**1.3**
At 31 December 2015	**26.9**	**14.2**	**151.7**	**55.0**	**178.6**	**69.2**
By exposure class						
IRB advanced approach	27.1	14.4	107.6	45.3	134.7	59.7
– central governments and central banks	1.5	0.3	7.7	0.8	9.2	1.1
– institutions	9.0	4.4	62.8	21.8	71.8	26.2
– corporates	16.6	9.7	37.1	22.7	53.7	32.4
IRB foundation approach	–	–	5.6	2.3	5.6	2.3
– corporates	–	–	5.6	2.3	5.6	2.3
Standardised approach	3.0	–	8.3	4.4	11.3	4.4
– central governments and central banks	3.0	–	3.7	–	6.7	–
– institutions	–	–	0.3	0.1	0.3	0.1
– corporates	–	–	4.3	4.3	4.3	4.3
CVA advanced[2]	–	3.5	–	–	–	3.5
CVA standardised[2]	–	–	–	18.0	–	18.0
CCP standardised	0.1	–	49.4	2.8	49.5	2.8
At 31 December 2014	30.2	17.9	170.9	72.8	201.1	90.7
By product						
Derivatives (OTC and Exchange traded derivatives)	30.2	14.4	117.9	42.8	148.1	57.2
SFTs	–	–	44.5	7.7	44.5	7.7
Other[1]	–	–	8.5	2.6	8.5	2.6
CVA advanced[2]	–	3.5	–	–	–	3.5
CVA standardised[2]	–	–	–	18.0	–	18.0
CCP default funds[3]	–	–	–	1.7	–	1.7
At 31 December 2014	30.2	17.9	170.9	72.8	201.1	90.7

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

Key points

- Market movements, principally in foreign exchange derivatives, and position reductions as a result of reduced client demand and portfolio compressions decreased RWAs by $15.3bn.
- The reclassification of long dated derivative transactions to the banking book resulted in an RWA decrease of $1.5bn which was offset by an increase in credit risk RWAs.
- In addition, RWA initiatives resulted in RWA reductions of $4.4bn.

Table 50: Counterparty credit risk exposure – by exposure class, product and geographical region

	Exposure value					
	Europe $bn	Asia $bn	MENA $bn	North America $bn	Latin America $bn	Total $bn
By exposure class						
IRB advanced approach	**68.7**	**34.3**	**0.2**	**24.8**	**1.2**	**129.2**
– central governments and central banks	**4.9**	**3.8**	**–**	**4.3**	**0.3**	**13.3**
– institutions	**31.2**	**17.8**	**0.2**	**10.4**	**0.8**	**60.4**
– corporates	**32.6**	**12.7**	**–**	**10.1**	**0.1**	**55.5**
IRB foundation approach	**4.7**	**–**	**0.7**	**–**	**–**	**5.4**
– corporates	**4.7**	**–**	**0.7**	**–**	**–**	**5.4**
Standardised approach	**5.0**	**0.4**	**1.2**	**0.3**	**2.2**	**9.1**
– central governments and central banks	**4.1**	**–**	**–**	**–**	**–**	**4.1**
– institutions	**–**	**–**	**0.2**	**0.3**	**–**	**0.5**
– corporates	**0.9**	**0.4**	**1.0**	**–**	**2.2**	**4.5**
CVA advanced[2]	**–**	**–**	**–**	**–**	**–**	**–**
CVA standardised[2]	**–**	**–**	**–**	**–**	**–**	**–**
CCP standardised	**14.8**	**4.2**	**–**	**15.5**	**0.4**	**34.9**
At 31 December 2015	**93.2**	**38.9**	**2.1**	**40.6**	**3.8**	**178.6**
By product						
Derivatives (OTC and Exchange traded derivatives)	**61.1**	**31.2**	**2.1**	**28.8**	**3.4**	**126.6**
SFTs	**28.9**	**4.1**	**–**	**11.7**	**0.4**	**45.1**
Other[1]	**3.2**	**3.6**	**–**	**0.1**	**–**	**6.9**
CVA advanced[2]	**–**	**–**	**–**	**–**	**–**	**–**
CVA standardised[2]	**–**	**–**	**–**	**–**	**–**	**–**
CCP default funds[3]	**–**	**–**	**–**	**–**	**–**	**–**
At 31 December 2015	**93.2**	**38.9**	**2.1**	**40.6**	**3.8**	**178.6**
By exposure class						
IRB advanced approach	69.2	38.3	0.6	25.1	1.5	134.7
– central governments and central banks	5.8	2.5	–	0.6	0.3	9.2
– institutions	32.7	23.6	0.6	13.7	1.2	71.8
– corporates	30.7	12.2	–	10.8	–	53.7
IRB foundation approach	5.3	–	0.3	–	–	5.6
– corporates	5.3	–	0.3	–	–	5.6
Standardised approach	6.7	0.3	1.7	0.1	2.5	11.3
– central governments and central banks	5.8	–	0.9	–	–	6.7
– institutions	0.1	–	0.2	–	–	0.3
– corporates	0.8	0.3	0.6	0.1	2.5	4.3
CVA advanced[2]	–	–	–	–	–	–
CVA standardised[2]	–	–	–	–	–	–
CCP standardised	25.1	5.1	–	19.1	0.2	49.5
At 31 December 2014	106.3	43.7	2.6	44.3	4.2	201.1
By product						
Derivatives (OTC and Exchange traded derivatives)	76.5	34.7	1.7	31.5	3.7	148.1
SFTs	27.4	2.9	0.9	12.8	0.5	44.5
Other[1]	2.4	6.1	–	–	–	8.5
CVA advanced[2]	–	–	–	–	–	–
CVA standardised[2]	–	–	–	–	–	–
CCP default funds[3]	–	–	–	–	–	–
At 31 December 2014	106.3	43.7	2.6	44.3	4.2	201.1

1 *Includes free deliveries not deducted from regulatory capital.*
2 *The RWA impact due to the CVA capital charge is calculated based on the same exposures as the IRB and standardised approaches. The table above does not present any exposures for CVA to avoid double counting.*
3 *Default fund contributions are cash balances posted to CCPs by all members. These cash balances have nil impact on reported exposure.*

Table 51: Counterparty credit risk – RWAs by exposure class, product and geographical region

	RWAs					
	Europe $bn	Asia $bn	MENA $bn	North America $bn	Latin America $bn	Total $bn
By exposure class						
IRB advanced approach	**22.0**	**12.3**	**–**	**9.5**	**0.9**	**44.7**
– central governments and central banks	**0.5**	**0.2**	**–**	**0.3**	**0.3**	**1.3**
– institutions	**7.8**	**4.5**	**–**	**3.0**	**0.4**	**15.7**
– corporates	**13.7**	**7.6**	**–**	**6.2**	**0.2**	**27.7**
IRB foundation approach	**1.6**	**–**	**0.5**	**–**	**–**	**2.1**
– corporates	**1.6**	**–**	**0.5**	**–**	**–**	**2.1**
Standardised approach	**1.0**	**0.5**	**1.0**	**–**	**2.2**	**4.7**
– central governments and central banks	**–**	**–**	**–**	**–**	**–**	**–**
– institutions	**–**	**–**	**0.1**	**–**	**–**	**0.1**
– corporates	**1.0**	**0.5**	**0.9**	**–**	**2.2**	**4.6**
CVA advanced[2]	**3.3**	**–**	**–**	**–**	**–**	**3.3**
CVA standardised[2]	**3.3**	**3.8**	**0.3**	**4.3**	**0.5**	**12.2**
CCP standardised	**0.9**	**0.5**	**–**	**0.8**	**–**	**2.2**
At 31 December 2015	**32.1**	**17.1**	**1.8**	**14.6**	**3.6**	**69.2**
By product						
Derivatives (OTC and Exchange traded derivatives)	**19.3**	**12.1**	**1.4**	**7.8**	**2.6**	**43.2**
SFTs	**3.9**	**0.4**	**–**	**2.2**	**0.5**	**7.0**
Other[1]	**1.6**	**0.6**	**–**	**–**	**–**	**2.2**
CVA advanced[2]	**3.3**	**–**	**–**	**–**	**–**	**3.3**
CVA standardised[2]	**3.3**	**3.8**	**0.4**	**4.2**	**0.5**	**12.2**
CCP default funds[3]	**0.7**	**0.2**	**–**	**0.4**	**–**	**1.3**
At 31 December 2015	**32.1**	**17.1**	**1.8**	**14.6**	**3.6**	**69.2**
By exposure class						
IRB advanced approach	28.5	16.4	0.2	13.9	0.7	59.7
– central governments and central banks	0.6	0.3	–	0.1	0.1	1.1
– institutions	12.4	7.6	0.2	5.4	0.6	26.2
– corporates	15.5	8.5	–	8.4	–	32.4
IRB foundation approach	2.1	–	0.2	–	–	2.3
– corporates	2.1	–	0.2	–	–	2.3
Standardised approach	0.8	0.3	0.7	–	2.6	4.4
– central governments and central banks	–	–	–	–	–	–
– institutions	–	–	0.1	–	–	0.1
– corporates	0.8	0.3	0.6	–	2.6	4.3
CVA advanced[2]	3.5	–	–	–	–	3.5
CVA standardised[2]	4.4	4.7	0.1	8.1	0.7	18.0
CCP standardised	1.3	0.5	–	1.0	–	2.8
At 31 December 2014	40.6	21.9	1.2	23.0	4.0	90.7
By product						
Derivatives (OTC and Exchange traded derivatives)	26.1	15.0	1.1	11.9	3.1	57.2
SFTs	4.5	0.5	–	2.5	0.2	7.7
Other[1]	1.3	1.3	–	–	–	2.6
CVA advanced[2]	3.5	–	–	–	–	3.5
CVA standardised[2]	4.4	4.7	0.1	8.1	0.7	18.0
CCP default funds[3]	0.8	0.4	–	0.5	–	1.7
At 31 December 2014	40.6	21.9	1.2	23.0	4.0	90.7

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

Table 52: Counterparty credit risk – RWA density by exposure class, product and geographical region

	RWA density					
	Europe %	Asia %	MENA %	North America %	Latin America %	Total %
By exposure class						
IRB advanced approach						
Central governments and central banks	**10**	**6**	**–**	**8**	**76**	**10**
Institutions	**25**	**25**	**–**	**29**	**55**	**26**
Corporates	**42**	**60**	**–**	**61**	**221**	**50**
IRB foundation approach						
Corporates	**35**	**–**	**50**	**–**	**–**	**37**
Standardised approach						
Central governments and central banks	**–**	**–**	**–**	**–**	**–**	**–**
Institutions	**–**	**–**	**47**	**–**	**–**	**47**
Corporates	**114**	**103**	**97**	**–**	**101**	**103**
CVA advanced[2]	**–**	**–**	**–**	**–**	**–**	**–**
CVA standardised[2]	**–**	**–**	**–**	**–**	**–**	**–**
CCP standardised	**7**	**12**	**–**	**5**	**–**	**6**
At 31 December 2015	**34**	**44**	**83**	**36**	**96**	**39**
By product						
Derivatives (OTC and Exchange traded derivatives)	**32**	**39**	**67**	**27**	**78**	**34**
SFTs	**13**	**10**	**–**	**19**	**123**	**15**
Other[1]	**48**	**17**	**–**	**–**	**–**	**32**
CVA advanced[2]	**–**	**–**	**–**	**–**	**–**	**–**
CVA standardised[2]	**–**	**–**	**–**	**–**	**–**	**–**
CCP default funds[3]	**–**	**–**	**–**	**–**	**–**	**–**
At 31 December 2015	**34**	**44**	**83**	**36**	**96**	**39**
By exposure class						
IRB advanced approach						
Central governments and central banks	10	14	–	17	38	12
Institutions	38	32	34	39	48	36
Corporates	50	70	–	78	–	60
IRB foundation approach						
Corporates	40	–	57	–	–	41
Standardised approach						
Institutions	–	–	37	–	–	37
Corporates	100	100	97	–	102	99
CVA advanced[2]	–	–	–	–	–	–
CVA standardised[2]	–	–	–	–	–	–
CCP standardised	5	9	–	5	–	6
At 31 December 2014	38	50	47	52	95	45
By product						
Derivatives (OTC and Exchange traded derivatives)	34	43	62	38	82	39
SFTs	17	18	–	19	40	17
Other[1]	52	22	–	–	–	31
CVA advanced[2]	–	–	–	–	–	–
CVA standardised[2]	–	–	–	–	–	–
CCP default funds[3]	–	–	–	–	–	–
At 31 December 2014	38	50	47	52	95	45

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

Wrong-way risk

Wrong-way risk occurs when a counterparty's exposures are adversely correlated with its credit quality. There are two types of wrong-way risk:

- General wrong-way risk occurs when the probability of counterparty default is positively correlated with general risk factors, for example, where a counterparty is resident and/or incorporated in a higher-risk country and seeks to sell a non-domestic currency in exchange for its home currency; and
- Specific wrong-way risk occurs when the exposure to a particular counterparty is positively correlated with the probability of counterparty default such as a reverse repo on the counterparty's own bonds. It is HSBC's policy that specific wrong-way transactions are approved on a case by case basis.

We use a range of tools to monitor and control wrong-way risk, including requiring the business to obtain prior approval before undertaking wrong-way risk transactions outside pre-agreed guidelines. The regional Traded Risk functions are responsible for the control and monitoring process within an overarching Group framework and limit framework.

Central counterparties

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

A dedicated CCP risk team has been established to manage the interface with CCPs and undertake in-depth due diligence of the unique risks associated with these organisations. This is to address an implication of the regulations that the Group's risk will be transferred from being distributed among individual, bilateral counterparties to a significant level of risk concentration on CCPs. We have developed a risk appetite framework to manage risk accordingly, on an individual CCP and global basis.

Securitisation

Group securitisation strategy

HSBC acts as originator, sponsor, liquidity provider and derivative counterparty to our own originated and sponsored securitisations, as well as those of third-parties. Our strategy is to use securitisation to meet our needs for aggregate funding or capital management, to the extent that market, regulatory treatments and other conditions are suitable, and for customer facilitation. We do not provide support to any of our originated or sponsored securitisations, and it is not our policy to do so. We have senior exposures to the SICs: Mazarin Funding Limited, Barion Funding Limited, Malachite Funding Limited and we hold all of the commercial paper issued by Solitaire Funding Limited. These are considered legacy businesses, and exposures are being repaid as the securities they hold amortise.

Group securitisation roles

Our roles in the securitisation process are as follows:

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

HSBC as originator

We use SPEs to securitise customer loans and advances and other debt that we have originated in order to diversify our sources of funding for asset origination and for capital efficiency purposes. In such cases, we transfer the loans and advances to the SPEs for cash, and the SPEs issue debt securities to investors to fund the cash purchases. This activity is conducted in a number of regions and across a number of asset classes. We also act as a derivative counterparty. Credit enhancements to the underlying assets may be used to obtain investment grade ratings on the senior debt issued by the SPEs. The majority of these securitisations are consolidated for accounting purposes (see page 87 for the regulatory treatment).

In addition, we use SPEs to mitigate the capital absorbed by some of the customer loans and advances we have originated. Credit derivatives are used to transfer the credit risk associated with such customer loans and advances to an SPE, using securitisations commonly known as synthetic securitisations by which the SPE writes CDS protection for HSBC. These SPEs are consolidated for accounting purposes when the substance of the relationship indicates that we control them.

During the year HSBC issued a synthetic securitisation, comprising drawn and undrawn seasoned corporate loans to relationship clients with a portfolio maximum notional amount of $5bn. The significant risk transfer for this synthetic securitisation is effected via an SPE which has sold protection on a $0.3bn tranche. The protection is collateralised from the proceeds of bonds issued by the SPE. The SPE for this securitisation is accounting consolidated but is not regulatory consolidated.

HSBC as sponsor

We are sponsor to a number of types of securitisation entities, including:

- a multi-seller conduit vehicle established to provide finance to clients – Regency Assets Limited – to which we provide senior liquidity facilities and programme-wide credit enhancement;
- three SICs established to provide tailored investments to third-party clients, backed primarily by senior tranches of securitisations and securities issued by financial institutions. Mazarin Funding Limited is an ABCP conduit to which we provide transaction-specific liquidity facilities; Barion Funding Limited and Malachite Funding Limited are vehicles to which we provide senior term funding; and

- Solitaire Funding Limited, HSBC's principal SIC, funded entirely by commercial paper issued to HSBC. HSBC also provides a liquidity facility and a first loss letter of credit to Solitaire Funding Limited. Solitaire has no need to draw on it as long as HSBC purchases its issued commercial paper, which HSBC intends to do for the foreseeable future.

The performance of our exposure to the SICs is primarily subject to the credit risk of the underlying securities.

The table below summarises the nature of exposures, including the relevant accounting and regulatory treatment applicable, to the most material of these sponsored entities.

Further details of these entities may be found in note 39 of the Annual Report and Accounts 2015.

Entity	Entity description and nature of exposure	Accounting consolidation	Regulatory consolidation	Regulatory treatment
Solitaire	ABCP conduit to which a first-loss letter of credit and transaction-specific liquidity facilities are provided	✓	✓	Look through to risk weights of underlying assets
Barion	Vehicle to which senior term funding is provided	✓	×	Exposures (including derivatives and liquidity facilities) are risk-weighted as securitisation positions
Malachite	Vehicle to which senior term funding is provided	✓	×	
Mazarin	ABCP conduit to which transaction-specific liquidity facilities are provided	✓	×	
Regency	Multi-seller conduit to which senior liquidity facilities and programme-wide credit enhancement are provided	✓	×	

HSBC as investor

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

Monitoring of securitisation positions

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

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

Liquidity risk of securitised assets is consistently managed as part of the Group's liquidity and funding risk management framework and further details are provided on page 159 of the *Annual Report and Accounts 2015*.

Valuation of securitisation positions

The valuation process of our investments in securitisation exposures primarily focuses on quotations from third parties, observed trade levels and calibrated valuations from market standard models. This process did not change in 2015.

Our hedging and credit risk mitigation strategy, with regards to retained securitisation and re-securitisation exposures, is to continually review our positions on an ongoing basis. Currently there are no material hedges in place and no credit risk mitigation is recognised on RWAs for our retained securitisation or re-securitisation positions.

Securitisation accounting treatment

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

Full details of these assessments and our accounting policy on structured entities may be found in note 1(g) and note 39 respectively of the Annual Report and Accounts 2015.

We reassess the required consolidation whenever there is a change in the substance of the relationship between HSBC and a structured entity.

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

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

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

Further disclosure of such transfers may be found in note 18 of the Annual Report and Accounts 2015.

Securitisation regulatory treatment

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

For the majority of our securitisation non-trading book positions we use the IRB approach, and within this principally the RBM, with lesser amounts on IAA and SFM. We also use the standardised approach for an immaterial amount of non-trading book positions. Securitisation positions in the trading book are overseen within Market Risk, using the standardised approach. Our securitisation and re-securitisation RWAs do not benefit from any credit risk mitigation.

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

There was $1.0bn (2014: $0.8bn) of unrealised losses on ABS in the year, also disclosed on page 152 of the *Annual Report and Accounts 2015*, which fully relates to assets within SPEs that are consolidated for regulatory purposes.

Analysis of securitisation exposures

HSBC's involvement in securitisation activities reflects the following:

- securitisation positions are not backed by revolving exposures other than trade receivables in Regency Assets Limited which is unchanged from 2014;
- facilities are not subject to early amortisation provisions (2014: nil);
- $4.7bn positions held as synthetic transactions (2014: not material);
- no assets awaiting securitisation (2014: nil);
- total exposures include off-balance sheet exposure of $17.1bn (2014: $21.4bn), mainly relating to contingent liquidity lines provided to securitisation vehicles where we act as sponsor, with a small amount from derivative exposures where we are an investor. The off-balance sheet exposures are held in the non-trading book and the exposure types are residential mortgages $0.1bn, commercial mortgages $1.9bn, trade receivables $13.8bn and re-securitisations $1.3bn; and
- no realised losses (2014: $0.2bn) on securitisation asset disposals during the year.

Further details of our securitisation exposures may be found on page 152 of the Annual Report and Accounts 2015.

Table 53: Securitisation exposure – by approach

	2015			2014		
	Trading book $bn	**Non-trading book $bn**	**Total $bn**	Trading book $bn	Non-trading book $bn	Total $bn
IRB approach	**2.8**	**40.9**	**43.7**	2.9	38.3	41.2
– ratings based	**2.8**	**21.6**	**24.4**	2.9	23.6	26.5
– internal assessment approach[1]	**–**	**19.3**	**19.3**	–	14.7	14.7
Standardised	**–**	**0.7**	**0.7**	–	0.4	0.4
At 31 December	**2.8**	**41.6**	**44.4**	2.9	38.7	41.6

1 *Applies to exposures in Regency Assets Limited.*

Table 54: Securitisation exposure – movement in the year

	Total at 1 January $bn	**Movement in year**			**Total at 31 December $bn**
		As originator $bn	**As sponsor $bn**	**As investor $bn**	
Aggregate amount of securitisation exposures					
Residential mortgages[1]	**4.2**	**–**	**–**	**(1.0)**	**3.2**
Commercial mortgages[1]	**4.2**	**–**	**–**	**(0.4)**	**3.8**
Leasing	**0.1**	**–**	**–**	**–**	**0.1**
Loans to corporates or SMEs	**1.1**	**4.7**	**–**	**0.4**	**6.2**
Consumer loans	**0.3**	**–**	**–**	**0.2**	**0.5**
Trade receivables[2]	**15.9**	**–**	**4.5**	**–**	**20.4**
Re-securitisations[1]	**15.8**	**(0.4)**	**(4.6)**	**(0.6)**	**10.2**
2015	**41.6**	**4.3**	**(0.1)**	**(1.4)**	**44.4**

	Total at 1 January $bn	Movement in year: As originator $bn	As sponsor $bn	As investor $bn	Total at 31 December $bn
Aggregate amount of securitisation exposures					
Residential mortgages[1]	2.5	–	–	1.7	4.2
Commercial mortgages[1]	4.8	–	–	(0.6)	4.2
Leasing	–	–	–	0.1	0.1
Loans to corporates or SMEs	0.2	–	–	0.9	1.1
Consumer loans	0.4	–	–	(0.1)	0.3
Trade receivables[2]	17.7	–	(1.8)	–	15.9
Re-securitisations[1]	25.6	(0.3)	(8.8)	(0.7)	15.8
Other assets	0.4	–	(0.4)	–	–
2014	51.6	(0.3)	(11.0)	1.3	41.6

1 *Residential and Commercial mortgages and re-securitisations principally include exposures to Solitaire Funding Limited, Mazarin Funding Limited, Barion Funding Limited and Malachite Funding Limited and restructured on-balance sheet assets. The pools primarily comprise the senior tranches of retail mortgage backed securities, commercial mortgage backed securities, auto ABS, credit card ABS, student loans, collateralised debt obligations, and also include bank subordinated debt.*
2 *Trade receivables largely relate to Regency Assets Limited and pools are senior with a maturity of less than 10 years.*

Table 55: Securitisation exposure – by trading and non-trading book

	2015: Trading book $bn	Non-trading book $bn	Total $bn	2014: Trading book $bn	Non-trading book $bn	Total $bn
As originator	**–**	**6.4**	**6.4**	–	2.1	2.1
– loans to corporates or SMEs	**–**	**4.7**	**4.7**	–	–	–
– re-securitisations	**–**	**1.7**	**1.7**	–	2.1	2.1
As sponsor	**–**	**27.8**	**27.8**	–	27.9	27.9
– trade receivables	**–**	**19.8**	**19.8**	–	15.3	15.3
– re-securitisations	**–**	**8.0**	**8.0**	–	12.6	12.6
As investor	**2.8**	**7.4**	**10.2**	2.9	8.7	11.6
– residential mortgages	**1.1**	**2.1**	**3.2**	1.7	2.5	4.2
– commercial mortgages	**0.7**	**3.1**	**3.8**	0.8	3.4	4.2
– leasing	**0.1**	**–**	**0.1**	–	0.1	0.1
– loans to corporates or SMEs	**0.4**	**1.1**	**1.5**	0.1	1.0	1.1
– consumer loans	**0.2**	**0.3**	**0.5**	0.1	0.2	0.3
– trade receivables	**0.1**	**0.5**	**0.6**	0.1	0.5	0.6
– re-securitisations	**0.2**	**0.3**	**0.5**	0.1	1.0	1.1
At 31 December	**2.8**	**41.6**	**44.4**	2.9	38.7	41.6

Table 56: Securitisation – asset values and impairments

	2015: Underlying assets[1] Total[4] $bn	Impaired and past due $bn	Securitisation exposures impairment $bn	2014: Underlying assets[1] Total $bn	Impaired and past due $bn	Securitisation exposures impairment $bn
As originator	**6.7**	**1.6**	**0.5**	2.2	2.1	0.7
– residential mortgages	**0.1**	**–**	**–**	0.3	–	–
– loans to corporates and SMEs	**5.0**	**–**	**–**	–	–	–
– re-securitisations[2]	**1.6**	**1.6**	**0.5**	1.9	2.1	0.7
As sponsor	**30.8**	**0.1**	**0.1**	28.9	0.3	0.2
– commercial mortgages	**2.2**	**–**	**–**	2.3	–	–
– trade receivables	**18.7**	**–**	**–**	12.4	–	–
– re-securitisations[2]	**9.9**	**0.1**	**0.1**	14.2	0.3	0.2
As investor[3]			**–**			–
– residential mortgages			**–**			–
– commercial mortgages			**–**			–
– re-securitisations			**–**			–
At 31 December			**0.6**			0.9

1 *Securitisation exposures may exceed the underlying asset values when HSBC provides liquidity facilities while also acting as derivative counterparty and a note holder in the SPE.*
2 *The amount of underlying assets reported for re-securitisations denotes the value of collateral within the re-securitisation vehicles.*
3 *For securitisations where HSBC acts as investor, information on third-party underlying assets is not available.*
4 *As originator and sponsor, all associated underlying assets are held in the non-trading book. These assets are all underlying to traditional securitisations with the exception of 'loans to corporates and SMEs' which is underlying to a synthetic securitisation.*

Table 57: Securitisation exposure – by risk weighting

	Exposure value[1]				Capital required[6]			
	Trading book		Non-trading book[2]		Trading book[3]		Non-trading book	
	S[4]	R[5]	S[4]	R[5]	S[4]	R[5]	S[4]	R[5]
	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
Long-term category – risk weights								
– less than or equal to 10%	**0.8**	**–**	**21.4**	**2.5**	**–**	**–**	**0.2**	**–**
– > 10% and ≤ 20%	**0.8**	**–**	**7.2**	**0.9**	**–**	**–**	**0.1**	**–**
– > 20% and ≤ 50%	**0.3**	**0.2**	**1.1**	**3.3**	**–**	**–**	**–**	**0.2**
– > 50% and ≤ 100%	**0.4**	**–**	**1.5**	**0.7**	**–**	**–**	**0.1**	**–**
– > 100% and ≤ 650%	**0.2**	**–**	**0.1**	**0.8**	**0.1**	**–**	**–**	**0.2**
– > 650% and < 1,250%	**–**	**–**	**–**	**0.1**	**–**	**–**	**–**	**–**
1,250%[7]	**0.1**	**–**	**0.3**	**1.7**	**0.1**	**–**	**0.3**	**1.3**
At 31 December 2015	**2.6**	**0.2**	**31.6**	**10.0**	**0.2**	**–**	**0.7**	**1.7**
Long-term category – risk weights								
– less than or equal to 10%	0.9	–	16.7	–	–	–	–	–
– > 10% and ≤ 20%	0.9	0.1	8.0	5.6	–	–	–	–
– > 20% and ≤ 50%	0.2	–	1.1	1.4	–	–	–	0.1
– > 50% and ≤ 100%	0.3	–	1.5	0.7	–	–	–	0.1
– > 100% and ≤ 650%	0.3	–	0.1	1.3	0.2	–	0.1	0.3
– > 650% and < 1,250%	–	–	–	–	–	–	–	–
1,250%	0.2	–	1.1	1.2	0.2	–	1.1	1.2
At 31 December 2014	2.8	0.1	28.5	10.2	0.4	–	1.2	1.7

1 *There are no short-term category exposures at 31 December 2015 (2014: nil).*
2 *Non-trading book figures at 31 December 2015 include $0.7bn exposures treated under the standardised approach (2014: $0.4bn).*
3 *Trading book securitisation capital requirements are also disclosed in table 58 within the market risk section.*
4 *Securitisation.*
5 *Re-securitisation. The total re-securitisation exposure value is less than that presented in tables 54 and 55, reflecting a differing treatment of Solitaire Funding Limited. In tables 54 and 55, Solitaire is treated as a re-securitisation, while the figures above are based on the fact that Solitaire is consolidated for regulatory purposes, and present the exposure values as securitisations allocated to the RWA bands of Solitaire's underlying pool of assets.*
6 *All our re-securitisation positions and the majority of our securitisation positions have their capital requirements calculated using the IRB approach. There is an immaterial amount of securitisation positions in the non-trading book that have their capital requirement calculated using the standardised approach. The standardised risk weight applicable and the resulting capital requirement at 31 December 2015 is 100% and $0.1bn, respectively, (2014: 100% and $0.1bn).*
7 *At 31 December 2015, positions risk weighted at 1,250% are, in the non-trading book, re-securitisation positions $1.7bn, residential mortgages $0.3bn, consumer loans $0.1bn and in the trading book commercial mortgages $0.1bn. Impairments are not included in the exposure values but they are reflected in the capital required.*

Key points

- The increase in exposure is a result of a $4.7bn newly issued HSBC synthetic securitisation, a $4.5bn exposure increase in Regency liquidity facilities offset by a $5.6bn reduction in re-securitisation exposures.
- The net movement in capital is a result of a lower risk weight being applied at 31 December 2015 while the total exposures increased in the year. Total exposures at 31 December 2015, compared to those at 31 December 2014, are on average of a higher credit quality, based on their external ratings, and this is reflected in the capital required.

Market risk

Overview and objectives

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

Exposure to market risk

Exposure to market risk is separated into two portfolios:

- *Trading portfolios* comprise positions arising from market-making and the warehousing of customer-derived positions.
- *Non-trading portfolios* comprise positions that primarily arise from the interest rate management of our retail and commercial banking assets and liabilities, financial investments designated as AFS and held to maturity, and exposures arising from our insurance operations.

Where appropriate, we apply similar risk management policies and measurement techniques to both trading and non-trading portfolios. Our objective is to manage and control market risk exposures in order to optimise return on risk while maintaining a market profile consistent with our status as one of the world's largest banking and financial services organisations.

The nature of the hedging and risk mitigation strategies performed across the Group corresponds to the market risk management instruments available within each operating jurisdiction. These strategies range from the use of traditional market instruments, such as interest rate swaps, to more sophisticated hedging strategies to address a combination of risk factors arising at portfolio level.

Overview of market risk in global businesses

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

	Trading risk	Non-trading risk			
Risk types	– Foreign exchange and commodities – Interest rates – Credit spreads – Equities	– Structural foreign exchange – Interest rates[1] – Credit spreads			
Global businesses	GB&M, including BSM	GB&M, incl BSM	GPB	CMB	RBWM
Risk measure	VaR | Sensitivity | Stress testing	VaR	Sensitivity	Stress testing	

1 *The interest rate risk on the fixed-rate securities issued by HSBC Holdings is not included in the Group VaR.*

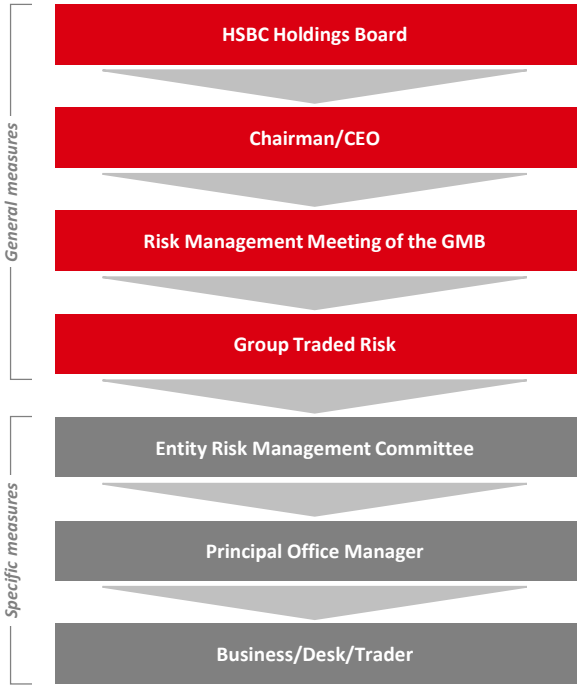
Market risk governance

Market risk is managed and controlled through limits approved by the RMM for HSBC Holdings and our various global businesses. These limits are allocated across business lines and to the Group's legal entities.

The management of market risk is principally undertaken in GB&M, where 94% of the total VaR of HSBC (excluding insurance) and almost all trading VaR resides, using risk limits approved by the GMB. VaR limits are set for portfolios, products and risk types, with market liquidity being a primary factor in determining the level of limits set.

Global Risk is responsible for setting market risk management policies and measurement techniques. Each major operating entity has an independent market risk management and control function which is responsible for measuring market risk exposures in accordance with policies defined by Global Risk, and monitoring and reporting these exposures against the prescribed limits on a daily basis. The market risk limits are governed according to the framework illustrated to the right.

Each operating entity is required to assess the market risks arising on each product in its business and to transfer them to either its local GB&M unit for management, or to separate books managed under the supervision of the local ALCO.



Our aim is to ensure that all market risks are consolidated within operations that have the necessary skills, tools, management and governance to manage them. In certain cases where the market risks cannot be fully transferred, we identify the effect of varying scenarios on valuations or on net interest income resulting from any residual risk positions.

Model risk is governed through MOCs at the regional and global wholesale credit and market risk levels. They have direct oversight and approval responsibility for all traded risk models utilised for risk measurement and management and stress testing. The MOCs prioritise the development of models, methodologies and practices used for trading risk management within the Group and ensure that they remain within our risk appetite and business plans. The Markets MOC reports into the Group MOC, which oversees all model risk types at Group level. Group MOC informs the Group RMM about material issues at least on a bi-annual basis. The RMM is the Group's 'Designated Committee' according to the regulatory rules and it has delegated day-to-day governance of all trading risk models to the Markets MOC.

Our control of market risk in the trading and non-trading portfolios is based on a policy of restricting individual operations to trading within a list of permissible instruments authorised for each site by Global Risk, of enforcing new product approval procedures, and of restricting trading in the more complex derivative products only to offices with appropriate levels of product expertise and robust control systems.

Table 58: Market risk – RWAs and capital required

	2015		2014	
	Capital required $bn	**RWAs $bn**	Capital required $bn	RWAs $bn
Internal model based[1]	**2.8**	**34.9**	3.6	44.6
– VaR	**0.6**	**7.7**	0.6	7.3
– stressed VaR	**0.8**	**9.8**	0.8	10.4
– incremental risk charge	**0.9**	**11.4**	1.6	20.1
– other VaR and stressed VaR[2]	**0.5**	**6.0**	0.6	6.8
Standardised approach[3]	**0.6**	**7.6**	0.9	11.4
– interest rate position risk	**0.3**	**3.0**	0.4	4.8
– foreign exchange position risk	**–**	**0.6**	0.1	0.7
– equity position risk	**0.1**	**1.3**	–	0.3
– commodity position risk	**–**	**–**	–	0.1
– securitisations	**0.2**	**2.6**	0.4	5.5
– options	**–**	**0.1**	–	–
At 31 December	**3.4**	**42.5**	4.5	56.0

1 *Internal model based RWAs include $6.6bn of RWAs arising from RNIV (December 2014 $6.5bn).*
2 *These are results from countries which cannot be included in the consolidated VaR permission because regulatory permission to do so has not been received, and which must therefore be aggregated rather than consolidated.*
3 *Products and sites that are not in the scope of the approved model permissions from the regulator are calculated using the Standardised approach specified in CRD IV.*

Key points

- Internal model based RWAs reduced year on year by $9.7bn. Reductions were driven by changes in the incremental risk charge, due to a combination of changes to the model applied following approval by the regulator and position reductions of government debt positions in Europe and Asia Pacific as part of RWA reduction initiatives.
- RWAs for Standardised approach reduced by $3.7bn. The majority of the reduction came as legacy securitisation positions were sold. Further reductions came in interest rate positions where specific risk was reduced across a number of Latin American countries.

Market risk measures

Monitoring and limiting market risk exposures

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

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

Sensitivity analysis

Sensitivity analysis measures the impact of individual market factor movements on specific instruments or portfolios including interest rates, foreign exchange rates and equity prices, such as the effect of a one basis point change in yield. We use sensitivity measures to monitor the market risk positions within each risk type. Sensitivity limits are set for portfolios, products and risk types, with the depth of the market being one of the principal factors in determining the level of limits set.

Value at risk

VaR is a technique that estimates the potential losses on risk positions in the trading portfolio as a result of movements in market rates and prices over a specified time horizon and to a given level of confidence. The use of VaR is integrated into market risk management and is calculated for all trading positions regardless of how we capitalise those exposures. Where there is not an approved internal model, we use the appropriate local rules to capitalise exposures locally.

In addition, we calculate VaR for non-trading portfolios to have a complete picture of risk. Our models are predominantly based on historical simulation. VaR is calculated at a 99% confidence level for a one-day holding period. Where we do not calculate VaR explicitly, we use alternative tools as summarised in the Market Risk Stress Testing table below.

Our VaR models derive plausible future scenarios from past series of recorded market rates and prices, taking into account inter-relationships between different markets and rates such as interest rates and foreign exchange rates. The models also incorporate the effect of option features on the underlying exposures.

The historical simulation models used incorporate the following features:

- historical market rates and prices are calculated with reference to foreign exchange rates and commodity prices, interest rates, equity prices and the associated volatilities;
- potential market movements utilised for VaR are calculated with reference to data from the past two years; and
- VaR measures are calculated to a 99% confidence level and use a one-day holding period.

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

VaR model limitations

Although a valuable guide to risk, VaR should always be viewed in the context of its limitations, for example:

- the use of historical data as a proxy for estimating future events may not encompass all potential events, particularly those which are extreme in nature;
- the use of a holding period assumes that all positions can be liquidated or the risks offset during that period. This may not fully reflect the market risk arising at times of severe illiquidity, when the holding period may be insufficient to liquidate or hedge all positions fully;
- the use of a 99% confidence level by definition does not take into account losses that might occur beyond this level of confidence;
- VaR is calculated on the basis of exposures outstanding at close of business and therefore does not necessarily reflect intra-day exposures; and
- VaR is unlikely to reflect loss potential on exposures that only arise under conditions of significant market movement.

Risk-not-in-VaR framework

Our VaR model is designed to capture significant basis risk such as CDS versus bond, asset swap spreads and cross-currency basis. Other basis risks which are not completely covered in VaR, such as the Libor tenor basis, are complemented by our RNIV calculations and are integrated into our capital framework.

The RNIV framework therefore aims to capture and capitalise material market risks that are not adequately covered in the VaR model. An example of this is Libor-overnight index swap basis risk for minor currencies. In such instances the RNIV framework uses stress tests to quantify the capital requirement. In 2015, the capital requirement derived from these stress tests represented, on average, 2.3% of the total internal model-based market risk requirement.

Risks covered by RNIV represent 19% of market risk RWAs for models with regulatory approval and include those resulting from underlying risk factors which are not observable on a daily basis across asset classes and products, such as dividend risk and implied correlation risks.

Risk factors are reviewed on a regular basis and either incorporated directly in the VaR models, where possible, or quantified through the VaR-based RNIV approach or a stress test approach within the RNIV framework. The severity of the scenarios is calibrated to be in line with the capital adequacy requirements. The outcome of the VaR-based RNIV is included in the VaR calculation and back-testing; a stressed VaR RNIV is also computed for the risk factors considered in the VaR-based RNIV approach.

Level 3 assets

The fair values of Level 3 assets and liabilities in trading portfolios are disclosed on page 380 of the *Annual Report and Accounts 2015*, and represent only a small proportion of the overall trading portfolio. Market risk arising from Level 3 instruments is managed by various market risk techniques such as stress testing and notional limits.

Back-testing

We routinely validate the accuracy of our VaR models by back-testing them against both actual, which replaced clean profit and loss from 1 August 2015, and hypothetical profit and loss against the corresponding VaR numbers. Hypothetical profit and loss excludes non-modelled items such as fees, commissions and revenues of intra-day transactions.

We would expect on average to see two or three profits, and two or three losses, in excess of VaR at the 99% confidence level over a one-year period. The actual number of profits or losses in excess of VaR over this period can therefore be used to gauge how well the models are performing.

We back-test our Group VaR at various levels which reflect a full legal entity scope of HSBC, including entities that do not have local permission to use VaR for regulatory purposes.

Back-testing using the regulatory hierarchy includes entities which have approval to use VaR in the calculation of market risk regulatory capital requirement. For example, all Latin American sites are excluded from this hierarchy as they are not approved by the PRA. In this case the regulatory capital is calculated using Standardised approach, rather than VaR.

In 2015, the PRA VaR approved entities experienced one profit exception and no loss exceptions against both actual and hypothetical profit and loss.

The profit exception was due primarily to profits from increased volatility in foreign exchange currencies, arising from the sharp fall in the Chinese stock market and its effect on the global markets. There is no evidence of model errors or control failures.

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

Stress testing

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

Stress testing is implemented at legal entity, regional and overall Group levels. A standard set of scenarios is utilised consistently across all regions within the Group. Scenarios are tailored to capture the relevant events or market movements at each level. The risk appetite around potential stress losses for the Group is set and monitored against referral limits.

Market Risk Stress Testing

Sensitivities	Technical	Hypothetical	Historical	
Impact of a single risk factor, e.g. break of a currency peg	Impact of the largest move in each risk factor without consideration of any underlying market correlation	Impact of potential macroeconomic events, e.g. slowdown in mainland China	Scenarios that incorporate historical observations of market movements, e.g. Black Monday 1987 for equities	Reverse Stress Testing

Market risk reverse stress tests are undertaken on the premise that there is a fixed loss. The stress testing process identifies which scenarios lead to this loss. The rationale behind the reverse stress test is to understand scenarios which are beyond normal business settings that could have contagion and systemic implications.

Stressed VaR and stress testing, together with reverse stress testing and the management of gap risk, provide management with insights regarding the 'tail risk' beyond VaR for which HSBC's appetite is limited.

Market risk capital models

There are a number of measures which HSBC has permission to use in calculating regulatory capital which are listed in table 59.

For regulatory purposes, the trading book comprises all positions in CRD financial instruments and commodities which are held with trading intent, which are taken with the intention of benefiting from short-term gains or positions where it can be demonstrated that they hedge positions in the trading book. Trading book positions must either be free of any restrictive covenants on their tradability or be capable of being hedged.

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

HSBC maintains a Trading Book Policy which defines the minimum requirements for trading book positions and the process for classifying positions as trading or banking book. Positions in the trading book are subject to market risk based rules, i.e. market risk capital, computed using regulatory approved models. Otherwise the market risk capital is calculated using the Standardised approach.

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

Capital add-ons also exist to capture event risk including foreign exchange risk on pegged currencies and concentration risk associated with large equity holdings.

Table 59: Market risk models[1]

Model component	RWAs for associated asset class $bn	Confidence level	Liquidity horizon	Model description and methodology
VaR	**7.7**	99%	10 day	Uses most recent two years' history of daily returns to determine a loss distribution. The result is scaled, using the square root of 10, from one day to provide an equivalent 10-day loss.
Stressed VaR	**9.8**	99%	10 day	Stressed VaR is calibrated to a one-year period of stress observed in history.
IRC	**11.4**	99.9%	1 year	Uses a multi-factor Gaussian Monte-Carlo simulation which includes product basis, concentration, hedge mismatch, recovery rate and liquidity as part of the simulation process. A minimum liquidity horizon of three months is applied and is based on a combination of factors including issuer type, currency and size of exposure.
Options	**0.1**	n/a	n/a	Uses a standard charge scenario approach based on a spot volatility grid where, for each point on the grid, there is a full revaluation of the portfolio. The regulators prescribe the ranges therefore there is no equivalence with confidence level and liquidity horizon.

1 *Non-proprietary details are available in the Financial Services Register on the PRA website.*

VaR

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

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

The trading books which received approval from the regulator to be covered via an internal model are used to calculate VaR for regulatory purposes. Regulatory VaR levels contribute to the calculation of market risk RWAs (see Market risk table on page 91).

Table 60: VaR used for regulatory purposes (one-day equivalent)

	2015 $m	2014 $m
At 31 December	**69**	71
Maximum	**91**	99
Minimum	**55**	50
Average	**67**	83

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

Stressed VaR

Stressed VaR is primarily used for regulatory capital purposes and is integrated into the risk management process to ensure prudent capital management. Stressed VaR complements other risk measures by providing the potential losses under stressed market conditions. Calculations are based on a continuous one-year period of stress for the trading portfolio, based on the assessment at the Group level.

Stress VaR modelling follows the same approach as our VaR risk measure except for the following:

- potential market movements employed for stressed VaR calculations are based on a continuous one-year period of stress for the trading portfolio;
- the choice of period changed from (November 2007 to November 2008) to (January 2008 to December 2008) in the last quarter of 2015 and is based on the assessment at the Group level of the most volatile period in recent history; and
- it is calculated to a 99% confidence using a 10-day holding period.

Table 61: Stressed value at risk (one-day equivalent)

	2015 $m	2014 $m
At 31 December	**116**	125
Maximum	**172**	191
Minimum	**105**	87
Average	**115**	134

The stressed VaR table is based on the regulatory permissions received, plus aggregated sites. The 2014 comparatives have been restated to reflect this formulation.

Stressed VaR exposures contribute to regulatory capital requirements. Stressed VaR fluctuated throughout 2015, reflecting the changing positions held.

Incremental Risk Charge

The IRC measures the default and migration risk of issuers of traded instruments.

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

The IRC is a standalone charge generating no diversification benefit with other charges. We do not use weighted averages for calculating the liquidity horizon for the IRC measure. IRC relies on a range of liquidity horizons from 3 months, corresponding to the regulatory floor, to 1 year. A wide range of criteria can indicate the liquidity of a position. The liquidity horizon for the IRC measure depends on a set of factors such as issuer features, including rating, sector, geography, and size of positions, including product, maturity and concentration.

Table 62: Incremental risk charge

	2015	2014
	$m	$m
At 31 December	**920**	1,508
Maximum	**2,372**	2,193
Minimum	**896**	1,462
Average	**972**	1,690

The IRC table is based on the regulatory permissions received, plus aggregated sites. The 2014 comparatives have been restated to reflect this formulation.

The decrease in IRC during the year was due to enhancing the granularity of the calibration of the IRC model. This involved more accurate sector-based transition matrices and credit spread mappings which reduced loss severity and increased diversification effects.

Trading portfolios

Volcker Rule

In 2013, US regulators finalised the Volcker Rule. Section 619 of the Dodd-Frank Wall Street Reform and Consumer Protection Act and its final implementing rules (collectively referred to as the 'Volcker Rule') impose broad restrictions on HSBC's ability to engage in 'proprietary trading' or to own, sponsor, or have certain relationships with hedge funds, private equity funds, and certain other collective investment vehicles (broadly defined as 'covered funds'). These restrictions are subject to a number of exemptions or exclusions, including market making, underwriting and risk-mitigating hedging, organising covered funds for customers and issuers of asset-backed securities, and underwriting or market making in covered fund interests.

The Volcker Rule broadly went into effect on 22 July 2015, with the exception of certain legacy fund activities that are able to rely on an extension of the conformance date.

HSBC has implemented a programme to comply with the Volcker Rule, including policies and procedures, internal controls, corporate governance, independent testing, training, record keeping and, eventually, calculation and reporting of quantitative metrics for certain trading activities.

HSBC has completed training for all affected front office and control personnel, has conformance plans for those covered funds to which the extension applies, and believes that it is compliant in all material respects with the Volcker Rule.

Gap risk

Certain products, such as non-recourse margin loans, are not exposed to small day-to-day moves in market rates or prices, but are exposed to large discontinuous moves. Such movements may occur, for example, when, in reaction to an adverse event or unexpected news announcement, some parts of the market move far beyond their normal volatility range and become temporarily illiquid. Products which exhibit exposure only to large discontinuous moves (gap risk) are not well captured by VaR measures or traditional market risk sensitivity measures. HSBC has implemented additional stress measurement and controls over such products.

In 2015 gap risk exposure was primarily due to non-recourse loan transactions, mostly for corporate clients, where the collateral against the loan is limited to the posted assets. Upon occurrence of a gap event, the value of the collateral could fall below the outstanding loan amount.

We did not incur any notable gap losses in 2015.

De-peg risk

For certain currencies (pegged or managed) the spot exchange rate is pegged at a fixed rate (typically to US dollars or euros), or managed within a pre-defined band around a pegged rate. De-peg risk is the risk of the peg or managed band changing or being abolished, and moving to a floating regime.

HSBC has extensive experience in managing fixed and managed currency regimes. Using stressed scenarios on spot rates, we are able to analyse how de-peg events would impact the positions held by HSBC. We monitor such scenarios to pegged or managed currencies, such as the Hong Kong dollar, renminbi and Middle Eastern currencies, and limit any potential losses that would occur. This historical VaR measure may not fully capture the risk involved in holding positions in pegged or managed currencies because such currencies may not have experienced a de-peg event during the historical timeframe being considered.

ABS/MBS exposures

The ABS/MBS exposures within the trading portfolios are managed within sensitivity and VaR limits, used for management purposes, as described on page 167 of the *Annual Report and Accounts 2015*, and are included within the stress testing scenarios described above.

Non-trading portfolios

Most of the Group's non-trading VaR relates to BSM or local treasury management functions. Contributions to Group non-trading VaR are driven by interest rates and credit spread risks arising from all global businesses. There is no commodity market risk in the non-trading portfolios.

Non-trading VaR also includes the interest rate risk of non-trading financial instruments held by the global businesses and transferred into portfolios managed by BSM or local treasury functions. In measuring, monitoring and managing risk in our non-trading portfolios, VaR is just one of the tools used. The management of interest rate risk in the banking book is described further in 'Non-trading interest rate risk' below, including the role of BSM.

Non-trading VaR excludes equity risk on AFS securities, structural foreign exchange risk, and interest rate risk on fixed rate securities issued by HSBC Holdings, the scope and management of which are described in the relevant sections below.

Our control of market risk in the non-trading portfolios is based on transferring the assessed market risk of non-trading assets and liabilities created outside BSM or Markets, to the books managed by BSM, provided the market risk can be neutralised. The net exposure is typically managed by BSM through the use of fixed rate government bonds (liquid assets held in AFS books) and interest rate swaps. The interest rate risk arising from fixed rate government bonds held within AFS portfolios is reflected within the Group's non-traded VaR. Interest rate swaps used by BSM are typically classified as either a fair value hedge or a cash flow hedge and are included within the Group's non-traded VaR. Any market risk that cannot be neutralised in the market is managed by local ALCO in segregated ALCO books.

Equity securities classified as available-for-sale

Potential new commitments are subject to risk appraisal to ensure that industry and geographical concentrations remain within acceptable levels for the portfolio. Regular reviews are performed to substantiate the valuation of the investments within the portfolio and investments held to facilitate ongoing business, such as holdings in government-sponsored enterprises and local stock exchanges.

See 'Other risks – Non-trading book exposures in equities' on page 101 for additional information.

Prudent valuation adjustment

HSBC has documented policies and maintains systems and controls for the calculation of PVA. Prudent value is the estimated lowest price that would be received to sell an asset or highest price paid to transfer a liability in 90% of orderly transactions occurring between market participants at the balance sheet date. HSBC's methodology addresses fair value uncertainties arising from a number of sources; market price uncertainty, bid offer ('close out') uncertainty, model risk, concentration, administrative cost, CVA ('unearned credit spread') and funding fair value adjustment.

Structural foreign exchange exposures

Structural foreign exchange exposures represent net investments in subsidiaries, branches and associates, the functional currencies of which are currencies other than the US dollar. An entity's functional currency is that of the primary economic environment in which the entity operates.

Exchange differences on structural exposures are recognised in 'Other comprehensive income'. We use the US dollar as our presentation currency in our consolidated financial statements because the US dollar and currencies linked to it form the major currency bloc in which we transact and fund our business. Our consolidated balance sheet is, therefore, affected by exchange differences between the US dollar and all the non-US dollar functional currencies of underlying subsidiaries.

We hedge structural foreign exchange exposures only in limited circumstances. Our structural foreign exchange exposures are managed with the primary objective of ensuring, where practical, that our consolidated capital ratios and the capital ratios of individual banking subsidiaries are largely protected from the effect of changes in exchange rates. Our policy is to stabilise capital ratios by maintaining, so far as practicable, a suitable amount of regulatory capital denominated in each currency in which it has RWAs. This is usually achieved by ensuring that, for each subsidiary bank, the ratio of structural exposures in a given currency to RWAs denominated in that currency is broadly equal to the capital ratio of the subsidiary in question.

We may also transact hedges where a currency in which we have structural exposures is considered likely to revalue adversely, and it is possible in practice to transact a hedge. Any hedging is undertaken using forward foreign exchange contracts which are accounted for under IFRSs as hedges of a net investment in a foreign operation, or by financing with borrowings in the same currencies as the functional currencies involved. We evaluate residual structural foreign exchange exposures using an expected shortfall method.

The structural foreign exchange risk is modelled for capital purposes using an internally developed de-peg risk model. The model uses the expected shortfall method to calculate a quantity of capital 'at risk' due to the structural foreign exchange exposures. The method translates the capital surplus/deficit based on capital ratios and then measures a US dollar variance in that capital position based on an average of the worst case scenarios arrived at using a Monte Carlo simulation of potential foreign exchange moves. The model also incorporates mean reversion for floating currencies and non-linear movements for pegged and managed currencies. The model is considered to be conservative, as it has fat tails and simulates extreme events.

Details of our structural foreign exchange exposures are provided in Note 33 of the Annual Report and Accounts 2015.

Non-trading interest rate risk

Non-trading book interest rate risk arises principally from mismatches between the future yield on assets and their funding cost, as a result of interest rate changes. Analysis of this risk is complicated by having to make assumptions on embedded optionality within certain product areas such as the incidence of mortgage prepayments, and from behavioural assumptions regarding the economic duration of liabilities which are contractually repayable on demand such as current accounts, and the re-pricing behaviour of managed rate products. These assumptions around behavioural features are captured in our interest rate risk behaviouralisation framework, which is described below.

We aim, through our management of market risk in non-trading portfolios, to mitigate the effect of prospective interest rate movements which could reduce future net interest income, while balancing the cost of such hedging activities on the current net revenue stream.

Our funds transfer pricing policies give rise to a two stage funds transfer pricing approach. For details see page 207 of the *Annual Report and Accounts 2015*.

The economic capital requirement for non-trading interest rate risk is measured using a two-step approach.

The economic capital requirement generated by our banking book is measured by our EVE sensitivity. EVE sensitivity considers all re-pricing mismatches assuming a run-off of the current balance sheet, and quantifies the larger loss in economic value of the Group's net asset position (including off balance sheet positions) under a +/-200bps shock to interest rates. We hold capital only to the extent that our EVE sensitivity metric is projecting a loss in our banking book (that is, the EVE sensitivity brings the economic value of our banking book below the book value of Tier 1).

We hold a management buffer which is informed by the potential downside risk to the CET1 ratio due to interest rate and credit spread risk in the AFS portfolio is measured by the portfolio's stressed VaR, using a 99% confidence level and an assumed holding period of a quarter. We hold a management buffer equivalent to our stressed VaR limit.

ALCM is responsible for measuring and controlling non-trading interest rate risk under the supervision of the RMM. Its primary responsibilities are:

- to define the rules governing the transfer of interest rate risk from the commercial bank to BSM;
- to ensure that all market interest rate risk that can be hedged is effectively transferred from the global businesses to BSM; and
- to define the rules and metrics for monitoring the residual interest rate risk in the global businesses.

The different types of non-trading interest rate risk and the controls which the Group uses to quantify and limit its exposure to these risks can be categorised as follows:

- risk which is transferred to BSM and managed by BSM within a defined risk mandate;
- risk which remains outside BSM because it cannot be hedged or which arises due to our behaviouralised transfer pricing assumptions. This risk will be captured by our net interest income EVE sensitivity, and corresponding limits are part of our global and regional risk appetite statement for non-trading interest rate risk. A typical example would be margin compression created by unusually low rates in key currencies;
- basis risk which is transferred to BSM when it can be hedged. Any residual basis risk remaining in the global businesses is reported to ALCO. A typical example would be a managed rate savings product transfer-priced using a Libor-based interest rate curve; and
- model risks which cannot be captured by net interest income or EVE sensitivity but are controlled by our stress testing framework. A typical example would be prepayment risk on residential mortgages or pipeline risk.

Details of the Group's monitoring of the sensitivity of projected net interest income under varying interest rate scenarios may be found on page 216 of the Annual Report and Accounts 2015.

Interest rate risk behaviouralisation

Unlike liquidity risk, which is assessed on the basis of a very severe stress scenario, non-trading interest rate risk is assessed and managed according to 'business-as-usual' conditions. In many cases the contractual profile of non-trading assets/liabilities arising from assets/liabilities created outside Markets or BSM does not reflect the behaviour observed. Behaviouralisation is therefore used to assess the market interest rate risk of non-trading assets/liabilities and this assessed market risk is transferred to BSM, in accordance with the rules governing the transfer of interest rate risk from the global businesses to BSM.

Behaviouralisation is applied in three key areas:

- the assessed re-pricing frequency of managed rate balances;
- the assessed duration of non-interest bearing balances, typically capital and current accounts; and
- the base case expected prepayment behaviour or pipeline take-up rate for fixed rate balances with embedded optionality.

Interest rate behaviouralisation policies have to be formulated in line with the Group's behaviouralisation policies and approved at least annually by local ALCOs, regional ALCMs and Group ALCM, in conjunction with local, regional and Group market risk monitoring teams.

The extent to which balances can be behaviouralised is driven by:

- the amount of the current balance that can be assessed as 'stable' under business-as-usual conditions; and
- for managed rate balances the historic market interest rate re-pricing behaviour observed; or
- for non-interest bearing balances the duration for which the balance is expected to remain under business-as-usual conditions. This assessment is often driven by the re-investment tenors available to BSM to neutralise the risk through the use of fixed rate government bonds or interest rate derivatives, and for derivatives the availability of cash flow hedging capacity.

Balance Sheet Management

Effective governance across BSM is supported by the dual reporting lines it has to the Chief Executive Officer of GB&M and to the Group Treasurer. In each operating entity, BSM is responsible for managing liquidity and funding under the supervision of the local ALCO (which usually meets on a monthly basis). It also manages the non-trading interest rate positions transferred to it within a Global Markets limit structure.

In executing the management of the liquidity risk on behalf of ALCO, and managing the non-trading interest rate positions transferred to it, BSM invests in highly-rated liquid assets in line with the Group's liquid asset policy. The majority of the liquidity is invested in central bank deposits and government, supranational and agency securities with most of the remainder held in short-term interbank and central bank loans.

Withdrawable central bank deposits are accounted for as cash balances. Interbank loans, statutory central bank reserves and loans to central banks are accounted for as loans and advances to banks. BSM's holdings of securities are accounted for as AFS or, to a lesser extent, held-to-maturity assets.

Statutory central bank reserves are not recognised as liquid assets. The statutory reserves that would be released in line with the Group's stressed customer deposit outflow assumptions are reflected as stressed inflows.

BSM is permitted to use derivatives as part of its mandate to manage interest rate risk. Derivative activity is predominantly through the use of vanilla interest rate swaps which are part of cash flow hedging and fair value hedging relationships.

Credit risk in BSM is predominantly limited to short-term bank exposure created by interbank lending, exposure to central banks and high quality sovereigns, supranationals or agencies which constitute the majority of BSM's liquidity portfolio. BSM does not manage the structural credit risk of any Group entity balance sheets.

BSM is permitted to enter into single name and index credit derivatives activity, but it does so to manage credit risk on the exposure specific to its securities portfolio in limited circumstances only. The risk limits are extremely limited and closely monitored. At 31 December 2015, BSM had no open credit derivative index risk.

VaR is calculated on both trading and non-trading positions held in BSM. It is calculated by applying the same methodology used for the Markets business and utilised as a tool for market risk control purposes.

BSM holds trading portfolio instruments in only very limited circumstances. Positions and the associated VaR were not significant during 2015.

Sensitivity of net interest income

A principal part of our management of market risk in non-trading portfolios is to monitor the sensitivity of projected net interest income under varying interest rate scenarios (simulation modelling). This monitoring is undertaken at an entity level by local ALCOs.

Entities apply a combination of scenarios and assumptions relevant to their local businesses, and standard scenarios which are required throughout HSBC. The latter are consolidated to illustrate the combined pro forma effect on our consolidated net interest income.

Projected net interest income sensitivity figures represent the effect of the pro forma movements in net interest income based on the projected yield curve scenarios and the Group's current interest rate risk profile. This effect, however, does not incorporate actions which would probably be taken by BSM or in the business units to mitigate the effect of interest rate risk. In reality, BSM seeks proactively to change the interest rate risk profile to minimise losses and optimise net revenues. The net interest income sensitivity calculations assume that interest rates of all maturities move by the same amount in the 'up-shock' scenario. Rates are not assumed to become negative in the 'down-shock' scenario which may, in certain currencies, effectively result in non-parallel shock. In addition, the net interest income sensitivity calculations take account of the effect on net interest income of anticipated differences in changes between interbank interest rates and interest rates over which the entity has discretion in terms of the timing and extent of rate changes.

Defined benefit pension schemes

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

See 'Other risks – Pension Risk' on page 101 for additional information.

Operational risk

Overview and objectives

Operational risk is defined as the risk to achieving our strategy or objectives as a result of inadequate or failed internal processes, people and systems or from external events.

Requirements under CRD IV include a capital requirement for operational risk, utilising three levels of sophistication as stated on page 18. We have historically adopted, and currently use, the standardised approach in determining our operational risk capital requirements. We are in the process of implementing an Operational Risk model which we will use for economic capital calculation purposes. The table below sets out our operational risk capital requirement by region and global business.

Operational risk is relevant to every aspect of our business. It covers a wide spectrum of issues, in particular legal, compliance, security and fraud. Losses arising from breaches of regulation and law, unauthorised activities, error, omission, inefficiency, fraud, systems failure or external events all fall within the definition of operational risk.

We have historically experienced operational risk losses in the following major categories:

- possible mis-selling of products;
- breach of regulatory requirements;
- fraudulent and other external criminal activities;
- breakdowns in processes/procedures due to human error, misjudgement or malice;
- terrorist attacks;
- system failure or non-availability; and
- in certain parts of the world, vulnerability to natural disasters.

Table 63: Operational risk RWAs

	2015		2014	
	Capital required $bn	**RWAs $bn**	Capital required $bn	RWAs $bn
By geographical region				
Europe	**2.8**	**34.9**	2.8	35.5
Asia	**3.8**	**47.1**	3.7	45.8
Middle East and North Africa	**0.5**	**6.2**	0.5	6.2
North America	**1.1**	**14.1**	1.2	15.2
Latin America	**1.0**	**13.1**	1.2	15.1
At 31 December	**9.2**	**115.4**	9.4	117.8
By global business				
Retail Banking and Wealth Management[1]	**2.9**	**35.9**	2.9	37.7
Commercial Banking[1]	**2.5**	**31.0**	2.6	32.2
Global Banking and Markets	**3.5**	**45.2**	3.6	44.5
Global Private Banking	**0.3**	**3.3**	0.3	3.6
Other	**–**	**–**	–	(0.2)
At 31 December	**9.2**	**115.4**	9.4	117.8

1 *In the first half of 2015, a portfolio of customers was transferred from CMB to RBWM in Latin America in order to better align the combined banking needs of the customers with our established global businesses. Comparative data have been re-presented accordingly.*

During 2015, our operational risk profile continued to be dominated by compliance risks as referred to in the 'Top and emerging risks' section on page 110 and in the appendix to Risk Section on page 217 of the *Annual Report and Accounts 2015.* The most material losses experienced in 2015 related largely to events that occurred in previous years. These events included the possible historical mis-selling of payment protection insurance products in the UK (see Note 29 of the *Annual Report and Accounts 2015*). A number of mitigating actions continue to be taken to prevent future mis-selling incidents.

The regulatory environment in which we operate is increasing the cost of doing business and could reduce our future profitability. The implementation of Global Standards remains one of the key strategic priorities for the Group and is ongoing.

For further details on compliance risk, refer to page 178 of the Annual Report and Accounts 2015.

We recognise that operational risk losses can be incurred for a wide variety of reasons, including rare but extreme events.

The objective of our operational risk management is to manage and control operational risk in a cost-effective manner and within our risk appetite, as defined by GMB.

Organisation and responsibilities

Responsibility for minimising operational risk losses lies primarily with HSBC's management and staff. Each regional, global business, country, business unit and functional head is required to maintain oversight over operational risk and internal control, covering all businesses and operational activities for which they are responsible.

The Group Operational Risk function and the ORMF assist business management in discharging their responsibilities.

The ORMF defines minimum standards and processes, and the governance structure for operational risk and internal control across the Group. To implement the ORMF, HSBC has implemented a 'Three lines of defence' model (an industry best practice approach) to underpin our approach to managing operational risk. It makes clear who does what within HSBC to manage operational risks on a daily basis.

The First Line of Defence owns the risk and is responsible for identifying, recording, reporting, managing the risks and ensuring that the right controls and assessments are in place to mitigate these risks. The Second Line of Defence sets the policy and guidelines for managing the risks and provides advice, guidance and challenge to the First Line of Defence on effective risk management. The Third Line of Defence is Internal Audit which independently ensures we are managing risk effectively.

More details on our ORMF may be found on page 176 of the Annual Report and Accounts 2015.

The Global Operational Risk Committee, which reports to RMM, meets monthly to discuss key risk issues and review the effective implementation of the ORMF.

Operational risk is organised as a specific risk discipline within Global Risk. The Group Operational Risk function supports the Group Chief Risk Officer and the Global Operational Risk Committee and is responsible for establishing and maintaining the ORMF, monitoring the level of operational losses and the effectiveness of the control environment. It is also responsible for operational risk reporting at Group level, including preparation of reports for consideration by RMM and GRC.

Measurement and monitoring

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

In 2015, we continued to enhance our ORMF policies and procedures, and undertook various activities, such as a global training programme, to further embed the use of the framework in the management of the business.

Articulation of risk appetite for material operational risks helps the business to understand the level of risk our organisation is willing to take. Monitoring operational risk exposure against risk appetite on a regular basis, and setting out our risk acceptance process, drives risk awareness in a more forward-looking manner. It assists management in determining whether further action is required.

In addition, an enhanced Risk Scenario Analysis process has been implemented across material legal entities to improve the quantification and management of material risks. This provides a top down, forward-looking view of risks to help determine whether they are being effectively managed within our risk appetite or whether further management action is required.

In each of our subsidiaries, business managers are responsible for maintaining an acceptable level of internal control, commensurate with the scale and nature of operations. They are responsible for identifying and assessing risks, designing controls and monitoring the effectiveness of these controls. The ORMF helps managers to fulfil these responsibilities by defining a standard risk assessment methodology and providing a tool for the systematic reporting of operational loss data.

Operational risk and control assessment approach

Operational risk and control assessments are performed by individual business units and functions. The risk and control assessment process is designed to provide business areas and functions with a forward-looking view of operational risks, an assessment of the effectiveness of controls, and a tracking mechanism for action plans so that they can proactively manage operational risks within acceptable levels. Risk and control assessments are reviewed and updated at least annually.

Appropriate means of mitigation and controls are considered. These include:

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

Recording

We use a centralised database to record the results of our operational risk management process. Operational risk and control assessments, as described above, are input and maintained by business units. Business management and Business Risk and Control Managers monitor and follow up the progress of documented action plans.

Operational risk loss reporting

To ensure that operational risk losses are consistently reported and monitored at Group level, all Group companies are required to report individual losses when the net loss is expected to exceed $10,000 and to aggregate all other operational risk losses under $10,000. Losses are entered into the Operational Risk IT system and are reported to the Group Operational Risk function on a monthly basis.

Other risks

Pension risk

We operate a number of pension plans throughout the world. Some of them are defined benefit plans. Sponsoring Group companies (and in some instances, employees) make regular contributions in accordance with advice from actuaries and in consultation with the plans' trustees (where relevant). In situations where a funding deficit emerges, sponsoring Group companies agree to make additional contributions to the plans, to address the deficit over an appropriate repayment period.

The defined benefit plans invest these contributions in a range of investments designed to meet their long-term liabilities.

Pension risk principally arises from the potential for a deficit in a defined benefit plan to arise from a number of factors, including:

- investments delivering a return below that required to provide the projected plan benefits. This could arise, for example, when there is a fall in the market value of equities, or when increases in long-term interest rates cause a fall in the value of fixed income securities held;
- the prevailing economic environment leading to corporate failures, thus triggering write-downs in asset values (both equity and debt);
- a change in either interest rates or inflation expectations, causing an increase in the value of the plan liabilities; and
- plan members living longer than expected (known as longevity risk).

Pension risk is assessed by way of an economic capital model that takes into account potential variations in these factors. The impact of the variation on both pension assets and pension liabilities is modelled using VaR methodology, with a 99.5% confidence interval and a one-year time horizon.

Non-trading book exposures in equities

Our non-trading equities exposures are reviewed by RMM at least annually. At 31 December 2015, we had equity investments in the non-trading book of $6.1bn (2014: $10.9bn). These consist of investments held for the purposes shown in table 64.

Table 64: Non-trading book equity investments

	2015			2014		
	Available-for-sale $bn	**Designated at fair value $bn**	**Total $bn**	Available-for-sale $bn	Designated at fair value $bn	Total $bn
Strategic investments	**2.1**	**0.1**	**2.2**	7.5	0.1	7.6
Private equity investments	**1.9**	**0.1**	**2.0**	2.0	0.1	2.1
Business facilitation[1]	**1.9**	**–**	**1.9**	1.2	–	1.2
At 31 December	**5.9**	**0.2**	**6.1**	10.7	0.2	10.9

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

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

Exchange traded investments amounted to $0.8bn (2014: $5.9bn), with the remainder being unlisted. These investments are held at fair value in line with market prices and are mainly strategic in nature. The decrease in strategic investments was largely due to the disposal of the Industrial Bank investment, partially offset by an increase in investments to facilitate ongoing business.

On a regulatory consolidation basis, the net gain from disposal of equity securities amounted to $1.8bn (2014: $1.0bn), while impairment of AFS equities amounted to $0.1bn (2014: $0.4bn). Unrealised gains on equities of $1.8bn at 31 December 2015 were fully recognised in CET1.

Details of our accounting policy for AFS equity investments and the valuation of financial instruments may be found on pages 398 and 378, respectively, of the Annual Report and Accounts 2015. *A detailed description of the valuation techniques applied to private equity may be found on page 382 of the* Annual Report and Accounts 2015.

Risk management of insurance operations

We operate an integrated bancassurance model which provides insurance products principally for customers with whom we have a banking relationship. Insurance products are sold through all global businesses, but predominantly by RBWM and CMB through our branches and direct channels worldwide.

The insurance contracts we sell relate to the underlying needs of our banking customers, which we can identify from our point-of-sale contacts and customer knowledge. The majority of sales are of savings and investment products and term and credit life contracts. By focusing largely on personal and SME lines of business we are able to optimise volumes and diversify individual insurance risks.

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

Where we do not have the risk appetite or operational scale to be an effective insurance manufacturer, we engage with a handful of leading external insurance companies in order to provide insurance products to our customers

through our banking network and direct channels. These arrangements are generally structured with our exclusive strategic partners and earn the Group a combination of commissions, fees and a share of profits.

We distribute insurance products in all of our geographical regions. We have life insurance manufacturing subsidiaries in nine countries (Argentina, mainland China, France, Hong Kong, Malaysia, Malta, Mexico, Singapore and the UK). We also have life insurance manufacturing associate in Saudi Arabia and a joint venture in India.

We measure the risk profile of our insurance manufacturing businesses using an economic capital approach, where assets and liabilities are measured on a market value basis and a capital requirement is held to ensure that there is less than a 1 in 200 chance of insolvency over the next year, given the risks that the businesses are exposed to. The methodology for the economic capital calculation is largely aligned to the new pan-European Solvency II insurance capital regulations, which are applicable from 2016.

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

Further details of the management of financial risks and insurance risk arising from the insurance operations are provided from page 180 of the Annual Report and Accounts 2015.

Liquidity and funding risk

Liquidity risk is the risk that the Group does not have sufficient financial resources to meet its obligations as they fall due, or will have to do so at an excessive cost. The risk arises from mismatches in the timing of cash flows.

The objective of our liquidity framework is to allow us to withstand very severe stresses. It is designed to be adaptable to changing business models, markets and regulations. Our liquidity and funding risk management framework requires:

- liquidity to be managed by operating entities on a stand-alone basis with no implicit reliance on the Group or central banks;
- all operating entities to comply with their limits for the advances to core funding ratio; and
- all operating entities to maintain positive stressed cash flow positions out to three months under prescribed Group stress scenarios.

We do not manage liquidity through the explicit allocation of capital as, in common with standard industry practice, this is not considered to be an appropriate or adequate mechanism for managing these risks. However, we recognise that a strong capital base can help to mitigate liquidity risk.

Funding risk is a form of liquidity risk arising when the liquidity needed to fund illiquid asset positions cannot be obtained at the expected terms and when required. Our primary sources of funding are customer current accounts and customer savings deposits payable on demand or at short notice. We issue wholesale securities (secured and unsecured) to supplement our customer deposits and change the currency mix, maturity profile or location of our liabilities. In the normal course of business we do not seek to utilise secured financing as a source of funding to finance customer assets, beyond the collateralised security financing activities within Global Markets. The table in Appendix II summarises the total on and off-balance sheet assets that are encumbered and unencumbered on liquidity and funding risk basis and unencumbered assets that could be used to support potential future funding and collateral needs.

Forward-looking framework

From 1 January 2016, the Group implemented a new internal Liquidity and Funding Risk Framework, using the external Liquidity Coverage Ratio and Net Stable Funding Requirement regulatory framework as a foundation, but adding extra metrics/limits and overlays to address the risks that we consider are not adequately reflected by the external regulatory framework.

The key aspects of the new internal Liquidity and Funding Risk Framework are:

- stand-alone management of liquidity and funding by operating entity;
- operating entity classification by inherent liquidity risk categorisation;
- minimum operating entity EC Liquidity Coverage Ratio requirement depending on inherent liquidity risk categorisation (EC Liquidity Coverage Ratio Delegated Regulation basis);
- minimum operating entity Net Stable Funding Requirement depending on inherent liquidity risk categorisation (on the basis of the Basel 295 publication, pending finalisation of the EC Net Stable Funding Requirement delegated regulation);
- legal entity depositor concentration limit;
- operating entity three-month and twelve-month cumulative rolling term contractual maturity limits covering deposits from banks, deposits from non-bank financials and securities issued;
- annual individual liquidity adequacy assessment by operating entity; and
- during 2016, we will also introduce a minimum operating entity Liquidity Coverage Ratio requirement by currency.

The new internal Liquidity and Funding Risk Framework and the risk tolerance (limits) were approved by the RMM and the Board on the basis of recommendations made by the GRC.

Our individual liquidity adequacy assessment process has been designed to identify risks that are not reflected in the Group framework and where additional limits are assessed to be required locally, and to validate the risk tolerance at the operating entity level.

The decision to create an internal framework modelled around the external regulatory framework was driven by the need to ensure that the external and internal frameworks are directionally aligned and to ensure that the Group's internal funds transfer pricing framework incentivises the global businesses within each operating entity to collectively comply with both the external (regulatory) and the internal risk tolerance.

Details of our Liquidity and Funding Risk parameters are provided from page 154 of the Annual Report and Accounts 2015.

Reputational risk

Reputational risk is the risk of failure to meet stakeholder expectations as a result of any event, behaviour, action or inaction, either by HSBC itself, our employees or those with whom we are associated, that might cause stakeholders to form a negative view of the Group. This may have financial or non-financial effects, resulting in a loss of confidence, or have other consequences. Reputational risk relates to stakeholders' perceptions, whether based on fact or otherwise. Stakeholders' expectations are constantly changing and thus reputational risk is dynamic and varies between geographical regions, groups and individuals. As a global bank, HSBC has an unwavering commitment to operating to the high standards we have set for ourselves in every jurisdiction. Any lapse in standards of integrity, compliance, customer service or operating efficiency represents a potential reputational risk.

For further details, please refer to the Reputational Risk section on page 189 of the Annual Report and Accounts 2015.

Sustainability risk

Sustainability risk arises from the provision of financial services to companies or projects which indirectly result in unacceptable impacts on people or on the environment. Sustainability risk is:

- measured by assessing the potential sustainability effect of a customer's activities and assigning a Sustainability Risk Rating to all high-risk transactions;
- monitored quarterly by the RMM and monthly by Group Sustainability Risk; and
- managed using sustainability risk policies covering project finance lending and sector-based sustainability policies for sectors and themes with potentially high environmental or social impacts.

Business risk

The PRA specifies that banks, as part of their ICAAP, should review their exposure to business risk.

Business risk is the potential negative effect on profits and capital from the Group not meeting our strategic objectives, as a result of unforeseen changes in the business and regulatory environment, exposure to economic cycles and technological changes.

We manage and mitigate business risk through our risk appetite, business planning and stress testing processes, so that our business model and planned activities are monitored, resourced and capitalised consistent with the commercial, economic and risk environment in which the Group operates, and that any potential vulnerabilities of our business plans are identified at an early stage so that mitigating actions can be taken.

Dilution risk

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

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

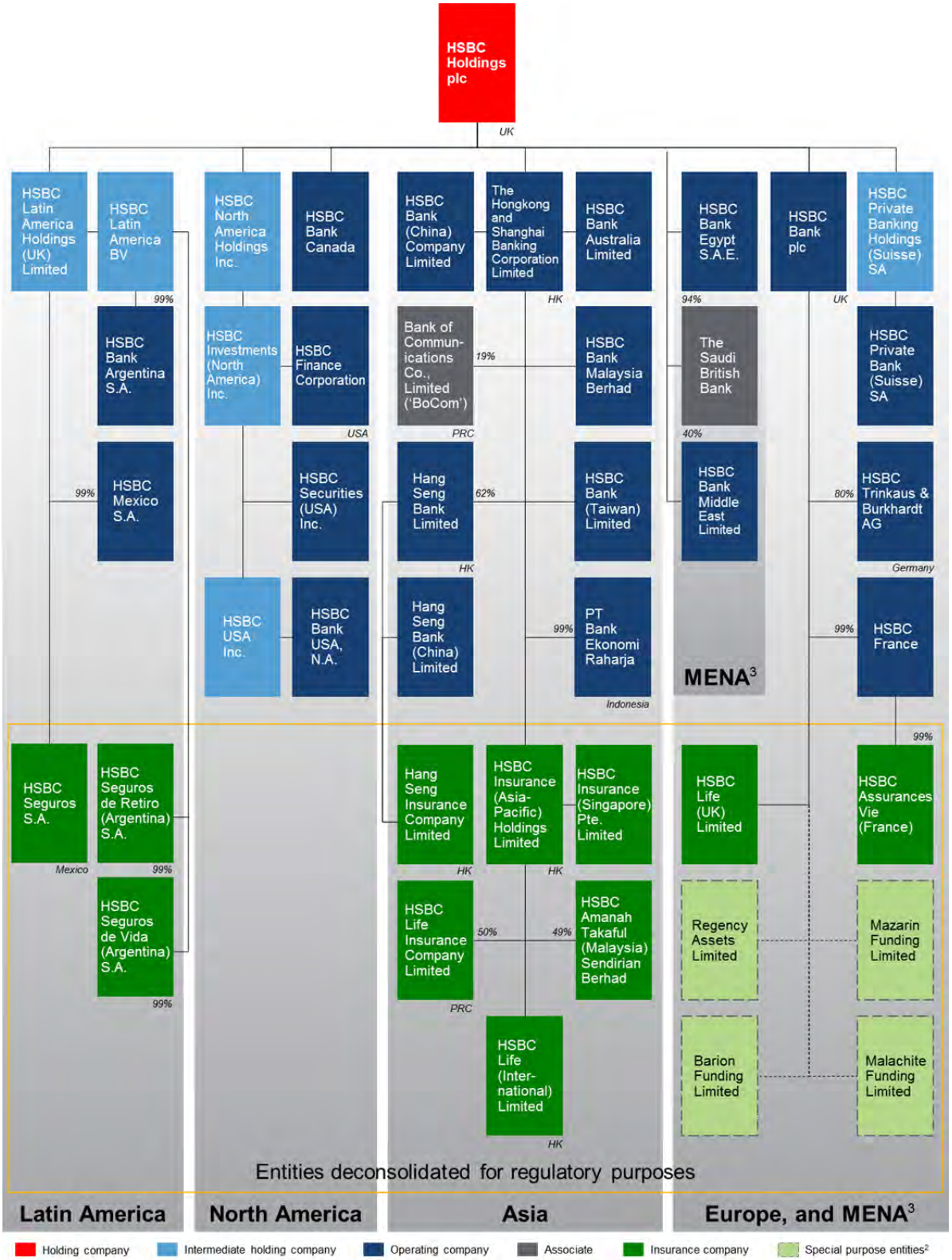
Details of our management of these risks may be found on the following pages of the Annual Report and Accounts 2015: *liquidity and funding 204, reputational 224 and sustainability 226.*

Remuneration

Details of the Group's remuneration policy, including details on the remuneration committee membership, activities, our remuneration strategy and tables showing the remuneration details of HSBC's Identified Staff and Material Risk Takers may be found under the Remuneration Policy on our website (www.hsbc.com/investor-relations/governance) and the Directors' Remuneration Report on page 285 of the *Annual Report and Accounts 2015*.

Appendix I

Simplified organisation chart for regulatory purposes[1]



1 *At 31 December 2015 showing entities in home and priority markets, wholly owned unless shown otherwise (part ownership rounded down to the nearest per cent), except 2, below.*

2 *Control of special purpose entities is not based on ownership.*

3 *Middle East and North Africa.*

Appendix II

Asset encumbrance

The following is the disclosure of on-balance sheet encumbered and unencumbered assets and off-balance sheet collateral (represented by median values of monthly data points in 2015) based on the requirement in Part Eight of CRD IV. The related Guideline, issued by the EBA on 27 June 2014, was implemented by the PRA through Supervisory Statement SS11/14.

Table 65: Asset encumbrance

A – Assets

		Carrying amount of encumbered assets	Fair value of encumbered assets	Carrying amount of unencumbered assets	Fair value of unencumbered assets
		010	040	060	090
		$m	$m	$m	$m
010	Assets of the reporting institution	**130,079**	**–**	**2,545,834**	**–**
030	Equity instruments	**8,085**	**8,085**	**72,608**	**72,493**
040	Debt securities	**67,903**	**67,805**	**451,722**	**442,657**
120	Other assets	**2,723**	**–**	**471,168**	**–**

B – Collateral received

		Fair value of encumbered collateral received or own debt securities issued	Fair value of collateral received or own debt securities issued available for encumbrance
		010	040
		$m	$m
130	Assets of the reporting institution	**143,295**	**118,790**
150	Equity instruments	**25,505**	**11,790**
160	Debt securities	**116,571**	**97,066**
230	Other collateral received	**–**	**4,771**
240	Own debt securities issued other than own covered bonds or ABSs	**–**	**–**

C – Encumbered assets/collateral received and associated liabilities

		Matching liabilities, contingent liabilities or securities lent	Assets, collateral received and own debt securities issued other than covered bonds and ABSs encumbered
		010	030
		$m	$m
010	Carrying amount of selected financial liabilities	**180,483**	**258,910**

Information on importance of encumbrance

We are a deposit-led bank and hence the majority of our funding is from customer current accounts and customer savings deposits payable on demand or at short notice. This is part of our Group framework, where we have defined the limit for the ratio of advances to deposits to be below 90% (2015: 72%). Given this structural unsecured funding position we have little requirement to fund ourselves in secured markets, and therefore our overall low level of encumbrance reflects this position. However, we do provide collateralised financing services to clients as part of our GB&M business model, providing cash financing or specific securities, and these result in off-balance sheet encumbrance. The other sources which contribute to encumbrance are securities pledged in derivative transactions, mostly for hedging purposes, issuance of asset-backed securities, and covered bond programmes in the UK, France and Australia. HSBC Holdings ALCO reviews the asset encumbrance of the institution as a whole quarterly and any events changing the asset encumbrance level are examined.

For details on-balance sheet encumbered and unencumbered assets, please refer to *Annual Report and Accounts 2015*, page 163.

Appendix III

Table 66: Transitional own funds disclosure

Ref[1]		Ref[2]	At 31 December 2015 $m	CRD IV prescribed residual amount $m	Final CRD IV text $m
	Common equity tier 1 (CET1) capital: instruments and reserves				
1	Capital instruments and the related share premium accounts		**20,858**	**–**	**20,858**
	of which: ordinary shares	*a*	**20,858**	**–**	**20,858**
2	Retained earnings	*a*	**143,976**	**–**	**143,976**
3	Accumulated other comprehensive income (and other reserves)	*a*	**(453)**	**–**	**(453)**
5	Minority interests (amount allowed in consolidated CET1)	*d*	**3,519**		**3,519**
5a	Independently reviewed interim net profits net of any foreseeable charge or dividend		**(3,717)**		**(3,717)**
6	Common equity tier 1 capital before regulatory adjustments		**164,183**		**164,183**
	Common equity tier 1 capital: regulatory adjustments				
7	Additional value adjustments		**(1,151)**		**(1,151)**
8	Intangible assets (net of related deferred tax liability)	*h*	**(20,650)**		**(20,650)**
10	Deferred tax assets that rely on future profitability excluding those arising from temporary differences (net of related tax liability)	*n*	**(1,204)**		**(1,204)**
11	Fair value reserves related to gains or losses on cash flow hedges		**(52)**		**(52)**
12	Negative amounts resulting from the calculation of expected loss amounts	*i*	**(4,920)**		**(4,920)**
14	Gains or losses on liabilities valued at fair value resulting from changes in own credit standing		**(495)**		**(495)**
15	Defined-benefit pension fund assets	*g*	**(4,009)**		**(4,009)**
16	Direct and indirect holdings of own CET1 instruments		**(839)**		**(839)**
	Regulatory adjustments applied to common equity tier 1 in respect of amounts subject to pre-CRD IV treatment		**–**		**–**
28	**Total regulatory adjustments to Common equity tier 1 (CET1)**		**(33,320)**	**–**	**(33,320)**
29	**Common equity tier 1 (CET1) capital**		**130,863**	**–**	**130,863**
	Additional Tier 1 (AT1) capital: instruments				
30	Capital instruments and the related share premium accounts		**9,261**	**–**	**9,261**
31	of which: classified as equity under applicable accounting standards	*c, j*	**9,261**	**–**	**9,261**
33	Amount of qualifying items and the related share premium accounts subject to phase out from AT1	*b, j*	**8,972**	**(8,972)**	**–**
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	*d, e, j*	**4,388**	**(4,219)**	**169**
35	of which: instruments issued by subsidiaries subject to phase out	*e, j*	**2,842**	**(2,842)**	**–**
36	**AT1 capital before regulatory adjustments**		**22,621**	**(13,191)**	**9,430**
	Additional Tier 1 capital: regulatory adjustments				
37	Direct and indirect holdings of own AT1 instruments		**(60)**	**–**	**(60)**
41b	Residual amounts deducted from Additional Tier 1 capital with regard to deduction from Tier 2 capital during the transitional period		**(121)**	**121**	**–**
	of which: 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		**(121)**	**121**	**–**
43	**Total regulatory adjustments to Additional Tier 1 (AT1) capital**		**(181)**	**121**	**(60)**
44	**Additional Tier 1 (AT1) capital**		**22,440**	**(13,070)**	**9,370**
45	**Tier 1 capital (T1 = CET1 + AT1)**		**153,303**	**(13,070)**	**140,233**

Ref[1]		Ref[2]	At 31 December 2015 $m	CRD IV prescribed residual amount $m	Final CRD IV text $m
	Tier 2 (T2) capital: instruments and provisions				
46	Capital instruments and the related share premium accounts	*m*	**15,863**	**–**	**15,863**
47	Amount of qualifying items and the related share premium accounts subject to phase out from T2	*m*	**6,645**	**(6,645)**	**–**
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	*d, l, m*	**14,344**	**(14,309)**	**35**
49	of which: instruments issued by subsidiaries subject to phase out	*l, m*	**14,330**	**(14,330)**	**–**
51	**Tier 2 (T2) capital before regulatory adjustments**		**36,852**	**(20,954)**	**15,898**
	Tier 2 (T2) 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)		**(282)**	**(121)**	**(403)**
57	**Total regulatory adjustments to Tier 2 (T2) capital**		**(322)**	**(121)**	**(443)**
58	**Tier 2 (T2) capital**		**36,530**	**(21,075)**	**15,455**
59	**Total capital (TC = T1 + T2)**		**189,833**	**(34,145)**	**155,688**
60	**Total risk-weighted assets**		**1,102,995**	**–**	**1,102,995**
	Capital ratios and buffers				
61	Common equity Tier 1		**11.9%**		**11.9%**
62	Tier 1		**13.9%**		**12.7%**
63	Total capital		**17.2%**		**14.1%**
64	Institution specific buffer requirement		**0.002%**		
65	of which: capital conservation buffer requirement				
66	of which: counter cyclical buffer requirement		**0.002%**		
67	of which: systemic risk buffer requirement				
67a	of which: Global Systemically Important Institution (G-SII) or Other Systemically Important Institution (O-SII) buffer				
68	Common Equity Tier 1 available to meet buffers		**6.1%**		
	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)		**3,518**		
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)		**3,451**		
75	Deferred tax assets arising from temporary differences (amount below 10% threshold, net of related tax liability)		**7,780**		
	Applicable caps on the inclusion of provisions in Tier 2				
76	Credit risk adjustments included in T2 in respect of exposures subject to standardised approach (prior to the application of the cap)		**–**		
77	Cap on inclusion of credit risk adjustments in T2 under standardised approach		**4,219**		
78	Credit risk adjustments included in T2 in respect of exposures subject to internal ratings-based approach (prior to the application of the cap)		**–**		
79	Cap for inclusion of credit risk adjustments in T2 under internal ratings-based approach		**3,297**		
	Capital instruments subject to phase-out arrangements (only applicable between 1 January 2013 and 1 January 2022)				
80	Current cap on CET1 instruments subject to phase out arrangements		**–**		
81	Amount excluded from CET1 due to cap (excess over cap after redemptions and maturities)		**–**		
82	Current cap on AT1 instruments subject to phase out arrangements		**12,112**		
83	Amount excluded from AT1 due to cap (excess over cap after redemptions and maturities)		**776**		
84	Current cap on T2 instruments subject to phase out arrangements		**20,975**		
85	Amount excluded from T2 due to cap (excess over cap after redemptions and maturities)		**3,217**		

1 *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.*

2 *The references (a) – (n) identify balance sheet components on page 8 which are used in the calculation of regulatory capital.*

CRD IV own funds disclosure requirements determine that firms must provide a detailed disclosure of the nature and amounts of specific items on own funds following an EBA specified uniform template. During the transitional period, the relevant template is the one set out in annex VI of Commission Implementing Regulation 1423/2013, which became applicable from 31 March 2014.

The capital position is presented on a CRD IV transitional basis as implemented by the PRA in the Definition of Capital part of the PRA Rulebook. Where appropriate, additional line items have been included to accommodate certain amounts not captured by the template. We have also provided additional information in the column, 'CRD IV prescribed residual amount', for completeness, to facilitate the reading of the end point capital resources position which results from adding the two columns together.

A list of the features of our capital instruments in accordance with annex III of Commission Implementing Regulation 1423/2013 is also being published on our website with reference to our balance sheet on 31 December 2015. This is in addition to the full terms and conditions of our securities, also available on our website.

Appendix IV

PD, LGD, RWA and exposure by country

The following tables set out the exposure-weighted average PD, exposure-weighted average LGD, RWAs and exposure by the location of the principal operations of the lending subsidiary or, in the case of operations of The Hongkong and Shanghai Banking Corporation, HSBC Bank, HSBC Bank Middle East and HSBC Bank USA, by the location of the lending branch.

Table 67a: PD, LGD, RWA and exposure by country – wholesale IRB advanced approach all asset classes[1]

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	2.31	30.5	87.5	209.4
– France	3.48	31.4	12.4	28.8
– Germany	0.41	41.9	0.3	1.3
– Switzerland	0.02	42.8	0.8	15.5
– Turkey	0.79	45.1	1.1	1.5
Asia				
– Hong Kong	0.62	41.7	74.0	262.4
– Australia	1.05	42.7	7.1	19.2
– India	1.03	54.0	9.3	17.0
– Indonesia	7.98	54.5	5.5	6.6
– Mainland China	0.92	46.5	28.7	69.6
– Malaysia	0.98	47.1	6.4	14.6
– Singapore	0.64	42.7	8.7	34.5
– Taiwan	0.24	47.9	3.8	16.6
Middle East and North Africa				
– Egypt	2.14	45.0	5.2	5.3
– UAE	0.12	39.0	1.9	10.7
North America				
– US	0.78	39.2	52.6	139.6
– Canada	1.83	38.4	21.7	50.0
Latin America				
– Argentina	7.11	45.5	2.8	1.7
– Brazil	0.48	45.0	6.0	9.5
– Mexico	1.44	44.5	2.8	7.5

Table 67b: PD, LGD, RWA and exposure by country – wholesale IRB advanced approach central governments and central banks

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	0.06	45.0	2.2	16.4
– France	0.05	45.1	0.3	2.3
– Germany	0.10	45.0	0.1	0.6
– Switzerland	0.01	45.0	0.6	13.9
– Turkey	0.68	45.0	0.9	1.3
Asia				
– Hong Kong	0.02	45.0	6.4	105.8
– Australia	0.01	45.0	0.3	5.7
– India	0.13	45.0	2.2	6.3
– Indonesia	0.31	45.0	0.6	1.4
– Mainland China	0.04	45.0	2.7	21.4
– Malaysia	0.05	45.0	0.8	5.4
– Singapore	0.01	45.0	0.5	13.0
– Taiwan	0.02	45.0	0.6	9.7
Middle East and North Africa				
– Egypt	2.34	45.0	4.7	4.3
– UAE	0.05	45.0	0.6	5.8
North America				
– US	0.01	45.1	5.5	45.6
– Canada	0.02	45.1	2.7	15.9
Latin America				
– Argentina	7.09	45.0	2.7	1.7
– Brazil	0.37	45.0	4.3	7.8
– Mexico	0.10	45.0	2.5	6.8

Table 67c: PD, LGD, RWA and exposure by country – wholesale IRB advanced approach institutions

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	0.35	21.3	3.2	21.0
– France	0.25	41.9	0.7	1.6
– Germany	0.10	38.1	0.2	0.6
– Switzerland	0.05	23.2	0.2	1.6
– Turkey	2.25	45.0	0.1	0.1
Asia				
– Hong Kong	0.06	42.7	4.3	29.6
– Australia	0.06	34.1	0.5	2.7
– India	0.18	45.2	0.2	0.6
– Indonesia	–	–	–	–
– Mainland China	0.12	45.6	1.9	8.6
– Malaysia	0.27	47.5	0.4	1.2
– Singapore	0.08	44.0	0.8	5.5
– Taiwan	0.08	45.0	0.1	0.5
Middle East and North Africa				
– Egypt	0.08	45.0	0.1	0.5
– UAE	0.09	46.5	0.1	0.3
North America				
– US	0.23	41.0	2.0	5.2
– Canada	0.06	28.2	0.3	2.3
Latin America				
– Argentina	–	–	–	–
– Brazil	0.97	45.1	1.7	1.7
– Mexico	0.26	45.0	0.2	0.3

Table 67d: PD, LGD, RWA and exposure by country – wholesale IRB advanced approach corporates[1]

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	2.77	30.2	82.1	172.0
– France	4.00	29.4	11.4	24.9
– Germany	0.77	47.7	–	0.1
– Switzerland	–	–	–	–
– Turkey	0.73	45.7	0.1	0.1
Asia				
– Hong Kong	1.25	38.7	63.3	127.0
– Australia	1.85	43.7	6.3	10.8
– India	1.63	60.0	6.9	10.1
– Indonesia	10.04	57.0	4.9	5.2
– Mainland China	1.56	47.5	24.1	39.6
– Malaysia	1.72	48.4	5.2	8.0
– Singapore	1.34	40.3	7.4	16.0
– Taiwan	0.57	52.4	3.1	6.4
Middle East and North Africa				
– Egypt	2.58	45.2	0.4	0.5
– UAE	0.20	30.8	1.2	4.6
North America				
– US	1.21	36.1	45.1	88.8
– Canada	2.86	35.8	18.7	31.8
Latin America				
– Argentina	8.84	80.8	0.1	–
– Brazil	–	–	–	–
– Mexico	22.57	37.0	0.1	0.4

Table 67e: PD, LGD, RWA and exposure by country – wholesale IRB foundation approach all asset classes

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	**2.22**	**41.4**	**5.2**	**8.9**
– France	**5.36**	**45.0**	**0.2**	**0.2**
– Germany	**1.04**	**44.7**	**10.5**	**16.2**
– Switzerland	–	–	–	–
– Turkey	–	–	–	–
Asia				
– Hong Kong	–	–	–	–
– Australia	–	–	–	–
– India	–	–	–	–
– Indonesia	–	–	–	–
– Mainland China	–	–	–	–
– Malaysia	–	–	–	–
– Singapore	–	–	–	–
– Taiwan	–	–	–	–
Middle East and North Africa				
– Egypt	–	–	–	–
– UAE	**2.44**	**44.2**	**8.1**	**12.4**
North America				
– US	–	–	–	–
– Canada	–	–	–	–
Latin America				
– Argentina	–	–	–	–
– Brazil	–	–	–	–
– Mexico	–	–	–	–

Table 67f: PD, LGD, RWA and exposure by country – wholesale IRB foundation approach central governments and central banks

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	–	–	–	–
– France	–	–	–	–
– Germany	–	–	–	–
– Switzerland	–	–	–	–
– Turkey	–	–	–	–
Asia				
– Hong Kong	–	–	–	–
– Australia	–	–	–	–
– India	–	–	–	–
– Indonesia	–	–	–	–
– Mainland China	–	–	–	–
– Malaysia	–	–	–	–
– Singapore	–	–	–	–
– Taiwan	–	–	–	–
Middle East and North Africa				
– Egypt	–	–	–	–
– UAE	**0.04**	**45.0**	–	**0.1**
North America				
– US	–	–	–	–
– Canada	–	–	–	–
Latin America				
– Argentina	–	–	–	–
– Brazil	–	–	–	–
– Mexico	–	–	–	–

Table 67g: PD, LGD, RWA and exposure by country – wholesale IRB foundation approach institutions

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	–	–	–	–
– France	–	–	–	–
– Germany	–	–	–	–
– Switzerland	–	–	–	–
– Turkey	–	–	–	–
Asia				
– Hong Kong	–	–	–	–
– Australia	–	–	–	–
– India	–	–	–	–
– Indonesia	–	–	–	–
– Mainland China	–	–	–	–
– Malaysia	–	–	–	–
– Singapore	–	–	–	–
– Taiwan	–	–	–	–
Middle East and North Africa				
– Egypt	–	–	–	–
– UAE	**0.29**	**45.0**	**0.1**	**0.3**
North America				
– US	–	–	–	–
– Canada	–	–	–	–
Latin America				
– Argentina	–	–	–	–
– Brazil	–	–	–	–
– Mexico	–	–	–	–

Table 67h: PD, LGD, RWA and exposure by country – wholesale IRB foundation approach corporates

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	**2.22**	**41.4**	**5.2**	**8.9**
– France	**5.36**	**45.0**	**0.2**	**0.2**
– Germany	**1.04**	**44.7**	**10.5**	**16.2**
– Switzerland	–	–	–	–
– Turkey	–	–	–	–
Asia				
– Hong Kong	–	–	–	–
– Australia	–	–	–	–
– India	–	–	–	–
– Indonesia	–	–	–	–
– Mainland China	–	–	–	–
– Malaysia	–	–	–	–
– Singapore	–	–	–	–
– Taiwan	–	–	–	–
Middle East and North Africa				
– Egypt	–	–	–	–
– UAE	**2.50**	**44.2**	**8.0**	**12.0**
North America				
– US	–	–	–	–
– Canada	–	–	–	–
Latin America				
– Argentina	–	–	–	–
– Brazil	–	–	–	–
– Mexico	–	–	–	–

Table 67i: PD, LGD, RWA and exposure by country – retail IRB approach all asset classes

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	**1.58**	**30.8**	**21.8**	**182.6**
– France	**5.61**	**15.1**	**3.1**	**23.7**
– Germany	**–**	**–**	**–**	**–**
– Switzerland	**0.80**	**2.7**	**0.3**	**10.1**
– Turkey	**–**			
Asia				
– Hong Kong	**0.94**	**39.0**	**18.2**	**97.5**
– Australia	**0.84**	**10.9**	**0.6**	**10.7**
– India	**–**	**–**	**–**	**–**
– Indonesia	**–**	**–**	**–**	**–**
– Mainland China	**–**	**–**	**–**	**–**
– Malaysia	**3.57**	**12.3**	**1.0**	**4.7**
– Singapore	**0.69**	**21.2**	**1.4**	**8.2**
– Taiwan	**1.21**	**11.2**	**0.4**	**3.9**
Middle East and North Africa				
– Egypt	**–**	**–**	**–**	**–**
– UAE	**–**	**–**	**–**	**–**
North America				
– US	**12.05**	**64.0**	**43.7**	**42.1**
– Canada	**1.04**	**19.8**	**2.4**	**18.0**
Latin America				
– Argentina	**–**	**–**	**–**	**–**
– Brazil	**–**	**–**	**–**	**–**
– Mexico	**–**	**–**	**–**	**–**

Table 67j: PD, LGD, RWA and exposure by country – retail IRB approach – retail secured by mortgages on immovable property non-SME

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	**1.32**	**12.5**	**7.1**	**134.2**
– France	**7.21**	**13.5**	**0.4**	**2.5**
– Germany	**–**	**–**	**–**	**–**
– Switzerland	**–**	**–**	**–**	**–**
– Turkey	**–**	**–**	**–**	**–**
Asia				
– Hong Kong	**0.76**	**10.0**	**8.9**	**59.7**
– Australia	**0.84**	**10.9**	**0.6**	**10.7**
– India	**–**	**–**	**–**	**–**
– Indonesia	**–**	**–**	**–**	**–**
– Mainland China	**–**	**–**	**–**	**–**
– Malaysia	**3.57**	**12.3**	**1.0**	**4.7**
– Singapore	**0.69**	**21.2**	**1.4**	**8.2**
– Taiwan	**1.21**	**11.2**	**0.4**	**3.9**
Middle East and North Africa				
– Egypt	**–**	**–**	**–**	**–**
– UAE	**–**	**–**	**–**	**–**
North America				
– US	**13.68**	**58.1**	**38.2**	**34.3**
– Canada	**0.93**	**17.5**	**1.8**	**15.8**
Latin America				
– Argentina	**–**	**–**	**–**	**–**
– Brazil	**–**	**–**	**–**	**–**
– Mexico	**–**	**–**	**–**	**–**

Table 67k: PD, LGD, RWA and exposure by country – retail IRB approach retail secured by mortgages on immovable property SME

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	–	–	–	–
– France	**8.01**	**18.8**	**0.5**	**2.0**
– Germany	–	–	–	–
– Switzerland	–	–	–	–
– Turkey	–	–	–	–
Asia				
– Hong Kong	**0.99**	**11.1**	–	**0.6**
– Australia	–	–	–	–
– India	–	–	–	–
– Indonesia	–	–	–	–
– Mainland China	–	–	–	–
– Malaysia	–	–	–	–
– Singapore	–	–	–	–
– Taiwan	–	–	–	–
Middle East and North Africa				
– Egypt	–	–	–	–
– UAE	–	–	–	–
North America				
– US	–	–	–	–
– Canada	**2.21**	**30.7**	**0.1**	**0.3**
Latin America				
– Argentina	–	–	–	–
– Brazil	–	–	–	–
– Mexico	–	–	–	–

Table 67l: PD, LGD, RWA and exposure by country – retail IRB approach retail QRRE

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	**1.17**	**85.2**	**6.1**	**33.2**
– France	–	–	–	–
– Germany	–	–	–	–
– Switzerland	–	–	–	–
– Turkey	–	–	–	–
Asia				
– Hong Kong	**1.11**	**100.1**	**8.0**	**30.6**
– Australia	–	–	–	–
– India	–	–	–	–
– Indonesia	–	–	–	–
– Mainland China	–	–	–	–
– Malaysia	–	–	–	–
– Singapore	–	–	–	–
– Taiwan	–	–	–	–
Middle East and North Africa				
– Egypt	–	–	–	–
– UAE	–	–	–	–
North America				
– US	**1.49**	**93.7**	**1.0**	**3.6**
– Canada	**2.91**	**61.2**	**0.1**	**0.4**
Latin America				
– Argentina	–	–	–	–
– Brazil	–	–	–	–
– Mexico	–	–	–	–

Table 67m: PD, LGD, RWA and exposure by country – retail IRB approach other SME

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	**7.07**	**66.0**	**4.7**	**8.1**
– France	**16.46**	**26.5**	**0.9**	**3.5**
– Germany	**–**	**–**	**–**	**–**
– Switzerland	**–**	**–**	**–**	**–**
– Turkey	**–**	**–**	**–**	**–**
Asia				
– Hong Kong	**0.13**	**10.8**	**–**	**0.1**
– Australia	**–**	**–**	**–**	**–**
– India	**–**	**–**	**–**	**–**
– Indonesia	**–**	**–**	**–**	**–**
– Mainland China	**–**	**–**	**–**	**–**
– Malaysia	**–**	**–**	**–**	**–**
– Singapore	**–**	**–**	**–**	**–**
– Taiwan	**–**	**–**	**–**	**–**
Middle East and North Africa				
– Egypt	**–**	**–**	**–**	**–**
– UAE	**–**	**–**	**–**	**–**
North America				
– US	**1.82**	**95.7**	**0.1**	**0.1**
– Canada	**4.31**	**47.3**	**0.1**	**0.2**
Latin America				
– Argentina	**–**	**–**	**–**	**–**
– Brazil	**–**	**–**	**–**	**–**
– Mexico	**–**	**–**	**–**	**–**

Table 67n: PD, LGD, RWA and exposure by country – retail IRB approach other non-SME

	Exposure-weighted average PD %	Exposure-weighted average LGD %	RWAs $bn	Exposure value $bn
Europe				
– UK	**2.18**	**83.2**	**3.9**	**7.1**
– France	**2.63**	**12.4**	**1.3**	**15.7**
– Germany	**–**	**–**	**–**	**–**
– Switzerland	**0.80**	**2.7**	**0.3**	**10.1**
– Turkey	**–**	**–**	**–**	**–**
Asia				
– Hong Kong	**1.85**	**21.1**	**1.3**	**6.5**
– Australia	**–**	**–**	**–**	**–**
– India	**–**	**–**	**–**	**–**
– Indonesia	**–**	**–**	**–**	**–**
– Mainland China	**–**	**–**	**–**	**–**
– Malaysia	**–**	**–**	**–**	**–**
– Singapore	**–**	**–**	**–**	**–**
– Taiwan	**–**	**–**	**–**	**–**
Middle East and North Africa				
– Egypt	**–**	**–**	**–**	**–**
– UAE	**–**	**–**	**–**	**–**
North America				
– US	**8.11**	**85.7**	**4.4**	**4.1**
– Canada	**0.99**	**28.1**	**0.3**	**1.3**
Latin America				
– Argentina	**–**	**–**	**–**	**–**
– Brazil	**–**	**–**	**–**	**–**
– Mexico	**–**	**–**	**–**	**–**

1 *Excludes specialised lending exposures subject to supervisory slotting approach.*

Appendix V

Summary of disclosures withheld due to their immateriality, confidentiality or proprietary nature

CRD IV reference	Description	Rationale
438(e) and 445	Capital requirements – Own funds requirements for settlement risk.	Materiality Settlement risk arises where certain transactions are unsettled after their due delivery date and is required to be separately disclosed. However, as settlement risk RWAs are not material and included within counterparty credit risk, they have not been separately disclosed.
442(c)	Credit Risk Adjustments – In relation to exposure to credit risk and dilution risk, the total amount of exposures after accounting offsets and without taking into account the effects of credit risk mitigation.	Materiality The disclosure has been made after taking into account the effects of credit risk mitigation; there are no significant differences between exposures pre and post credit risk mitigation at exposure class level.
448(a)	Key assumptions (including assumptions regarding loan prepayments and behaviour of non-maturity deposits) on their exposure to interest rate risk on positions not included in the trading book.	Proprietary Assumptions regarding fixed term loan repayments and term behaviouralisation of non-maturity deposits and capital drive HSBC's structural interest rates positioning and market hedging requirements. Disclosure could give key business strategy information to our competitors.

Appendix VI

Glossary

Term	Definition
A	
Additional valuation adjustment	See 'Prudent valuation adjustment'.
Arrears	Customers are said to be in arrears (or in a state of delinquency) when they are behind in fulfilling their obligations, with the result that an outstanding loan is unpaid or overdue. When a customer is in arrears, the total outstanding loans on which payments are overdue are described as delinquent.
Asset-backed securities ('ABS's)	Securities that represent an interest in an underlying pool of referenced assets. The referenced pool can comprise any assets which attract a set of associated cash flows but are commonly pools of residential or commercial mortgages.
Available-for-sale ('AFS')	Those non-derivative financial assets that are designated as available for sale or are not classified as a) loans and receivables b) held-to-maturity investments or c) financial assets at fair value through profit or loss.
B	
Back-testing	A statistical technique used to monitor and assess the accuracy of a model, and how that model would have performed had it been applied in the past.
Bail-in	Bail-in refers to the imposition of losses at the point of non-viability (but before insolvency) on bank liabilities (bail-inable debt) that are not exposed to losses while the institution remains a viable, going concern. Whether by way of write-down or conversion into equity, this has the effect of recapitalising the bank (although it does not provide any new funding).
Bank Recovery and Resolution Directive	A European legislative package issued by the European Commission and adopted by EU Member States. This directive was finalised in July 2014 and the majority of provisions came into effect on 1 January 2015. This introduces a common EU framework for how authorities should intervene to address banks which are failing or are likely to fail. The framework includes early intervention and measures designed to prevent failure and in the event of bank failure for authorities to ensure an orderly resolution.
Basel II	The capital adequacy framework issued by the Basel Committee in June 2006 in the form of the 'International Convergence of Capital Measurement and Capital Standards', amended by subsequent changes to the capital requirements for market risk and re-securitisations, commonly known as Basel 2.5, which took effect from 31 December 2011.
Basel III	In December 2010, the Basel Committee issued 'Basel III rules: a global regulatory framework for more resilient banks and banking systems' and 'International framework for liquidity risk measurement, standards and monitoring'. Together these documents present the Basel Committee's reforms to strengthen global capital and liquidity rules with the goal of promoting a more resilient banking sector. In June 2011, the Basel Committee issued a revision to the former document setting out the finalised capital treatment for counterparty credit risk in bilateral trades.
Basis risk	The risk that prices of offsetting financial instruments in a hedging strategy will not move in entirely opposite directions from each other. There is therefore a risk that the imperfect correlation between the instruments used for the hedging strategy produces an overall gain or loss.
C	
Capital conservation buffer ('CCB')	A capital buffer prescribed by regulators under Basel III and designed to ensure banks build up capital buffers outside periods of stress which can be drawn down as losses are incurred. Should a bank's CET1 capital fall within the capital conservation buffer range, capital distributions will be constrained by the regulators.
Capital required	Capital required represents the Pillar 1 capital charge calculated at 8% of RWAs.
Capital Requirements Directive ('CRD')	A capital adequacy legislative package adopted by EU member states. The CRD IV package comprises a recast Capital Requirements Directive and a new Capital Requirements Regulation. The package implements the Basel III capital proposals together with transitional arrangements for some of its requirements. CRD IV came into force on 1 January 2014.
Capital resources	Capital held on balance sheet that is eligible to satisfy capital requirements.
CET 1 ratio	A Basel III measure of CET 1 capital expressed as percentage of total risk exposure amount.

Term	Definition
Commercial paper	An unsecured, short-term debt instrument issued by a corporation, typically for the financing of accounts receivable, inventories and meeting short-term liabilities. The debt is usually issued at a discount, reflecting prevailing market interest rates.
Commercial real estate ('CRE')	Any real estate, comprising buildings or land, intended to generate a profit, either from capital gain or rental income.
Comprehensive risk measure	The comprehensive risk measure model covers all positions that are part of the correlation trading portfolio. Comprehensive risk measure covers all price risks including spread, default and migration. Like incremental risk charge, it is calibrated to a 99.9 percentile loss and a one-year capital horizon to generate a capital add-on to VAR.
Conduits	HSBC sponsors and manages multi-seller conduits and SICs. The multi-seller conduits hold interests in diversified pools of third-party assets such as vehicle loans, trade receivables and credit card receivables funded through the issuance of short-dated commercial paper and supported by a liquidity facility. The SICs hold predominantly asset-backed securities referencing such items as commercial and residential mortgages, vehicle loans and credit card receivables funded through the issuance of both long-term and short-term debt.
Consumer and Mortgage Lending ('CML')	In the US, the CML portfolio consists of our Consumer Lending and Mortgage Services businesses, which are in run-off. The Consumer Lending business offered secured and unsecured loan products, such as first and second lien mortgage loans, open-ended home equity loans and personal non-credit card loans through branch locations and direct mail. The majority of the mortgage lending products were for refinancing and debt consolidation rather than home purchases. In the first quarter of 2009, we discontinued all originations by our Consumer Lending business. Prior to the first quarter of 2007, when we ceased loan purchase activity, the Mortgage Services business purchased non-conforming first and second lien real estate secured loans from unaffiliated third parties. The business also included the operations of Decision One Mortgage Company ('Decision One'), which historically originated mortgage loans sourced by independent mortgage brokers and sold these to secondary market purchasers. Decision One ceased originations in September 2007.
Countercyclical capital buffer ('CCyB')	A capital buffer prescribed by regulators under Basel III which aims to ensure that capital requirements take account of the macro-financial environment in which banks operate. This will provide the banking sector with additional capital to protect it against potential future losses, when excess credit growth in the financial system as a whole is associated with an increase in system-wide risk.
Counterparty credit risk ('CCR')	Counterparty credit risk, in both the trading and non-trading books, is the risk that the counterparty to a transaction may default before completing the satisfactory settlement of the transaction.
Credit Conversion Factor ('CCF')	CCFs are used in determining the EAD in relation to credit risk exposures. The CCF is an estimate of the proportion of undrawn commitments expected to have been drawn down at the point of default.
Credit default swap ('CDS')	A derivative contract whereby a buyer pays a fee to a seller in return for receiving a payment in the event of a defined credit event (e.g. bankruptcy, payment default on a reference asset or assets, or downgrades by a rating agency) on an underlying obligation (which may or may not be held by the buyer).
Credit enhancements	Facilities used to enhance the creditworthiness of financial obligations and cover losses due to asset default.
Credit quality step	A step in the CRD IV credit quality assessment scale which is based on the credit ratings of ECAIs. It is used to assign risk weights under the standardised approach.
Credit risk	Risk of financial loss if a customer or counterparty fails to meet an obligation under a contract. It arises mainly from direct lending, trade finance and leasing business but also from products such as guarantees, derivatives and debt securities.
Credit risk adjustment ('CRA')	Credit risk adjustments are all amounts by which CET1 has been reduced in order to reflect losses exclusively related to credit risk under IFRSs, resulting from impairments, value adjustments or provisions for off-balance sheet items that are recognised in the profit or loss account.
Credit risk mitigation	A technique to reduce the credit risk associated with an exposure by application of credit risk mitigants such as collateral, guarantees and credit protection.
Credit spread risk	The risk that movements in credit spreads will affect the value of financial instruments.
Credit Support Annex ('CSA')	A legal document that regulates credit support (collateral) for OTC derivative transactions between two parties.

Term	Definition
Credit valuation adjustment ('CVA')	An adjustment to the valuation of derivative contracts to reflect the creditworthiness of derivative counterparties.
Customer risk rating ('CRR')	An internal scale of 23 grades measuring obligor PD.
CVA risk capital charge	A capital charge under CRD IV to cover the risk of mark-to-market losses on expected counterparty risk to derivatives.
D	
Debit valuation adjustment	An adjustment made by an entity to the valuation of OTC derivative liabilities to reflect within fair value the entity's own credit risk.
Debt securities	Financial assets on the Group's balance sheet representing certificates of indebtedness of credit institutions, public bodies or other undertakings, excluding those issued by central banks.
Delinquency	See 'Arrears'.
E	
Economic capital	The internally calculated capital requirement which is deemed necessary by HSBC to support the risks to which it is exposed.
Economic Value of Equity ('EVE') sensitivity	Considers all re-pricing mismatches in the current balance sheet and calculates the change in market value that would result from a set of defined interest rate shocks.
Equity risk	The risk arising from positions, either long or short, in equities or equity-based instruments, which create exposure to a change in the market price of the equities or equity instruments.
Expected loss ('EL')	A regulatory calculation of the amount expected to be lost on an exposure using a 12-month time horizon and downturn loss estimates. EL is calculated by multiplying the PD (a percentage) by the EAD (an amount) and LGD (a percentage).
Exposure	A claim, contingent claim or position which carries a risk of financial loss.
Exposure at default ('EAD')	Under the standardised approach, the amount expected to be outstanding after any credit risk mitigation, if and when the counterparty defaults. Under IRB, the amount outstanding if and when the counterparty defaults. EAD reflects drawn balances as well as allowance for undrawn amounts of commitments and contingent exposures.
Exposures in default	'Exposures in default' is an exposure class under the standardised approach to credit risk. A financial asset falls into this exposure class if it is more than 90/180 days past due or the obligor is deemed unlikely to pay his credit obligations. A financial asset such as a loan is past due when the counterparty has failed to make a payment when contractually due.
Exposure value	Exposure at default.
External Credit Assessment Institutions ('ECAI')	ECAIs include external credit rating agencies such as Standard & Poor's, Moody's and Fitch.
F	
Fair value	Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.
Financial collateral comprehensive method	This method applies a volatility adjustment (or 'haircut') to the value of the collateral to allow for the fact that the collateral taken may fall in value when it comes to taking control of the collateral and selling it. This adjusted collateral value is then subtracted from the exposure to create an 'adjusted exposure'. Firms on the standardised approach will then apply the risk weight of the borrower to the adjusted exposure value, while firms using foundation IRB make a formulaic adjustment to the LGD number which has a similar effect. To calculate these 'haircuts', the firm can use either a table of supervisory numbers or its own numbers if it meets certain requirements.
Financial Conduct Authority	The Financial Conduct Authority regulates the conduct of financial firms and, for certain firms, prudential standards in the UK. It has a strategic objective to ensure that the relevant markets function well.
Financial Policy Committee ('FPC')	The Financial Policy Committee, at the Bank of England, is charged with a primary objective of identifying, monitoring and taking action to remove or reduce systemic risks with a view to protecting and enhancing the resilience of the UK financial system. The FPC has a secondary objective to support the economic policy of the UK Government.

Term	Definition
G	
Global Systemically Important Bank ('G-SIB')	The FSB established in November 2011 a methodology to identify G-SIBs based on 12 principal indicators. Designation will result in the application of a CET1 buffer between 1% and 3.5%, to be phased in by 1 January 2019. The list of G-SIBs is re-assessed through annual re-scoring of banks and a triennial review of the methodology. National regulators have discretion to introduce higher charges than the minima. In CRD IV this is implemented via the Global Systemically Important Institutions (G-SII) Buffer. The requirements, initially for those banks identified in November 2014 as G-SIBs, are being phased in from 1 January 2016, becoming fully effective on 1 January 2019. National regulators have discretion to introduce higher thresholds than the minima.
H	
Haircut	A discount applied by management when determining the amount at which an asset can be realised. The discount takes into account the method of realisation including the extent to which an active market for the asset exists. With respect to credit risk mitigation, a downward adjustment to collateral value to reflect any currency or maturity mismatches between the credit risk mitigant and the underlying exposure to which it is being applied. Also a valuation adjustment to reflect any fall in value between the date the collateral was called and the date of liquidation or enforcement.
Held-to-maturity	An accounting classification for investments acquired with the intention and ability of being held until they mature.
I	
Impaired loans	Loans where the Group does not expect to collect all the contractual cash flows or expects to collect them later than they are contractually due.
Impairment allowances	Management's best estimate of losses incurred in the loan portfolios at the balance sheet date.
Impairment charge	Impairment charges represent a movement in the impairment allowance balance during the year, reflecting loss events which occurred during the financial year and changes in estimates of losses arising on events which occurred prior to the current year.
Incremental risk charge ('IRC')	The IRC model captures the potential distribution of profit and loss due to default and migration for a portfolio of credit positions. For credit positions held on the trading book, and subject to specific interest rate risk VAR for regulatory capital, an IRC based on the 99.9th percentile of the IRC distribution, over a one-year capital horizon, is used as a capital add-on to VAR.
Institutions	Under the standardised approach, Institutions comprise credit institutions or investment firms. Under the IRB approach, Institutions also include regional governments and local authorities, public sector entities and multilateral development banks.
Insurance risk	A risk, other than financial risk, transferred from the holder of a contract to the insurance provider. The principal insurance risk is that, over time, the combined cost of claims, administration and acquisition of the contract may exceed the aggregate amount of premiums received and investment income.
Interest rate risk	Exposure to adverse movements in interest rates. Accepting this risk is a normal part of banking and can be an important source of profitability and shareholder value.
Internal Assessment Approach ('IAA')	One of three calculation methods defined under the IRB approach for securitisations.
Internal Capital Adequacy Assessment Process ('ICAAP')	The Group's own assessment of the levels of capital that it needs to hold through an examination of its risk profile from regulatory and economic capital viewpoints.
Internal Model Method ('IMM')	One of three approaches defined in the Basel framework to determine exposure values for counterparty credit risk.
Internal ratings-based approach ('IRB')	A method of calculating credit risk capital requirements using internal, rather than supervisory, estimates of risk parameters.
IRB advanced approach	A method of calculating credit risk capital requirements using internal PD, LGD and EAD models.
IRB foundation approach	A method of calculating credit risk capital requirements using internal PD models but with supervisory estimates of LGD and conversion factors for the calculation of EAD.
L	
Leverage ratio	A measure which is the ratio of tier 1 capital to total exposures. Total exposures include on-balance sheet items, off-balance sheet items and derivatives, and should generally follow the accounting measure of exposure. This supplementary measure to the risk-based capital requirements is intended to constrain the build-up of excess leverage in the banking sector.

Term	Definition
Liquidity risk	The risk that HSBC does not have sufficient financial resources to meet its obligations as they fall due, or will have to do so at an excessive cost. This risk arises from mismatches in the timing of cash flows.
Loss given default ('LGD')	The estimated ratio (percentage) of the loss on an exposure to the amount outstanding at default ('EAD') upon default of a counterparty.
M	
Market risk	The risk that movements in market risk factors, including foreign exchange rates and commodity prices, interest rates, credit spreads and equity prices will reduce income or portfolio values.
Mark-to-market approach	One of three approaches to determine exposure values for counterparty credit risk.
Minimum capital requirement	The minimum amount of regulatory capital that a financial institution must hold to meet the Pillar 1 requirements for credit, market and operational risk. Also see 'capital required'.
Model validation	The process of assessing how well a credit risk model performs using a predefined set of criteria including the discriminatory power of the model, model accuracy, the appropriateness of the inputs and expert opinion.
Multilateral Development Bank ('MDB')	An institution created by a group of countries to provide financing for the purpose of development. Under the standardised approach to credit risk, eligible multilateral development banks attract a zero per cent risk weight.
N	
Net interest income	The amount of interest received or receivable on assets net of interest paid or payable on liabilities.
O	
Obligor grade	Obligor grades, summarising a more granular underlying counterparty risk rating scale for estimates of PD, are defined as follows: • 'Minimal Default Risk': The strongest credit risk, with a negligible PD. • 'Low Default Risk': A strong credit risk, with a low PD. • 'Satisfactory Default Risk': A good credit risk, with a satisfactory PD. • 'Fair Default Risk': The risk of default remains fair, but identified weaknesses may warrant more regular monitoring. • 'Moderate Default Risk': The overall position will not be causing any immediate concern, but more regular monitoring will be necessary as a result of sensitivities to external events that give rise to the possibility of risk of default increasing. • 'Significant Default Risk': Performance may be limited by one or more troublesome aspects, known deterioration, or the prospect of worsening financial status. More regular monitoring required. • 'High Default Risk': Continued deterioration in financial status, that requires frequent monitoring and ongoing assessment. The PD is of concern but the borrower currently has the capacity to meet its financial commitments. • 'Special Management': The PD is of increasing concern and the borrower's capacity to fully meet its financial commitments is becoming increasingly less likely. • 'Default': A default is considered to have occurred with regard to a particular obligor when either or both of the following events has taken place: the Group considers that the obligor is unlikely to pay its credit obligations in full, without recourse by the Group to actions such as realising security; or the obligor is past due more than 90 days, (90 days to 180 days for retail), on any material credit obligation to the Group.
Operational risk	The risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events, including legal risk.
Original exposure	Original exposure is the exposure value without taking into account value adjustments and provisions, credit conversion factors and the effect of credit risk mitigation techniques.
Over-the-counter ('OTC')	A bilateral transaction (e.g. derivatives) that is not exchange traded and that is valued using valuation models.
P	
Pillar 1	Minimum capital requirements – the calculation of regulatory capital for credit, market, and operational risk.
Pillar 2	The supervisory review process – sets out the process by which a bank should review its overall capital adequacy and the processes under which the supervisors evaluate how well financial institutions are assessing their risks and take appropriate actions in response to the assessments.

Term	Definition
Pillar 3	Market discipline – sets out the disclosure requirements for banks to publish certain details of their risks, capital and risk management, with the aim of strengthening market discipline.
Point-in-time ('PIT')	Estimates of PD (or other measures) generally covering a short time horizon (usually a 12-month period) and that are sensitive to changes in the economic cycle. This differs from a TTC basis which uses long run average economic and risk data to reduce such sensitivity.
Potential future exposure ('PFE')	The potential future credit exposure on derivatives contracts, calculated using the mark-to-market approach.
PRA Standard rules	The method prescribed by the PRA for calculating market risk capital requirements in the absence of VaR model approval.
Present value of in-force long-term insurance business	An asset representing the present value of the equity holders' interest in the issuing insurance companies' profits, expected to emerge from long-term insurance business or long-term investment contracts with discretionary participating features, written at the balance sheet date.
Private equity investments	Equity securities in operating companies not quoted on a public exchange, often involving the investment of capital in private companies or the acquisition of a public company that results in its delisting.
Probability of default ('PD')	The probability that an obligor will default within one year.
Prudential Regulation Authority ('PRA')	The Prudential Regulation Authority in the UK is responsible for prudential regulation and supervision of banks, building societies, credit unions, insurers and major investment firms.
Prudent Valuation Adjustment ('PVA')	A deduction from common equity tier 1 capital where the prudent value of trading assets or other financial assets measured at fair value is materially lower than the fair value recognised in the financial statements.
Q	
Qualifying revolving retail exposures	Retail IRB exposures that are revolving, unsecured, and, to the extent they are not drawn, immediately and unconditionally cancellable, such as credit cards.
R	
Ratings Based Method ('RBM')	One of three calculation methods defined under the IRB approach to securitisations. The approach uses risk weightings based on ECAI ratings, the granularity of the underlying pool and the seniority of the position and whether it is a re-securitisation.
Reference PD	HSBC's master CRR scale has been constructed using a set of PD points, falling at regular intervals along an exponential PD curve and determining the boundaries of 23 CRR bands. Reference PDs have been determined, which for most bands fall mid-way between that band's boundary PD points. The determination of the bands and corresponding reference PDs takes into account the need to avoid concentration in any one band, and to ensure effective mapping to risk management portfolio quality scales.
Regulatory capital	The capital which HSBC holds, determined in accordance with CRD IV as implemented by the PRA for the consolidated Group and by local regulators for individual Group companies.
Repo/reverse repo (or sale and repurchase agreement)	A short-term funding agreement that allows a borrower to create a collateralised loan by selling a financial asset to a lender. As part of the agreement the borrower commits to repurchase the security at a date in the future repaying the proceeds of the loan. For the party on the other end of the transaction (buying the security and agreeing to sell in the future) it is a reverse repurchase agreement or a reverse repo.
Re-securitisation	A securitisation exposure, where the risk associated with an underlying pool of exposures is tranched and at least one of the underlying exposures is a securitisation exposure.
Residual maturity	The period outstanding from the reporting date to the maturity or end date of an exposure.
Retail Internal Ratings Based ('Retail IRB') approach	Retail exposures that are treated under the IRB approach.
Return on equity	Profit attributable to ordinary shareholders of the parent company divided by average ordinary shareholders' equity.
Risk appetite	The aggregate level and types of risk a firm is willing to assume within its risk capacity to achieve its strategic objectives and business plan.
Risk-weighted assets ('RWAs')	Calculated by assigning a degree of risk expressed as a percentage (risk weight) to an exposure value.
Run-off portfolios	Legacy credit in GB&M, the US CML portfolio and other US run-off portfolios, including the treasury services related to the US CML businesses and commercial operations in run-off. Origination of new business in the run-off portfolios has been discontinued and balances are being managed down through attrition and sale.

Term	Definition
RWA density	The average risk weight, expressed as a percentage of RWAs divided by exposure value, based on those RWA and exposure value numbers before they are rounded to the nearest $0.1bn for presentation purposes.
S	
Securities Financing Transactions ('SFT')	A repurchase or reverse repurchase transaction, a securities or commodities lending or borrowing transaction, or a margin lending transaction.
Securitisation	A transaction or scheme whereby the credit risk associated with an exposure, or pool of exposures, is tranched and where payments to investors in the transaction or scheme are dependent upon the performance of the exposure or pool of exposures. A traditional securitisation involves the transfer of the exposures being securitised to a SPE which issues securities. In a synthetic securitisation, the tranching is achieved by the use of credit derivatives and the exposures are not removed from the balance sheet of the originator.
Securitisation position	Securitisation position means an exposure to a securitisation.
Six filters	An internal measure designed to improve capital deployment across the Group. Five of the filters examine the strategic relevance of each business in each country, in terms of connectivity and economic development, and the current returns, in terms of profitability, cost efficiency and liquidity. The sixth filter requires adherence to global risk standards.
Specialised lending exposure	Specialised lending exposures are defined as exposures to an entity which was created specifically to finance and/or operate physical assets, where the contractual arrangements give the lender a substantial degree of control over the assets and the income that they generate and the primary source of repayment of the obligation is the income generated by the assets being financed, rather than the independent capacity of a broader commercial enterprise.
Special Purpose Entity ('SPE')	A corporation, trust or other non-bank entity, established for a narrowly defined purpose, including for carrying on securitisation activities. The structure of the SPE and its activities are intended to isolate its obligations from those of the originator and the holders of the beneficial interests in the securitisation.
Standardised approach ('STD')	In relation to credit risk, a method for calculating credit risk capital requirements using rating agencies and supervisory risk weights. In relation to operational risk, a method of calculating the operational capital requirement by the application of a supervisory defined percentage charge to the gross income of eight specified business lines.
Stressed VaR	A market risk measure based on potential market movements for a continuous one-year period of stress for a trading portfolio.
Subordinated liabilities	Liabilities which rank after the claims of other creditors of the issuer in the event of insolvency or liquidation.
Supervisory Formula Method ('SFM')	An alternative Ratings Based Method to be used primarily on HSBC sponsored securitisations. It is used to calculate the capital requirements of exposures to a securitisation as a function of the collateral pool and contractual properties of the tranche or tranches retained.
Supervisory slotting approach	A method for calculating capital requirements for specialised lending exposures where the internal rating of the obligor is mapped to one of five supervisory categories, each associated with a specific supervisory risk weight.
Systemic Risk Buffer ('SRB')	A capital buffer prescribed in the EU under CRD IV, to address risks in the financial sector as a whole, or one or more sub-sectors, to be deployed as necessary by each EU member state with a view to mitigate structural macro-prudential risk. In the UK this was transposed in January 2015 and is intended to apply to ring-fenced banks and building societies over a certain threshold.
T	
Through-the-cycle ('TTC')	A rating methodology which seeks to take cyclical volatility out of the estimation of default risk by assessing a borrower's performance over the business cycle.
Tier 1 capital	A component of regulatory capital, as defined in CRD IV, comprising common equity tier 1 and additional tier 1. Additional tier 1 includes eligible non-common equity capital securities and any related share premium.
Tier 2 capital	A component of regulatory capital, as defined in CRD IV, comprising eligible capital securities and any related share premium.
Total Loss Absorbing Capacity ('TLAC')	Requirements set out by the FSB for global systemically important banks to have a sufficient amount of specific types of liabilities which can be used to absorb losses and recapitalise a bank in resolution. These requirements were finalised in November 2015 and are intended to facilitate an orderly resolution that minimises any impact on financial stability, ensures the continuity of critical functions, and avoids exposing taxpayers to loss.

Term	Definition
Total return swap	A credit derivative transaction that swaps the total return on a financial instrument (cash flows and capital gains and losses), for a guaranteed interest rate, such as an inter-bank rate, plus a margin.
Trading book	Positions in financial instruments and commodities held either with intent to trade or in order to hedge other elements of the trading book. To be eligible for trading book capital treatment, financial instruments must either be free of any restrictive covenants on their tradability or able to be hedged completely.
Trading risk	Market risk arising from trading portfolios.
V	
Value at risk ('VaR')	A measure of the loss that could occur on risk positions as a result of adverse movements in market risk factors (e.g. rates, prices, volatilities) over a specified time horizon and to a given level of confidence.
W	
Write-down/write-off	When a financial asset is written down or written off, a customer balance is partially or fully removed, respectively, from the balance sheet. Loans (and related impairment allowance accounts) are normally written off, either partially or in full, when there is no realistic prospect of recovery. Where loans are secured, this is generally after receipt of any proceeds from the realisation of security. In circumstances where the net realisable value of any collateral has been determined and there is no reasonable expectation of further recovery, write-off may be earlier.
Wrong-way risk	An adverse correlation between the counterparty's PD and the mark-to-market value of the underlying transaction.

Appendix VII

Cautionary statement regarding forward-looking statements

The Capital and Risk Management Pillar 3 Disclosures 2015 contains certain forward-looking statements with respect to HSBC's financial condition, results of operations, capital position and business.

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

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

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

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

Appendix VIII

Contacts

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