Credit Suisse Group AG

CREDIT SUISSE

Pillar 3 and regulatory disclosures

4Q19

For purposes of this report, unless the context otherwise requires, the terms “Credit Suisse,” the “Group,” “we,” “us” and “our” mean Credit Suisse Group AG and its consolidated subsidiaries. The business of Credit Suisse AG, the direct bank subsidiary of the Group, is substantially similar to the Group, and we use these terms to refer to both when the subject is the same or substantially similar. We use the term the “Bank” when we are only referring to Credit Suisse AG and its consolidated subsidiaries.

Abbreviations are explained in the List of abbreviations in the back of this report.

Publications referenced in this report, whether via website links or otherwise, are not incorporated into this report.

In various tables, use of “–” indicates not meaningful or not applicable.

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Introduction

General

This Group report as of December 31, 2019 is based on the revised Circular 2016/1 "Disclosure – banks" (FINMA circular) issued by the Swiss Financial Market Supervisory Authority FINMA (FINMA) on October 31, 2019. The revised FINMA circular includes the implementation of the revised Pillar 3 disclosure requirements issued by the Basel Committee on Banking Supervision (BCBS) in March 2017.

This report is produced and published quarterly, in accordance with FINMA requirements. The reporting frequency for each disclosure requirement is either annual, semi-annual or quarterly. This document should be read in conjunction with the Pillar 3 and regulatory disclosures – Credit Suisse Group AG 2Q19 and 3Q19 and the Credit Suisse Annual Report 2019, which includes important information on regulatory capital, risk management (specific references have been made herein to these documents) and regulatory developments and proposals.

The highest consolidated entity in the Group to which the FINMA circular applies is Credit Suisse Group.

These disclosures were verified and approved internally in line with our board-approved policy on disclosure controls and procedures. The level of internal control processes for these disclosures is similar to those applied to the Group's quarterly and annual financial reports. This report has not been audited by the Group's external auditors.

For certain prescribed table formats where line items have zero balances, such line items have not been presented.

This report reflects certain updates and corrections to prior period metrics which have been noted in the relevant tabular disclosures, where applicable.

Other regulatory disclosures

In connection with the implementation of Basel III, certain regulatory disclosures for the Group and certain of its subsidiaries are required. The Group's Pillar 3 disclosure, regulatory disclosures, additional information on capital instruments, including the main features of regulatory capital instruments and total loss-absorbing capacity (TLAC)-eligible instruments that form part of the eligible capital base and TLAC resources, Global systemically important bank (G-SIB) financial indicators, reconciliation requirements, leverage ratios and certain liquidity disclosures as well as regulatory disclosures for subsidiaries can be found on our website.

→ Refer to credit-suisse.com/regulatorydisclosures for additional information.

Regulatory developments

In June 2019, the BCBS released a revised framework regarding the treatment of client-cleared derivatives for purposes of the leverage ratio and a revision of the leverage ratio disclosure requirements as part of the Pillar 3 framework. The revision regarding the treatment of client-cleared derivatives aims to align the leverage ratio measurement of client-cleared derivatives with the standardized approach to measuring counterparty credit risk exposures as applied for risk-based capital requirements. Additionally, the revised leverage ratio disclosure requirements set out additional obligations for banks to disclose their leverage ratios based on quarter-end and on daily average values of securities financing transactions. Both revisions will be applicable to the version of the leverage ratio standard that will enter into effect on January 1, 2022.

→ Refer to "Regulatory developments" (pages 119 to 120) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Capital management in the Credit Suisse Annual Report 2019 for further information on regulatory developments.

Location of disclosure

This report provides the Pillar 3 and regulatory disclosures required by the FINMA circular for the Group to the extent that these disclosures are not included in the Credit Suisse Annual Report 2019 or in the regulatory disclosures on our website.

→ Refer to "Annual Report" under credit-suisse.com/ar for disclosures included in the Credit Suisse Annual Report 2019.

Location of disclosures

FINMA disclosure requirements	Location	Page number
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Risk management approach [Table OVA]	"Risk management oversight" "Risk appetite framework" "Risk coverage and management"	136 – 140 140 – 142 143 – 159
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Composition of capital and TLAC		
Differences in basis of consolidation [Table CC2]	List of significant subsidiaries and associated entities: "Note 40 – Significant subsidiaries and equity method investments" Changes in scope of consolidation: "Note 3 – Business developments, significant shareholders and subsequent events"	 387 – 390 279
Main features of regulatory capital instruments and TLAC-eligible instruments [Table CCA]	Refer to "Capital instruments" under credit-suisse.com/regulatorydisclosures [1]	
Macroprudential supervisor measures		
Disclosure of G-SIBs indicators [Table GSIB1]	Refer to "G-SIB Indicators" under credit-suisse.com/regulatorydisclosures [1]	
Credit risk		
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Securitization		
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Special duties of disclosure for systemically important financial institutions and stand-alone banks		
List and qualification of alleviations granted [Appendix 4]	"FINMA Decrees"	118

1 The disclosure will be available by the end of April 2020.

Swiss capital requirements

FINMA requires the Group to fully comply with the special requirements for systemically important financial institutions operating internationally. The following tables present the Swiss capital and leverage requirements and metrics as required by FINMA.

→ Refer to "Swiss requirements" (pages 117 to 119) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Capital management – Regulatory framework and "Swiss metrics" (pages 128 to 129) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Capital management in the Credit Suisse Annual Report 2019 for further information on general Swiss requirements and the related metrics.

Swiss capital requirements and metrics

		Phase-in		Look-through
end of 4Q19	CHF million	in % of RWA	CHF million	in % of RWA
Swiss risk-weighted assets				
Swiss risk-weighted assets	291,282	–	291,282	–
Risk-based capital requirements (going-concern) based on Swiss capital ratios				
Total	40,401	13.87	42,499	14.59
of which CET1: minimum	14,273	4.9	13,108	4.5
of which CET1: buffer	13,923	4.78	16,021	5.5
of which CET1: countercyclical buffers	845	0.29	845	0.29
of which additional tier 1: minimum	9,030	3.1	10,195	3.5
of which additional tier 1: buffer	2,330	0.8	2,330	0.8
Swiss eligible capital (going-concern)				
Swiss CET1 capital and additional tier 1 capital [1]	52,691	18.1	49,757	17.1
of which CET1 capital [2]	36,740	12.6	36,740	12.6
of which additional tier 1 high-trigger capital instruments	8,310	2.9	8,310	2.9
of which additional tier 1 low-trigger capital instruments [3]	4,707	1.6	4,707	1.6
of which tier 2 low-trigger capital instruments [4]	2,934	1.0	–	–
Risk-based requirement for additional total loss-absorbing capacity (gone-concern) based on Swiss capital ratios				
Total according to size and market share	33,789 [5]	11.6 [5]	41,653	14.3
Reductions due to rebates in accordance with article 133 of the CAO	(5,406)	(1.856)	(6,665)	(2.288)
Reductions due to the holding of additional instruments in the form of convertible capital in accordance with Art. 132 para 4 CAO	–	–	(1,467)	(0.504)
Total, net	28,383	9.744	33,522	11.508
Eligible additional total loss-absorbing capacity (gone-concern)				
Total	38,576	13.2	41,138	14.1
of which bail-in instruments	37,172	12.8	37,172	12.8
of which tier 2 low-trigger capital instruments	1,032	0.4	3,966	1.4
of which non-Basel III-compliant tier 2 capital	372 [6]	0.1	–	–

Rounding differences may occur.

1 Excludes tier 1 capital, which is used to fulfill gone-concern requirements.

2 Excludes CET1 capital, which is used to fulfill gone-concern requirements.

3 If issued before July 1, 2016, such capital instruments qualify as additional tier 1 high-trigger capital instruments until their first call date according to the transitional Swiss "Too Big to Fail" rules.

4 If issued before July 1, 2016, such capital instruments qualify as additional tier 1 high-trigger capital instruments no later than December 31, 2019 according to the transitional Swiss "Too Big to Fail" rules.

5 Consists of a base requirement of 10.52%, or CHF 30,643 million, and a surcharge of 1.08%, or CHF 3,146 million.

6 Non-Basel III-compliant tier 2 capital instruments are subject to phase-out requirements. The amount includes the amortization component of CHF 58 million and the unamortized component of CHF 314 million.

Swiss leverage requirements and metrics

end of 4Q19	Phase-in CHF million	Phase-in in % of LRD	Look-through CHF million	Look-through in % of LRD
Leverage exposure				
Leverage ratio denominator	909,994	–	909,994	–
Unweighted capital requirements (going-concern) based on Swiss leverage ratio				
Total	40,950	4.5	45,500	5.0
of which CET1: minimum	15,470	1.7	13,650	1.5
of which CET1: buffer	13,650	1.5	18,200	2.0
of which additional tier 1: minimum	11,830	1.3	13,650	1.5
Swiss eligible capital (going-concern)				
Swiss CET1 capital and additional tier 1 capital [1]	52,691	5.8	49,757	5.5
of which CET1 capital [2]	36,740	4.0	36,740	4.0
of which additional tier 1 high-trigger capital instruments	8,310	0.9	8,310	0.9
of which additional tier 1 low-trigger capital instruments [3]	4,707	0.5	4,707	0.5
of which tier 2 low-trigger capital instruments [4]	2,934	0.3	–	–
Unweighted requirements for additional total loss-absorbing capacity (gone-concern) based on Swiss leverage ratio				
Total according to size and market share	36,400 [5]	4.0 [5]	45,500	5.0
Reductions due to rebates in accordance with article 133 of the CAO	(5,824)	(0.64)	(7,280)	(0.8)
Reductions due to the holding of additional instruments in the form of convertible capital in accordance with Art. 132 para 4 CAO	–	–	(1,467)	(0.161)
Total, net	30,576	3.36	36,753	4.039
Eligible additional total loss-absorbing capacity (gone-concern)				
Total	38,576	4.2	41,138	4.5
of which bail-in instruments	37,172	4.1	37,172	4.1
of which tier 2 low-trigger capital instruments	1,032	0.1	3,966	0.4
of which non-Basel III-compliant tier 2 capital	372 [6]	0.0	–	–

Rounding differences may occur.

1 Excludes tier 1 capital, which is used to fulfill gone-concern requirements.

2 Excludes CET1 capital, which is used to fulfill gone-concern requirements.

3 If issued before July 1, 2016, such capital instruments qualify as additional tier 1 high-trigger capital instruments until their first call date according to the transitional Swiss "Too Big to Fail" rules.

4 If issued before July 1, 2016, such capital instruments qualify as additional tier 1 high-trigger capital instruments no later than December 31, 2019 according to the transitional Swiss "Too Big to Fail" rules.

5 Consists of a base requirement of 3.625%, or CHF 32,987 million, and a surcharge of 0.375%, or CHF 3,413 million.

6 Non-Basel III-compliant tier 2 capital instruments are subject to phase-out requirements. The amount includes the amortization component of CHF 58 million and the unamortized component of CHF 314 million.

Overview of risk management

General

Fundamental to our business is the prudent taking of risk in line with our strategic priorities. The primary objectives of risk management are to protect our financial strength and reputation, while ensuring that capital is well deployed to support business activities. Our risk management framework is based on transparency, management accountability and independent oversight. Risk management is an integral part of our business planning process with strong involvement of senior management and the Board of Directors. Risk measurement models are reviewed by the Model Risk Management team, an independent validation function, and regularly presented to and approved by the relevant oversight committee.

→ Refer to "Risk management oversight" (pages 136 to 140), "Risk appetite framework" (pages 140 to 142) and "Risk coverage and management" (pages 143 to 159) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management in the Credit Suisse Annual Report 2019 for information on risk management oversight including risk culture, risk governance, risk organization, risk types, risk appetite, risk limits, stress testing and strategies/processes to manage, hedge and mitigate risks.

Risk reporting

Risk reporting is performed regularly and there are numerous internal control procedures in place, in particular the standard operating procedures, risk and control assessment and independent report review. These ensure the reporting and measurement systems are up to date and are working as intended. They cover: validation and authorization of risk measurement data, status summary reports, data reconciliation, independent checks/validation and error reports to capture any failings. Senior management and the Board of Directors are informed about key risk metrics, including Value-at-Risk (VaR), Economic Risk Capital (ERC), key risks and top exposures with the monthly Group Risk Report.

Key risks

The Group is exposed to several key banking risks such as:

- Credit risk (refer to section "Credit risk" on pages 12 to 43);
- Counterparty credit risk (refer to section "Counterparty credit risk" on pages 44 to 53);
- Securitization risk (refer to section "Securitization risk" on pages 54 to 61);
- Market risk (refer to section "Market risk" on pages 62 to 66);
- Interest rate risk in the banking book (refer to section "Interest rate risk in the banking book" on pages 67 to 70); and
- Operational risk.

→ Refer to "Non-financial risk regulatory capital measurement" (page 155) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk coverage and management in the Credit Suisse Annual Report 2019 for information on operational risk.

The Basel framework proposes various approaches for determining capital requirements which banks have to abide by in order maintain regulatory compliance. Credit Suisse has adopted a modelled approach with respect to most of its risk types, both for regulatory and internal requirements, in order to ensure our capital resources are appropriate to our risk profile.

Risk-weighted assets

With the adoption of the revised FINMA circular, risk-weighted assets (RWA) presented in this report, including prior period comparisons, are based on the Swiss capital requirements.

→ Refer to "Swiss requirements" (pages 117 to 119) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Capital management in the Credit Suisse Annual Report 2019 for further information on Swiss capital requirements.

The following table presents an overview of total Swiss RWA forming the denominator of the risk-based capital requirements. Further breakdowns of RWA are presented in subsequent sections of this report.

RWA of CHF 291.3 billion as of the end of 4Q19 decreased 4% compared to the end of 3Q19, mainly resulting from a decrease relating to movements in risk levels in credit risk and market risk and a negative foreign exchange impact, partially offset by an increase relating to external model and parameter updates in credit risk.

RWA flow statements for credit risk, counterparty credit risk (CCR) and market risk are presented in subsequent parts of this report.

→ Refer to "Risk-weighted assets" (pages 124 to 126) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Capital management in the Credit Suisse Annual Report 2019 for further information on risk-weighted assets movements in 2019.

OV1 – Overview of Swiss risk-weighted assets and capital requirements

	Risk-weighted assets			Capital requirement [1]
end of	**4Q19**	3Q19	4Q18	**4Q19**
CHF million				
Credit risk (excluding counterparty credit risk)	144,984	146,413	139,867	11,599
of which standardized approach (SA)	25,518	24,935	13,190	2,042
of which supervisory slotting approach	4,212	3,509	2,403	337
of which advanced internal ratings-based (A-IRB) approach	115,254	117,969	124,274	9,220
Counterparty credit risk	20,365	23,044	17,613	1,629
of which standardized approach for counterparty credit risk (SA-CCR) [2]	1,830	2,964	2,559	146
of which internal model method (IMM)	17,486	19,060	14,086	1,399
of which other counterparty credit risk [3]	1,049	1,020	968	84
Credit valuation adjustments (CVA)	6,892	8,402	5,743	551
Equity positions in the banking book under the simple risk weight approach	10,202	10,410	8,378	816
Settlement risk	219	148	259	18
Securitization exposures in the banking book	13,333	14,393	12,541	1,067
of which securitization internal ratings-based approach (SEC-IRBA)	7,751	8,222	6,915	620
of which securitization external ratings-based approach (SEC-ERBA), including internal assessment approach (IAA)	1,555	1,622	1,727	125
of which securitization standardized approach (SEC-SA)	4,027	4,549	3,899	322
Market risk	15,192	18,376	18,643	1,215
of which standardized approach (SA)	1,981	2,031	2,393	158
of which internal model approach (IMA)	13,211	16,345	16,250	1,057
Operational risk (AMA)	68,318	70,475	71,040	5,466
Amounts below the thresholds for deduction (subject to 250% risk weight)	11,777	11,249	11,109	942
Total	**291,282**	**302,910**	**285,193**	**23,303**

1 Calculated as 8% of Swiss risk-weighted assets, based on total capital minimum requirements, excluding capital conservation buffer and G-SIB buffer requirements.

2 Calculated under the current exposure method.

3 Includes RWA for contributions to the default fund of a central counterparty and loans hedged by centrally cleared CDS.

Linkages between financial statements and regulatory exposures

This section shows the various sources of differences between the carrying values presented in the Group's financial statements prepared in accordance with accounting principles generally accepted in the US (US GAAP) and the exposure amounts used for regulatory purposes. The identification, classification and presentation of these sources of differences requires a significant amount of management judgement and is based on the information available at the time. As such, reclassifications have been made compared to the prior year. Management believes that the estimates and assumptions used in the preparation of these disclosures are prudent, reasonable and consistently applied.

The following table shows the differences between the scope of accounting consolidation and the scope of regulatory consolidation, broken down by how the amounts reported in the Group's financial statements correspond to regulatory risk categories. The column about the securitization framework includes securitizations in the banking book, whereas securitizations in the trading book are included in the column about market risk. Foreign exchange risk in the banking book is captured by the Internal Model Approach (IMA) in market risk. Positions with foreign exchange risk in the banking book are not included in the column about market risk. Cash collateral is excluded from market risk. However, the cash leg of securities financing transactions (SFT) in the trading book is included in the column about market risk.

LI1 – Differences between accounting and regulatory scopes of consolidation and mapping of financial statements with regulatory risk categories

	Carrying values		Carrying values of items subject to:				
end of 4Q19	Published financial statements	Regulatory scope of consolidation	Credit risk framework	Counterparty credit risk framework	Securitization framework	Market risk framework	Not subject to capital requirements or subject to deduction from capital
Assets (CHF million)							
Cash and due from banks	101,879	101,487	99,956	10	0	0	1,521
Interest-bearing deposits with banks	741	1,167	1,167	0	0	0	0
Central bank funds sold, securities purchased under resale agreements and securities borrowing transactions	106,997	106,997	25	106,972	0	98,244	0
Securities received as collateral, at fair value	40,219	40,219	0	40,219	0	40,190	0
Trading assets, at fair value [1]	153,797	147,302	8,883	64,394 [2]	1,718	150,080	0
Investment securities	1,006	1,006	990	0	16	0	0
Other investments	5,666	5,848	3,086	0	382	464	1,916
Net loans	296,779	297,095	267,989	208	27,868	1,586	(309)
Goodwill	4,663	4,668	0	0	0	0	4,668
Other intangible assets	291	291	0	0	0	0	291
Brokerage receivables	35,648	35,648	2,245	28,159	0	0	5,249
Other assets	39,609	38,917	18,502	5,137	1,551	6,386	7,380
Total assets	**787,295**	**780,645**	**402,843**	**245,099**	**31,535**	**296,950**	**20,716**
Liabilities (CHF million)							
Due to banks	16,744	17,139	0	0	0	0	17,139
Customer deposits	383,783	383,793	0	0	0	0	383,793
Central bank funds purchased, securities sold under repurchase agreements and securities lending transactions	27,533	32,597	0	32,573	0	20,988	24
Obligation to return securities received as collateral, at fair value	40,219	40,219	0	40,219	0	40,190	0
Trading liabilities, at fair value [1]	38,186	38,252	12	14,577	0	56,746	478
Short-term borrowings	28,385	23,370	0	0	0	5,628	17,742
Long-term debt	152,005	150,364	0	0	0	50,966	99,398
Brokerage payables	25,683	25,683	0	20,413	0	0	5,270
Other liabilities	31,043	25,402	418	8,562	0	639	15,810
Total liabilities	**743,581**	**736,819**	**430**	**116,344**	**0**	**175,157**	**539,654**

There are items in the table which attract capital charges according to more than one risk category framework. As an example, derivatives assets/liabilities held in the regulatory trading book are shown in the column about market risk and in the column about counterparty credit risk.

1 Trading assets/liabilities on the balance sheet reflect the balance after considering netting benefit of cash collateral hence reflect a lower balance than disclosed in the market risk column as cash collateral is not part of the market risk framework.

2 Includes assets pledged as collateral since collateral posted is subject to counterparty credit risk.

LI1 – Differences between accounting and regulatory scopes of consolidation and mapping of financial statements with regulatory risk categories (continued)

	Carrying values		Carrying values of items subject to:				
end of 4Q18	Published financial statements	Regulatory scope of consolidation	Credit risk framework	Counterparty credit risk framework	Securitization framework	Market risk framework	Not subject to capital requirements or subject to deduction from capital
Assets (CHF million) [1]							
Cash and due from banks	100,047	99,827	98,677	262	0	0	899
Interest-bearing deposits with banks	1,142	1,461	1,461	0	0	0	0
Central bank funds sold, securities purchased under resale agreements and securities borrowing transactions	117,095	117,095	42	117,053	0	107,831	0
Securities received as collateral, at fair value	41,696	41,696	0	41,696	0	41,696	0
Trading assets, at fair value [2]	132,203	126,936	9,722	51,359 [3]	1,360	129,595	0
Investment securities	2,911	1,479	1,471	0	8	0	0
Other investments	4,890	4,971	2,114	0	1,068	499	1,290
Net loans	287,581	288,215	267,012	122	20,204	1,213	(192)
Goodwill	4,766	4,770	0	0	0	0	4,770
Other intangible assets	219	219	0	0	0	0	219
Brokerage receivables	38,907	38,907	2,446	28,498	0	0	7,971
Other assets	37,459	36,747	16,819	8,606	1,196	3,617	7,259
Total assets	**768,916**	**762,323**	**399,764**	**247,596**	**23,836**	**284,451**	**22,216**
Liabilities (CHF million) [1]							
Due to banks	15,220	16,032	0	0	0	0	16,032
Customer deposits	363,925	363,828	0	0	0	0	363,828
Central bank funds purchased, securities sold under repurchase agreements and securities lending transactions	24,623	30,277	0	30,188	0	23,496	89
Obligation to return securities received as collateral, at fair value	41,696	41,696	0	41,696	0	41,696	0
Trading liabilities, at fair value [2]	42,169	42,212	0	16,311	0	59,746	627
Short-term borrowings	21,926	16,536	0	0	0	3,466	13,070
Long-term debt	154,308	152,058	0	0	0	46,685	105,373
Brokerage payables	30,923	30,923	0	23,097	0	0	7,826
Other liabilities	30,107	24,635	394	7,787	0	1,369	15,096
Total liabilities	**724,897**	**718,197**	**394**	**119,079**	**0**	**176,458**	**521,941**

There are items in the table which attract capital charges according to more than one risk category framework. As an example, derivatives assets/liabilities held in the regulatory trading book are shown in the column about market risk and in the column about counterparty credit risk.

1 Prior period has been corrected.

2 Trading assets/liabilities on the balance sheet reflect the balance after considering netting benefit of cash collateral hence reflect a lower balance than disclosed in the market risk column as cash collateral is not part of the market risk framework.

3 Includes assets pledged as collateral since collateral posted is subject to counterparty credit risk.

For financial reporting purposes, our consolidation principles comply with US GAAP. For capital adequacy reporting purposes, however, entities that are not active in banking and finance are not subject to consolidation (i.e. insurance, commercial and certain real estate companies). Also, FINMA does not require consolidating private equity and other fund type vehicles for capital adequacy reporting. Further differences in consolidation principles between US GAAP and capital adequacy reporting relate to special purpose entities (SPEs) that are consolidated under a control-based approach for US GAAP but are assessed under a risk-based approach for capital adequacy reporting. In addition, FINMA requires us to consolidate companies which form an economic unit with Credit Suisse or if Credit Suisse is obliged to provide compulsory financial support to a company. The investments into such entities, which are not material to the Group, are treated in accordance with the regulatory rules and are either subject to a risk-weighted capital requirement or a deduction from regulatory capital.

All significant equity method investments represent investments in the capital of banking, financial and insurance entities and are subject to a threshold calculation in accordance with the Basel framework and the Swiss Capital Adequacy Ordinance.

→ Refer to "Note 40 – Significant subsidiaries and equity method investments" (pages 387 to 390) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for a list of significant subsidiaries and associated entities.

In addition to the differences between accounting and regulatory scopes of consolidation as shown in table LI1 there are further main sources of differences between the financial statements' carrying value amounts and the exposure amounts used for regulatory purposes.

LI2 – Main sources of differences between regulatory exposure amounts and carrying values in financial statements

		Items subject to:		
end of	Credit risk frame-work	Counter-party credit risk frame-work [1]	Securiti-zation frame-work	Market risk frame-work
4Q19 (CHF million)				
Asset carrying value amount under regulatory scope of consolidation	402,843	245,099	31,535	296,950
Liabilities carrying value amount under regulatory scope of consolidation	430	116,344	0	175,157
Total net amount under regulatory scope of consolidation	402,413	128,755	31,535	121,793
Off-balance sheet amounts	67,994	0	28,901	0
Differences due to application of potential future exposures (SA-CCR) [2]	0	4,290	0	0
Differences due to the application of internal models for derivatives (IMM) and SFTs (VaR)	0	(50,941)	0	0
Other differences not classified above	1,056	2,112	(2,914)	0
Exposure amounts considered for regulatory purposes	**471,463**	**84,216**	**57,522**	**– [3]**
4Q18 (CHF million) [4]				
Asset carrying value amount under regulatory scope of consolidation	399,764	247,596	23,836	284,451
Liabilities carrying value amount under regulatory scope of consolidation	394	119,079	0	176,458
Total net amount under regulatory scope of consolidation	399,370	128,517	23,836	107,993
Off-balance sheet amounts	67,244	0	26,736	0
Differences due to application of potential future exposures (SA-CCR) [2]	0	4,222	0	0
Differences due to the application of internal models for derivatives (IMM) and SFTs (VaR)	0	(51,187)	0	0
Other differences not classified above	(297)	976	(2,405)	0
Exposure amounts considered for regulatory purposes	**466,317**	**82,528**	**48,167**	**– [3]**

The funded portion of the default funds for clearing houses are recorded as a brokerage receivable in accounting. For these positions there is no exposure amount considered for regulatory purposes.

1 Counterparty credit risk includes client cleared exposures, whereas such agency exposures are not reported in the financial statements. Additionally, the column counterparty credit risk and the column market risk take into account the impact of collateral pledges received in SFTs.

2 Calculated under the current exposure method.

3 The concept of "exposure amounts considered for regulatory purposes" is not applicable for market risk as for example for the VaR model.

4 Prior period has been corrected.

→ Refer to "Comparison of the standardized and internal model approaches" (pages 19 to 23) in Credit risk – Credit risk under the standardized approach for further information on the origins of differences between carrying values and amounts considered for regulatory purposes shown in the table above.

Valuation process

The Basel capital adequacy framework and the Swiss regulation provide guidance for systems and controls, valuation methodologies and valuation adjustments and reserves to provide prudent and reliable valuation estimates.

Financial instruments in the trading book are carried at fair value. The fair value of the majority of these financial instruments is marked to market based on quoted prices in active markets or observable inputs. Additionally, the Group holds financial instruments which are marked to models where the determination of fair values requires subjective assessment and varying degrees of judgment depending on liquidity, concentration, pricing assumptions and the risks affecting the specific instrument.

Control processes are applied to ensure that the reported fair values of the financial instruments, including those derived from pricing models, are appropriate and determined on a reasonable basis. These control processes include approval of new instruments, timely review of profit and loss, risk monitoring, price verification procedures and validation of models used to estimate the fair value. These functions are managed by senior management and personnel with relevant expertise, independent of the trading and investment functions.

In particular, the price verification function is performed by Product Control, independent from the trading and investment functions, reporting directly to the Chief Financial Officer (CFO), a member of the Executive Board.

The valuation process is governed by separate policies and procedures. To arrive at fair values, the following type of valuation adjustments are typically considered and regularly assessed for appropriateness: model, parameter, credit and exit-risk-related adjustments.

Management believes it complies with the relevant valuation guidance and that the estimates and assumptions used in valuation of financial instruments are prudent, reasonable and consistently applied.

→ Refer to "Fair valuations" (page 65) in II – Operating and financial review – Credit Suisse – Other information, to "Fair value" (page 101) in II – Operating and financial review – Critical accounting estimates and to "Note 35 – Financial instruments" (pages 347 to 352) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for further information on fair value.

Credit risk

General

This section covers credit risk as defined by the Basel framework. CCR, including those that are in the banking book for regulatory purposes, and all positions subject to the securitization framework are presented in separate sections.

→ Refer to "Counterparty credit risk" (pages 44 to 53) for further information on the capital requirements relating to counterparty credit risk.

→ Refer to "Securitization" (pages 54 to 61) for further information on the securitization framework.

The Basel framework permits banks to choose between two broad methodologies in calculating their capital requirements for credit risk: the standardized approach or the internal ratings-based (IRB) approach. Off-balance-sheet items are converted into credit exposure equivalents through the use of credit conversion factors (CCF).

The reported credit risk arises from the execution of the Group's business strategy through the divisions and is predominantly driven by cash and balances with central banks, loans and commitments provided to corporate and institutional clients, loans to private clients including residential mortgages and lending against financial collateral.

Risk management objectives and policies for credit risk

→ Refer to "Credit risk" (pages 146 to 149) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk coverage and management in the Credit Suisse Annual Report 2019 for information on risk management objectives and policies for credit risk, including our credit risk profile, the setting of credit risk limits, the structure and organization of credit risk management.

Credit risk reporting

Credit risk is subject to daily monitoring and reporting, and is governed by internal policies & procedures and a framework of limits and controls. The groups credit risk exposure is subject to formal monthly reporting through the Group Risk Report which provides summary information in relation to the credit risk portfolio composition, rating profile, and the largest single name loans and commitments. The Group Risk Report also provides qualitative commentary on key credit risk matters and developments, and is discussed at Board of Directors Risk Committee and distributed to the Board of Directors and Executive Board members.

Credit quality of assets

The amounts shown in the following tables are the US GAAP carrying values according to the regulatory scope of consolidation that are subject to the credit risk framework.

The following tables present a breakdown of exposures by geographical areas, industry and residual maturity.

CRB – Geographic concentration of gross credit exposures

end of	Switzerland	Americas	Asia Pacific	EMEA	**Total**
4Q19 (CHF million)					
Loans and debt securities	207,888	56,330	45,228	86,644	396,090
Off-balance sheet exposures [1]	17,842	55,521	5,191	26,024	104,578
Total	**225,730**	**111,851**	**50,419**	**112,668**	**500,668**
4Q18 (CHF million) [2]					
Loans and debt securities	208,570	55,450	40,365	86,844	391,229
Off-balance sheet exposures [1]	16,661	54,177	5,584	25,757	102,179
Total	**225,231**	**109,627**	**45,949**	**112,601**	**493,408**

The geographic distribution is based on the domicile of the counterparty, shown pre-substitution.

1 Revocable loan commitments, which are excluded from the disclosed exposures, can attract risk-weighted assets.

2 Prior period has been corrected.

CRB – Industry concentration of gross credit exposures

end of	Financial institutions [1]	Commercial	Consumer	Public authorities	**Total**
4Q19 (CHF million)					
Loans and debt securities	164,034	86,141	140,687	5,228	396,090
Off-balance sheet exposures [2]	31,064	72,445	888	181	104,578
Total	**195,098**	**158,586**	**141,575**	**5,409**	**500,668**
4Q18 (CHF million) [3]					
Loans and debt securities	153,666	87,562	137,143	12,858	391,229
Off-balance sheet exposures [2]	24,488	76,594	848	249	102,179
Total	**178,154**	**164,156**	**137,991**	**13,107**	**493,408**

Exposures are shown pre-substitution.

1 Includes exposures to central banks of CHF 89.1 billion and CHF 81.5 billion as of the end of 4Q19 and 4Q18, respectively.

2 Revocable loan commitments, which are excluded from the disclosed exposures, can attract risk-weighted assets.

3 Prior period has been corrected.

CRB – Remaining contractual maturity of gross credit exposures

end of	within 1 year [1]	within 1-5 years	Thereafter	**Total**
4Q19 (CHF million)				
Loans and debt securities	170,769	169,680	55,641	396,090
Off-balance sheet exposures [2]	41,778	56,880	5,920	104,578
Total	**212,547**	**226,560**	**61,561**	**500,668**
4Q18 (CHF million) [3]				
Loans and debt securities	166,363	173,674	51,192	391,229
Off-balance sheet exposures [2]	41,853	55,641	4,685	102,179
Total	**208,216**	**229,315**	**55,877**	**493,408**

1 Includes positions without agreed residual contractual maturity.

2 Revocable loan commitments, which are excluded from the disclosed exposures, can attract risk-weighted assets.

3 Prior period has been corrected.

The following tables show the amounts of impaired exposures and related allowances and write-offs, broken down by geographical areas and industry.

CRB – Geographic concentration of allowances, impaired loans and write-offs

end of	Allowances individually evaluated for impairment	Allowances collectively evaluated for impairment	**Total allowances**	Impaired loans with specific allowances	Impaired loans without specific allowances	**Total impaired loans**	**Gross write-offs**
4Q19 (CHF million)							
Switzerland	511	182	693	1,301	335	1,636	152
EMEA	26	29	55	177	68	245	60
Americas	57	83	140	150	13	163	20
Asia Pacific	14	49	63	87	0	87	75
Total	**608**	**343**	**951**	**1,715**	**416**	**2,131**	**307**
4Q18 (CHF million)							
Switzerland	475	180	655	1,046	710	1,756	221
EMEA	70	26	96	179	120	299	3
Americas	19	61	80	30	15	45	24
Asia Pacific	44	33	77	98	0	98	32
Total	**608**	**300**	**908**	**1,353**	**845**	**2,198**	**280**

CRB – Industry concentration of allowances, impaired loans and write-offs

end of	Allowances individually evaluated for impairment	Allowances collectively evaluated for impairment	**Total allowances**	Impaired loans with specific allowances	Impaired loans without specific allowances	**Total impaired loans**	**Gross write-offs**
4Q19 (CHF million)							
Financial institutions	37	25	62	48	0	48	0
Commercial	426	272	698	1,059	335	1,394	213
Consumer	145	46	191	608	81	689	94
Total	**608**	**343**	**951**	**1,715**	**416**	**2,131**	**307**
4Q18 (CHF million)							
Financial institutions	50	29	79	86	0	86	0
Commercial	412	224	636	736	693	1,429	184
Consumer	146	47	193	531	152	683	96
Total	**608**	**300**	**908**	**1,353**	**845**	**2,198**	**280**

The following table presents a comprehensive picture of the credit quality of the Group's on and off-balance sheet assets.

CR1 – Credit quality of assets

end of	Defaulted exposures	Non-defaulted exposures	**Gross exposures**	Allowances/ impairments	**Net exposures**
4Q19 (CHF million)					
Loans [1]	2,924	381,588	384,512	(951)	383,561
Debt securities	90	11,488	11,578	0	11,578
Off-balance sheet exposures [2]	110	104,468	104,578	(191)	104,387
Total	**3,124**	**497,544**	**500,668**	**(1,142)**	**499,526**
2Q19 (CHF million)					
Loans [1]	2,671	364,340	367,011	(888)	366,123
Debt securities	103	13,046	13,149	0	13,149
Off-balance sheet exposures [2]	143	105,517	105,660	(174)	105,486
Total	**2,917**	**482,903**	**485,820**	**(1,062)**	**484,758**

1 Loans include all on-balance sheet exposures that give rise to a credit risk charge and exclude debt securities, derivatives, securities financing transactions and off-balance sheet exposures.

2 Revocable loan commitments, which are excluded from the disclosed exposures, can attract risk-weighted assets.

The definitions of "past due" and "impaired" are aligned between accounting and regulatory purposes. However, there are some exemptions for impaired positions related to troubled debt restructurings where the default definition is different for accounting and regulatory purposes.

→ Refer to "Note 1 – Summary of significant accounting policies" (pages 271 to 273) and "Note 19 – Loans, allowance for loan losses and credit quality" (pages 289 to 296) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for further information on the credit quality of loans including past due and impaired loans.

The following table presents the changes in the Group's defaulted loans, debt securities and off-balance sheet exposures, the flows between non-defaulted and defaulted exposure categories and reductions in the defaulted exposures due to write-offs.

CR2 – Changes in defaulted exposures

	2H19
CHF million	
Defaulted exposures at beginning of period	**2,917**
Exposures that have defaulted since the last reporting period	743
Returned to non-defaulted status	(137)
Amounts written-off	(131)
Other changes	(268)
Defaulted exposures at end of period	**3,124**

The following table shows the aging analysis of accounting past-due exposures.

CRB – Aging analysis of accounting past-due exposures

	Current	Past due				
end of		Up to 30 days	31–60 days	61–90 days	More than 90 days	Total	**Total**
4Q19 (CHF million)							
Financial institutions	15,315	88	1	3	47	139	15,454
Commercial	108,805	642	74	73	728	1,517	110,322
Consumer	157,676	504	83	57	493	1,137	158,813
Public authorities	1,208	26	0	0	0	26	1,234
Gross loans held at amortized cost	**283,004**	**1,260**	**158**	**133**	**1,268**	**2,819**	**285,823**
Gross loans held at fair value							12,662
Gross loans							**298,485**
4Q18 (CHF million)							
Financial institutions	12,871	107	19	3	45	174	13,045
Commercial	104,361	461	101	83	861	1,506	105,867
Consumer	153,107	528	65	45	519	1,157	154,264
Public authorities	1,173	13	0	0	0	13	1,186
Gross loans held at amortized cost	**271,512**	**1,109**	**185**	**131**	**1,425**	**2,850**	**274,362**
Gross loans held at fair value							14,873
Gross loans							**289,235**

Loans that are modified in a troubled debt restructuring are reported as restructured loans. Generally, restructured loans would have been considered impaired and an associated allowance for loan losses would have been established prior to the restructuring. As of December 31, 2019, CHF 168 million were reported as restructured loans.

→ Refer to "Note 19 – Loans, allowance for loan losses and credit quality" (page 296) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for further information on restructured exposure.

Credit risk mitigation

Credit Suisse actively mitigates credit exposure through the use of legal netting agreements, security over supporting financial and non-financial collateral or financial guarantees and through the use of credit hedging techniques, primarily credit default swaps (CDS). The recognition of credit risk mitigation (CRM) against exposures is governed by a robust set of policies and processes that ensure enforceability and effectiveness.

Netting

→ Refer to "Derivative instruments" (pages 166 to 167) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk portfolio analysis and to "Note 1 – Summary of significant accounting policies" (pages 269 to 270) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for information on policies and procedures for on- and off-balance sheet netting.

→ Refer to "Note 27 – Offsetting of financial assets and financial liabilities" (pages 306 to 309) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for further information on the offsetting of derivatives, reverse repurchase and repurchase agreements, and securities lending and borrowing transactions.

Collateral valuation and management

The policies and processes for collateral valuation and management are driven by:

- a legal document framework that is bilaterally agreed with our clients;
- a collateral management risk framework enforcing transparency through self-assessment and management reporting; and
- any prevailing regulatory terms which must be complied with.

For exposures collateralized by financial collateral (e.g. marketable securities), collateral valuations are performed on a daily basis and any requirement for additional collateral (e.g. frequency and process for margin calls) is governed by the legal documentation. The market prices used for daily collateral valuation are a combination of internal pricing sources, as well as market prices sourced from trading platforms and external service providers where appropriate.

For exposures collateralized by non-financial collateral (e.g. real estate, ships, aircraft), valuations are performed at the time of credit approval and periodically thereafter depending on the type of collateral and the loan-to-value (LTV) ratio in accordance with documented internal policies and controls. Valuations are based on a combination of internal and external reference price sources.

Primary types of collateral

The primary types of collateral are described below.
Collateral securing foreign exchange transactions and over-the-counter (OTC) trading activities primarily includes:

- Cash and US Treasury instruments;
- G-10 government securities; and
- Other assets that are eligible as per the uncleared margin rules (including supranationals and equities).

Collateral securing loan transactions primarily includes:

- Financial collateral pledged against loans collateralized by securities of clients of the private, corporate and institutional banking businesses (primarily cash and marketable securities);
- Real estate property for mortgages, mainly residential, but also multi-family buildings, offices and commercial properties; and
- Other types of lending collateral, such as accounts receivable, inventory, plant and equipment.

Concentrations within risk mitigation

Credit Suisse, primarily through its Global Markets division, is an active participant in the credit derivatives market and trades with a variety of market participants, principally commercial and investment banks. Credit derivatives are primarily used to mitigate investment grade credit exposures. Where required or practicable, these trades are cleared through central counterparties (CCP), reducing the potential risk against individual CRM providers.

As a result of a strong domestic franchise, Credit Suisse has a significant volume of residential mortgage lending in Switzerland and a resultant concentration of residential real estate collateral.

Credit Suisse has clear underwriting standards with regard to mortgage lending and ensures that the composition of the real estate portfolio is subject to ongoing monitoring, periodic revaluation, and assessment of the geographical and borrower composition of the portfolio.

Credit Suisse provides loan facilities to private clients against financial collateral such as cash and marketable securities (e.g. equities, bonds, or funds). The financial collateral portfolio within risk mitigation is generally diversified and the portfolio is subject to ongoing monitoring and reporting to identify any concentrations, which may result in lower LTV ratios or other mitigating actions.

→ Refer to "Credit risk" (pages 161 to 167) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk portfolio analysis in the Credit Suisse Annual Report 2019 for further information on credit derivatives, including a breakdown by rating class.

CRM techniques – overview

The following table presents the use of CRM techniques. Credit Suisse recognizes the CRM effect of eligible collateral either as a reduction from the exposure at default (EAD) value of the secured instrument or as an adjustment to the probability of default (PD) or loss given default (LGD) associated with the exposure. All exposures that are secured through eligible collateral are disclosed as "Net exposures partially or fully secured". Eligible collateral amounts, regardless of which CRM technique has been applied, are disclosed as "Exposures secured by collateral". Exposures secured by credit derivatives do not include certain immaterial positions, where the credit derivative is recognized with an adjustment to the LGD.

CR3 – CRM techniques

	Net exposures			Exposures secured by		
end of	Unsecured	Partially or fully secured	**Total**	Collateral	Financial guarantees	Credit derivatives
4Q19 (CHF million)						
Loans [1]	145,288	238,273	383,561	196,864	7,243	2
Debt securities	11,119	459	11,578	282	0	0
Total	**156,407**	**238,732**	**395,139**	**197,146**	**7,243**	**2**
of which defaulted	609	1,797	**2,406**	1,246	175	0
2Q19 (CHF million)						
Loans [1]	120,720	245,403	366,123	208,561	5,582	95
Debt securities	12,804	345	13,149	311	0	0
Total	**133,524**	**245,748**	**379,272**	**208,872**	**5,582**	**95**
of which defaulted	397	1,865	**2,262**	1,280	158	0

1 Loans include all on-balance sheet exposures that give rise to a credit risk charge and exclude debt securities, derivatives, securities financing transactions and off-balance sheet exposures.

Credit risk under the standardized approach

General

Under the standardized approach, risk weights are determined either according to credit ratings provided by recognized external credit assessment institutions (ECAI) or, for unrated exposures, by using the applicable regulatory risk weights.

Credit risk exposure and CRM effects

The following table presents the effect of CRM (comprehensive and simple approach) on the standardized approach capital requirements' calculations. RWA density provides a synthetic metric on the riskiness of each portfolio.

CR4 – Credit risk exposure and CRM effects

	Exposures pre-CCF and CRM			Exposures post-CCF and CRM				
end of	On-balance sheet	Off-balance sheet	**Total**	On-balance sheet	Off-balance sheet	**Total**	RWA	RWA density
4Q19 (CHF million)								
Sovereigns	72,456	24	72,480	72,344	12	72,356	433	1%
Institutions – Banks and securities dealer	1,552	1,492	3,044	1,549	396	1,945	558	29%
Institutions – Other institutions	268	0	268	268	0	268	268	100%
Corporates	7,721	7,615	15,336	7,112	2,558	9,670	7,818	81%
Retail	1,006	139	1,145	1,006	139	1,145	1,021	89%
Other exposures	17,346	2,140	19,486	17,346	1,954	19,300	15,420	80%
of which non-counterparty related assets	7,942	0	7,942	7,942	0	7,942	7,942	100%
Total	**100,349**	**11,410**	**111,759**	**99,625**	**5,059**	**104,684**	**25,518**	**24%**
2Q19 (CHF million)								
Sovereigns	67,825	0	67,825	68,044	5	68,049	806	1%
Institutions – Banks and securities dealer	1,167	618	1,785	1,146	300	1,446	307	21%
Institutions – Other institutions	76	0	76	76	0	76	76	100%
Corporates	7,719	7,196	14,915	7,018	2,228	9,246	7,518	81%
Retail	1,088	152	1,240	1,088	152	1,240	1,071	86%
Other exposures	17,485	1,940	19,425	16,216	1,750	17,966	14,099	78%
of which non-counterparty related assets	7,815	0	7,815	7,815	0	7,815	7,815	100%
Total	**95,360**	**9,906**	**105,266**	**93,588**	**4,435**	**98,023**	**23,877**	**24%**

Exposures by asset class and risk weight

The following table presents the breakdown of credit exposures by asset class and risk weight, which correspond to the riskiness attributed to the exposure according to the standardized approach.

CR5 – Exposures by asset class and risk weight

	Risk weight							
end of	0%	20%	50%	75%	100%	150%	Others	Exposures post-CCF and CRM
4Q19 (CHF million)								
Sovereigns	71,825	26	274	0	112	119	0	72,356
Institutions – Banks and securities dealer	0	1,539	317	0	85	4	0	1,945
Institutions – Other institutions	0	0	0	0	268	0	0	268
Corporates	0	1,222	1,997	0	6,201	250	0	9,670
Retail	0	0	0	494	651	0	0	1,145
Other exposures	3,918	0	0	0	15,370	0	12	19,300
of which non-counterparty related assets	0	0	0	0	7,942	0	0	7,942
Total	**75,743**	**2,787**	**2,588**	**494**	**22,687**	**373**	**12**	**104,684**
of which past due	0	0	0	0	102	185	0	**287**
2Q19 (CHF million)								
Sovereigns	66,764	605	304	0	62	314	0	68,049
Institutions – Banks and securities dealer	0	1,395	46	0	5	0	0	1,446
Institutions – Other institutions	0	0	0	0	76	0	0	76
Corporates	0	1,076	1,975	0	5,957	238	0	9,246
Retail	0	0	0	675	565	0	0	1,240
Other exposures	3,890	1	0	0	14,068	0	7	17,966
of which non-counterparty related assets	0	0	0	0	7,815	0	0	7,815
Total	**70,654**	**3,077**	**2,325**	**675**	**20,733**	**552**	**7**	**98,023**
of which past due	0	0	0	0	48	406	0	**454**

Comparison of the standardized and internal model approaches

Background

We have regulatory approval to use a number of internal models for calculating our Pillar 1 capital charge for credit risk (default risk). These include the advanced-internal ratings-based (A-IRB) approach for risk weights, Internal Models Method (IMM) for derivatives credit exposure, and repo VaR for securities financing transactions (SFT). These modelled based approaches are used for the vast majority of credit risk exposures, with the standardized approaches used for only a relatively small proportion of credit exposures.

Regulators and investors are increasingly interested in the differences between capital requirements under modelled and standardized approaches. This is due, in part, to ongoing and future regulatory changes by the BCBS, such as the new standardized approaches for counterparty credit risk (SA-CCR) and credit risk as well as the restrictions on the use of internal models for certain portfolios in 2022. As such, FINMA requires us to disclose further information on differences between credit risk RWA computed under internal modelled approaches, and current standardized approaches. FINMA also requires us to disclose the differences between the EAD based on internal modelled approaches and the EAD used in the leverage ratio.

Key methodological differences

The differences between credit risk RWA calculated under the internal modelled approaches and the standardized approaches are driven by the risk weights applied to counterparties and the calculations used for measuring EAD.

Risk weights: Under the A-IRB approach, the maturity of a transaction, and internal estimates of the PD and downturn LGD are used as inputs to the Basel risk-weight formula for calculating RWA. In the standardized approach, risk weights are less granular and are driven by ratings provided by ECAI.

EAD calculations: Under the IMM and repo VaR methods, counterparty exposure is computed using monte-carlo simulation models or VaR models. These models allow for the recognition of netting impacts at exposure and collateral levels for each counterparty portfolio. The standardized approach is based on market values at the balance sheet date plus conservative add-ons to account for potential market movements. This approach gives very limited recognition to netting benefits and portfolio effects.

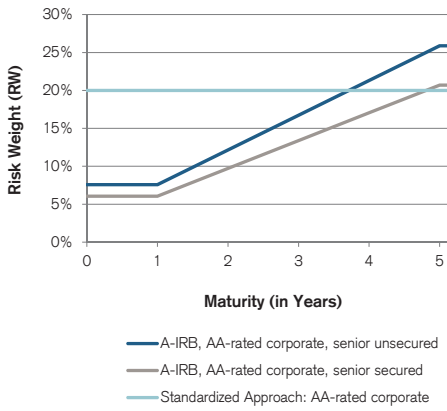
The following table provides a summary of the key conceptual differences between the internal models approach and the current standardized approach.

Key differences between the standardized approach and the internal model approach

	Standardized approach	Internal model approach	Key impact
EAD for derivatives	Current Exposure Method is simplistic (market value and add-on): replaced with SA-CCR in 2020.	Internal Models Method (IMM) allows Monte-Carlo simulation to estimate exposure.	For large diversified derivatives portfolios, standardized EAD is higher than model EAD.
	No differentiation between margined and unmargined transactions.	Ability to net and offset risk factors within the portfolio (i.e. diversification).	Impact applies across all asset classes.
	Differentiates add-ons by five exposure types and three maturity buckets only.	Application of multiplier on IMM exposure estimate.	
	Limited ability to net.	Variability in holding period applied to collateralized transactions, reflecting liquidity risks.	
Risk weighting	Reliance on ECAIs: where no rating is available a 100% risk weight is applied (i.e. for most small and medium-size enterprises and funds).	Reliance on internal ratings where each counterparty/transaction receives a rating.	Model approach produces lower RWA for high-quality short-term transactions.
	Crude risk weight differentiation with 4 key weights: 20%, 50%, 100%, 150% (and 0% for AAA sovereigns; 35%, 75% or 100% for mortgages; 75% or 100% for retail).	Granular risk sensitive risk weights differentiation via individual PDs and LGDs.	Standardized approach produces lower RWA for non-investment grade and long-term transactions.
	No differentiation for transaction features.	LGD captures transaction quality features incl. collateralization.	Impact relevant across all asset classes.
		Application of a 1.06 scaling factor.	
Risk mitigation	Limited recognition of risk mitigation.	Risk mitigation recognized via risk sensitive LGD or EAD.	Standardized approach RWA higher than model approach RWA for most collaterals.
	Restricted list of eligible collateral.	Wider variety of collateral types eligible.	Impact particularly relevant for lombard lending and SFTs.
	Conservative and crude regulatory haircuts.	Repo VaR allows use of VaR models to estimate exposure and collateral for SFTs. Approach permits full diversification and netting across all collateral types.	
Maturity in risk weight	No differentiation for maturity of transactions, except for interbank exposures in a coarse manner.	No internal modelling of maturity.	Model approach produces lower RWA for high-quality short-term transactions.
		Regulatory RWA function considers maturity: the longer the maturity the higher the risk weight (see chart "Risk weight by maturity").	

The following chart shows standardized risk weights, and model based (A-IRB) risk weights for loans of varying maturity. The graphs are plotted for a AA-rated corporate senior unsecured loan with a LGD of 45% (consistent with Foundation-IRB, F-IRB), and a AA-rated corporate senior secured loan with a LGD of 36%. The graphs show that standardized risk weights are not sensitive to maturity, whereas A-IRB risk weights are sensitive to maturity. In particular, under A-IRB, lower maturity loans receive lower risk weights reflecting an increased likelihood of repayment for loans with a shorter maturity.

Risk weight by maturity



Key methodological differences between internally modelled EAD and EAD used in leverage ratio

The exposure measure used in the leverage ratio also differs from the exposure measure used in the internal modelled approach. The main methodological difference is that leverage ratio exposure estimates do not take into account physical or financial collateral, guarantees or other CRM techniques to reduce the credit risk. Leverage ratio exposures also do not fully reflect netting and portfolio diversification. As a result, leverage ratio exposures are typically larger than model based exposures.

The following table shows the internal model-based EAD, along with average risk weight, compared to an estimate of the exposure measure used in the leverage ratio calculation. Estimates are provided at Basel asset class level. As expected, leverage exposure measures exceed internal model-based EAD for banks and corporates where the impacts of netting, diversification and CRM are large.

Leverage exposure estimate

	Internal model approach		
	EAD	Risk weight	Leverage exposures [1]
Basel asset class (CHF billion, except where indicated)			
Corporates	173	53%	320
Banks	27	29%	59
Sovereigns	26	7%	26
Retail	201	16%	200

1 The leverage exposure estimates only consider those exposures which are comparable to the credit risk RWA calculation under internal model approach and hence excludes exposures such as trading book, securitization and non-credit exposures. Asset class leverage ratio based exposures are approximate and provided on a best efforts basis.

It should be noted that credit risk capital requirements based on the internal model based approach are not directly comparable to capital requirements under the leverage ratio. The reason for this is that the 3% leverage ratio capital requirement can be met with total tier 1 capital, including capital for market risk and operational risk.

Risk-weighted assets under the standardized and internal model approaches

Credit risk RWA computed under the standardized approach are higher than those based on the internal models for which we have received regulatory approval. Higher risk-weights under the standardized approach rules are a material driver of the higher RWA for all Basel asset classes. The standardized exposure calculations also lead to some higher RWA, with the corporate and bank asset classes being most significantly affected.

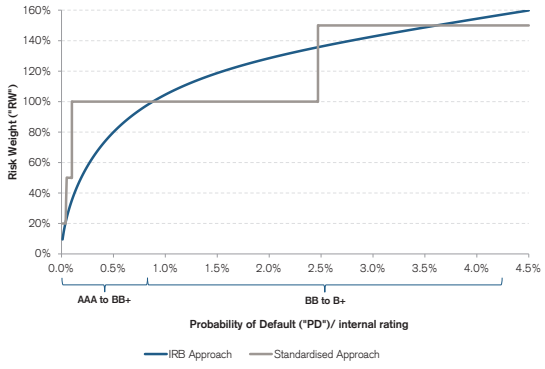
Corporate asset class

The table "Leverage exposure estimate" shows that the EAD for corporates computed under the internal model approach is CHF 173 billion. The EAD for corporates under the standardized approach is significantly higher. This difference is driven mainly by the standardized exposure calculations for OTC derivatives and secured financing transactions. For these products, exposures calculated under the standardized approach are higher than the model based exposures because the standardized approach does not fully recognize the benefits of netting, portfolio diversification and collateral. The exposure calculated under the leverage ratio is higher than the EAD computed using internal models. This is because CRM, netting and portfolio diversification are not reflected in the leverage ratio exposure calculation.

Another significant driver of the increase in credit risk RWA under the standardized approach is higher risk weights. The exposure weighted-average risk weight under the internal model approach is 53%. This is significantly lower than the risk weights assigned to corporates under the standardized approach.

The following graph shows the risk weights assigned to counterparties under the A-IRB approach and the standardized approach. For the IRB risk weight curve, an LGD value of 45% and a maturity adjustment of 2.5 years are chosen, as these are the Basel Foundation IRB parameters. For counterparties in the AAA to BB+ range (based on external ratings), higher risk weights (20%, 50% and 100%) are assigned under the standardized approach than under the A-IRB approach. For the corporate asset class, approximately three-quarters of the Group's exposures are in this range (based on internal ratings), and this is a key driver for the higher RWA under the standardized approach. The different treatments of loan maturity in the model based approach and standardized approach are not a material cause of RWA differences.

Corporates



The Group's exposure weighted-average maturity of its corporate portfolio is lower than the foundation IRB value of 2.5 years, and lower maturities would result in a lower model-based risk weight curve than shown in the graph. In addition, the PD for each rating shown in the graph are consistent with the Group's PD masterscale.

An additional driver of higher risk weights within the corporate asset class are counterparties without an external rating. Under the standardized approach, counterparties without an external rating receive a fixed risk weight of 100%. This applies to a large proportion of the Group's exposures, among them non-banking financial institutions and specialized lending. This fixed standardized risk weight is typically higher than the model based risk weight with for example, the average model based risk weight of specialized lending being approximately 40%.

→ Refer to "CR6 – Credit exposures by portfolio and PD range" (pages 28 to 35) for further information on EAD and risk weights for each credit rating for the corporate asset class.

Bank asset class

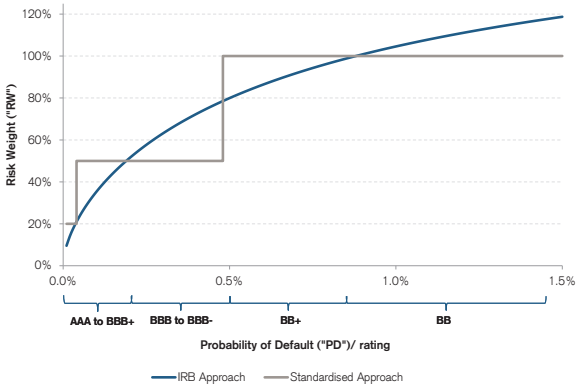
The table "Leverage exposure estimate" shows that the EAD for banks under the internal model approach is CHF 27 billion. The EAD for banks calculated under the standardized approach is significantly higher. This is driven predominantly by the exposure calculations for both OTC derivatives and secured financing transactions and, to a lesser extent, the exposure calculations for listed and centrally cleared derivatives. For these products, exposures calculated under the standardized approach are much higher than the model based exposures because the standardized approach does not fully recognize the benefits of netting, portfolio diversification and collateral. The exposures calculated under the leverage ratio are significantly higher than the EAD computed using internal models. This is because CRM, netting and portfolio diversification are not reflected in the leverage ratio exposure calculation.

In addition, there is a significant increase in credit risk RWA under the standardized approach due to higher credit risk-weights. The exposure weighted-average risk-weight under the internal model approach is 29%. This is significantly lower than the risk weights assigned to banks under the standardized approach where a significant amount of the Group's exposures would attract a risk weight of 50%.

The following graph shows the risk weights assigned to counterparties under the A-IRB approach and the standardized approach. For the IRB risk weight curve, an LGD value of 45% and a maturity adjustment of 2.5 years are chosen, as these are the Basel Foundation IRB parameters. The graph shows that counterparties in the AAA to BBB+ range (based on external ratings) attract higher risk weights (20% and 50%) under the standardized approach than under the A-IRB approach. In excess of three-quarters of the Group's exposures fall in this range (based on internal ratings) and this leads to higher RWA under the standardized approach for these counterparties. The different treatments of loan maturity in the model based approach and standardized approach are not a material cause of RWA differences.

→ Refer to "CR6 – Credit exposures by portfolio and PD range" (pages 28 to 35) for further information on EAD and risk weights for each credit rating for the bank asset class.

Banks



The Group's exposure weighted-average maturity of its bank portfolio is lower than the foundation IRB value of 2.5 years, and lower maturities would result in a lower model based risk weight curve than shown in the graph. In addition, the PD for each rating shown in the graph are consistent with the Group's PD masterscale.

Sovereign asset class

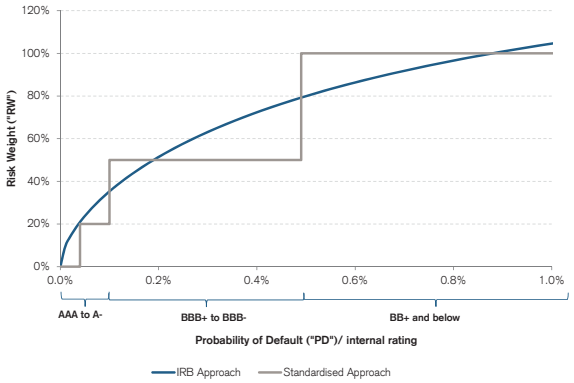
The table "Leverage exposure estimate" shows that the EAD for sovereigns under the internal model approach is CHF 26 billion. This is comparable to the EAD calculated under the standardized approach and the leverage ratio exposure. This is because the majority of the sovereign exposure is in the form of uncollateralized loans, i.e. there are no material differences in the exposure calculation.

The impact of employing standardized credit risk weights to the sovereign portfolio is an overall increase in credit risk RWA. The exposure weighted-average risk weight under the internal model approach is less than 7%. This is lower than the risk weights assigned to counterparties under the standardized approach.

The following graph shows the risk weights assigned to counterparties under the A-IRB approach and the standardized approach. For the IRB risk weight curve, an LGD value of 45% and a maturity adjustment of 2.5 years are chosen, as these are the Basel Foundation IRB parameters. The graph shows that counterparties in the AAA to A range (based on external ratings) would attract lower risk weights (0% and 20%) under the standardized approach than under the A-IRB approach. The majority of the Group's exposures have extremely low risk-weights under the A-IRB approach and would attract risk weights of 0% under the standardized approach. The remaining exposures would receive higher risk weights under the standardized approach (20%, 50% or 100%) than under the A-IRB approach. Overall, this would lead to higher RWA under the standardized approach. The different treatments of loan maturity in the model based approach and standardized approach are not a material cause of RWA differences.

→ Refer to "CR6 – Credit exposures by portfolio and PD range" (pages 28 to 35) for further information on EAD and risk weights for each credit rating for the sovereign asset class.

Sovereigns



The Group's exposure weighted-average maturity of its sovereign portfolio is lower than the foundation IRB value of 2.5 years, and lower maturities would result in a lower model-based risk weight curve than shown in the following graph. In addition, the PD for each rating shown in the graph are consistent with the Group's PD masterscale.

Retail asset class

The EAD of the retail asset class under the internal model approach is CHF 201 billion, which is comparable to the EAD calculated under the standardized approach and the leverage ratio. This is because the majority of retail exposure is on-balance sheet exposure.

The application of the standardized approach would lead to higher credit risk RWA. The exposure weighted-average risk weight is 16% using internal model approach. This is lower than the risk weights assigned to counterparties under the standardized approach. The maturity of the loan has no impact on the modelled risk weights in the retail asset class.

The retail portfolio consists mainly of residential mortgage loans, lombard lending and other retail exposures, and further analysis for each of these portfolios is provided below:

Residential mortgages: Under the standardized approach, fixed risk weights are applied depending on the LTV, i.e. risk weight of 100% for LTV > 80%, risk weight of 75% for 80% > LTV > 67% and risk weight of 35% for LTV < 67%. The internal model-based approach however takes into account borrowers' ability to service debt more accurately, including mortgage affordability and calibration to large amounts of historic data. The Group's residential mortgage portfolio is focused on the Swiss market and the Group has robust review processes over borrowers' ability to repay. This results in the Group's residential mortgage portfolio having a low average LTV and results in an average risk weight of 18% under the A-IRB approach.

Lombard lending: For lombard lending, the average risk weight using internal models is 11%. RWA under the standardized approach would be higher for these exposures.

Other retail exposures: Other retail exposures are risk-weighted at 75% or 100% under the standardized approach. This yields higher RWA compared to the A-IRB approach where the average risk-weight is 39%.

Conclusion

Overall, the Group's credit risk RWA would be significantly higher under the standardized approach than under the internal model based approach. For most Basel asset classes, this is due to standardized risk weights being much higher than the IRB risk weights for high quality investment grade lending, which is where the majority of the Group's exposures are. For certain asset classes, standardized exposure calculations also lead to significantly higher RWA. This is where the standardized exposure methods give limited recognition to economic offsetting and diversification for derivatives and SFTs at a portfolio level.

The credit risk RWA under the standardized approaches described above is not reflective of the capital charges under the new standardized approach for credit risk on which the BCBS published new rules in December 2017. This new standardized approach for credit risk is more risk sensitive and employs a different approach for incorporating external ratings. In addition, there is a new standardized approach for counterparty credit risk (SA-CCR), which prescribes a standardized calculation of EAD for derivative transactions. SA-CCR, which was implemented in January 2020, will more accurately recognize the risk mitigating effect of collateral and the benefits from legal and economic offsetting. These regulatory changes could potentially lead to very different results to the ones described above.

The credit risk RWA computed under the internal model-based approach provide a more risk-sensitive indication of the credit risk capital requirements and are more reflective of the economic risk of the Group. The use of models produces a strong link between capital requirements and business drivers, and promotes a proactive risk culture at the origination of a transaction and strong capital consciousness within the organization. A rigorous monitoring and control framework also ensures compliance with internal as well as regulatory standards.

Credit risk under internal ratings-based approaches

General

Under the IRB approach, risk weights are determined by using internal risk parameters and applying an asset value correlation multiplier uplift where exposures are to financial institutions meeting regulatory defined criteria. We have received approval from FINMA to use, and have fully implemented, the A-IRB approach whereby we provide our own estimates for PD, LGD and EAD.

PD parameters capture the risk of a counterparty defaulting over a one-year time horizon. PD estimates are mainly derived from models tailored to the specific business of the respective obligor. The models are calibrated to the long run average of annual internal or external default rates where applicable. For portfolios with a small number of empirical defaults, low default portfolio techniques are used.

LGD parameters consider seniority, collateral, counterparty industry and in certain cases fair value markdowns. LGD estimates are mainly based on an empirical analysis of historical loss rates. To reflect time value of money, recovered amounts on defaulted obligations are discounted to the time of default and to account for potential adverse outcomes in a downturn environment, final parameters are chosen such as they reflect periods where economic downturns have been observed and/or where increased losses manifested. For portfolios with low amount of statistical values available conservative values are chosen based on proxy analysis and expert judgement. For much of the private, corporate and institutional banking businesses loan portfolio, the LGD is primarily dependent upon the type and amount of collateral pledged. The credit approval and collateral monitoring process are based on LTV limits. For mortgages (residential or commercial), recovery rates are differentiated by type of property.

EAD is either derived from balance sheet values or by using models. EAD for a non-defaulted facility is an estimate of the expected exposure upon default of the obligor. Estimates are derived based on a CCF approach using default-weighted averages of historical realized conversion factors on defaulted loans by facility type. Estimates are calibrated to capture negative operating environment effects. To comply with regulatory guidance in deriving individual observed CCF values as basis for the estimation are floored at zero, i.e. it is assumed that drawn exposure can never become lower in the run to default.

→ Refer to "Credit risk" (pages 146 to 149) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk coverage and management in the Credit Suisse Annual Report 2019 for further information on PD and LGD.

Risk weights are calculated using either the PD/LGD approach or the supervisory risk weights approach for certain types of specialized lending.

Reporting related to credit risk models

→ Refer to "Model validation" (pages 25 to 26), "Use of internal ratings" (page 27) and "Credit Risk Review" (page 27) for further information on the scope and main content of the reporting related to credit risk models.

Rating models

The majority of the credit rating models used in Credit Suisse are developed internally by Core Credit Models, a specialized unit within the Quantitative Analysis and Technology area in the risk organization. These models are independently validated by Model Risk Management team prior to use in the Basel III regulatory capital calculation, and thereafter on a regular basis. Credit Suisse also uses models purchased from recognized data and model providers (e.g. credit rating agencies). These models are owned by Core Credit Models and are validated internally following the same governance process as models developed internally.

All new or material changes to rating models are subject to a robust governance process. Post development and validation of a rating model or model change, the model is taken through a number of committees where model developers, validators and users of the models discuss the technical and regulatory aspects of the model. The relevant committees opine on the information provided and decide to either approve or reject the model or model change. The ultimate decision making committee is the Risk Processes & Standards Committee (RPSC). The responsible Executive Board Member for the RPSC is the Chief Risk Officer (CRO). The RPSC sub-group responsible for credit risk models is the Credit Methodology Steering Committee (CMSC). RPSC or CMSC also review and monitor the continued use of existing models on an annual basis.

The following table provides an overview of the main PD and LGD models used by Credit Suisse. It reflects the portfolio segmentation from a credit risk model point of view, showing the RWA, type and number of the most significant models, and the loss period available for model development by portfolio. As the table follows an internal risk segmentation and captures the most significant models only, these figures do not match regulatory asset class or other A-IRB based segmentation.

Some of the portfolios shown in the table sum up multiple rating models. The distinction criteria determining which model applies, differs from portfolio to portfolio. Corporates, banks and non-banking financial institutions are split by turnover and geography. For funds, the distinction criteria is the different form of funds e.g. mutual-, hedge-funds etc., whereas for income producing real estate (IPRE), it is corporate vs. private counterparties. The distinction criteria for Sovereign is global governments vs. Swiss Canton vs. local governments (e.g. cities).

CRE – Main PD and LGD models used by Credit Suisse

				PD		LGD	
Portfolio	Asset class	RWA (in CHF billion)	Number of years loss data	No. of models	Model comment	No. of models	Model comment
Corporates	Corporates, retail	60	>15 years	2	Statistical scorecards using e.g. balance sheet, P&L data and qualitative factors	3	Statistical and hybrid models using e.g. industry and counterparty segmentation, collateral types and amounts, seniority and other transaction specific factors with granularity enhancements by public research and expert judgement
Banks and other financial institutions	Banks, corporates	10	>30 years	5	Statistical scorecard and constrained expert judgement using e.g. balance sheet, P&L data and qualitative factors		
Funds	Corporates	11	>10 years	4	Statistical scorecards using e.g. net asset value, volatility of returns and qualitative factors		
Residential mortgages	Retail	13	>10 years	1	Statistical scorecard using e.g. LTV, affordability, assets and qualitative factors	1	Statistical model using e.g. counterparty segmentation, collateral types and amounts
Income producing real estate	Specialized lending, retail	20	>10 years	2	Statistical scorecards using e.g. LTV, debt service coverage and qualitative factors		
Commodity traders	Corporates, specialized lending	2	>10 years	1	Statistical scorecard using e.g. volume, liquidity and duration of financed commodity transactions		
Sovereign	Sovereign, corporates	2	>10 years	1	Statistical scorecards using e.g. GDP, financials and qualitative factors	1	Statistical models using e.g. industry and counterparty segmentation, seniority and other transaction specific factors
Ship finance	Specialized lending	3	>10 years	1	Statistical scorecard using e.g. freight rates, ship market values, operational expenses and group information	1	Statistical model using e.g. LTV and counterparty attributes
Lombard, Securities Borrowing & Lending	Retail	14	>10 years	1	Merton type model using e.g. LTV, collateral volatility and counterparty attributes	1	Merton type model using e.g. LTV, collateral volatility and counterparty attributes

Model development

The techniques to develop models are carefully selected by Core Credit Models to meet industry standards in the banking industry as well as regulatory requirements. The models are developed to exhibit "through-the-cycle" characteristics, reflecting a PD in a 12 month period across the credit cycle.

All models have clearly defined model owners who have primary responsibility for development, enhancement, review, maintenance and documentation. The models have to pass statistical performance tests, where feasible, followed by usability tests by designated Credit Risk Management experts to proceed to formal approval and implementation. The development process of a new model is thoroughly documented and foresees a separate schedule for model updates.

The level of calibration of the models is based on a range of inputs, including internal and external benchmarks where available. Additionally, the calibration process ensures that the estimated calibration level accounts for variations of default rates through the economic cycle and that the underlying data contains a representative mix of economic states. Conservatism is incorporated in the model development process to compensate for any known or suspected limitations and uncertainties.

Model validation

Model validation for risk capital models is performed by the Model Risk Management function. Model governance is subject to clear and objective internal standards as outlined in the Model Risk Management policy and the Model Validation Policy. The governance framework ensures a consistent and meaningful approach for the validation of models in scope across the bank. All models whose outputs fall into the scope of the Basel internal model framework are subject to full independent validation. Externally developed models are subject to the same governance and validation standards as internal models.

The governance process requires each in scope model to be validated and approved before go-live; the same process is followed for material changes to an existing model. Existing models are subject to an ongoing governance process which requires each model to be periodically validated and the performance to be monitored annually. The validation process is a comprehensive quantitative and qualitative assessment with goals that include:

- to confirm that the model remains conceptually sound and the model design is suitable for its intended purpose;
- to verify that the assumptions are still valid and weaknesses and limitations are known and mitigated;
- to determine that the model outputs are accurate compared to realized outcome;

- to establish whether the model is accepted by the users and used as intended with appropriate data governance;
- to check whether a model is implemented correctly;
- to ensure that the model is fully transparent and sufficiently documented.

To meet these goals, models are validated against a series of quantitative and qualitative criteria. Quantitative analyses may include a review of model performance (comparison of model output against realized outcome), calibration accuracy against the longest time series available, assessment of a model's ability to rank order risk and performance against available benchmarks. Qualitative assessment typically includes a review of the appropriateness of the key model assumptions, the identification of the model limitations and their mitigation, and ensuring appropriate model use. The modeling approach is re-assessed in light of developments in the academic literature and industry practice.

Results and conclusions are presented to senior risk management including the RPSC; shortcomings and required improvements identified during validation must be remediated within an agreed deadline. The Model Risk Management function is independent of model developers and users and has the final say on the content of each validation report.

Model governance at Credit Suisse follows the "three lines of defense" principle. Model developers and owners provide the first line of defense, Model Risk Management the second line, and Internal Audit the third line of defense. Organization independence ensures that these functions are able to provide appropriate oversight. For Credit Risk models, the development and validation functions are independent up to the CRO (Executive Board level). Internal Audit has fully independent reporting into the Chair of the Board of Directors Audit Committee.

Stress testing of parameters

The potential biases in PD estimates in unusual market conditions are accounted for by the use of long run average estimates. Credit Suisse additionally uses stress-testing when back-testing PD models. When predefined thresholds are breached during back-testing, a review of the calibration level is undertaken. For LGD/CCF calibration stress testing is applied in defining Downturn LGD/CCF values, reflecting potentially increased losses during stressed periods.

Descriptions of the rating processes

All counterparties that Credit Suisse is exposed to are assigned an internal credit rating. The rating is assigned at the time of initial credit approval and subsequently reviewed and updated regularly. Where available, Credit Risk Management employs rating models relative to the counterparty type that incorporate qualitative and quantitative factors. Expert judgement may further be applied through a well governed model override process in the assignment of a credit rating or PD, which measures the counterparty's risk of default over a one-year period.

Corporates (excluding corporates managed on the Swiss platform), banks and sovereigns (primarily in the investment banking businesses)

Where used, rating models are an integral part of the rating process. To ensure all relevant information is considered when rating a counterparty, experienced credit officers complement the outputs from the models with other relevant information not otherwise captured via a robust model-override framework. Other relevant information may include, but is not limited to peer analysis, industry comparisons, external ratings and research and the judgment of credit experts. This analysis emphasizes a forward looking approach, concentrating on economic trends and financial fundamentals. Where rating models are not used the assignment of credit ratings is based on a well-established expert judgment based process which captures key factors specific to the type of counterparty.

For structured and asset finance deals, the approach is more quantitative. The focus is on the performance of the underlying assets, which represent the collateral of the deal. The ultimate rating is dependent upon the expected performance of the underlying assets and the level of credit enhancement of the specific transaction. Additionally, a review of the originator and/or servicer is performed. External ratings and research (rating agency and/or fixed income and equity), where available, are incorporated into the rating justification, as is any available market information (e.g., bond spreads, equity performance).

Transaction ratings are based on the analysis and evaluation of both quantitative and qualitative factors. The specific factors analyzed include seniority, industry and collateral.

Corporates managed on the Swiss platform, mortgages and other retail (primarily in the private, corporate and institutional banking businesses)

For corporates managed on the Swiss platform and mortgage lending, the PD is calculated directly by proprietary statistical rating models, which are based on internally compiled data comprising both quantitative factors (primarily LTV ratio and the borrower's income level for mortgage lending and balance sheet information for corporates) and qualitative factors (e.g., credit histories from credit reporting bureaus, management quality). In this case, an equivalent rating is assigned for reporting purposes, based on the PD band associated with each rating. Collateral loans (margin lending), which form the largest part of "Other retail", is also following an individual PD and LGD approach. This approach is already rolled out for loans booked on the Swiss platform and for the majority of international locations; the remaining international locations follow a pool PD and pool LGD approach. Both approaches are calibrated to historical loss experience. Most of the collateral loans are loans collateralized by securities.

The internal rating grades are mapped to the Credit Suisse Internal Masterscale. The PDs assigned to each rating grade are reflected in the following table.

CRE – Credit Suisse counterparty ratings

Ratings	PD bands (%)	Definition	S&P	Fitch	Moody's	Details
AAA	0.000 – 0.021	Substantially risk free	AAA	AAA	Aaa	Extremely low risk, very high long-term stability, still solvent under extreme conditions
AA+ AA AA-	0.021 – 0.027 0.027 – 0.034 0.034 – 0.044	Minimal risk	AA+ AA AA-	AA+ AA AA-	Aa1 Aa2 Aa3	Very low risk, long-term stability, repayment sources sufficient under lasting adverse conditions, extremely high medium-term stability
A+ A A-	0.044 – 0.056 0.056 – 0.068 0.068 – 0.097	Modest risk	A+ A A-	A+ A A-	A1 A2 A3	Low risk, short- and mid-term stability, small adverse developments can be absorbed long term, short- and mid-term solvency preserved in the event of serious difficulties
BBB+ BBB BBB-	0.097 – 0.167 0.167 – 0.285 0.285 – 0.487	Average risk	BBB+ BBB BBB-	BBB+ BBB BBB-	Baa1 Baa2 Baa3	Medium to low risk, high short-term stability, adequate substance for medium-term survival, very stable short term
BB+ BB BB-	0.487 – 0.839 0.839 – 1.442 1.442 – 2.478	Acceptable risk	BB+ BB BB-	BB+ BB BB-	Ba1 Ba2 Ba3	Medium risk, only short-term stability, only capable of absorbing minor adverse developments in the medium term, stable in the short term, no increased credit risks expected within the year
B+ B B-	2.478 – 4.259 4.259 – 7.311 7.311 – 12.550	High risk	B+ B B-	B+ B B-	B1 B2 B3	Increasing risk, limited capability to absorb further unexpected negative developments
CCC+ CCC CCC- CC	12.550 – 21.543 21.543 – 100.00 21.543 – 100.00 21.543 – 100.00	Very high risk	CCC+ CCC CCC- CC	CCC+ CCC CCC- CC	Caa1 Caa2 Caa3 Ca	High risk, very limited capability to absorb further unexpected negative developments
C D1 D2	100 Risk of default has materialized	Imminent or actual loss	C D	C D	C	Substantial credit risk has materialized, i.e. counterparty is distressed and/or non-performing. Adequate specific provisions must be made as further adverse developments will result directly in credit losses.

Transactions rated C are potential problem loans; those rated D1 are non-performing assets and those rated D2 are non-interest earning.

Use of internal ratings

Internal ratings play an essential role in the decision-making and the credit approval processes. The portfolio credit quality is set in terms of the proportion of investment and non-investment grade exposures. Investment/non-investment grade is determined by the internal rating assigned to a counterparty.

Internal counterparty ratings (and associated PDs), transaction ratings (and associated LGDs) and CCF for loan commitments are inputs to RWA and ERC calculations. Model outputs are the basis for risk-adjusted-pricing or assignment of credit competency levels.

The internal ratings are also integrated into the risk management reporting infrastructure and are reviewed in senior risk management committees. These committees include the RPSC and the Capital Allocation & Risk Management Committee (CARMC).

Credit Risk Review

Governance and supervisory checks within credit risk management are supplemented by the credit risk review function. The credit risk review function is independent from credit risk management with a direct functional reporting line to the Risk Committee Chair, administratively reporting to the Group CRO. Credit risk review's primary responsibility is to provide timely and independent assessments of the Group's credit exposures and credit risk management processes and practices. Any findings and agreed actions are reported to senior management and, as necessary, to the Risk Committee.

EAD covered by the various approaches

The following table shows the part of EAD covered by the standardized and the A-IRB approach for each of the asset classes. The F-IRB approach is currently not applied.

CRE – EAD covered by the various approaches

end of 4Q19	Standardized approach	A-IRB approach
EAD (in %)		
Sovereigns	75	25
Institutions – Banks and securities dealer	13	87
Institutions – Other institutions	17	83
Corporates	7	93
Residential mortgages	0	100
Retail	1	99
Other exposures	100	0
Total	**23**	**77**

Credit risk exposures by portfolio and PD range

The following table presents the main parameters used for the calculation of capital requirements for IRB models.

CR6 – Credit risk exposures by portfolio and PD range

end of 4Q19	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	**Total exposures**	Average CCF
Sovereigns (CHF million, except where indicated)				
0.00% to <0.15%	22,619	351	22,970	94%
0.15% to <0.25%	68	85	153	100%
0.25% to <0.50%	71	0	71	–
0.50% to <0.75%	49	0	49	–
0.75% to <2.50%	63	3	66	45%
2.50% to <10.00%	1,067	0	1,067	45%
10.00% to <100.00%	20	0	20	0%
100.00% (Default)	258	0	258	–
Sub-total	**24,215**	**439**	**24,654**	**95%**
Institutions – Banks and securities dealer				
0.00% to <0.15%	9,093	1,225	10,318	45%
0.15% to <0.25%	234	147	381	36%
0.25% to <0.50%	635	260	895	45%
0.50% to <0.75%	146	51	197	55%
0.75% to <2.50%	170	221	391	43%
2.50% to <10.00%	697	322	1,019	36%
10.00% to <100.00%	43	7	50	44%
100.00% (Default)	14	0	14	–
Sub-total	**11,032**	**2,233**	**13,265**	**43%**
Institutions – Other institutions				
0.00% to <0.15%	693	2,127	2,820	22%
0.15% to <0.25%	18	3	21	45%
0.25% to <0.50%	14	2	16	45%
0.50% to <0.75%	17	6	23	45%
0.75% to <2.50%	0	0	0	–
2.50% to <10.00%	31	144	175	45%
Sub-total	**773**	**2,282**	**3,055**	**23%**
Corporates – Specialized lending				
0.00% to <0.15%	6,413	2,141	8,554	33%
0.15% to <0.25%	4,915	1,406	6,321	34%
0.25% to <0.50%	2,963	1,294	4,257	35%
0.50% to <0.75%	2,210	2,209	4,419	36%
0.75% to <2.50%	8,980	3,198	12,178	36%
2.50% to <10.00%	3,335	83	3,418	41%
10.00% to <100.00%	36	0	36	45%
100.00% (Default)	492	29	521	45%
Sub-total	**29,344**	**10,360**	**39,704**	**36%**

1 CRM is reflected by shifting the counterparty exposure from the underlying obligor to the protection provider.
2 Reflects RWA post CCF.

Total exposures were stable compared to the end of 2Q19, primarily reflecting increases in other retail offset by decreases in corporates without specialized lending.

EAD post-CRM and post-CCF [1]	Average PD	Number of obligors (thousands)	Average LGD	Average maturity (years)	RWA [2]	RWA density	Expected loss	Provisions
22,905	0.03%	< 0.1	8%	1.3	467	2%	0	–
140	0.22%	< 0.1	47%	2.8	77	55%	0	–
71	0.37%	< 0.1	53%	1.5	44	61%	0	–
49	0.64%	< 0.1	42%	4.9	52	105%	0	–
64	1.83%	< 0.1	53%	1.6	78	123%	1	–
268	6.31%	< 0.1	51%	2.6	537	201%	9	–
20	16.44%	< 0.1	52%	2.5	56	276%	2	–
17	100.00%	< 0.1	58%	1.2	18	106%	0	–
23,534	**0.19%**	**0.1**	**9%**	**1.3**	**1,329**	**6%**	**12**	**0**
11,373	0.06%	1.6	54%	0.7	1,923	17%	4	–
319	0.22%	0.1	50%	1.4	151	47%	0	–
718	0.37%	0.2	65%	0.8	588	82%	2	–
222	0.61%	0.1	41%	0.6	144	65%	1	–
232	1.62%	0.1	56%	1.2	321	139%	2	–
528	4.81%	0.1	49%	1.3	849	161%	12	–
30	27.26%	< 0.1	52%	0.1	87	295%	4	–
14	100.00%	< 0.1	55%	3.3	15	106%	0	–
13,436	**0.47%**	**2.2**	**54%**	**0.8**	**4,078**	**30%**	**25**	**0**
1,182	0.05%	0.4	43%	1.7	167	14%	0	–
19	0.23%	< 0.1	30%	1.4	8	40%	0	–
15	0.36%	< 0.1	55%	2.4	11	77%	0	–
20	0.58%	< 0.1	49%	1.8	17	84%	0	–
0	1.09%	< 0.1	20%	2.1	0	43%	0	–
99	3.94%	< 0.1	6%	4.8	23	23%	0	–
1,335	**0.35%**	**0.5**	**41%**	**1.9**	**226**	**17%**	**0**	**0**
7,242	0.06%	0.8	29%	2.0	1,456	20%	1	–
5,390	0.20%	0.7	28%	2.3	2,034	38%	3	–
3,414	0.37%	0.5	27%	2.3	1,586	47%	3	–
3,013	0.58%	0.3	29%	1.5	1,460	48%	5	–
10,123	1.45%	0.8	18%	2.7	4,636	46%	24	–
3,369	4.20%	0.2	10%	3.5	1,228	36%	15	–
36	17.01%	< 0.1	9%	3.8	20	57%	1	–
398	100.00%	< 0.1	47%	2.6	422	106%	107	–
32,985	**2.24%**	**3.3**	**23%**	**2.4**	**12,842**	**39%**	**159**	**107**

CR6 – Credit risk exposures by portfolio and PD range (continued)

end of 4Q19	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	**Total exposures**	Average CCF
Corporates without specialized lending (CHF million, except where indicated)				
0.00% to <0.15%	15,462	44,662	60,124	43%
0.15% to <0.25%	4,158	8,581	12,739	37%
0.25% to <0.50%	5,287	13,599	18,886	34%
0.50% to <0.75%	4,592	3,569	8,161	36%
0.75% to <2.50%	10,606	9,214	19,820	39%
2.50% to <10.00%	8,473	18,539	27,012	44%
10.00% to <100.00%	1,577	574	2,151	51%
100.00% (Default)	1,058	252	1,310	36%
Sub-total	**51,213**	**98,990**	**150,203**	**41%**
Residential mortgages				
0.00% to <0.15%	28,093	1,486	29,579	40%
0.15% to <0.25%	30,660	1,834	32,494	38%
0.25% to <0.50%	39,937	2,317	42,254	46%
0.50% to <0.75%	6,183	517	6,700	38%
0.75% to <2.50%	5,614	682	6,296	35%
2.50% to <10.00%	622	68	690	10%
10.00% to <100.00%	23	0	23	–
100.00% (Default)	503	8	511	82%
Sub-total	**111,635**	**6,912**	**118,547**	**40%**
Qualifying revolving retail				
0.75% to <2.50%	456	5,410	5,866	–
10.00% to <100.00%	86	0	86	–
100.00% (Default)	8	0	8	5%
Sub-total	**550**	**5,410**	**5,960**	**0%**
Other retail				
0.00% to <0.15%	57,717	134,541	192,258	7%
0.15% to <0.25%	2,921	8,697	11,618	9%
0.25% to <0.50%	1,215	4,546	5,761	13%
0.50% to <0.75%	775	1,442	2,217	32%
0.75% to <2.50%	3,649	2,490	6,139	24%
2.50% to <10.00%	4,570	768	5,338	22%
10.00% to <100.00%	35	4	39	26%
100.00% (Default)	454	43	497	36%
Sub-total	**71,336**	**152,531**	**223,867**	**7%**
Sub-total (all portfolios)				
0.00% to <0.15%	140,090	186,533	326,623	16%
0.15% to <0.25%	42,974	20,753	63,727	25%
0.25% to <0.50%	50,122	22,018	72,140	31%
0.50% to <0.75%	13,972	7,794	21,766	36%
0.75% to <2.50%	29,538	21,218	50,756	27%
2.50% to <10.00%	18,795	19,924	38,719	43%
10.00% to <100.00%	1,820	585	2,405	51%
100.00% (Default)	2,787	332	3,119	38%
Sub-total (all portfolios)	**300,098**	**279,157**	**579,255**	**22%**
Alternative treatment				
Exposures from free deliveries applying standardized risk weights or 100% under the alternative treatment	–	–	–	–
IRB – maturity and export finance buffer	–	–	–	–
Total (all portfolios and alternative treatment)	**300,098**	**279,157**	**579,255**	**22%**

1 CRM is reflected by shifting the counterparty exposure from the underlying obligor to the protection provider.
2 Reflects RWA post CCF.

	EAD post-CRM and post-CCF [1]	Average PD	Number of obligors (thousands)	Average LGD	Average maturity (years)	RWA [2]	RWA density	Expected loss	Provisions
	36,959	0.07%	2.7	40%	2.4	8,499	23%	10	–
	7,461	0.21%	1.2	36%	2.3	2,857	38%	6	–
	9,896	0.37%	1.7	36%	2.1	4,851	49%	13	–
	5,617	0.62%	1.3	42%	2.7	4,313	77%	20	–
	13,710	1.48%	1.9	38%	2.5	12,911	94%	78	–
	14,638	5.17%	1.6	34%	2.8	24,514	167%	254	–
	1,622	18.24%	0.1	40%	2.0	4,024	248%	110	–
	887	100.00%	0.2	41%	1.8	901	102%	270	–
	90,790	**2.48%**	**10.7**	**38%**	**2.5**	**62,870**	**69%**	**761**	**293**
	29,628	0.09%	43.5	15%	2.9	2,115	7%	4	–
	31,350	0.18%	38.2	15%	2.9	4,139	13%	8	–
	41,003	0.30%	52.9	15%	3.0	7,864	19%	19	–
	5,377	0.58%	6.9	17%	2.8	1,843	34%	5	–
	5,850	1.24%	7.0	20%	2.7	3,326	57%	15	–
	629	4.44%	0.8	22%	2.2	697	111%	6	–
	23	17.22%	< 0.1	18%	2.1	53	235%	1	–
	482	100.00%	0.3	18%	1.3	512	106%	27	–
	114,342	**0.72%**	**149.6**	**15%**	**2.9**	**20,549**	**18%**	**85**	**27**
	647	1.30%	794.4	50%	1.0	160	25%	4	–
	86	25.00%	95.9	35%	0.2	91	105%	8	–
	3	100.00%	0.3	36%	0.2	3	106%	5	–
	736	**4.00%**	**890.6**	**48%**	**0.9**	**254**	**34%**	**17**	**5**
	66,882	0.04%	50.0	63%	1.4	5,278	8%	16	–
	3,672	0.19%	3.6	39%	1.3	588	16%	3	–
	1,791	0.36%	5.8	24%	1.3	276	15%	2	–
	1,222	0.60%	11.8	41%	1.0	425	35%	3	–
	4,255	1.49%	84.3	40%	2.0	2,045	48%	25	–
	4,737	4.92%	84.2	38%	2.5	2,817	59%	90	–
	36	17.12%	0.4	48%	1.6	38	104%	3	–
	341	100.00%	5.7	72%	1.5	361	106%	170	–
	82,936	**0.83%**	**245.8**	**58%**	**1.5**	**11,828**	**14%**	**312**	**170**
	176,171	0.05%	99.2	41%	1.8	19,905	11%	35	–
	48,351	0.19%	43.9	22%	2.6	9,854	20%	20	–
	56,908	0.32%	61.1	20%	2.7	15,220	27%	39	–
	15,520	0.60%	20.4	31%	2.3	8,254	53%	34	–
	34,881	1.43%	888.4	30%	2.5	23,477	67%	149	–
	24,268	4.97%	86.9	32%	2.8	30,665	126%	386	–
	1,853	18.62%	96.4	39%	1.9	4,369	236%	129	–
	2,142	100.00%	6.5	42%	1.8	2,232	104%	579	–
	360,094	**1.29%**	**1,302.8**	**33%**	**2.2**	**113,976**	**32%**	**1,371**	**602**
	7	–	–	–	–	2	–	–	–
	–	–	–	–	–	1,276	–	–	–
	360,101	**1.29%**	**1,302.8**	**33%**	**2.2**	**115,254**	**32%**	**1,371**	**602**

CR6 – Credit risk exposures by portfolio and PD range

end of 2Q19	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	**Total exposures**	Average CCF
Sovereigns (CHF million, except where indicated)				
0.00% to <0.15%	18,110	336	18,446	100%
0.15% to <0.25%	89	87	176	100%
0.25% to <0.50%	93	0	93	100%
0.50% to <0.75%	29	0	29	–
0.75% to <2.50%	179	19	198	41%
2.50% to <10.00%	1,218	0	1,218	100%
10.00% to <100.00%	28	0	28	55%
100.00% (Default)	261	0	261	–
Sub-total	**20,007**	**442**	**20,449**	**99%**
Institutions – Banks and securities dealer				
0.00% to <0.15%	9,289	837	10,126	59%
0.15% to <0.25%	132	88	220	56%
0.25% to <0.50%	1,116	305	1,421	63%
0.50% to <0.75%	161	107	268	66%
0.75% to <2.50%	229	304	533	57%
2.50% to <10.00%	353	427	780	43%
10.00% to <100.00%	16	20	36	20%
100.00% (Default)	14	0	14	–
Sub-total	**11,310**	**2,088**	**13,398**	**58%**
Institutions – Other institutions				
0.00% to <0.15%	665	2,120	2,785	98%
0.15% to <0.25%	16	4	20	100%
0.25% to <0.50%	39	2	41	94%
0.50% to <0.75%	2	0	2	51%
0.75% to <2.50%	0	0	0	100%
2.50% to <10.00%	25	2	27	75%
Sub-total	**747**	**2,128**	**2,875**	**98%**
Corporates – Specialized lending				
0.00% to <0.15%	6,655	1,881	8,536	100%
0.15% to <0.25%	5,503	1,361	6,864	97%
0.25% to <0.50%	3,066	1,017	4,083	94%
0.50% to <0.75%	3,108	2,262	5,370	70%
0.75% to <2.50%	8,930	2,834	11,764	76%
2.50% to <10.00%	2,389	393	2,782	92%
10.00% to <100.00%	143	0	143	100%
100.00% (Default)	586	9	595	88%
Sub-total	**30,380**	**9,757**	**40,137**	**86%**

1 CRM is reflected by shifting the counterparty exposure from the underlying obligor to the protection provider.
2 Reflects RWA post CCF.

	EAD post-CRM and post-CCF [1]	Average PD	Number of obligors (thousands)	Average LGD	Average maturity (years)	RWA [2]	RWA density	Expected loss	Provisions
	18,382	0.03%	< 0.1	6%	1.2	351	2%	0	–
	160	0.22%	< 0.1	47%	3.0	92	57%	0	–
	93	0.37%	< 0.1	51%	2.0	63	68%	0	–
	29	0.64%	< 0.1	42%	4.8	31	105%	0	–
	183	1.54%	< 0.1	53%	1.2	201	110%	2	–
	321	6.63%	< 0.1	51%	2.8	661	206%	12	–
	28	16.44%	< 0.1	58%	3.5	91	325%	3	–
	17	100.00%	< 0.1	58%	1.7	18	106%	0	–
	19,213	**0.27%**	**0.1**	**8%**	**1.2**	**1,508**	**8%**	**17**	**0**
	11,695	0.06%	0.7	53%	0.7	1,981	17%	4	–
	335	0.22%	< 0.1	50%	1.2	159	48%	0	–
	1,204	0.37%	0.2	58%	1.2	856	71%	2	–
	256	0.61%	< 0.1	45%	0.6	181	71%	1	–
	338	1.58%	< 0.1	56%	1.4	478	141%	3	–
	295	5.74%	< 0.1	49%	1.6	540	183%	9	–
	6	16.44%	< 0.1	53%	0.5	16	256%	1	–
	14	100.00%	< 0.1	0%	2.7	7	48%	34	–
	14,143	**0.36%**	**1.2**	**53%**	**0.8**	**4,218**	**30%**	**54**	**34**
	1,202	0.04%	0.4	43%	1.6	165	14%	0	–
	17	0.23%	< 0.1	33%	1.9	7	42%	0	–
	40	0.36%	< 0.1	50%	1.0	24	61%	0	–
	2	0.58%	< 0.1	50%	0.6	1	73%	0	–
	0	0.96%	< 0.1	39%	1.3	0	68%	0	–
	29	3.34%	< 0.1	15%	4.7	16	55%	0	–
	1,290	**0.13%**	**0.5**	**43%**	**1.7**	**213**	**17%**	**0**	**0**
	7,508	0.06%	0.8	29%	2.1	1,510	20%	1	–
	6,058	0.21%	0.8	28%	2.4	2,272	38%	3	–
	3,526	0.36%	0.5	28%	2.3	1,761	50%	4	–
	3,824	0.58%	0.4	24%	1.9	1,618	42%	5	–
	9,927	1.41%	0.7	19%	2.6	4,930	50%	25	–
	2,548	4.59%	0.1	12%	3.4	1,091	43%	14	–
	142	12.87%	< 0.1	14%	2.9	98	69%	3	–
	467	100.00%	< 0.1	16%	2.8	495	106%	122	–
	34,000	**2.34%**	**3.4**	**24%**	**2.4**	**13,775**	**41%**	**177**	**122**

CR6 – Credit risk exposures by portfolio and PD range (continued)

end of 2Q19	Original on-balance sheet gross exposure	Off-balance sheet exposures pre CCF	**Total exposures**	Average CCF
Corporates without specialized lending (CHF million, except where indicated)				
0.00% to <0.15%	14,454	45,989	60,443	59%
0.15% to <0.25%	4,587	9,000	13,587	67%
0.25% to <0.50%	5,939	7,172	13,111	61%
0.50% to <0.75%	5,374	6,816	12,190	53%
0.75% to <2.50%	12,237	14,518	26,755	51%
2.50% to <10.00%	8,481	17,857	26,338	51%
10.00% to <100.00%	1,145	484	1,629	60%
100.00% (Default)	760	229	989	73%
Sub-total	**52,977**	**102,065**	**155,042**	**57%**
Residential mortgages				
0.00% to <0.15%	28,235	1,723	29,958	100%
0.15% to <0.25%	30,525	1,878	32,403	100%
0.25% to <0.50%	39,165	2,475	41,640	100%
0.50% to <0.75%	6,394	534	6,928	100%
0.75% to <2.50%	5,207	710	5,917	100%
2.50% to <10.00%	517	36	553	100%
10.00% to <100.00%	39	0	39	100%
100.00% (Default)	515	9	524	100%
Sub-total	**110,597**	**7,365**	**117,962**	**100%**
Qualifying revolving retail				
0.75% to <2.50%	538	5,525	6,063	0%
10.00% to <100.00%	108	1	109	43%
100.00% (Default)	10	0	10	50%
Sub-total	**656**	**5,526**	**6,182**	**44%**
Other retail				
0.00% to <0.15%	57,350	127,113	184,463	96%
0.15% to <0.25%	4,292	8,117	12,409	91%
0.25% to <0.50%	1,533	4,859	6,392	89%
0.50% to <0.75%	476	1,224	1,700	91%
0.75% to <2.50%	3,663	1,416	5,079	95%
2.50% to <10.00%	3,997	1,161	5,158	99%
10.00% to <100.00%	78	36	114	79%
100.00% (Default)	310	128	438	98%
Sub-total	**71,699**	**144,054**	**215,753**	**95%**
Sub-total (all portfolios)				
0.00% to <0.15%	134,758	179,999	314,757	71%
0.15% to <0.25%	45,144	20,535	65,679	78%
0.25% to <0.50%	50,951	15,830	66,781	76%
0.50% to <0.75%	15,544	10,943	26,487	60%
0.75% to <2.50%	30,983	25,326	56,309	58%
2.50% to <10.00%	16,980	19,876	36,856	55%
10.00% to <100.00%	1,557	541	2,098	59%
100.00% (Default)	2,456	375	2,831	80%
Sub-total (all portfolios)	**298,373**	**273,425**	**571,798**	**68%**
Alternative treatment				
Exposures from free deliveries applying standardized risk weights or 100% under the alternative treatment	9	–	9	–
IRB – maturity and export finance buffer	–	–	–	–
Total (all portfolios and alternative treatment)	**298,382**	**273,425**	**571,807**	**68%**

1 CRM is reflected by shifting the counterparty exposure from the underlying obligor to the protection provider.
2 Reflects RWA post CCF.

	EAD post-CRM and post-CCF [1]	Average PD	Number of obligors (thousands)	Average LGD	Average maturity (years)	RWA [2]	RWA density	Expected loss	Provisions
	36,703	0.07%	2.9	39%	2.4	8,076	22%	10	–
	7,849	0.21%	1.2	37%	2.4	3,063	39%	6	–
	8,695	0.37%	1.8	36%	2.7	4,708	54%	12	–
	7,837	0.62%	1.4	40%	2.4	5,325	68%	19	–
	16,879	1.52%	1.9	40%	2.3	17,279	102%	105	–
	13,885	5.77%	1.6	34%	2.8	24,369	176%	271	–
	1,217	19.12%	< 0.1	34%	2.3	2,744	225%	77	–
	687	100.00%	0.2	52%	2.4	667	97%	212	–
	93,752	**2.24%**	**11.1**	**38%**	**2.5**	**66,231**	**71%**	**712**	**239**
	29,707	0.09%	43.8	15%	2.9	2,136	7%	4	–
	31,261	0.18%	38.4	15%	2.9	4,154	13%	9	–
	40,276	0.31%	52.1	15%	2.9	7,789	19%	19	–
	5,682	0.58%	7.0	17%	2.7	1,947	34%	6	–
	5,401	1.22%	7.2	18%	2.6	3,119	58%	11	–
	519	4.28%	0.8	18%	2.3	618	119%	4	–
	39	18.79%	< 0.1	19%	2.0	88	226%	1	–
	497	100.00%	0.3	17%	1.5	527	106%	25	–
	113,382	**0.73%**	**149.8**	**15%**	**2.8**	**20,378**	**18%**	**79**	**25**
	566	1.30%	798.0	50%	1.0	140	25%	4	–
	108	25.00%	86.3	35%	0.2	114	105%	9	–
	5	100.00%	0.4	35%	0.2	5	106%	5	–
	679	**5.81%**	**884.7**	**48%**	**0.9**	**259**	**38%**	**18**	**5**
	66,609	0.04%	49.9	62%	1.4	5,336	8%	16	–
	4,975	0.21%	3.6	38%	1.2	807	16%	4	–
	2,335	0.35%	5.9	26%	1.3	379	16%	2	–
	621	0.62%	11.7	40%	1.2	215	35%	2	–
	3,935	1.58%	82.4	40%	2.4	2,102	53%	25	–
	4,353	5.23%	85.4	40%	2.6	2,764	64%	90	–
	81	12.91%	0.3	60%	1.6	95	117%	6	–
	206	100.00%	5.5	75%	1.7	219	106%	160	–
	83,115	**0.67%**	**244.7**	**58%**	**1.5**	**11,917**	**14%**	**305**	**159**
	171,806	0.06%	98.6	41%	1.8	19,555	11%	35	–
	50,655	0.19%	44.1	23%	2.6	10,554	21%	22	–
	56,169	0.32%	60.5	21%	2.7	15,580	28%	39	–
	18,251	0.60%	20.6	29%	2.3	9,318	51%	33	–
	37,229	1.45%	890.3	32%	2.4	28,249	76%	175	–
	21,950	5.50%	88.1	32%	2.8	30,059	137%	400	–
	1,621	18.59%	86.8	34%	2.2	3,246	200%	100	–
	1,893	100.00%	6.4	36%	2.2	1,938	102%	558	–
	359,574	**1.23%**	**1,295.4**	**33%**	**2.2**	**118,499**	**33%**	**1,362**	**584**
	9	–	–	–	–	7	–	–	–
	–	–	–	–	–	1,555	–	–	–
	359,583	**1.23%**	**1,295.4**	**33%**	**2.2**	**120,061**	**33%**	**1,362**	**584**

Credit derivatives used as CRM techniques

The following table presents the effect on RWA of credit derivatives used as CRM techniques by portfolio.

For exposures covered by recognized credit derivatives, the substitution approach is applied, which means the risk weight of the obligor is substituted with the risk weight of the protection provider. The CRM effect is reflected according to the actual post-risk mitigation asset class for pre-credit derivatives and actual RWA. The table does not include the impact of certain immaterial positions where the credit derivative was recognized with an adjustment to LGD.

CR7 – Effect on risk-weighted assets of credit derivatives used as CRM techniques

	4Q19		2Q19	
end of	Pre-credit derivatives RWA	Actual RWA	Pre-credit derivatives RWA	Actual RWA
CHF million				
Sovereigns – A-IRB	1,329	1,329	1,530	1,508
Institutions – Banks and securities dealers – A-IRB	4,178	4,080	4,372	4,218
Institutions – Other institutions – A-IRB	226	226	213	213
Corporates – Specialized lending – A-IRB	17,054	17,054	16,478	16,478
Corporates without specialized lending – A-IRB	62,914	62,870	66,284	66,237
Residential mortgages	20,549	20,549	20,378	20,378
Qualifying revolving retail	254	254	259	259
Other retail	11,828	11,828	11,917	11,917
Maturity and export finance buffer – IRB	1,276	1,276	1,555	1,555
Total	**119,608**	**119,466**	**122,986**	**122,763**

Includes RWA related to the A-IRB approach and supervisory slotting approach.

RWA flow statements of credit risk exposures under IRB

The following table presents the 4Q19 flow statement explaining the variations in the credit risk RWA determined under the IRB approach.

Credit risk RWA under IRB decreased CHF 2.0 billion to CHF 119.5 billion compared to CHF 121.5 billion as of the end of 3Q19, primarily driven by decreases in asset size and a negative foreign exchange impact, partially offset by increases in model and parameter updates.

The decrease in asset size was primarily driven by new banking book securitizations. The increase in model and parameter updates mainly reflected additional phase-in of the multipliers on IPRE and non-IPRE exposures.

CR8 – Risk-weighted assets flow statements of credit risk exposures under IRB

	4Q19
CHF million	
Risk-weighted assets at beginning of period	**121,478**
Asset size	(2,034)
Asset quality	528
Model and parameter updates	607
Foreign exchange impact	(1,113)
Risk-weighted assets at end of period	**119,466**

Includes RWA related to the A-IRB approach and supervisory slotting approach.

Definition of risk-weighted assets movement components related to credit risk and CCR

Description	Definition
Asset size	Represents changes on the portfolio size arising in the ordinary course of business (including new businesses). Asset size also includes movements arising from the application of the comprehensive approach with regard to the treatment of financial collateral
Asset quality/credit quality of counterparties	Represents changes in average risk weighting across credit risk classes
Model and parameter updates	Represents movements arising from internally driven or externally mandated updates to models and recalibrations of model parameters specific only to Credit Suisse
Methodology and policy changes	Represents movements arising from externally mandated regulatory methodology and policy changes to accounting and exposure classification and treatment policies not specific only to Credit Suisse
Acquisitions and disposals	Represents changes in book sizes due to acquisitions and disposals of entities
Foreign exchange impact	Represents changes in exchange rates of the transaction currencies compared to the Swiss franc
Other	Represents changes that cannot be attributed to any other category

Model performance

The A-IRB models are subject to a comprehensive backtesting process to demonstrate that model performance can be confirmed annually during the entire lifecycle of each model. As evidenced during model development and confirmed via annual performance monitoring, typically discriminatory power of credit models is well above industry standard and calibration targets are set conservatively.

The following table provides backtesting data to validate the reliability of PD calculations. The estimated PDs are compared with the actual default rates by PD ranges within each exposure class. The estimated PDs are forward-looking average PDs at the beginning of the twelve-month period, which started at the end of December 2017. The estimated PDs are compared with the simple average of historical default rates covering a period starting at the earliest in 2001 and ending at the end of 2018.

CR9 – Backtesting of PD per portfolio

	Master scale from CRM S&P	Master scale from CRM Fitch	Master scale from CRM Moody	Weighted average PD
Sovereigns				
0.00% to <0.15%	AAA to BBB+	AAA to BBB+	Aaa to Baa1	0.02%
0.15% to <0.25%	BBB+ to BBB	BBB+ to BBB	Baa1 to Baa2	0.22%
0.25% to <0.50%	BBB to BB+	BBB to BB+	Baa2 to Ba1	0.37%
0.50% to <0.75%	BB+	BB+	Ba1	0.64%
0.75% to <2.50%	BB+ to B+	BB+ to B+	Ba1 to B1	1.10%
2.50% to <10.00%	B+ to B-	B+ to B-	B1 to B3	6.28%
10.00% to <100.00%	B- to CCC	B- to CCC	B3 to Caa2	0.00%
Institutions – Banks and securities dealer				
0.00% to <0.15%	AAA to BBB+	AAA to BBB+	Aaa to Baa1	0.06%
0.15% to <0.25%	BBB+ to BBB	BBB+ to BBB	Baa1 to Baa2	0.22%
0.25% to <0.50%	BBB to BB+	BBB to BB+	Baa2 to Ba1	0.37%
0.50% to <0.75%	BB+	BB+	Ba1	0.61%
0.75% to <2.50%	BB+ to B+	BB+ to B+	Ba1 to B1	1.17%
2.50% to <10.00%	B+ to B-	B+ to B-	B1 to B3	6.61%
10.00% to <100.00%	B- to CCC	B- to CCC	B3 to Caa2	19.14%
Institutions – Other institutions				
0.00% to <0.15%	AAA to BBB+	AAA to BBB+	Aaa to Baa1	0.05%
0.15% to <0.25%	BBB+ to BBB	BBB+ to BBB	Baa1 to Baa2	0.19%
0.25% to <0.50%	BBB to BB+	BBB to BB+	Baa2 to Ba1	0.37%
0.50% to <0.75%	BB+	BB+	Ba1	0.58%
0.75% to <2.50%	BB+ to B+	BB+ to B+	Ba1 to B1	1.94%
2.50% to <10.00%	B+ to B-	B+ to B-	B1 to B3	7.03%
Corporates – Specialized lending				
0.00% to <0.15%	AAA to BBB+	AAA to BBB+	Aaa to Baa1	0.06%
0.15% to <0.25%	BBB+ to BBB	BBB+ to BBB	Baa1 to Baa2	0.21%
0.25% to <0.50%	BBB to BB+	BBB to BB+	Baa2 to Ba1	0.37%
0.50% to <0.75%	BB+	BB+	Ba1	0.58%
0.75% to <2.50%	BB+ to B+	BB+ to B+	Ba1 to B1	1.24%
2.50% to <10.00%	B+ to B-	B+ to B-	B1 to B3	4.16%
10.00% to <100.00%	B- to CCC	B- to CCC	B3 to Caa2	19.31%

1 The number of obligors used in the calculation is based on the transactional-based approach.

2 Reflects risk data where prudential portfolios are not captured. Accordingly for these columns approximations are required. For minor subsets of the qualifying revolving retail portfolio most recent figures are approximated. Further, fast defaults are in tendency understated since capturing of fast defaults is not available for all clients in risk data. Underlying default rates are determined on client level, i.e. a client can have more than one transaction/credit.

	Arithmetic average PD by obligors [1]	Number of obligors (thousands)		Defaulted obligors in the year [2]	of which: new defaulted obligors in the year [2]	Average historical annual default rate [2]
		End of previous year	End of the year			
	0.03%	< 0.1	< 0.1	0	0	0.04%
	0.21%	< 0.1	< 0.1	0	0	0.00%
	0.37%	< 0.1	< 0.1	0	0	0.00%
	0.59%	< 0.1	< 0.1	0	0	0.00%
	1.30%	< 0.1	< 0.1	0	0	0.00%
	6.10%	< 0.1	< 0.1	0	0	1.03%
	0.00%	0	0	0	0	6.86%
	0.07%	0.6	0.7	0	0	0.04%
	0.22%	< 0.1	< 0.1	0	0	0.16%
	0.37%	0.2	0.2	0	0	0.30%
	0.60%	0.1	0.1	0	0	0.20%
	1.20%	0.2	0.2	0	0	0.14%
	5.92%	0.1	0.1	1	0	0.65%
	22.34%	< 0.1	< 0.1	0	0	2.61%
	0.06%	0.3	0.4	0	0	0.00%
	0.19%	0.1	< 0.1	0	0	0.00%
	0.37%	< 0.1	< 0.1	0	0	0.00%
	0.58%	< 0.1	< 0.1	0	0	0.08%
	1.28%	< 0.1	< 0.1	0	0	0.00%
	5.31%	< 0.1	< 0.1	–	–	–
	0.06%	0.8	0.9	0	0	0.02%
	0.20%	0.8	0.7	0	0	0.03%
	0.37%	0.5	0.6	1	0	0.03%
	0.58%	0.4	0.4	0	0	0.18%
	1.48%	0.8	0.8	9	3	0.38%
	5.52%	0.1	< 0.1	8	0	4.30%
	19.31%	< 0.1	< 0.1	0	0	19.85%

CR9 – Backtesting of PD per portfolio (continued)

	Master scale from CRM S&P	Master scale from CRM Fitch	Master scale from CRM Moody	Weighted average PD
Corporates without specialized lending				
0.00% to <0.15%	AAA to BBB+	AAA to BBB+	Aaa to Baa1	0.06%
0.15% to <0.25%	BBB+ to BBB	BBB+ to BBB	Baa1 to Baa2	0.21%
0.25% to <0.50%	BBB to BB+	BBB to BB+	Baa2 to Ba1	0.37%
0.50% to <0.75%	BB+	BB+	Ba1	0.60%
0.75% to <2.50%	BB+ to B+	BB+ to B+	Ba1 to B1	1.46%
2.50% to <10.00%	B+ to B-	B+ to B-	B1 to B3	5.46%
10.00% to <100.00%	B- to CCC	B- to CCC	B3 to Caa2	20.54%
Residential mortgages				
0.00% to <0.15%	AAA to BBB+	AAA to BBB+	Aaa to Baa1	0.08%
0.15% to <0.25%	BBB+ to BBB	BBB+ to BBB	Baa1 to Baa2	0.20%
0.25% to <0.50%	BBB to BB+	BBB to BB+	Baa2 to Ba1	0.35%
0.50% to <0.75%	BB+	BB+	Ba1	0.58%
0.75% to <2.50%	BB+ to B+	BB+ to B+	Ba1 to B1	1.21%
2.50% to <10.00%	B+ to B-	B+ to B-	B1 to B3	4.67%
10.00% to <100.00%	B- to CCC	B- to CCC	B3 to Caa2	17.85%
Qualifying revolving retail				
0.75% to <2.50%	BB+ to B+	BB+ to B+	Ba1 to B1	1.30%
10.00% to <100.00%	B- to CCC	B- to CCC	B3 to Caa2	25.00%
Other retail				
0.00% to <0.15%	AAA to BBB+	AAA to BBB+	Aaa to Baa1	0.04%
0.15% to <0.25%	BBB+ to BBB	BBB+ to BBB	Baa1 to Baa2	0.19%
0.25% to <0.50%	BBB to BB+	BBB to BB+	Baa2 to Ba1	0.37%
0.50% to <0.75%	BB+	BB+	Ba1	0.58%
0.75% to <2.50%	BB+ to B+	BB+ to B+	Ba1 to B1	1.63%
2.50% to <10.00%	B+ to B-	B+ to B-	B1 to B3	5.72%
10.00% to <100.00%	B- to CCC	B- to CCC	B3 to Caa2	15.95%

1 The number of obligors used in the calculation is based on the transactional-based approach.

2 Reflects risk data where prudential portfolios are not captured. Accordingly for these columns approximations are required. For minor subsets of the qualifying revolving retail portfolio most recent figures are approximated. Further, fast defaults are in tendency understated since capturing of fast defaults is not available for all clients in risk data. Underlying default rates are determined on client level, i.e. a client can have more than one transaction/credit.

	Arithmetic average PD by obligors [1]	Number of obligors (thousands) End of previous year	End of the year	Defaulted obligors in the year [2]	of which: new defaulted obligors in the year [2]	Average historical annual default rate [2]
	0.06%	2.7	2.9	1	0	0.03%
	0.21%	1.7	1.3	0	0	0.17%
	0.37%	1.3	1.8	3	0	0.12%
	0.61%	1.4	1.4	1	0	0.25%
	1.49%	2.7	3.0	19	1	0.78%
	5.83%	1.9	2.4	35	2	1.94%
	19.11%	0.1	< 0.1	9	1	13.36%
	0.08%	42.8	46.4	14	0	0.02%
	0.20%	69.4	40.1	9	0	0.02%
	0.37%	20.7	48.3	34	0	0.06%
	0.58%	8.0	6.8	7	0	0.14%
	1.23%	7.5	6.8	14	0	0.27%
	4.47%	0.8	0.8	72	1	3.77%
	17.49%	< 0.1	< 0.1	14	0	19.17%
	1.30%	788.6	808.3	6,140	0	1.06%
	25.00%	96.9	93.3	22,165	0	23.18%
	0.04%	49.6	49.9	12	2	0.06%
	0.20%	5.0	3.6	0	0	0.35%
	0.37%	4.3	5.6	55	0	0.98%
	0.58%	11.9	11.6	0	0	0.00%
	1.66%	78.7	80.6	1,229	122	0.91%
	5.44%	85.7	85.0	3,444	259	3.91%
	17.17%	0.3	0.3	–	–	–

Specialized lending

The following tables present the carrying values, exposure amounts and RWA for the Group's specialized lending under the supervisory slotting approach.

CR10 – Specialized lending

end of		On-balance sheet amount	Off-balance sheet amount	Risk weight	Exposure amount [1]	RWA	Expected losses
4Q19 (CHF million, except where indicated)							
Other than high-volatility commercial real estate							
Regulatory categories and remaining maturity							
Strong	Less than 2.5 years	154	509	50%	433	229	0
	Equal to or more than 2.5 years	756	403	70%	977	725	4
Good	Less than 2.5 years	332	159	70%	419	311	2
	Equal to or more than 2.5 years	788	828	90%	1,180	1,126	9
Satisfactory		610	138	115% [2]	687	837	19
Weak		64	5	250%	67	178	5
Default		8	0	–	8	0	4
Total		**2,712**	**2,042**	**–**	**3,771**	**3,406**	**43**
High-volatility commercial real estate							
Regulatory categories and remaining maturity							
Strong	Equal to or more than 2.5 years	28	67	95%	65	65	0
Good	Equal to or more than 2.5 years	114	17	120%	123	156	0
Satisfactory		149	37	140%	169	251	5
Weak		126	0	250%	126	334	10
Default		8	2	–	10	0	5
Total		**425**	**123**	**–**	**493**	**806**	**20**
2Q19 (CHF million, except where indicated)							
Other than high-volatility commercial real estate							
Regulatory categories and remaining maturity							
Strong	Less than 2.5 years	8	378	50%	216	114	0
	Equal to or more than 2.5 years	472	675	70%	843	626	3
Good	Less than 2.5 years	444	2	70%	445	330	2
	Equal to or more than 2.5 years	285	242	90%	418	399	3
Satisfactory		319	121	115% [2]	385	470	11
Total		**1,528**	**1,418**	**–**	**2,307**	**1,939**	**19**
High-volatility commercial real estate							
Regulatory categories and remaining maturity							
Strong	Equal to or more than 2.5 years	18	131	95%	90	91	0
Good	Equal to or more than 2.5 years	286	47	120%	312	397	1
Satisfactory		128	52	140%	157	233	5
Weak		0	29	250%	16	42	1
Default		45	3	–	47	0	24
Total		**477**	**262**	**–**	**622**	**763**	**31**

1 Exposure amounts in connection with IPRE.

2 For a portion of the exposure, a risk weight of 120% is applied.

Equity positions in the banking book

For equity type securities in the banking book, risk weights are determined using the simple risk-weight approach, which differentiates by equity sub-asset types, such as exchange-traded and other equity exposures.

CR10 – Equity positions in the banking book under the simple risk-weight approach

end of	On-balance sheet amount	Off-balance sheet amount	Risk weight	Exposure amount	RWA
4Q19 (CHF million)					
Exchange-traded equity exposures	31	0	300%	31	98
Other equity exposures	2,383	0	400%	2,383	10,104
Total	**2,414**	**0**	–	**2,414**	**10,202**
2Q19 (CHF million)					
Exchange-traded equity exposures	26	0	300%	26	83
Other equity exposures	2,007	0	400%	2,007	8,509
Total	**2,033**	**0**	–	**2,033**	**8,592**

Counterparty credit risk

General

Counterparty exposure

CCR arises from over-the-counter (OTC) and exchange-traded derivatives, as well SFTs, such as repurchase agreements, securities lending and borrowing and other similar products. CCR exposures depend on the value of underlying market factors, for example, interest rates and foreign exchange rates, which may be volatile.

Credit Suisse has received approval from FINMA to use the IMM for measuring CCR for the majority of the derivatives and the VaR model for SFTs.

→ Refer to "Credit risk" (pages 146 to 149) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk coverage and management in the Credit Suisse Annual Report 2019 for further information on counterparty credit risk, including transaction rating, credit approval process and provisioning.

→ Refer to "Credit risk reporting" (page 12) in Credit risk – General for information on our counterparty risk reporting.

Credit limits

All credit exposure is approved, either through approval of an individual transaction/facility (e.g., lending facilities), or under a system of credit limits (e.g., OTC derivatives). Credit exposure is monitored daily to ensure it does not exceed the approved credit limit. Credit limits are set either on a potential exposure basis or on a notional exposure basis. Moreover, these limits are ultimately governed by the Group Risk Appetite Framework. Potential exposure means the possible future value that would be lost upon default of the counterparty on a particular future date, and is taken as a high percentile of a distribution of possible exposures computed by the internal exposure models. Secondary debt inventory positions are subject to separate limits that are set at the issuer level.

→ Refer to "Credit risk" (pages 146 to 149) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk coverage and management in the Credit Suisse Annual Report 2019 for further information on credit limits.

Central counterparties risk

The Basel III framework provides specific requirements for exposures the Group has to CCPs arising from OTC derivatives, exchange-traded derivative transactions and SFTs. Exposures to CCPs which are considered to be qualifying CCPs by the regulator will receive a preferential capital treatment compared to exposures to non-qualifying CCPs.

The Group can incur exposure to CCPs as either a clearing member, or clearing through another member. Qualifying CCPs are expected to be subject to best-practice risk management, and sound regulation and oversight to ensure that they reduce risk, both for their participants and for the financial system. Most CCPs are benchmarked against standards issued by the Committee on Payment and Settlement Systems and the Technical Committee of the International Organization of Securities Commissions, herein collectively referred to as "CPSS-IOSCO".

The exposures to CCP (represented as "Central counterparties (CCP) risks") consist of trade exposure, default fund exposure and contingent exposure based on trade replacement due to a clearing member default. Trade exposure represents the current and potential future exposure of the clearing member (or a client) to a CCP arising from the underlying transaction and the initial margin posted to the CCP. Default fund exposure represents existing and potential future additional contributions to a CCPs default fund. Credit Risk Management performs credit assessment and annual review of the risk profile of CCPs as counterparties including an assessment of qualitative and quantitative factors. As part of its assessment, Credit Risk Management conducts periodic due diligence and in conjunction with General Counsel will make a determination whether (i) the CCP is a qualifying CCP and (ii) the collateral posted is considered bankruptcy remote. The determinations are subject to Credit Risk Management guidelines and include a review of collateral bankruptcy remoteness and verification that CCP collateral positions are held in custody with entities that employ account segregation and safekeeping procedures with internal controls that fully protect these securities. The determination is made in the context of "Authorization of CCP" (European Market Infrastructure Regulation (EMIR), Article 14) and "Third Countries" (EMIR, Article 25). This information will be appropriately reflected in the risk weightings within the capital calculations.

The Group monitors its daily exposure to the CCP as part of its ongoing limit and exposure monitoring process.

→ Refer to "Risk management objectives and policies" in Credit risk – General (page 12) for further information.

Credit valuation adjustment risk

Credit valuation adjustment (CVA) is a regulatory capital charge designed to capture the risk associated with potential mark-to-market losses associated with the deterioration in the creditworthiness of a counterparty.

Under Basel III, banks are required to calculate capital charges for CVA under either the Standardized CVA approach or the Advanced CVA approach (ACVA). The CVA rules stipulate that where banks have permission to use market risk VaR and counterparty risk IMM, they are to use the ACVA unless their regulator decides otherwise. FINMA has confirmed that the ACVA should be used for both IMM and non-IMM exposures.

The regulatory CVA capital charge applies to all counterparty exposures arising from OTC derivatives, excluding those with CCP. Exposures arising from SFTs are not required to be included in the CVA charge unless they could give rise to a material loss. FINMA has confirmed that Credit Suisse can exclude these exposures from the regulatory capital charge.

Guarantees and other risk mitigants

→ Refer to "Credit risk mitigation" (pages 16 to 17) in Credit risk for further information on policies relating to guarantees and other risk mitigants.

Wrong-way exposure

Wrong-way risk arises when Credit Suisse enters into a financial transaction in which exposure is adversely correlated to the creditworthiness of the counterparty. In a wrong-way situation, the exposure to the counterparty increases while the counterparty's financial condition and its ability to pay on the transaction diminishes.

Exposure adjusted risk calculation

Regulatory guidance distinguishes two types of wrong-way risk, general and specific:

- General wrong-way risk arises when the probability of default of counterparties is positively correlated with general market risk factors.
- Specific wrong-way risk arises when the exposure to a particular counterparty is positively correlated with the probability of default of the counterparty due to the nature of the transactions with the counterparty.

Capturing wrong-way risk requires checking if there is a legal relationship or a correlation between the trade/collateral and the counterparty.

The management of wrong-way risk is integrated within Credit Suisse's overall credit risk assessment approach and is subject to a framework for identification and treatment of wrong-way risk, which includes multiple processes, methodologies, governance, reporting, review and escalation. A conservative treatment for the purpose of calculating exposure profiles is applied to material trades with wrong-way risk features. The wrong-way risk framework applies to OTC, SFTs, loans and centrally cleared trades.

In instances where a material wrong-way risk has been identified, limit utilization and default capital are accordingly adjusted through more conservative exposure calculations. These adjustments cover both transactions and collateral and form part of the daily credit exposure calculation process, resulting in a higher utilization of the counterparty credit limit.

Regular reporting of wrong-way risk at both the individual trade and portfolio level allows wrong-way risk to be identified and corrective actions taken by Credit Risk Management. The Front Office is responsible as a first line of defense for identifying and escalating trades that could potentially give rise to wrong-way risk. Any material wrong-way risk at portfolio or trade level would be escalated to senior Credit Risk Management executives and risk committees.

Effect of a credit rating downgrade

On a daily basis, we monitor the level of incremental collateral that would be required by derivative counterparties in the event of a Credit Suisse ratings downgrade. Collateral triggers are maintained by our collateral management department and vary by counterparty.

→ Refer to "Credit ratings" (pages 114 to 115) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Liquidity and funding management – Funding management in the Credit Suisse Annual Report 2019 for further information on the effect of a one, two or three notch downgrade as of December 31, 2019.

The impact of downgrades in the Bank's long-term debt ratings are considered in the stress assumptions used to determine the conservative funding profile of our balance sheet and would not be material to our liquidity and funding needs.

Details of counterparty credit risk exposures

Analysis of counterparty credit risk exposure by approach

The following table presents a comprehensive view of the methods used to calculate CCR regulatory requirements and the main parameters used within each method.

CCR1 – Analysis of counterparty credit risk exposure by approach

end of	Re-placement cost	PFE	EEPE	Alpha used for computing regulatory EAD	EAD post-CRM	RWA
4Q19 (CHF million, except where indicated)						
SA-CCR (for derivatives) [1]	2,323	2,474	–	1.0	4,797	1,778
IMM (for derivatives)	–	–	20,720	1.4 – 1.6 [2]	31,462	11,336
Comprehensive Approach for CRM (for SFTs)	–	–	–	–	3	1
VaR for SFTs	–	–	–	–	30,825	5,810
Total	**–**	**–**	**–**	**–**	**67,087**	**18,925**
2Q19 (CHF million, except where indicated)						
SA-CCR (for derivatives) [1]	4,863	2,880	–	1.0	7,743	2,738
IMM (for derivatives)	–	–	18,874	1.4 – 1.6 [2]	28,206	10,761
Comprehensive Approach for CRM (for SFTs)	–	–	–	–	4	2
VaR for SFTs	–	–	–	–	29,897	4,898
Total	**–**	**–**	**–**	**–**	**65,850**	**18,399**

1 Calculated under the current exposure method.
2 EEPE alpha factors are generally equal to either 1.4 or 1.6, depending on the model used. Alpha factor is set equal to 1.0 in case of wrong way risk.

CVA capital charge

The following table presents the CVA regulatory calculations by advanced and standardized approaches.

RWA increased CHF 0.9 billion compared to the end of 2Q19, mainly reflecting a regular update to the stressed window calibration, partially offset by an increase in hedging benefits.

CCR2 – CVA capital charge

	4Q19		2Q19	
end of	EAD post-CRM	RWA	EAD post-CRM	RWA
CHF million				
Total portfolios subject to the advanced CVA capital charge	33,982	6,723	34,897	5,905
of which VaR component (including the 3 x multiplier)	–	1,529	–	1,998
of which stressed VaR component (including the 3 x multiplier)	–	5,194	–	3,907
All portfolios subject to the standardized CVA capital charge	151	169	128	112
Total subject to the CVA capital charge	**34,133**	**6,892**	**35,025**	**6,017**

EAD post-CRM is disclosed as of the end of the period (end of day), whereas the RWA is an average as of the last 12 weeks.

CCR exposures by regulatory portfolio and risk weight – standardized approach

The following table presents a breakdown of CCR exposures by regulatory portfolio (type of counterparties) and by risk weight (riskiness attributed to the exposure according to the standardized approach).

CCR3 – CCR exposures by regulatory portfolio and risk weight – standardized approach

	Risk weight					
end of	0%	20%	50%	100%	150%	Exposures post-CCF and CRM
4Q19 (CHF million)						
Sovereigns	456	0	0	2	0	458
Institutions – Banks and securities dealer	0	285	464	51	15	815
Corporates	18	1,215	133	1,277	37	2,680
Retail	0	0	0	3	0	3
Other exposures	0	0	0	737	0	737
Total	**474**	**1,500**	**597**	**2,070**	**52**	**4,693**
2Q19 (CHF million)						
Sovereigns	421	0	138	13	0	572
Institutions – Banks and securities dealer	0	136	144	39	22	341
Corporates	0	1,977	300	1,105	38	3,420
Retail	0	0	0	3	0	3
Other exposures	0	0	0	504	0	504
Total	**421**	**2,113**	**582**	**1,664**	**60**	**4,840**

CCR exposures by portfolio and PD scale – IRB models

The following table presents all relevant parameters used for the calculation of CCR capital requirements for IRB models.

→ Refer to "Rating models" (pages 24 to 25) in Credit risk – Credit risk under internal risk-based approaches for further information on key models used at the group-wide level, explanation how the scope of models was determined and the risk-weighted assets covered by the models shown for each of the regulatory portfolios.

CCR4 – CCR exposures by portfolio and PD scale – IRB models

end of 4Q19	EAD post-CRM	Average PD	Number of obligors (thousands)	Average LGD	Average maturity (years)	RWA	RWA density
Sovereigns (CHF million, except where indicated)							
0.00% to <0.15%	1,892	0.03%	< 0.1	47%	0.3	79	4%
0.15% to <0.25%	133	0.22%	< 0.1	41%	1.0	41	31%
0.25% to <0.50%	38	0.37%	< 0.1	53%	0.0	16	42%
0.50% to <0.75%	0	0.64%	< 0.1	42%	1.0	0	59%
2.50% to <10.00%	242	5.92%	< 0.1	46%	0.7	364	150%
Sub-total	**2,305**	**0.66%**	**< 0.1**	**46%**	**0.4**	**500**	**22%**
Institutions – Banks and securities dealer							
0.00% to <0.15%	11,891	0.06%	0.5	58%	0.7	2,360	20%
0.15% to <0.25%	279	0.22%	0.1	59%	0.9	142	51%
0.25% to <0.50%	671	0.37%	0.1	56%	0.8	443	66%
0.50% to <0.75%	115	0.64%	< 0.1	47%	0.6	77	67%
0.75% to <2.50%	417	1.77%	0.1	53%	0.5	501	120%
2.50% to <10.00%	139	4.92%	0.1	53%	0.9	222	160%
10.00% to <100.00%	19	27.94%	< 0.1	40%	1.0	43	228%
Sub-total	**13,531**	**0.23%**	**0.8**	**58%**	0.7	**3,788**	**28%**
Institutions – Other institutions							
0.00% to <0.15%	145	0.05%	< 0.1	45%	1.0	17	12%
0.15% to <0.25%	7	0.24%	< 0.1	31%	1.0	2	25%
0.50% to <0.75%	0	0.58%	< 0.1	44%	1.0	0	59%
Sub-total	**152**	**0.06%**	**< 0.1**	**45%**	**1.0**	**19**	**12%**
Corporates – Specialized lending							
0.25% to <0.50%	0	0.37%	< 0.1	50%	1.0	0	46%
0.75% to <2.50%	11	1.20%	< 0.1	50%	1.0	9	89%
2.50% to <10.00%	3	4.34%	< 0.1	50%	1.0	4	147%
Sub-total	**14**	**1.84%**	**< 0.1**	**50%**	**1.0**	**13**	**101%**

CCR4 – CCR exposures by portfolio and PD scale – IRB models (continued)

end of 4Q19	EAD post-CRM	Average PD	Number obligors (thousands)	Average LGD	Average maturity (years)	RWA	RWA density
Corporates without specialized lending (CHF million, except where indicated)							
0.00% to <0.15%	36,534	0.05%	9.8	48%	0.5	4,157	11%
0.15% to <0.25%	2,082	0.21%	0.8	51%	0.9	814	39%
0.25% to <0.50%	1,118	0.37%	0.5	54%	0.9	650	58%
0.50% to <0.75%	737	0.63%	0.4	61%	0.8	696	94%
0.75% to <2.50%	1,586	1.46%	1.1	71%	0.7	2,484	157%
2.50% to <10.00%	1,199	5.40%	0.6	41%	1.0	2,556	213%
10.00% to <100.00%	14	19.81%	< 0.1	48%	1.0	45	317%
100.00% (Default)	5	100.00%	< 0.1	49%	1.0	5	106%
Sub-total	**43,275**	**0.29%**	**13.3**	**49%**	**0.5**	**11,407**	**26%**
Other retail							
0.00% to <0.15%	2,518	0.05%	3.0	60%	1.0	214	8%
0.15% to <0.25%	219	0.20%	0.4	39%	1.0	36	16%
0.25% to <0.50%	112	0.32%	0.3	50%	0.9	33	29%
0.50% to <0.75%	87	0.58%	0.5	49%	1.1	35	40%
0.75% to <2.50%	64	1.80%	< 0.1	49%	1.0	42	65%
2.50% to <10.00%	49	5.55%	< 0.1	52%	1.0	40	82%
10.00% to <100.00%	3	20.01%	< 0.1	31%	1.1	2	73%
100.00% (Default)	0	100.00%	< 0.1	53%	1.0	0	100%
Sub-total	**3,052**	**0.23%**	**4.3**	**57%**	**1.0**	**402**	**13%**
Total (all portfolios)							
0.00% to <0.15%	52,980	0.05%	13.4	51%	0.5	6,827	13%
0.15% to <0.25%	2,720	0.21%	1.3	50%	0.9	1,035	38%
0.25% to <0.50%	1,939	0.37%	0.9	54%	0.8	1,142	59%
0.50% to <0.75%	939	0.63%	0.9	58%	0.8	808	86%
0.75% to <2.50%	2,078	1.53%	1.3	67%	0.7	3,036	146%
2.50% to <10.00%	1,632	5.44%	0.7	44%	0.9	3,186	195%
10.00% to <100.00%	36	24.04%	< 0.1	43%	1.0	90	248%
100.00% (Default)	5	100.00%	< 0.1	49%	1.0	5	106%
Total (all portfolios)	**62,329**	**0.29%**	**18.5**	**52%**	**0.6**	**16,129**	**26%**

EAD post-CRM increased CHF 1.4 billion compared to the end of 2Q19, primarily reflecting increases in corporates without specialized lending.

CCR4 – CCR exposures by portfolio and PD scale – IRB models

end of 2Q19	EAD post-CRM	Average PD	Number of obligors (thousands)	Average LGD	Average maturity (years)	RWA	RWA density
Sovereigns (CHF million, except where indicated)							
0.00% to <0.15%	1,774	0.03%	< 0.1	47%	0.3	84	5%
0.15% to <0.25%	676	0.22%	< 0.1	41%	1.0	206	30%
0.25% to <0.50%	42	0.37%	< 0.1	53%	0.0	17	42%
0.50% to <0.75%	0	0.64%	< 0.1	42%	1.0	0	58%
0.75% to <2.50%	66	1.89%	< 0.1	53%	0.2	70	105%
2.50% to <10.00%	339	7.05%	< 0.1	46%	0.7	540	159%
Sub-total	**2,897**	**0.94%**	**< 0.1**	**46%**	**0.5**	**917**	**32%**
Institutions – Banks and securities dealer							
0.00% to <0.15%	12,976	0.06%	0.5	58%	0.6	2,544	20%
0.15% to <0.25%	338	0.22%	< 0.1	58%	0.9	170	50%
0.25% to <0.50%	409	0.37%	< 0.1	55%	0.8	261	64%
0.50% to <0.75%	55	0.64%	< 0.1	50%	0.5	38	70%
0.75% to <2.50%	280	1.80%	< 0.1	53%	0.3	341	122%
2.50% to <10.00%	167	6.46%	< 0.1	49%	0.8	267	159%
10.00% to <100.00%	5	24.24%	< 0.1	52%	1.0	14	306%
Sub-total	**14,230**	**0.20%**	**0.9**	**58%**	0.6	**3,635**	**26%**
Institutions – Other institutions							
0.00% to <0.15%	111	0.05%	< 0.1	46%	3.3	27	24%
0.15% to <0.25%	4	0.16%	< 0.1	27%	5.0	2	38%
0.25% to <0.50%	1	0.30%	< 0.1	28%	1.0	0	26%
0.50% to <0.75%	0	0.58%	< 0.1	53%	1.1	0	70%
Sub-total	**116**	**0.05%**	**< 0.1**	**45%**	**3.4**	**29**	**25%**
Corporates – Specialized lending							
0.00% to <0.15%	140	0.05%	< 0.1	45%	3.7	35	25%
0.15% to <0.25%	12	0.20%	< 0.1	28%	3.0	3	27%
0.25% to <0.50%	14	0.36%	< 0.1	48%	4.3	10	72%
0.50% to <0.75%	11	0.61%	< 0.1	34%	4.7	7	67%
0.75% to <2.50%	13	1.04%	< 0.1	25%	4.0	8	60%
2.50% to <10.00%	1	5.16%	< 0.1	12%	4.0	1	47%
Sub-total	**191**	**0.22%**	**< 0.1**	**42%**	**3.8**	**64**	**33%**

CCR4 – CCR exposures by portfolio and PD scale – IRB models (continued)

end of 2Q19	EAD post-CRM	Average PD	Number of obligors (thousands)	Average LGD	Average maturity (years)	RWA	RWA density
Corporates without specialized lending (CHF million, except where indicated)							
0.00% to <0.15%	33,904	0.05%	10.2	50%	0.5	3,872	11%
0.15% to <0.25%	1,933	0.21%	1.0	50%	1.8	906	47%
0.25% to <0.50%	808	0.37%	0.6	49%	1.4	480	59%
0.50% to <0.75%	1,009	0.64%	0.4	55%	1.1	864	86%
0.75% to <2.50%	1,772	1.47%	1.2	55%	1.1	2,171	123%
2.50% to <10.00%	1,135	5.08%	0.6	46%	0.9	2,599	229%
10.00% to <100.00%	8	18.91%	< 0.1	28%	4.1	14	180%
100.00% (Default)	5	100.00%	< 0.1	49%	1.0	5	106%
Sub-total	**40,574**	**0.30%**	**14.0**	**50%**	**0.6**	**10,911**	**27%**
Other retail							
0.00% to <0.15%	2,517	0.05%	3.3	52%	1.0	198	8%
0.15% to <0.25%	181	0.19%	0.3	27%	2.1	21	11%
0.25% to <0.50%	89	0.34%	0.3	29%	1.8	16	17%
0.50% to <0.75%	65	0.58%	0.7	46%	1.5	25	38%
0.75% to <2.50%	81	2.09%	< 0.1	63%	1.0	70	88%
2.50% to <10.00%	17	5.68%	< 0.1	58%	0.4	15	92%
10.00% to <100.00%	2	20.28%	< 0.1	24%	5.0	1	57%
100.00% (Default)	6	100.00%	< 0.1	100%	1.0	6	106%
Sub-total	**2,958**	**0.38%**	**4.6**	**50%**	**1.1**	**352**	**12%**
Total (all portfolios)							
0.00% to <0.15%	51,422	0.05%	14.1	52%	0.6	6,760	13%
0.15% to <0.25%	3,144	0.22%	1.4	47%	1.6	1,308	42%
0.25% to <0.50%	1,363	0.37%	1.0	50%	1.2	784	58%
0.50% to <0.75%	1,140	0.63%	1.1	54%	1.1	934	82%
0.75% to <2.50%	2,212	1.54%	1.4	55%	1.0	2,660	120%
2.50% to <10.00%	1,659	5.63%	0.7	47%	0.9	3,422	206%
10.00% to <100.00%	15	20.81%	< 0.1	35%	3.2	29	202%
100.00% (Default)	11	100.00%	< 0.1	77%	1.0	11	106%
Total (all portfolios)	**60,966**	**0.31%**	**19.7**	**52%**	**0.7**	**15,908**	**26%**

Composition of collateral for CCR exposure

The following table presents a breakdown of all types of collateral posted or received by banks to support or reduce CCR exposures related to derivative transactions or SFTs, including transactions cleared through a CCP. For disclosure purposes, the collateral values are presented as the market value of the collateral without any adjustments for haircuts.

CCR5 – Composition of collateral for CCR exposure

	Collateral used in derivative transactions						Collateral used in SFTs	
	Fair value of collateral received			Fair value of posted collateral			Fair value of collateral received	Fair value of posted collateral
end of	Segregated	Unsegregated	**Total**	Segregated	Unsegregated	**Total**		
4Q19 (CHF million)								
Cash – domestic currency	0	3,851	3,851	0	3,017	3,017	319	4,687
Cash – other currencies	0	42,489	42,489	0	37,683	37,683	95,382	167,728
Domestic sovereign debt	0	689	689	0	34	34	2,195	263
Other sovereign debt	0	27,337	27,337	2,701	17,710	20,411	210,219	130,338
Government agency debt	0	194	194	0	56	56	1,141	9,202
Corporate bonds	0	6,308	6,308	0	143	143	68,251	22,708
Equity securities	0	10,982	10,982	1,883	1,610	3,493	249,434 [1]	108,436 [1]
Other collateral	0	4,631	4,631	2	7	9	29,219	18,537
Total	**0**	**96,481**	**96,481**	**4,586**	**60,260**	**64,846**	**656,160**	**461,899**
2Q19 (CHF million)								
Cash – domestic currency	0	6,049	6,049	0	5,389	5,389	395	3,637
Cash – other currencies	0	44,792	44,792	0	37,265	37,265	100,898	184,106
Domestic sovereign debt	0	126	126	0	30	30	1,970	449
Other sovereign debt	0	20,956	20,956	2,346	15,638	17,984	203,799	117,405
Government agency debt	0	194	194	0	77	77	1,172	7,175
Corporate bonds	0	6,390	6,390	0	58	58	76,616	21,712
Equity securities	0	8,219	8,219	1,976	703	2,679	266,653 [1]	106,972 [1]
Other collateral	0	4,286	4,286	4	4	8	26,281	21,636
Total	**0**	**91,012**	**91,012**	**4,326**	**59,164**	**63,490**	**677,784**	**463,092**

1 The Equity Prime Brokerage business consists of clients acquiring long and short positions in the market in a Credit Suisse account along with the appropriate margins. In the case of a counterparty default, Credit Suisse gains control over the long positions and are free to sell them to cover the exposure and the long positions are thus considered as "collateral received". On the other hand, the short positions are considered as "trades" and are not reported in the disclosure as "posted collateral".

Credit derivatives exposures

We enter into derivative contracts in the normal course of business for market making, positioning and arbitrage purposes, as well as for our own risk management needs, including mitigation of interest rate, foreign currency and credit risk. Derivative exposure also includes economic hedges where the Group enters into derivative contracts for its own risk management purposes, but where the contracts do not qualify for hedge accounting under US GAAP. Derivative exposures are calculated according to regulatory methods, using either the current exposures method or approved IMM. These regulatory methods take into account potential future movements and as a result generate risk exposures that are greater than the net replacement values disclosed for US GAAP.

As of the end of 4Q19, no credit derivatives were utilized that qualify for hedge accounting under US GAAP.

→ Refer to "Derivative instruments" (pages 166 to 167) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk review and results in the Credit Suisse Annual Report 2019 for further information on derivative instruments, including counterparties and their creditworthiness.

→ Refer to "Note 32 – Derivatives and hedging activities" (pages 329 to 334) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for further information on the fair value of derivative instruments and the distribution of current credit exposures by types of credit exposures.

→ Refer to "Note 27 – Offsetting of financial assets and financial liabilities" (pages 306 to 309) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for further information on netting benefits, netted current credit exposures, collateral held and net derivatives credit exposure.

The following table presents the extent of the Group's exposures to credit derivative transactions as protection bought or sold.

CCR6 – Credit derivatives exposures

	4Q19		2Q19	
end of	Protection bought	Protection sold	Protection bought	Protection sold
Notionals (CHF billion)				
Single-name CDS	111.4	92.4	112.6	89.7
Index CDS	174.3	133.6	170.5	137.6
Total return swaps	8.0	8.7	5.8	3.7
Credit options	0.5	0.0	0.5	0.0
Other credit derivatives	73.9	36.0	49.1	23.6
of which credit default swaptions	73.9	36.0	49.1	23.6
Total notionals	**368.1**	**270.7**	**338.5**	**254.6**
Fair values (CHF billion)				
Positive fair value (asset)	1.7	5.6	3.1	5.1
Negative fair value (liability)	7.5	1.5	7.9	2.4

Includes the client leg of cleared credit derivatives.

RWA flow statements of CCR exposures under IMM

The following table presents the 4Q19 flow statement explaining changes in CCR RWA determined under the IMM for CCR (derivatives and SFTs).

CCR7 – Risk-weighted assets flow statements of CCR exposures under IMM

	4Q19
CHF million	
Risk-weighted assets at beginning of period	**19,060**
Asset size	(1,635)
Credit quality of counterparties	(420)
Model and parameter updates	995
Foreign exchange impact	(514)
Risk-weighted assets at end of period	**17,486**

→ Refer to "RWA flow statements of credit risk exposures under IRB" (pages 36 to 37) in Credit risk for definitions of the RWA flow statements components.

CCR RWA under IMM of CHF 17.5 billion decreased 8% compared to the end of 3Q19, primarily driven by decreases in asset size and a negative foreign exchange impact, partially offset by increases in model and parameter updates, mainly reflecting the application of the IMM for certain derivatives, which were previously captured under the current exposure method.

Exposures to central counterparties

The following table presents a comprehensive picture of the Group's exposure to CCPs.

CCR8 – Exposures to central counterparties

	4Q19		2Q19	
end of	EAD (post-CRM)	RWA	EAD (post-CRM)	RWA
CHF million				
QCCPs				
Exposures for trades at QCCPs	16,855	361	17,649	369
of which OTC derivatives	9,560	215	9,414	204
of which exchange-traded derivatives	7,009	140	7,596	152
of which SFTs	286	6	639	13
Segregated initial margin	2,976	–	2,497	–
Non-segregated initial margin	192	4	286	6
Pre-funded default fund contributions	3,330	969	2,724	1,093
Total exposures to QCCPs	**–**	**1,334**	**–**	**1,468**
Non-QCCPs				
Exposures for trades at non-QCCPs	82	82	15	15
of which SFTs	82	82	15	15
Pre-funded default fund contributions	2	24	2	22
Total exposures to non-QCCPs	**–**	**106**	**–**	**37**

Exposures associated with initial margin, where the exposures are measured under the IMM, have been included within the exposures for trades.

Securitization

General

The following disclosures, which also considers the "Industry good practice guidelines on Pillar 3 disclosure requirements for securitization", refer to traditional and synthetic securitizations held in the banking and trading book and regulatory capital on these exposures calculated according to the Basel framework for securitizations.

→ Refer to "Note 34 – Transfers of financial assets and variable interest entities" (pages 339 to 347) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for further information on securitization, the various roles, the use of SPEs, the involvement of the Group in consolidated and non-consolidated SPEs, the accounting policies for securitization activities and methods and key assumptions applied in valuing positions retained/purchased and gains/losses relating to RMBS and CMBS securitization activity in 2019.

A traditional securitization is a structure where an underlying pool of assets is sold to an SPE which pays for the assets by issuing tranched securities collateralized by the underlying asset pool. A synthetic securitization is a tranched structure where the credit risk of an underlying pool of assets is transferred, in whole or in part, through the use of credit derivatives or guarantees that may serve to hedge the credit risk of the portfolio. Many synthetic securitizations are not accounted for as securitizations under US GAAP. In both traditional and synthetic securitizations, risk is dependent on the seniority of the retained interest and the performance of the underlying asset pool.

Roles and activities in connection with securitization

Securitization in the banking book

The Group is active in various roles in connection with securitization, including originator, investor and sponsor. As originator, the Group creates or purchases financial assets (e.g., commercial mortgages or corporate loans) and then securitizes them in a traditional or synthetic transaction that achieves significant risk transfer to third party investors. The Group acts as liquidity provider to Alpine Securitization Ltd. (Alpine), a multi-seller commercial paper conduit administered by Credit Suisse and also provides liquidity to a couple of Asset Backed Commercial Paper programs managed by third party administrators.

In addition, the Group invests in securitization-related products created by third parties.

The Group has both securitization and re-securitization transactions in the banking book referencing different types of underlying assets including real estate loans (commercial and residential).

Securitization in the trading book

Within its mortgage business there are four key roles that the Group undertakes within securitization markets: issuer, underwriter, market maker and financing counterparty. The Group holds one of the top trading franchises in market making in all major securitized product types and is a top issuer and underwriter in the re-securitization market in the US as well as being one of the top underwriters in asset-backed securities (ABS) and residential mortgage-backed securities (RMBS) securitization in the US. In addition the Group also has a relatively small correlation trading portfolio.

The Group's key objective in relation to trading book securitization is to meet clients' investment and divestment needs by making markets in securitized products across all major collateral types, including residential mortgages, commercial mortgages, asset finance (i.e. auto loans, credit card receivables, etc.) and corporate loans. The Group focuses on opportunities to intermediate transfers of risk between sellers and buyers.

The Group is also active in new issue securitization and re-securitization. The Group's Securitized Products Finance team provides short-term secured warehouse financing to clients who originate credit card, auto loan, and other receivables, and the Group sells asset-backed securities collateralized by these receivables to provide its clients long-term financing that matches the lives of their assets.

At times, the Group purchases loans and bonds for the purpose of securitization and sells these assets to SPEs which in turn issue new securities. Re-securitizations of previously issued mortgage-backed securities (typically RMBS) securities occur when certificates issued out of an existing securitization vehicle are sold into a newly created and separate securitization vehicle.

Risks assumed and retained

Key risks retained while securities or loans remain in inventory are related to the performance of the underlying assets (residential real estate loans, commercial loans, credit card loans, etc.). These risks are summarized in the securitization pool level attributes: PD of underlying loans (default rate), the severity of loss and prepayment speeds. The transactions may also be exposed to general market risk, credit spread and counterparty credit risk.

The Group maintains models for both government-guaranteed and private label mortgage products. These models project the above risk drivers based on market interest rates and volatility as well as macro-economic variables such as housing price index, projected GDP and inflation, unemployment etc.

In its role as a market maker, the Group actively trades in and out of positions. Both Front Office and Risk Management continuously monitor liquidity risk as reflected in trading spreads and trading volumes. To address liquidity concerns a specific set of limits on the size of aged positions are in place for the securitized positions we hold.

The Group classifies securities within the transactions by the nature of the collateral (residential, commercial, ABS, CLOs, etc.) and the seniority each security has in the capital structure (i.e. senior, mezzanine, subordinate etc.), which in turn will be reflected in the transaction risk assessment. Risk Management monitors portfolio composition by capital structure and collateral type on a daily basis with subordinate exposure and each

collateral type subject to separate risk limits and risk flags. In addition, the Group's internal risk methodology is designed such that risk charges are based on the place the particular security holds in the capital structure, the less senior the bond the higher the risk charges.

For re-securitization risk, the Group's risk management models take a 'look through' approach where they model the behavior of the underlying securities or constituent counterparties based on their own particular collateral and then transmit that to the re-securitized position. No additional risk factors are considered within the re-securitization portfolios in addition to those identified and measured within securitization risk.

With respect to both the wind-down corporate correlation trading portfolio and the on-going transactions the key risks that need to be managed includes default risk, counterparty credit risk, correlation risk and cross effects between spread and correlation. The impacts of liquidity risk for securitization products is embedded within the firm's historical simulation model through the incorporation of market data from stressed periods, and in the scenario framework through the calibration of price shocks to the same period.

Both correlation and first-to-default are valued using a correlation model which uses the market implied correlation and detailed market data such as constituent spread term structure and constituent recovery. The risks embedded in securitization and re-securitizations are similar and include spread risk, recovery risk, default risk and correlation risk. The risks for different seniority of tranches will be reflected in the tranche price sensitivities to each constituent in the pools. The complexity of the correlation portfolio's risk lies in the level of convexity and cross risk inherent, for example, the risks to large spread moves and the risks to spread and correlation moving together. The risk limit framework is carefully designed to address the key risks for the correlation trading portfolio.

Monitoring of changes in credit and market risk of securitization exposures

The Group has in place a comprehensive risk management process whereby the Front Office and Risk Management work together to monitor positions and position changes, portfolio structure and trading activity and calculate a set of risk measures on a daily basis using risk sensitivities and exposures.

For the mortgage business the Group also uses monthly remittance reports (available from public sources) to get up to date information on collateral performance (delinquencies, defaults, pre-payment etc.). Monthly or quarterly reports (sourced directly from the originator or sponsor of the securitization) are used to monitor performance of most banking book securitizations.

Risk Management has also put in place a set of key risk limits for the purpose of managing the Group's risk appetite framework in relation to securitizations/re-securitizations. These limits will cover exposure measures, risk sensitivities, VaR and capital measures with the majority monitored on a daily basis. In addition within the Group's risk management framework an extensive scenario analysis framework is in place whereby all underlying risk factors are stressed to determine portfolio sensitivity.

Re-securitized products in the mortgage business go through the same risk management process but looking through the structures with the focus on the risk of the underlying securities or constituent names.

Retained banking book exposures for mortgage, ABS, commercial mortgage-backed securities (CMBS) and collateralized debt obligation (CDO) transactions are risk managed on the same basis as similar trading book transactions.

Risk mitigation

In addition to the strict exposure limits noted above, the Group uses a number of different risk mitigation approaches to manage risk appetite for securitization and re-securitization exposures. Where true counterparty credit risk exposure is identified for a particular transaction, there is a requirement for it to be approved through normal credit risk management processes with collateral taken as required. The Group also may use various proxies including corporate single name and index hedges and equity hedges to mitigate the price and spread risks to which it is exposed. Hedging decisions are made by the trading desk based on current market conditions and will be made in consultation with Risk Management. Every trade that is an unusual and material trade require approval under the Group's Pre-Trade Approval governance process. International investment banks are the main counterparties to the hedges that are used across these business areas.

Affiliated entities

In the normal course of business it is possible for the Group's managed separate account portfolios and the Group's controlled investment entities, such as mutual funds, fund of funds, private equity funds and other fund linked products to invest in the securities issued by other vehicles sponsored by the Group engaged in securitization and re-securitization activities. To address potential conflicts, standards governing investments in affiliated products and funds have been adopted.

Regulatory capital treatment of securitization structures

Banking book securitization

For banking book securitizations, the regulatory capital requirements are calculated since January 2018 with the following approaches: the Securitization Internal Ratings-Based Approach (SEC-IRBA), the Securitization External Ratings-Based Approach (SEC-ERBA), or the Securitization Standardized Approach (SEC-SA). External ratings used in regulatory capital calculations for securitization risk exposures in the banking book are obtained from Fitch, Moody's, Standard & Poor's or Dominion Bond Rating Service.

Trading book securitization

We use the standardized measurement method (SMM) which is based on the ratings-based approach and the supervisory formula approach for securitization purposes and other supervisory approaches for trading book securitization positions covering the approach for nth-to-default products and portfolios covered by the weighted average risk weight approach.

Securitization exposures in the banking book

Securitization exposures presented in the following table represent the EAD.

Securitization exposures in the banking book where the Group acts as originator increased CHF 4.5 billion compared to the end of 2Q19, primarily relating to new collateralized debt obligations (CDO)/collateralized loan obligations (CLO) securitizations.

Securitization exposures in the banking book where the Group acts as sponsor decreased CHF 1.2 billion and securitization exposures in the banking book where the Group acts as investor increased CHF 2.3 billion compared to the end of 2Q19.

SEC1 – Securitization exposures in the banking book

	Bank acts as originator			Bank acts as sponsor			Bank acts as investor		
end of	Traditional	Synthetic	**Total**	Traditional	Synthetic	**Total**	Traditional	Synthetic	**Total**
4Q19 (CHF million)									
Commercial mortgages	49	0	49	0	0	0	320	3	323
Residential mortgages	197	0	197	0	0	0	1,612	244	1,856
CDO/CLO	977	37,047	38,024	966	0	966	2,437	5	2,442
Other ABS	719	0	719	6,015	0	6,015	6,709	222	6,931
Total	**1,942**	**37,047**	**38,989**	**6,981**	**0**	**6,981**	**11,078**	**474**	**11,552**
2Q19 (CHF million)									
Commercial mortgages	61	0	61	0	0	0	246	4	250
Residential mortgages	39	0	39	94	0	94	1,301	239	1,540
CDO/CLO	1,057	32,383	33,440	1,742	0	1,742	2,037	4	2,041
Other ABS	940	0	940	6,359	0	6,359	5,234	196	5,430
Total	**2,097**	**32,383**	**34,480**	**8,195**	**0**	**8,195**	**8,818**	**443**	**9,261**

Securitization exposures in the trading book

SEC2 – Securitization exposures in the trading book

	Bank acts as originator			Bank acts as sponsor			Bank acts as investor		
end of	Traditional	Synthetic	**Total**	Traditional	Synthetic	**Total**	Traditional	Synthetic	**Total**
4Q19 (CHF million)									
Commercial mortgages	72	0	72	0	0	0	1,838	347	2,185
Residential mortgages	160	2	162	0	0	0	3,258	42	3,300
Other ABS	1	0	1	0	0	0	360	102	462
CDO/CLO	7	0	7	0	0	0	372	26	398
Total	**240**	**2**	**242**	**0**	**0**	**0**	**5,828**	**517**	**6,345**
2Q19 (CHF million)									
Commercial mortgages	59	0	59	0	0	0	1,441	320	1,761
Residential mortgages	21	0	21	0	0	0	3,190	49	3,239
Other ABS	1	0	1	0	0	0	579	60	639
CDO/CLO	4	0	4	0	0	0	320	185	505
Total	**85**	**0**	**85**	**0**	**0**	**0**	**5,530**	**614**	**6,144**

Calculation of capital requirements

The following tables present the securitization exposures in the banking book and the associated regulatory capital requirements.

→ Refer to "Market risk under standardized approach" (page 62) in Market risk for capital charges related to securitization positions in the trading book.

SEC3 – Securitization exposures in the banking book and associated regulatory capital requirements – Credit Suisse acting as originator or as sponsor

	Exposure value (by RW band)				
end of	<=20% RW	>20% to 50% RW	>50% to 100% RW	>100% to <1250% RW	1250% RW
4Q19 (CHF million)					
Total exposures	**40,996**	**3,444**	**672**	**794**	**64**
Traditional securitization	4,798	2,725	605	751	44
of which securitization	4,798	2,725	605	748	13
of which retail underlying	2,183	1,581	227	42	8
of which wholesale	2,615	1,144	378	706	5
of which re-securitization	0	0	0	3	31
of which senior	0	0	0	0	27
of which non-senior	0	0	0	3	4
Synthetic securitization	36,198	719	67	43	20
of which securitization	36,198	719	67	43	20
of which retail underlying	1,678	85	0	3	6
of which wholesale	34,520	634	67	40	14
2Q19 (CHF million)					
Total exposures	**34,380**	**6,110**	**827**	**1,292**	**66**
Traditional securitization	5,475	2,693	827	1,255	42
of which securitization	5,475	2,693	827	1,255	32
of which retail underlying	3,230	1,428	13	39	21
of which wholesale	2,245	1,265	814	1,216	11
of which re-securitization	0	0	0	0	10
of which senior	0	0	0	0	3
of which non-senior	0	0	0	0	7
Synthetic securitization	28,905	3,417	0	37	24
of which securitization	28,905	3,417	0	37	24
of which retail underlying	458	6	0	0	0
of which wholesale	28,447	3,411	0	37	24

	Exposure value (by regulatory approach)				RWA (by regulatory approach)				Capital charge after cap			
	SEC-IRBA	SEC-ERBA	SEC-SA	1250% RW	SEC-IRBA	SEC-ERBA	SEC-SA	1250% RW	SEC-IRBA	SEC-ERBA	SEC-SA	1250% RW
	38,568	**1,251**	**6,087**	**64**	**7,621**	**1,050**	**1,337**	**799**	**573**	**78**	**108**	**64**
	1,541	1,251	6,087	44	931	1,050	1,337	552	38	78	108	44
	1,541	1,251	6,084	13	931	1,050	1,303	172	38	78	105	13
	0	767	3,265	8	0	504	620	103	0	34	50	8
	1,541	484	2,819	5	931	546	683	69	38	44	55	5
	0	0	3	31	0	0	34	380	0	0	3	31
	0	0	0	27	0	0	0	332	0	0	0	27
	0	0	3	4	0	0	34	48	0	0	3	4
	37,027	0	0	20	6,690	0	0	247	535	0	0	20
	37,027	0	0	20	6,690	0	0	247	535	0	0	20
	1,766	0	0	6	359	0	0	69	29	0	0	6
	35,261	0	0	14	6,331	0	0	178	506	0	0	14
	34,474	**1,278**	**6,857**	**66**	**7,056**	**933**	**1,976**	**818**	**528**	**75**	**158**	**66**
	2,115	1,278	6,857	42	922	933	1,976	514	38	75	158	42
	2,115	1,278	6,857	32	922	933	1,976	393	38	75	158	32
	0	933	3,777	21	0	418	732	258	0	33	59	21
	2,115	345	3,080	11	922	515	1,244	135	38	42	99	11
	0	0	0	10	0	0	0	121	0	0	0	10
	0	0	0	3	0	0	0	35	0	0	0	3
	0	0	0	7	0	0	0	86	0	0	0	7
	32,359	0	0	24	6,134	0	0	304	490	0	0	24
	32,359	0	0	24	6,134	0	0	304	490	0	0	24
	464	0	0	0	81	0	0	2	6	0	0	0
	31,895	0	0	24	6,053	0	0	302	484	0	0	24

SEC4 – Securitization exposures in the banking book and associated regulatory capital requirements – Credit Suisse acting as investor

	Exposure value (by RW band)				
end of	<=20% RW	>20% to 50% RW	>50% to 100% RW	>100% to <1250% RW	1250% RW
4Q19 (CHF million)					
Total exposures	**8,482**	**2,028**	**716**	**325**	**1**
Traditional securitization	8,301	1,838	627	313	0
of which securitization	8,301	1,838	496	313	0
of which retail underlying	3,885	1,570	69	61	0
of which wholesale	4,416	268	427	252	0
of which re-securitization	0	0	131	0	0
of which non-senior	0	0	131	0	0
Synthetic securitization	181	190	89	12	1
of which securitization	181	190	89	12	0
of which retail underlying	106	184	89	7	0
of which wholesale	75	6	0	5	0
of which re-securitization	0	0	0	0	1
of which senior	0	0	0	0	1
2Q19 (CHF million)					
Total exposures	**5,866**	**2,120**	**1,105**	**165**	**5**
Traditional securitization	5,757	1,892	1,021	144	4
of which securitization	5,757	1,892	939	144	4
of which retail underlying	3,020	609	201	4	4
of which wholesale	2,737	1,283	738	140	0
of which re-securitization	0	0	82	0	0
of which non-senior	0	0	82	0	0
Synthetic securitization	109	228	84	21	1
of which securitization	109	228	84	21	0
of which retail underlying	11	131	82	15	0
of which wholesale	98	97	2	6	0
of which re-securitization	0	0	0	0	1
of which senior	0	0	0	0	1

	Exposure value (by regulatory approach)				RWA (by regulatory approach)				Capital charge after cap			
	SEC-IRBA	SEC-ERBA	SEC-SA	1250% RW	SEC-IRBA	SEC-ERBA	SEC-SA	1250% RW	SEC-IRBA	SEC-ERBA	SEC-SA	1250% RW
	2,273	**1,354**	**7,924**	**1**	**341**	**440**	**3,185**	**11**	**27**	**35**	**182**	**1**
	2,273	1,037	7,769	0	341	287	3,158	1	27	23	180	0
	2,273	1,037	7,637	0	341	287	3,027	1	27	23	169	0
	0	555	5,031	0	0	137	1,378	1	0	11	88	0
	2,273	482	2,606	0	341	150	1,649	0	27	12	81	0
	0	0	132	0	0	0	131	0	0	0	11	0
	0	0	132	0	0	0	131	0	0	0	11	0
	0	317	155	1	0	153	27	10	0	12	2	1
	0	317	155	0	0	153	27	0	0	12	2	0
	0	244	141	0	0	135	25	0	0	11	2	0
	0	73	14	0	0	18	2	0	0	1	0	0
	0	0	0	1	0	0	0	10	0	0	0	1
	0	0	0	1	0	0	0	10	0	0	0	1
	1,460	**1,289**	**6,507**	**5**	**219**	**575**	**2,795**	**65**	**18**	**46**	**151**	**5**
	1,460	984	6,370	4	219	380	2,764	52	18	31	148	4
	1,460	984	6,288	4	219	380	2,682	52	18	31	141	4
	0	402	3,433	4	0	169	1,067	52	0	14	56	4
	1,460	582	2,855	0	219	211	1,615	0	18	17	85	0
	0	0	82	0	0	0	82	0	0	0	7	0
	0	0	82	0	0	0	82	0	0	0	7	0
	0	305	137	1	0	195	31	13	0	15	3	1
	0	305	137	0	0	195	31	3	0	15	3	0
	0	239	0	0	0	167	0	0	0	13	0	0
	0	66	137	0	0	28	31	0	0	2	3	0
	0	0	0	1	0	0	0	10	0	0	0	1
	0	0	0	1	0	0	0	10	0	0	0	1

Market risk

General

We use the advanced approach for calculating the market risk capital requirements for the majority of our market risk exposures. As of December 31, 2019, 87% of our market risk RWA are computed using internal models. In line with regulatory requirements, the SMM is used for the specific risk of securitized exposures.

→ Refer to "Regulatory capital treatment of securitization structures" (page 56) in Securitization – General for further information on the standardized measurement method and other supervisory approaches.

Risk management objectives and policies for market risk

→ Refer to "Market risk" (pages 149 to 153) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management – Risk coverage and management in the Credit Suisse Annual Report 2019 for information on our risk management objectives and policies for market risk.
→ Refer to "Note 1 – Summary of significant accounting policies" (pages 269 to 270) and "Note 32 – Derivatives and hedging activities" (pages 329 to 334) in VI – Consolidated financial statements – Credit Suisse Group in the Credit Suisse Annual Report 2019 for further information on policies for hedging risk and strategies/processes for monitoring the continuing effectiveness of hedges.

Market risk reporting

Market risk reporting is performed on a daily, weekly and monthly basis across various levels of the organization, including the Group, its legal entities and the business divisions. The audience of these reports includes senior management within CRO, the Front Office and the Board of Directors.

Market risk under standardized approach

The following table shows the components of the capital requirement under the standardized approach for market risk.

MR1 – Market risk under standardized approach

end of	4Q19	2Q19
Risk-weighted assets (CHF million)		
Securitization	1,981	2,190
Total risk-weighted assets	**1,981**	**2,190**

Market risk under internal model approach

General

The market risk internal model approach (IMA) framework includes regulatory VaR, stressed VaR, risks not in VaR (RNIV) and Incremental Risk Charge (IRC). RNIV includes certain stressed RNIV. In 2014, Comprehensive Risk Measure was discontinued due to the small size of the correlation trading portfolio. We now use the standard rules for this portfolio.

The following table shows the main characteristics of the different models.

MRB – Internal model approach – overview

	Regulatory VaR	Stressed VaR	IRC
Method applied	Historical simulation	Historical simulation	Portfolio loss simulation
Data set	2 years	1 Year	–
Holding period	10 days (overlapping)	10 days (overlapping)	One-year liquidity horizon
Confidence level	99% equivalent	99% equivalent	99.9%
Population	Regulatory trading book (where applicable, foreign exchange and commodity risks in the regulatory banking book are added)	Regulatory trading book (where applicable, foreign exchange and commodity risks in the regulatory banking book are added)	Regulatory trading book subject to issuer default and migration risk (excl. securitizations and correlation trades)

The following table shows a breakdown of RWA covered by each of the models.

MRB – IMA – Risk-weighted assets

end of 4Q19	CHF billion	in %
Risk-weighted assets		
Regulatory VaR	2.6	20
Stressed VaR	4.6	35
RNIV	4.5	34
IRC	1.4	11
Total risk-weighted assets	**13.2**	**100**

Regulatory VaR, stressed VaR and risks not in VaR

The regulatory VaR and stressed VaR models cover primarily the activities of Credit Suisse's business units that are held within trading books. The models are predominantly based on historical simulation and include risk types covering equity, currency, interest rate, commodity and credit spread risks. The models are also used to capture foreign exchange and commodity risk within banking books where required by the regulator.

In addition to the regulatory VaR and stressed VaR models Credit Suisse operates a RNIV framework. This is applied to the same activities as the VaR/stressed VaR model but covers risk types that are not included in the internal model due, for example, to a lack of historical data or other model constraints. The purpose of the RNIV framework is to ensure that capital is held to meet all risks which are not captured, or not captured adequately, by the firm's VaR and stressed VaR models. These include, but are not limited to risk factors such as cross-risks and higher-order risks.

The objective of Credit Suisse is to ensure the greatest consistency possible between the model used for the Group and the one used for subsidiaries and other legal entities. The model used in all instances is based on the same historical simulation approach but precise configuration and inclusion of risk types may differ for a variety of reasons. These include timing differences in receiving the necessary regulatory approvals (in which case the differences may be temporary) or different supervisory requirements or interpretations (in which case the differences may be expected to remain).

The Group model is used for Credit Suisse AG (consolidated and parent company), Credit Suisse (Schweiz) AG, Neue Aargauer Bank AG and Credit Suisse (Hong Kong) Ltd. The model used for Credit Suisse Holdings (USA), Credit Suisse Capital LLC, Credit Suisse International and Credit Suisse Securities (Europe) Limited is similar but is based on a one-tailed percentile rather than expected shortfall.

The main approach of the model is to use historical simulation, which is the industry standard for internal models. The stressed VaR model is based on an observation period of 1 year and relates to a period of significant financial stress. The market data in the model is updated on an at least weekly basis (some current rates/spreads required by the model are updated on a daily basis). Expected shortfall is the preferred tail measure where permitted and is calibrated to be equivalent to a 99% confidence level.

The risk management VaR model for the Group is similar to the regulatory VaR model with a few differences. Certain positions excluded from regulatory and stressed VaR can be included for risk management purposes, such as specific risk from securitization positions and certain banking book exposures. The holding period for risk management VaR is 1 day. The tail measure for risk management is calibrated to be equivalent to a 98% confidence level rather than the regulatory 99%.

The regulatory VaR model for the Group and its entities uses a two-year lookback window and an exponential weighting scheme with a time decay factor of 0.994 is applied to the profits and losses (P&L) vector prior to computing the tail estimate. The weighting is calibrated to ensure a balance between responsiveness to shifts in market regime changes and regulatory requirements. The holding period of the model is calculated using actual 10-day overlapping returns and does not use scaling of 1-day returns. The methods used to simulate the potential movements in risk factors are primarily dependent on the risk types. For risk types pertaining to equity prices, foreign exchange rates and volatilities, the returns are modelled as a function of proportional historical moves. For certain spread risks, the returns are modelled as a function of absolute historical moves. For some risk types, such as swap spreads and emerging markets credit spreads, a mixed approach is used. The P&L vectors are generated using a variety of approaches; Taylor Series approximation, partial revaluation ladders and grids as well as full revaluation, depending on the complexity and linearity of the underlying risks.

The stressed VaR model for the Group and its entities uses an actual 10 day return calculated over a 1 year historical observation period with no exponential weighting applied, except of Credit Suisse Holdings (USA) where stressed VaR uses regulatory VaR time weighting parameters. The underlying risk types are simulated using the same approaches as for regulatory VaR. The 1-year period of stress is assessed on a monthly basis by calculating stressed VaR for a range of alternative 1-year periods taking into account recent portfolio compositions.

The Group has IMA permission for modelling both general market and specific risk of debt and equity instruments. There are two approaches used to model general and specific risk:

- **Full simulation approach:** This approach uses an individual risk factor for each security. Therefore, for each security, this approach incorporates both specific risk and general risk within the same risk factor.
- **Regression approach:** This approach uses a common risk factor across related securities in conjunction with additional specific risk add-ons for each security. This modelling approach segregates historical price variations into general and specific risk components.

Under the full simulation approach, scenario P&Ls incorporating both specific and general risk are aggregated in the historical simulation VaR via individual risk factor time series. Under the regression approach, scenario P&Ls corresponding to general risk are aggregated in the historical simulation VaR, while for each specific risk, a VaR is calculated by applying either a 1st or a 99th percentile historical move (depending on the direction of the position). Specific risk VaR components are then aggregated with historical simulation VaR under a zero correlation assumption (square root sum of squares).

The performance of our internal models is regularly monitored and discussed at internal risk governance committees which review the regulatory backtesting results in addition to internal metrics of model performance. Position information flowing into the VaR model is reviewed daily, historical market data is reviewed before going live on a weekly basis, and model parameters are reviewed regularly.

Stress testing analysis is performed on a periodic basis to ensure model stability and robustness against an adverse market environment. For this purpose, impacts from large changes in inputs and parameters are simulated and assessed against expected model outputs under different stress scenarios.

→ Refer to "Market risk" (pages 149 to 153) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Risk management in the Credit Suisse Annual Report 2019 for further information on VaR, including VaR limitations, VaR backtesting, stress testing, VaR governance and differences between the model used for risk management purposes and the model used for regulatory purposes.

Incremental Risk Charge

The IRC capitalizes issuer default and migration risk in the trading book, arising from positions such as bonds or CDS, but excluding securitizations and correlation trading. Credit Suisse has received approval from FINMA, as well as from regulators of several of our subsidiaries, to use our IRC model.

The IRC model assesses risk at 99.9% confidence level over a one-year time horizon assuming the Constant Position Assumption, i.e. a single liquidity horizon of one year. This corresponds to the most conservative assumption on liquidity that is available under current IRC regulatory rules.

The IRC portfolio model is a Merton-type portfolio model designed to calculate the cumulative loss at the 99.9% confidence level. The model's design is based on the same principles as industry standard credit portfolio models including the Basel II A-IRB model.

As part of the exposure aggregation model, stochastic recovery rates are used to capture recovery rate uncertainty, including the case of basis risks on default, where different instruments issued by the same issuer can experience different recovery rates.

In 2019, Credit Suisse has refined the capture of systematic risks in the IRC model by expanding the asset correlation framework into a multifactor set-up.

To achieve the IRB soundness standard, Credit Suisse uses IRC parameters that are either based on the A-IRB reference data sets (migration matrices including PDs, LGDs, LGD correlation and volatility), or parameters based on other internal or external data covering more than ten years of history and including periods of stress.

RWA flow statements of market risk exposures under an IMA

The following table presents the 4Q19 flow statement explaining variations in the market risk RWA determined under an internal model approach (IMA).

Market risk RWA under an IMA of CHF 13.2 billion decreased 19% compared to the end of 3Q19, primarily due to the decrease in stressed VaR, driven by movements in risk levels, and the decrease in risks not in VaR, driven by model and parameter updates, mainly reflecting RNIV methodology enhancements.

MR2 – Risk-weighted assets flow statements of market risk exposures under an IMA

4Q19	Regulatory VaR	Stressed VaR	IRC	Other [1]	Total
CHF million					
Risk-weighted assets at beginning of period	**2,621**	**6,376**	**1,221**	**6,127**	**16,345**
Regulatory adjustment	270	(722)	0	182	(270)
Risk-weighted assets at beginning of period (end of day)	**2,891**	**5,654**	**1,221**	**6,309**	**16,075**
Movement in risk levels	(610)	(1,551)	(134)	(324)	(2,619)
Model and parameter updates	444	(22)	205	(1,357)	(730)
Foreign exchange impact	(72)	(152)	(42)	(159)	(425)
Risk-weighted assets at end of period (end of day)	**2,653**	**3,929**	**1,250**	**4,469**	**12,301**
Regulatory adjustment	(7)	719	129	69	910
Risk-weighted assets at end of period	**2,646**	**4,648**	**1,379**	**4,538**	**13,211**

1 Risks not in VaR.

Definitions of risk-weighted assets movement components related to market risk

Description	Definition
RWA as of the end of the previous/current reporting periods	Represents RWA at quarter-end
Regulatory adjustment	Indicates the difference between RWA and RWA (end of day) at beginning and end of period
RWA as of the previous/current quarters end (end of day)	For a given component (e.g., VaR) it refers to the RWA that would be computed if the snapshot quarter end amount of the component determines the quarter end RWA, as opposed to a 60-day average for regulatory
Movement in risk levels	Represents movements due to position changes
Model and parameter updates	Represents movements arising from internally driven or externally mandated updates to models and recalibrations of model parameters specific only to Credit Suisse
Methodology and policy changes	Represents movements arising from externally mandated regulatory methodology and policy changes to accounting and exposure classification and treatment policies not specific only to Credit Suisse
Acquisitions and disposals	Represents changes in book sizes due to acquisitions and disposals of entities
Foreign exchange impact	Represents changes in exchange rates of the transaction currencies compared to the Swiss franc
Other	Represents changes that cannot be attributed to any other category

IMA approach values for trading portfolios

The following table presents the maximum, minimum, average and period end values resulting from the different types of models used for computing regulatory capital charge at the Group level, before any additional capital charge is applied.

MR3 – Regulatory VaR, stressed VaR and Incremental Risk Charge

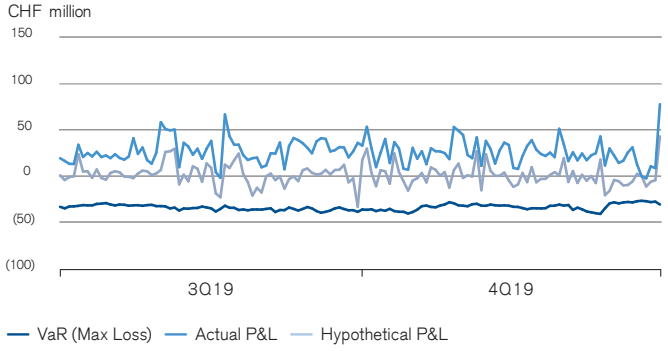
in / end of	**2H19**	1H19
CHF million		
Regulatory VaR (10 day 99%)		
Maximum value	107	120
Average value	70	73
Minimum value	57	57
Period end	71	75
Stressed VaR (10 day 99%)		
Maximum value	194	179
Average value	144	122
Minimum value	98	89
Period end	105	120
IRC (99.9%)		
Maximum value	130	138
Average value	99	97
Minimum value	73	51
Period end	100	81

During 2H19, the average stressed VaR increased, primarily driven by the stressed window calibration during 3Q19. The period end IRC increased, primarily driven by a model upgrade replacing single-factor correlations with multi-factor ones.

Comparison of VaR estimates with gains/losses

The following chart compares the results of estimates from the regulatory VaR model with both hypothetical and actual trading outcomes.

MR4 – Comparison of VaR estimates with actual/hypothetical profits and losses



Backtesting involves comparing the results produced by the VaR model with the hypothetical trading revenues on the trading book. Hypothetical trading revenues are defined in compliance with regulatory requirements and aligned with the VaR model output by excluding (i) non-market elements (such as fees, commissions, cancellations and terminations, net cost of funding and credit-related valuation adjustments) and (ii) gains and losses from intra-day trading. A backtesting exception occurs when a hypothetical trading loss exceeds the daily VaR estimate.

For capital purposes and in line with Bank for International Settlements (BIS) requirements, FINMA increases the capital multiplier for every regulatory VaR backtesting exception above four in the prior rolling 12-month period, resulting in an incremental market risk capital requirement for the Group. VaR models with less than five backtesting exceptions are considered by regulators to be classified in a defined “green zone”. The “green zone” corresponds to backtesting results that do not themselves suggest a problem with the quality or accuracy of a bank’s model.

In 2H19, we had no backtesting exceptions in our regulatory VaR model calculated using hypothetical trading revenues.

Since there were fewer than five backtesting exceptions in the rolling 12-month period through the end of 4Q19, in line with BIS industry guidelines, the bank is in the “green zone”.

Interest rate risk in the banking book

Risk management objectives and policies

Overview

The Group manages interest rate risk in the banking book (IRRBB) both in terms of risk to earnings as well as risk to the economic value of the asset and liability position, arising from changes in interest rates.

The Group monitors IRRBB through established systems, processes and controls. Risk measures are provided to estimate the impact of changes in interest rates, which is one of the primary ways in which IRRBB is assessed for risk management purposes.

The Group does not have a regulatory requirement to hold capital against IRRBB. The economic impacts of adverse shifts in interest rates from FINMA-defined scenarios are significantly below 15% of tier 1 capital the threshold used by the regulator to identify banks that potentially run excessive levels of interest rate risk at group and legal entity levels.

Major sources of interest rate risk in the banking book

We assume interest rate risks in our banking book through lending and deposit-taking, money market and funding activities, and the deployment of our consolidated equity, as well as other activities involving banking book positions at the divisional level. Non-maturing products, such as savings accounts, have no contractual maturity date or direct market-linked interest rate and are risk-managed on a pooled basis using replication portfolios on behalf of the business divisions. Replicating portfolios transform non-maturing products into a series of fixed-term products that approximate the re-pricing and volume behavior of the pooled client transactions.

Risk management and control governance

The Group's overarching objective is to manage the risk of banking book positions in an efficient and controlled manner, across both regulatory constraints and the Group's risk appetite frameworks. The Group applies the three lines of defense model to IRRBB with clear segregation between the CFO and the businesses (first line), the CRO (second line) and Internal Audit (third line).

Oversight of business strategies, new initiatives, risk measures and risk appetite is provided by a set of governance committees. The CARMC is the main governance committee for the Group's funding, liquidity and capital management. The CARMC is responsible for the Group's IRRBB risk control framework and escalation of risk constraint breaches.

The Group's RPSC and associated sub-committees are responsible for the oversight and approval of IRRBB-related risk models, global policies, manuals, guidelines and procedures. Divisional and legal entity risk management committees review IRRBB-related matters specific to their local entities and jurisdictions.

Independent model validation is performed by the model risk management function, a CRO unit independent from model developers, which follows specific quality standards and procedures, such as minimum revalidation cycles. The validation outcome is presented to management and to the RPSC for model approval, in accordance with model development policies.

IRRBB is integrated into the Group's risk appetite framework and is considered by risk constraints formulated by the Group's Board of Directors for both earnings- and economic value-based risk measures. The Group's IRRBB risk appetite level – in terms of the change in net present values, also referred to as "delta economic value of equity (ΔEVE)" – is primarily driven by the available capital and is allocated to the Group's material legal entities.

Additionally, the crisis response framework can be triggered by management, for example, due to changing market conditions, and requires IRRBB to be quantitatively assessed in response to a specific crisis event. Since crisis reporting can be triggered anytime, the risk measures may need to be generated on an ad hoc basis, outside the recurring production cycles, to provide management with timely reports focused on the identified driver.

Internal Audit regularly assesses the design and operating effectiveness of our interest rate risk management processes and controls, according to the annual audit plan. Internal Audit is independent from the departments involved in the measurement and management of IRRBB and directly reports to the Group's Board of Directors.

Hedging

The Group assumes a conservative IRRBB risk strategy, which aims to keep a low exposure profile to economic value risks while maintaining high earnings' stability. This is achieved mainly by systematic hedging of issued debt and open interest rate risk arising from loans and deposit maturity mismatches in the private banking business.

The main instruments used for hedging are interest rate swaps. Most of these swaps qualify for hedge accounting treatment under US GAAP, which allows for the reduction of economic risks without increasing accounting volatility.

Key risk measures

We monitor the change in net interest income, also referred to as "delta net interest income (ΔNII)" on a monthly basis at both the Group and the divisional levels. This is performed by running internal interest rate stress test scenarios on a proprietary model, which follows the Group's business logic and the expected client behavior. The regulatory ΔNII uses the modelling and parameter assumptions summarized below.

From an economic value perspective, key risk measures are the ΔEVE, representing the change in economic value based on shocked interest rate curves, and the interest rate sensitivity of a one basis point parallel increase in yield curves (DV01). Both are available to management on a daily basis. For internal risk management purposes, we monitor a ΔEVE measure, which covers all banking book positions. For the regulatory ΔEVE measure, we exclude bonds issued as additional tier 1 capital; this is in line with FINMA guidance. Additional ΔEVE modelling and parameter assumptions are summarized below. The regulatory ΔEVE measure is used for both the IRRBB outlier test and for the Pillar 3 disclosures. We monitor this regulatory risk measure on a monthly basis.

Risk measure scenarios

The Group has implemented the FINMA-mandated scenarios on the regulatory ΔEVE and ΔNII risk measures. Beyond the regulatory scenarios, we have also defined a comprehensive set of internal stress test scenarios. The scenarios are reviewed periodically in terms of both scenario selection and calibration of the shocks applied, reflecting changes in macroeconomic conditions and specific interest rate environments.

Key modelling and parametric assumptions

The following list summarizes the key modelling and parameter assumptions used in the IRRBBA1 and IRRBB1 tables:

Regulatory ΔEVE:

- ΔEVE is measured by excluding client margins and applying risk-free discounting.
- Following the internal approach for ΔEVE, the aggregation logic for each of the six prescribed regulatory scenarios allows for diversification between the different currencies.
- Additional tier 1 capital is excluded from the regulatory ΔEVE measure.
- ΔEVE is calculated using a sensitivity-based approach.

Regulatory ΔNII:

- The regulatory constant balance sheet assumptions prescribe using both constant volumes and constant margins throughout the one-year horizon.
- Volumes are kept constant, both in balance sheet size and product composition.
- Margins are kept at a constant level for the new positions, in line with the maturing positions.
- In accordance with regulatory guidance, cash positions held at central banks are excluded.
- Under the regulatory banking book definition, the Group's banking book contains more liabilities than assets. This is mainly due to trading book assets, which are funded out of banking books. The funding costs out of the banking book are included, while trading book revenues are excluded from the reporting. As a result, the banking book ΔNII disclosed does not include a material source of income.
- ΔNII is measured including additional tier 1 capital instruments.
- As of the reporting date, there are no material exposures to customer loans with prepayment optionality.

Additional assumptions and internal approach:

- All the above-mentioned risk measures are generated based on granular position data and reflect the individual contractual details, while utilizing the latest available market data.
- The non-maturing deposits' average repricing maturity has been calculated based on the internal term-replication strategy.
- The regulatory ΔEVE disclosure results are higher than the internal ΔEVE. This is due to the previously noted exclusion of additional tier 1 capital instruments in the regulatory ΔEVE.
- The Group manages risks to NII considering internal models that differ from the regulatory ΔNII definition by including dynamic adjustments to client margins and volumes, benefits to or costs from holding cash at central banks and interest received from internal funding of assets by excess banking book liabilities. Under these assumptions, the NII results for the regulatory interest rate scenarios are more stable.

Quantitative disclosures

The following table presents the exposure's structure and repricing period.

IRRBBA1 – Quantitative information on the exposure's structure and repricing period

	Volume			Average repricing period (years)		Maximum repricing period for exposures with modelled (not determined) repricing date (years)	
end of 4Q19	**Total**	of which CHF	of which other significant currencies [1]	**Total**	of which CHF	**Total**	of which CHF
CHF million, except where indicated							
Definite repricing date							
Due from banks	95,956	2,998	91,830	0.1	0.0	–	–
Due from customers	140,127	21,606	104,548	0.4	0.9	–	–
Money market mortgages	41,321	41,321	0	0.2	0.2	–	–
Fixed-rate mortgages	92,474	92,474	0	4.6	4.6	–	–
Financial investments	3,168	143	2,105	0.4	0.1	–	–
Other receivables	21	0	21	0.0	0.0	–	–
Receivables from interest rate derivatives [2]	1,137,526	251,343	859,124	1.1	1.3	–	–
Due to banks	49,118	3,552	44,045	0.1	0.1	–	–
Customer deposits	107,512	6,121	85,317	0.1	0.2	–	–
Cash bonds	237	237	0	2.5	2.5	–	–
Bonds issues and central mortage institution loans	152,059	14,722	135,078	2.6	7.9	–	–
Other payables	35,938	1,189	34,555	0.2	0.3	–	–
Payables to interest rate derivatives [2]	1,133,394	322,442	786,733	0.9	1.1	–	–
Indefinite repricing date							
Variable mortgages	1,173	1,173	0	0.1	0.1	–	–
Other receivables on demand	2,635	757	1,878	0.1	0.1	–	–
Payables on demand from personal accounts and current accounts	161,512	93,065	66,201	1.5	2.1	–	–
Other payables on demand	0	0	0	0.1	0.1	–	–
Payables arising from client deposits, terminable but not transferable (savings)	38,874	38,874	0	2.9	2.9	–	–
Total	–	–	–	–	–	8.0	8.0

1 Reflects currencies which represent more than 10% of the assets or liabilities as well as JPY and GBP.

2 Receivables and liabilities from interest rate derivatives are shown gross, including intercompany transactions.

The following table presents information on the exposure's regulatory ΔEVE and regulatory ΔNII.

IRRBB1 – Quantitative information on the regulatory ΔEVE and regulatory ΔNII

		4Q19		2Q19
end of	ΔEVE [1]	ΔNII [2]	ΔEVE [1]	ΔNII [2]
Interest rate shock scenarios (CHF million)				
Parallel up	(1,629)	(3,506)	(1,199)	(2,595)
Parallel down	1,939	4,277	1,346	3,285
Steepener shock [3]	(129)	–	(195)	–
Flattener shock [4]	(260)	–	(92)	–
Rise in short-term interest rates	(953)	–	(609)	–
Fall in short-term interest rates	918	–	592	–
Maximum	**(1,629)**	**(3,506)**	**(1,199)**	**(2,595)**

1 Reflects changes in the net present value.
2 Reflects changes in the earnings value.
3 Reflects a fall in short-term interest rates combined with a rise in long-term interest rates.
4 Reflects a rise in short-term interest rates combined with a fall in long-term interest rates.

IRRBB1 – Tier 1 capital

end of	**4Q19**	2Q19
Tier 1 capital (CHF million)		
Swiss CET1 capital and additional tier 1 capital [1]	52,691	50,772

1 Excludes tier 1 capital, which is used to fulfill gone concern requirements.

The change in ΔEVE was due to DV01 exposure movements on our banking book positions in 2019. The main drivers are related to Swiss private banking activities and increased volumes in net interest income hedging activities. The latter is related to an alignment of the Group's capital hedging strategy in connection with the change in the calculation of the Group's RWA for operational risk. The calculation now uses US dollars instead of Swiss francs. The results are inflated due to the required exclusion of additional tier 1 bonds while the respective hedges have to be included in the ΔEVE. In 2019 additional tier 1 bonds issuances occurred.

Regarding ΔNII, changes are mainly driven by increased volume gap between assets and liabilities falling under the regulatory scope for the risk measure. The increase of the in-scope banking book liabilities was not fully offset by an equal increase of the in-scope banking book assets. This further increased the banking book liability excess, as trading book assets are funded out of banking books.

Additional regulatory disclosures

Composition of capital

Credit Suisse is a systemically important financial institution.

→ Refer to "Swiss capital requirements" (pages 4 to 5) for the systemically important financial institution view.

The following tables provide details on the composition of Swiss regulatory capital including common equity tier 1 (CET1) capital, additional tier 1 capital and tier 2 capital as if the Group was not a systemically important financial institution.

CC1 – Composition of regulatory capital

end of 4Q19		Amounts	Reference [1]
Swiss CET1 capital (CHF million)			
1	Directly issued qualifying common share (and equivalent for non-joint stock companies) capital plus related stock surplus	34,763	1
2	Retained earnings	30,597	2
3	Accumulated other comprehensive income (and other reserves) [2]	(21,717)	3
6	**CET1 capital before regulatory adjustments**	**43,643**	
8	Goodwill, net of tax	(4,848)	4
9	Other intangible assets (excluding mortgage servicing rights), net of tax	(38)	5
10	Deferred tax assets that rely on future profitability (excluding temporary differences), net of tax	(1,465)	6
11	Cash flow hedge reserve	(36)	
12	Shortfall of provisions to expected losses	(458)	
14	Gains/(losses) due to changes in own credit on fair-valued liabilities	2,911	
15	Defined-benefit pension assets	(2,263)	7
16	Investments in own shares	(426)	
21	Deferred tax assets arising from temporary differences (amount above 10% threshold, net of tax)	0	8
26b	National specific regulatory adjustments	(280)	
28	**Total regulatory adjustments to CET1 capital**	**(6,903)**	
29	**CET1 capital**	**36,740**	
30	Directly issued qualifying additional tier 1 instruments plus related stock surplus [3]	13,050	
32	of which classified as liabilities under applicable accounting standards	13,050	9
36	**Additional tier 1 capital before regulatory adjustments**	**13,050**	
37	Investments in own additional tier 1 instruments	(33)	
43	**Total regulatory adjustments to additional tier 1 capital**	**(33)**	
44	**Additional tier 1 capital**	**13,017**	
Swiss tier 1 capital (CHF million)			
45	**Tier 1 capital**	**49,757**	
Swiss tier 2 capital (CHF million)			
46	Directly issued qualifying tier 2 instruments plus related stock surplus [4]	2,934	10
47	Directly issued capital instruments subject to phase-out from tier 2 capital	314	11
58	**Tier 2 capital**	**3,248**	
Swiss eligible capital (CHF million)			
59	**Total eligible capital**	**53,005**	

1 Refer to the balance sheet under regulatory scope of consolidation in the table "CC2 – Reconciliation of regulatory capital to balance sheet". Only material items are referenced to the balance sheet.

2 Includes treasury shares.

3 Consists of high-trigger and low-trigger capital instruments. Of this amount, CHF 8.3 billion consists of capital instruments with a capital ratio write-down trigger of 7% and CHF 4.7 billion consists of capital instruments with a capital ratio write-down trigger of 5.125%.

4 Consists of low-trigger capital instruments with a capital ratio write-down trigger of 5%.

CC1 – Composition of regulatory capital (continued)

end of 4Q19		Amounts	Reference [1]
Swiss risk-weighted assets (CHF million)			
60	Risk-weighted assets	291,282	
Swiss risk-based capital ratios as a percentage of risk-weighted assets (%)			
61	CET1 capital ratio	12.6	
62	Tier 1 capital ratio	17.1	
63	Total capital ratio	18.2	
BIS CET1 buffer requirements (%) [2]			
64	Total BIS CET buffer requirement	3.604	
65	of which capital conservation buffer [3]	2.5	
66	of which extended countercyclical buffer	0.104	
67	of which progressive buffer for G-SIB and/or D-SIB [3]	1.0	
68	CET1 capital ratio available after meeting the bank's minimum capital requirements [4]	8.1	
Amounts below the thresholds for deduction (before risk weighting) (CHF million)			
72	Non-significant investments in the capital and other TLAC liabilities of other financial entities	3,429	
73	Significant investments in the common stock of financial entities	1,260	
74	Mortgage servicing rights, net of tax	211	
75	Deferred tax assets arising from temporary differences, net of tax	3,240	
Applicable caps on the inclusion of provisions in tier 2 (CHF million)			
77	Cap on inclusion of provisions in tier 2 under standardized approach	242	
79	Cap for inclusion of provisions in tier 2 under internal ratings-based approach	867	
Capital instruments subject to phase-out arrangements (CHF million)			
84	Current cap on tier 2 instruments subject to phase-out arrangements	314	

1 Refer to the balance sheet under regulatory scope of consolidation in the table "CC2 – Reconciliation of regulatory capital to balance sheet". Only material items are referenced to the balance sheet.
2 CET1 buffer requirements are based on BIS requirements as a percentage of Swiss risk-weighted assets.
3 Reflects the phase-in requirement.
4 Reflects the CET1 capital ratio of 12.6%, less the BIS minimum CET1 ratio requirement of 4.5%.

The following table presents the balance sheet as published in the consolidated financial statements of the Group and the balance sheet under the regulatory scope of consolidation.

→ Refer to "Linkages between financial statements and regulatory disclosures" (pages 8 to 11) for information on key differences between the accounting and the regulatory scope of consolidation.

CC2 – Reconciliation of regulatory capital to balance sheet

end of 4Q19	Financial statements	Regulatory scope of consolidation	Reference to composition of capital
Assets (CHF million)			
Cash and due from banks	101,879	101,487	
Interest-bearing deposits with banks	741	1,167	
Central bank funds sold, securities purchased under resale agreements and securities borrowing transactions	106,997	106,997	
Securities received as collateral, at fair value	40,219	40,219	
Trading assets, at fair value	153,797	147,302	
Investment securities	1,006	1,006	
Other investments	5,666	5,848	
Net loans	296,779	297,095	
Goodwill	4,663	4,668	4
Other intangible assets	291	291	
of which other intangible assets (excluding mortgage servicing rights)	47	47	5
Brokerage receivables	35,648	35,648	
Other assets	39,609	38,917	
of which deferred tax assets related to net operating losses	1,465	1,465	6
of which deferred tax assets from temporary differences	2,934	2,524	8
of which defined-benefit pension fund net assets	2,878	2,878	7
Total assets	**787,295**	**780,645**	
Liabilities and equity (CHF million)			
Due to banks	16,744	17,139	
Customer deposits	383,783	383,793	
Central bank funds purchased, securities sold under repurchase agreements and securities lending transactions	27,533	32,597	
Obligation to return securities received as collateral, at fair value	40,219	40,219	
Trading liabilities, at fair value	38,186	38,252	
Short-term borrowings	28,385	23,370	
Long-term debt	152,005	150,364	
Brokerage payables	25,683	25,683	
Other liabilities	31,043	25,402	
Total liabilities	**743,581**	**736,819**	
of which additional tier 1 instruments, fully eligible	14,046	13,017	9
of which tier 2 instruments, fully eligible	3,966	2,934	10
of which tier 2 instruments subject to phase-out	2,136	314	11
Common shares	102	102	1
Additional paid-in capital	34,661	34,661	1
Retained earnings	30,634	30,597	2
Treasury shares, at cost	(1,484)	(1,481)	3
Accumulated other comprehensive income/(loss)	(20,269)	(20,236)	3
Total shareholders' equity [1]	**43,644**	**43,643**	
Noncontrolling interests [2]	70	183	
Total equity	**43,714**	**43,826**	
Total liabilities and equity	**787,295**	**780,645**	

1 Eligible as CET1 capital, prior to regulatory adjustments.

2 The difference between the accounting and regulatory scope of consolidation primarily represents private equity and other fund type vehicles, which FINMA does not require to consolidate for capital adequacy reporting.

Composition of TLAC

The following table presents the composition of our TLAC.

TLAC1 – TLAC composition for G-SIBs

end of	4Q19
TLAC (CHF million)	
CET1 capital	36,740
Additional tier 1 instruments eligible under TLAC framework	15,951
Tier 2 capital before TLAC adjustments	314
TLAC adjustments	1,090
of which amortized portion of tier 2 instruments where remaining maturity > 1 year	1,090
Tier 2 instruments eligible under TLAC framework	1,404
TLAC arising from regulatory capital	**54,095**
External TLAC instruments issued directly by Credit Suisse Group AG and subordinated to excluded liabilities	20,268
External TLAC instruments issued by funding vehicles prior to January 1, 2022	22,007
TLAC arising from non-regulatory capital instruments before adjustments	**42,275**
TLAC before deductions	**96,370**
Deduction of investment in own other TLAC liabilities	34
Other adjustments to TLAC	5,069
TLAC	**91,267**
Risk-weighted assets and leverage exposure (CHF million)	
Swiss risk-weighted assets	291,282
Leverage exposure	909,994
TLAC ratios and buffers (%)	
TLAC ratio	31.3
TLAC leverage ratio	10.0
CET1 capital ratio available after meeting the resolution group's minimum capital and TLAC requirements	8.1
Institution-specific buffer requirement (capital conservation buffer plus countercyclical buffer requirements plus higher loss absorbency requirement, expressed as a percentage of risk-weighted assets)	3.604
of which capital conservation buffer requirement	2.5
of which bank specific countercyclical buffer requirement	0.104
of which higher loss absorbency requirement	1.0

The following table presents information regarding creditors rankings of the liabilities structure of the resolution entity.

TLAC3 – Resolution entity – Creditor ranking at legal entity level

	Creditor ranking			
end of 4Q19	Shareholders' equity	Subordinated debt instruments Additional tier 1	Bail-in debt instruments and pari passu liabilities [1]	**Total**
CHF million				
Total capital and liabilities net of credit risk mitigation	45,675	12,914	20,759	79,348
Excluded liabilities	–	–	442	442
Total capital and liabilities less excluded liabilities	45,675	12,914	20,317	78,906
of which potentially eligible as TLAC [2]	45,675	12,709	20,107	78,491
of which residual maturity between 2 to 5 years	–	–	6,809	6,809
of which residual maturity between 5 to 10 years	–	–	11,430	11,430
of which residual maturity greater than 10 years, excluding perpetual securities	–	–	1,868	1,868
of which perpetual securities	45,675	12,709	–	58,384

Presented for Credit Suisse Group AG at the legal entity level and therefore instruments issued by subsidiaries and special purpose entities are excluded. Credit Suisse substitutes Credit Suisse Group AG as issuer with another Credit Suisse entity for some TLAC instruments. Amounts are prepared in accordance with the provisions of the Swiss Law on Accounting and Financial Reporting (32nd title of the Swiss Code of Obligations).

1 Amount does not include CHF 5,515 million of intercompany liabilities, which are pari passu to the external bail-in debt instruments and are not considered to be excluded liabilities.

2 Accrued but not yet paid interest on TLAC instruments is not eligible as TLAC, however can be bailed in by FINMA.

Key prudential metrics

Most line items in the following table presents the view as if the Group was not a systemically important financial institution.

KM1 – Key metrics

end of	**4Q19**	3Q19	2Q19	1Q19	4Q18
Capital (CHF million)					
Swiss CET1 capital	36,740	37,331	36,240	36,422	35,719
Swiss tier 1 capital	49,757	50,812	47,243	46,897	45,935
Swiss total eligible capital	53,005	54,191	51,145	50,804	50,134
Minimum capital requirement (8% of Swiss risk-weighted assets) [1]	23,303	24,233	23,315	23,258	22,815
Risk-weighted assets (CHF million)					
Swiss risk-weighted assets	291,282	302,910	291,438	290,729	285,193
Risk-based capital ratios as a percentage of risk-weighted assets (%)					
Swiss CET1 capital ratio	12.6	12.3	12.4	12.5	12.5
Swiss tier 1 capital ratio	17.1	16.8	16.2	16.1	16.1
Swiss total capital ratio	18.2	17.9	17.5	17.5	17.6
BIS CET1 buffer requirements (%) [2]					
Capital conservation buffer	2.5	2.5	2.5	2.5	1.875
Extended countercyclical buffer	0.104	0.11	0.104	0.102	0.09
Progressive buffer for G-SIB and/or D-SIB	1.0	1.0	1.0	1.0	1.125
Total BIS CET1 buffer requirement	3.604	3.61	3.604	3.602	3.09
CET1 capital ratio available after meeting the bank's minimum capital requirements [3]	8.1	7.8	7.9	8.0	8.0
Basel III leverage ratio (CHF million)					
Leverage exposure	909,994	921,411	897,916	901,814	881,386
Basel III leverage ratio (%)	5.5	5.5	5.3	5.2	5.2
Liquidity coverage ratio (CHF million) [4]					
Numerator: total high-quality liquid assets	164,503	163,464	161,276	161,401	161,231
Denominator: net cash outflows	83,255	86,544	83,378	84,505	87,811
Liquidity coverage ratio (%)	198	189	193	191	184

The new current expected credit loss (CECL) model under US GAAP will become effective for Credit Suisse as of January 1, 2020.

1 Calculated as 8% of Swiss risk-weighted assets, based on total capital minimum requirements, excluding the BIS CET1 buffer requirements.

2 CET1 buffer requirements are based on BIS requirements as a percentage of Swiss risk-weighted assets.

3 Reflects the CET1 capital ratio of 12.6%, less the BIS minimum CET1 ratio requirement of 4.5%.

4 Calculated using a three-month average, which is calculated on a daily basis.

→ Refer to "Swiss capital requirements" (pages 4 to 5) for the systemically important financial institution view.

→ Refer to "Swiss metrics" (pages 128 to 129) and "Risk-weighted assets" (pages 127 to 129) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Capital management in the Credit Suisse Annual Report 2019 for further information on movements in capital, capital ratios, risk-weighted assets and leverage ratios.

→ Refer to "Liquidity coverage ratio" (pages 110 to 111) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Liquidity and funding management – Liquidity management in the Credit Suisse Annual Report 2019 for further information on movements in liquidity coverage ratio.

→ Refer to "Swiss requirements" (pages 117 to 119) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Capital management – Regulatory framework in the Credit Suisse Annual Report 2019 for further information on additional CET1 buffer requirements.

The following table presents information about available TLAC and TLAC requirements applied at the resolution group level, which is defined as Credit Suisse Group AG consolidated.

KM2 – Key metrics – TLAC requirements (at resolution group level)

end of	**4Q19**	3Q19	2Q19	1Q19
CHF million				
TLAC	91,267	95,666	87,747	86,900
Swiss risk-weighted assets	291,282	302,910	291,438	290,729
TLAC ratio (%)	31.3	31.6	30.1	29.9
Leverage exposure	909,994	921,411	897,916	901,814
TLAC leverage ratio (%)	10.0	10.4	9.8	9.6
Does the subordination exemption in the antepenultimate paragraph of Section 11 of the FSB TLAC Term Sheet apply?	No	No	No	No
Does the subordination exemption in the penultimate paragraph of Section 11 of the FSB TLAC Term Sheet apply?	No	No	No	No
If the capped subordination exemption applies, the amount of funding issued that ranks pari passu with Excluded Liabilities and that is recognized as external TLAC, divided by funding issued that ranks pari passu with Excluded Liabilities and that would be recognized as external TLAC if no cap was applied (%)	N/A – refer to our response above	N/A – refer to our response above	N/A – refer to our response above	N/A – refer to our response above

Macroprudential supervisor measures

The following table presents an overview of the geographical distribution of RWA for private sector credit exposures used in the calculation of the extended countercyclical buffer (CCyB).

CCyB1 – Geographical distribution of risk-weighted assets used in the CCyB

end of	CCyB rate (%)	RWA used in the computation of the CCyB	Bank-specific CCyB rate (%)	CCyB amount
4Q19 (CHF million)				
Hong Kong	2.000	3,616	–	–
Sweden	2.500	559	–	–
UK	1.0	10,064	–	–
France	0.250	2,261	–	–
Subtotal	–	**16,500**	–	–
Other countries	0.0	167,599	–	–
Total [1]	**–**	**184,099**	**0.104**	**305**
2Q19 (CHF million)				
Hong Kong	2.500	3,441	–	–
Sweden	2.000	440	–	–
UK	1.0	9,405	–	–
Subtotal	–	**13,286**	–	–
Other countries	0.0	168,146	–	–
Total [1]	**–**	**181,432**	**0.104**	**303**

1 Reflects the total of RWA for private sector credit exposures across all jurisdictions to which the Group is exposed, including jurisdictions with no CCyB rate or with a CCyB rate set at zero, and value of the Group specific CCyB rate and resulting CCyB amount.

Leverage metrics

Credit Suisse has adopted the BIS leverage ratio framework, as issued by the BCBS and implemented in Switzerland by FINMA.

→ Refer to "Leverage metrics" (page 127) and "Swiss metrics" (pages 128 to 129) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Capital management in the Credit Suisse Annual Report 2019 for further information on leverage metrics, including the calculation methodology and movements in leverage exposures.

LR1 – Summary comparison of accounting assets vs leverage ratio exposure

end of	4Q19
Reconciliation of consolidated assets to leverage exposure (CHF million)	
Total consolidated assets as per published financial statements	787,295
Adjustment for investments in banking, financial, insurance or commercial entities that are consolidated for accounting purposes but outside the scope of regulatory consolidation [1]	(14,146)
Adjustments for derivatives financial instruments	75,856
Adjustments for SFTs (i.e. repos and similar secured lending)	(29,580)
Adjustments for off-balance sheet items (i.e. conversion to credit equivalent amounts of off-balance sheet exposures)	90,569
Leverage exposure	**909,994**

1 Includes adjustments for investments in banking, financial, insurance or commercial entities that are consolidated for accounting purposes but outside the scope of regulatory consolidation and tier 1 capital deductions related to balance sheet assets.

LR2 – Leverage ratio common disclosure template

end of	4Q19
Reconciliation of consolidated assets to leverage exposure (CHF million)	
On-balance sheet items (excluding derivatives and SFTs, but including collateral)	597,549
Asset amounts deducted from Basel III tier 1 capital	(9,801)
Total on-balance sheet exposures	**587,748**
Reconciliation of consolidated assets to leverage exposure (CHF million)	
Replacement cost associated with all derivatives transactions (i.e. net of eligible cash variation margin)	23,226
Add-on amounts for PFE associated with all derivatives transactions	74,777
Gross-up for derivatives collateral provided where deducted from the balance sheet assets pursuant to the operative accounting framework	20,695
Deductions of receivables assets for cash variation margin provided in derivatives transactions	(19,705)
Exempted CCP leg of client-cleared trade exposures	(12,980)
Adjusted effective notional amount of all written credit derivatives	194,688
Adjusted effective notional offsets and add-on deductions for written credit derivatives	(186,933)
Derivative Exposures	**93,768**
Securities financing transaction exposures (CHF million)	
Gross SFT assets (with no recognition of netting), after adjusting for sale accounting transactions	138,627
Netted amounts of cash payables and cash receivables of gross SFT assets	(11,357)
Counterparty credit risk exposure for SFT assets	11,740
Agent transaction exposures	(1,101)
Securities financing transaction exposures	**137,909**
Other off-balance sheet exposures (CHF million)	
Off-balance sheet exposure at gross notional amount	282,196
Adjustments for conversion to credit equivalent amounts	(191,627)
Other off-balance sheet exposures	**90,569**
Swiss tier 1 capital (CHF million)	
Swiss tier 1 capital	**49,757**
Leverage exposure (CHF million)	
Leverage exposure	**909,994**
Leverage ratio (%)	
Basel III leverage ratio	**5.5**

Liquidity

Liquidity risk management framework

Our liquidity and funding policy is designed to ensure that funding is available to meet all obligations in times of stress, whether caused by market events or issues specific to Credit Suisse.

→ Refer to "Liquidity and funding management" (pages 108 to 115) in III – Treasury, Risk, Balance sheet and Off-balance sheet in the Credit Suisse Annual Report 2019 for further information on our liquidity risk management framework including governance, stress testing, liquidity metrics, funding sources and uses and contractual maturity of assets and liabilities.

Liquidity coverage ratio

Our calculation methodology for the liquidity coverage ratio (LCR) is prescribed by FINMA. For disclosure purposes our LCR is calculated using a three-month average which, is measured using daily calculations during the quarter.

→ Refer to "Liquidity metrics" (pages 110 to 111) and "Funding sources" (page 112) in III – Treasury, Risk, Balance sheet and Off-balance sheet – Liquidity and funding management in the Credit Suisse Annual Report 2019 for further information on the Group's liquidity coverage ratio including high-quality liquid assets, liquidity pool and funding sources.

LIQ1 – Liquidity coverage ratio

end of 4Q19	Unweighted value [1]	Weighted value [2]
High-quality liquid assets (CHF million)		
High-quality liquid assets [3]	**–**	**164,503**
Cash outflows (CHF million)		
Retail deposits and deposits from small business customers	162,941	20,519
of which less stable deposits	162,941	20,519
Unsecured wholesale funding	216,540	92,801
of which operational deposits (all counterparties) and deposits in networks of cooperative banks	37,655	9,414
of which non-operational deposits (all counterparties)	111,573	64,261
of which unsecured debt	19,088	19,088
Secured wholesale funding	–	49,456
Additional requirements	184,726	33,761
of which outflows related to derivative exposures and other collateral requirements	74,929	13,295
of which outflows related to loss of funding on debt products	807	807
of which credit and liquidity facilities	108,990	19,659
Other contractual funding obligations	58,909	58,909
Other contingent funding obligations	228,798	5,792
Total cash outflows	**–**	**261,238**
Cash inflows (CHF million)		
Secured lending	127,097	84,353
Inflows from fully performing exposures	69,239	32,567
Other cash inflows	61,063	61,063
Total cash inflows	**257,399**	**177,983**
Liquidity cover ratio (CHF million)		
High-quality liquid assets	–	164,503
Net cash outflows	–	83,255
Liquidity coverage ratio (%)	**–**	**198**

Calculated based on an average of 65 data points in 4Q19.

1 Calculated as outstanding balances maturing or callable within 30 days.

2 Calculated after the application of haircuts for high-quality liquid assets or inflow and outflow rates.

3 Consists of cash and eligible securities as prescribed by FINMA and reflects a post-cancellation view.

List of abbreviations

A	
ABS	Asset-backed securities
ACVA	Advanced credit valuation adjustment approach
A-IRB	Advanced-Internal Ratings-Based Approach
AMA	Advanced Measurement Approach
B	
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
C	
CAO	Capital Adequacy Ordinance
CARMC	Capital Allocation & Risk Management Committee
CCF	Credit Conversion Factor
CCO	Chief Credit Officer
CCP	Central counterparties
CCR	Counterparty credit risk
CCyB	Countercyclical buffer
CDO	Collateralized debt obligation
CDS	Credit default swap
CECL	Current expected credit loss
CET1	Common equity tier 1
CFO	Chief Financial Officer
CLO	Collateralized loan obligation
CMBS	Commercial mortgage-backed securities
CMSC	Credit Model Steering Committee
CRM	Credit Risk Mitigation
CRO	Chief Risk Officer
CVA	Credit valuation adjustment
D	
D-SIB	Domestic systemically important banks
E	
EAD	Exposure at default
ECAI	External credit assessment institutions
EEPE	Effective Expected Positive Exposure
EMIR	European Market Infrastructure Regulation
ERC	Economic Risk Capital
F	
FINMA	Swiss Financial Market Supervisory Authority FINMA
F-IRB	Foundation-Internal Ratings-Based Approach
FSB	Financial Stability Board
G	
GDP	Gross Domestic Product
G-SIB	Global systemically important banks
I	
IAA	Internal Assessment Approach
IMA	Internal Models Approach
IMM	Internal Models Method
IPRE	Income producing real estate
IRB	Internal Ratings-Based Approach
IRRBB	Interest rate risk in the banking book
IRC	Incremental Risk Charge
L	
LCR	Liquidity coverage ratio
LGD	Loss given default
LRD	Leverage ratio denominator
LTV	Loan-to-value
N	
NII	Net interest income
O	
OTC	Over-the-counter
P	
P&L	Profits and losses
PD	Probability of default
PFE	Potential future exposure
Q	
QCCP	Qualifying central counterparty
R	
RMBS	Residential mortgage-backed securities
RNIV	Risks not in value-at-risk
RPSC	Risk Processes & Standards Committee
RW	Risk weight
RWA	Risk-weighted assets
S	
SA	Standardized Approach
SA-CCR	Standardized Approach – counterparty credit risk
SEC-ERBA	Securitization External Ratings-Based Approach
SEC-IRBA	Securitization Internal Ratings-Based Approach
SEC-SA	Securitization Standardized Approach
SFT	Securities financing transactions
SMM	Standardized Measurement Method
SPE	Special purpose entity
T	
TLAC	Total loss-absorbing capacity
U	
US GAAP	Accounting principles generally accepted in the US
V	
VaR	Value-at-Risk
Δ	
ΔEVE	Delta economic value of equity
ΔNII	Delta net interest income

Cautionary statement regarding forward-looking information

This document contains statements that constitute forward-looking statements. In addition, in the future we, and others on our behalf, may make statements that constitute forward-looking statements. Such forward-looking statements may include, without limitation, statements relating to the following:

- our plans, targets or goals;
- our future economic performance or prospects;
- the potential effect on our future performance of certain contingencies; and
- assumptions underlying any such statements.

Words such as "believes," "anticipates," "expects," "intends" and "plans" and similar expressions are intended to identify forward-looking statements but are not the exclusive means of identifying such statements. We do not intend to update these forward-looking statements.

By their very nature, forward-looking statements involve inherent risks and uncertainties, both general and specific, and risks exist that predictions, forecasts, projections and other outcomes described or implied in forward-looking statements will not be achieved. We caution you that a number of important factors could cause results to differ materially from the plans, targets, goals, expectations, estimates and intentions expressed in such forward-looking statements. These factors include:

- the ability to maintain sufficient liquidity and access capital markets;
- market volatility and interest rate fluctuations and developments affecting interest rate levels, including the persistence of a low or negative interest rate environment;
- the strength of the global economy in general and the strength of the economies of the countries in which we conduct our operations, in particular the risk of continued slow economic recovery or downturn in the EU, the US or other developed countries or in emerging markets in 2020 and beyond;
- the emergence of widespread health emergencies, infectious diseases or pandemics, such as COVID-19;
- the direct and indirect impacts of deterioration or slow recovery in residential and commercial real estate markets;
- adverse rating actions by credit rating agencies in respect of us, sovereign issuers, structured credit products or other credit-related exposures;
- the ability to achieve our strategic goals, including those related to our targets, ambitions and financial goals;
- the ability of counterparties to meet their obligations to us and the adequacy of our allowance for credit losses;
- the effects of, and changes in, fiscal, monetary, exchange rate, trade and tax policies, as well as currency fluctuations;
- political, social and environmental developments, including war, civil unrest or terrorist activity and climate change;
- the ability to appropriately address social, environmental and sustainability concerns that may arise from our business activities;
- the effects of, and the uncertainty arising from, the UK's withdrawal from the EU;
- the possibility of foreign exchange controls, expropriation, nationalization or confiscation of assets in countries in which we conduct our operations;
- operational factors such as systems failure, human error, or the failure to implement procedures properly;
- the risk of cyber attacks, information or security breaches or technology failures on our business or operations;
- the adverse resolution of litigation, regulatory proceedings and other contingencies;
- actions taken by regulators with respect to our business and practices and possible resulting changes to our business organization, practices and policies in countries in which we conduct our operations;
- the effects of changes in laws, regulations or accounting or tax standards, policies or practices in countries in which we conduct our operations;
- the expected discontinuation of LIBOR and other interbank offered rates and the transition to alternative reference rates;
- the potential effects of changes in our legal entity structure;
- competition or changes in our competitive position in geographic and business areas in which we conduct our operations;
- the ability to retain and recruit qualified personnel;
- the ability to maintain our reputation and promote our brand;
- the ability to increase market share and control expenses;
- technological changes instituted by us, our counterparties or competitiors;
- the timely development and acceptance of our new products and services and the perceived overall value of these products and services by users;
- acquisitions, including the ability to integrate acquired businesses successfully, and divestitures, including the ability to sell non-core assets; and
- other unforeseen or unexpected events and our success at managing these and the risks involved in the foregoing.

We caution you that the foregoing list of important factors is not exclusive. When evaluating forward-looking statements, you should carefully consider the foregoing factors and other uncertainties and events, including the information set forth in "Risk factors" in I – Information on the company in our Annual Report 2019.

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