Genossenschaftliche FinanzGruppe
Volksbanken Raiffeisenbanken

December 31, 2018

Regulatory risk report of the DZ BANK banking group

DZ BANK Gruppe

Contents

1 Basis of regulatory risk reporting

1.1 Legal basis

The Basel Committee on Banking Supervision has created a global regulatory framework called Basel III setting out international standards for the capital adequacy and liquidity of banks. This framework was implemented into European law by Directive 2013/36/EU on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms (**Capital Requirements Directive IV, CRD IV**) and Regulation (EU) No. 575/2013 (**Capital Requirements Regulation, CRR**).

Articles 431 to 455 (Part 8) CRR define the quantitative and qualitative requirements in respect of regulatory disclosure. The **Guidelines on disclosure requirements under Part 8 of Regulation (EU) No. 575/2013 (EBA/GL/2016/11)** published by the European Banking Authority (EBA) dated August 7, 2017 and the **Guidelines on LCR disclosure to complement the disclosure of liquidity risk management under article 435 of Regulation (EU) No. 575/2013 (EBA/GL/2017/01)** dated June 21, 2017 apply, along with the CRR and various implementing and regulatory standards applicable to disclosure.

The guidelines set out the CRR disclosure requirements in more detail by providing specific requirements and formats, in particular by stipulating the tables and templates to be used. **Circular 05/2015 (BA)** from the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) [German Federal Financial Supervisory Authority] dated June 8, 2015 also continues to apply in relation to implementation of the EBA's guidelines on the disclosure of the materiality of information, proprietary and confidential information, and on disclosure frequency (EBA/GL/2014/14 dated December 23, 2014). The requirements regarding the frequency of disclosure have also been increased due to EBA/GL/2016/11.

As the parent company (EU parent institution) of the DZ BANK banking group (pursuant to section 10a (1) of the German Banking Act (KWG)), DZ BANK AG Deutsche Zentral-Genossenschaftsbank, Frankfurt am Main, (DZ BANK) has fulfilled its disclosure requirement (pursuant to article 436 (1) letter a CRR) at banking group level by publishing this consolidated **regulatory risk report** as at December 31, 2018.

This report focuses on the regulatory **requirements in the CRR regarding disclosure**, whereas the combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Group's Annual Report is oriented to international and national accounting law.

As well as information on **risk management** and the **scope of application**, this report, which is based on the DZ BANK banking group, contains disclosures on the following:

- **Liquidity coverage ratio** (LCR)
- **Own funds** and **capital requirements**
- **Credit risk**, including **counterparty credit risk**
- **Securitizations**
- **Market risk**
- **Operational risk** and **reputational risk**
- Macroprudential regulatory measures, such as the **countercyclical capital buffer** and the **indicators of global systemic importance**
- **Leverage ratio (LR)**
- **Asset encumbrance** (AE)
- **Remuneration policy.**

The **country-by-country reporting** information pursuant to the disclosure requirements defined in section 26a (1) sentence 2 et seq. KWG is not contained in this report. The country-by-country reporting is disclosed separately on DZ BANK's website in the Investor Relations section under Reports.

The **disclosure of the return on assets** required by section 26a (1) sentence 4 KWG can be found in the 2018 Annual Financial Statements and Management Report of DZ BANK AG in the management report, chapter II 'Business report', section 4 'Net assets' (page 24), while the disclosures required pursuant to **section 35 of the German Bank Recovery and Resolution Act (SAG)** are presented in section 3.1 (page 74) of the opportunity and risk report.

In line with article 434 CRR, DZ BANK publishes the regulatory risk report on its website in the Investor Relations section under Reports and under Bondholder Information.

Fig. 1 shows the different sources to which reference is made in this regulatory risk report and where they are published.

FIG. 1 – REFERENCES IN THE REGULATORY RISK REPORT TO OTHER SOURCES

Source	Publication medium
DZ BANK Annual Report	https://www.dzbank.de/content/dzbank_de/de/home/unser_profil/investorrelations/berichte/2018.html
Annual Financial Statements and Management Report of DZ BANK AG	
Country-by-country reporting	
Results of the collection of data to identify global systemically important institutions	
Regulatory risk report, including the capital instruments annex	
Remuneration policy disclosures	
Full contractual terms and conditions for capital instruments, pursuant to article 437 (1) letter c CRR	https://www.dzbank.de/content/dzbank_de/de/home/unser_profil/investorrelations/info_fuer_fremdkapitalgeber/kapitalinstrumente.disclaimer.disclaimer_kapitalinstrumente.html

There is no statutory requirement for the regulatory risk report to contain an independent auditor's report, so no such report is included.

1.2 Implementation in the DZ BANK banking group

This regulatory risk report comprehensively describes the risk profile of the DZ BANK banking group as at the reporting date by fulfilling all CRR disclosure requirements relevant to the banking group, while taking account of the principle of materiality pursuant to article 432 (1) CRR. The exemptions pursuant to article 432 (1) CRR are not used.

The DZ BANK banking group makes use of the option to refer to other reports. This report contains the information required by the CRR, provided it has not already been published in other media. Where this is the case, the regulatory risk report makes reference to those sources.

The basis for regulatory risk reporting is the **disclosure policy** approved by the Board of Managing Directors. This policy sets out the principles and fundamental decisions for the methods, organizational structure, and IT systems to be used for disclosure in the DZ BANK banking group. The disclosure policy also governs the integration of risk disclosure into general financial disclosure and provides the link to internal risk reporting. By adopting the policy, the Board of Managing Directors also established the key elements of the risk-related disclosure procedures and communicated them throughout the DZ BANK banking group. With this policy, DZ BANK has therefore implemented a formal process in which the operational steps – from preparing the report to obtaining the adoption of a resolution by the Board of Managing Directors and publishing the report – are defined, along with the required controls. This process also sets out all roles and responsibilities. The policy is audited regularly to assess whether it remains appropriate and is amended in line with changes to internal and external circumstances, thereby complying with the requirements of article 431 (3) CRR.

The requirements regarding the **adequacy declarations** to be made by the Board of Managing Directors pursuant to article 435 (1) letter e CRR are met in the opportunity and risk report, section 2.1.1 'Adequacy declaration' (page 41). The whole of section 2 (pages 67 to 71) of the opportunity and risk report forms the **risk statement** by the Board of Managing Directors specified in article 435 (1) letter f CRR. The accuracy of these declarations and statements are confirmed in the DZ BANK 2018 Annual Report by means of the signatures of the Board of Managing Directors in the 'Responsibility statement' section (page 396).

Section 2 (pages 16 to 20) on the management of the DZ BANK Group in the 'DZ BANK Group fundamentals' chapter of DZ BANK's 2018 Annual Report, in conjunction with sections 3.4 to 5 (pages 75 to 81) of the opportunity and risk report, describes the **information flow** within the DZ BANK banking group to the management body pursuant to article 435 (2) letters d and e CRR and section 26a KWG.

The **frequency** and **scope** (article 433 CRR) of the regulatory risk report are determined by the indicators regarding frequency of disclosure that are listed in Title V of EBA/GL/2016/11. These assessment criteria include not only DZ BANK's classification as an other systemically important institution (O-SII) but also the DZ BANK Group's total assets and the consolidated exposures pursuant to article 429 CRR. As at the reporting date, DZ BANK was one of the three largest banks in Germany. The assessment found that the DZ BANK banking group was again obliged in 2018 to publish certain information in an interim report.

To ensure the necessary transparency for market participants, **comparative figures** as at previous reporting dates or relating to a previous period are disclosed in accordance with the requirements in EBA/GL/2016/11. Any significant changes – particularly to quantitative disclosures – between the reporting periods are explained.

Unless otherwise indicated, all information in this report relates to the entities consolidated for regulatory purposes in the **DZ BANK banking group** as at the reporting date pursuant to article 10a KWG in conjunction with articles 11 to 22 CRR.

Significant subsidiaries and those of material significance for their local market are required to disclose information on own funds, capital requirements, the capital buffer, credit risk adjustments, the remuneration policy, leverage, and the use of methods to mitigate credit risk on either an individual or a sub-consolidated basis in accordance with article 13 (1) CRR. To identify and categorize subsidiaries as material, DZ BANK applies the materiality criteria to those subsidiaries classified as a credit institution or investment firm under the CRR that are significant for internal management purposes. On this basis, the subsidiaries listed in section 3.1 of this report are included as significant subsidiaries in the risk inventory. The subsidiaries must comply with the requirements in **article 13 CRR** unless they are covered by the **waiver** pursuant to article 7 CRR. The disclosures required for these subsidiaries on the basis of article 13 CRR can be found in the regulatory risk reports on the websites of the subsidiaries in question. The additional disclosure requirements for significant subsidiaries pursuant to article 13 (1) CRR are presented in section 5.2.4 of this report.

To calculate the **regulatory capital requirements** pursuant to the CRR, the DZ BANK banking group mainly applies the foundation internal ratings-based approach (IRB approach or IRBA) for credit risk.

The regulatory credit risk measurement methods used by DVB Bank SE, Frankfurt am Main, (DVB Bank; subgroup abbreviated to DVB) are based on the advanced IRB approach.
The IRB approach is used to calculate the credit risk of the retail businesses of Bausparkasse Schwäbisch Hall AG, Schwäbisch Hall, (Bausparkasse Schwäbisch Hall; subgroup abbreviated to BSH), DZ HYP AG, Hamburg, (DZ HYP), and TeamBank AG Nürnberg, Nuremberg, (TeamBank), although the probability of default (PD) and the loss given default (LGD) are based on internal accounting estimates.

Capital requirements for market risk are predominantly measured using internal calculation models and, to a minor extent, the regulatory Standardized Approaches. The Standardized Approach is used at the DZ BANK banking group level to determine operational risk in accordance with regulatory requirements, while the individual institutions are responsible for their own calculations and reporting (as a rule the Standardized Approach, although the Basic Indicator Approach is possible in exceptional cases) in accordance with article 315 et seq. CRR.

Significant components of the **qualitative regulatory risk reporting** requirements are covered in the opportunity and risk report. The DZ BANK banking group predominantly utilizes the option available under article 434 (1) CRR to make reference to the opportunity and risk report for the qualitative disclosures. The section references for each topic are included in this report.

Disclosures that are solely of relevance for regulatory purposes are published in the regulatory risk report. This also applies to information that is fundamentally integral to the internal risk management system but, because of the detailed level of disclosure required, is not included in the opportunity and risk report so as not to impair the report's usefulness in the decision-making process. In particular, this concerns the detailed information on the internal rating systems and the disclosures about the risk models approved by the European Central Bank (ECB) for calculating the regulatory capital requirements for general and specific market risk. The same applies to the accounting-related disclosures on long-term equity investments and securitizations, which are also included in this regulatory risk report. As in the procedure adopted for qualitative disclosures, however, the quantitative disclosures required in regulatory risk reporting, which are derived from the internal risk management system, are included in the opportunity and risk report rather than in the regulatory risk report.

The quantitative disclosures in this risk report are rounded to the nearest whole million euros. This may give rise to small discrepancies between the totals shown in the tables and diagrams and totals calculated from the individual values shown. Table cells with a dark gray background are not relevant for disclosure purposes. The symbol – is used to indicate that a line item in a table has no value. If a line item (after rounding) amounts to less than €1 million, a value of 0 is disclosed.

In its Pillar 3 reporting, DZ BANK aims to ensure the **consistency and comparability of disclosures** over time at the level of the DZ BANK banking group and to contribute to consistency and comparability across the industry. The quantitative disclosures in this report are therefore based, in particular, on the requirements in EBA/GL/2016/11. Some of them are still based on the table formats (referred to as 'use cases') recommended by the specialist disclosure subcommittee (as at September 2012) and the applicable (EU) implementing regulations in order to fully comply with the disclosure requirements of Part 8 CRR.

In general, all disclosure requirements pursuant to Part 8 of the CRR are met. The following requirements are currently **not relevant** to the DZ BANK banking group, and the corresponding data has therefore not been included in this regulatory risk report:

- Disclosure of the alpha factor pursuant to article 439 sentence 1 letter i CRR is not necessary since no internal DZ BANK banking group models approved by the supervisory authority were used in 2018 to calculate capital requirements for derivative counterparty risk exposure.

- The same applies to securitizations under the early amortization approach pursuant to article 449 sentence 1 letter n (iv) CRR. Such securitizations were not carried out by entities in the DZ BANK banking group during the reporting year, nor are they part of any existing business.

- In the case of risk in connection with fair value changes in the correlation trading portfolio (CTP, article 455 sentence 1 letter a (ii) CRR), no internal model approved by the supervisory authority is currently available, so the capital requirements for these exposures are calculated using the Standardized Approach.

- An RWA flow statement for counterparty credit risk under the internal model method (IMM) (table EU CCR7) is not included, as DZ BANK does not have an IMM for this risk.

- As the banking group's operational risks are calculated in accordance with the Standardized Approach, there are no disclosures about the use of Advanced Measurement Approaches for operational risk (article 454 CRR).

- International Financial Reporting Standard 9 (IFRS 9) came into effect on January 1, 2018. The DZ BANK banking group is not currently using the regulatory transitional provisions for the effects of initial application of IFRS 9 in accordance with article 473a CRR.

1.3 Risks covered in the regulatory risk report

The regulatory risk report includes the **subsidiaries** that must be consolidated as part of the DZ BANK banking group for regulatory purposes in accordance with article 4 (1) no. 16 CRR and section 10a (4) and (5) KWG. Further risks arising at subsidiaries that are not consolidated for regulatory purposes are disclosed in the opportunity and risk report at the DZ BANK Group level.

Regulatory capital requirements mainly relate to the following **risk types**: credit risk (including equity investment risk), market risk, and operational risk. In addition to these risk types, the technical risk of a home savings and loan company, actuarial risk, and business risk are also backed by economic risk capital as part of the internal economic capital management process (Pillar 2). Market risk disclosed for regulatory purposes corresponds to the market risk disclosed in accordance with Pillar 2. Liquidity risk is also taken into account in a separate liquidity-related analysis of risk-bearing capacity.

There are also **differences between economic and regulatory risk coverage**, in particular:

- When the **regulatory capital requirements** and the related disclosures **are being determined**, risk-bearing exposures are treated differently in terms of quantification of their risk depending on whether they are allocated to the trading book or banking book. For example, on-balance-sheet and off-balance-sheet exposures in the banking book and counterparty risk arising from derivatives exposure in the banking book and trading book are classified under credit risk. The issuer-related exposures in the trading book are treated as market risk exposures and are therefore backed with regulatory own funds, whereas they are treated as issuer risks and classified under credit risk for internal management purposes.

- As a result of this approach, the **credit risk exposures** presented in this risk report are based on regulatory bases of assessment and therefore differ from the lending volume presented in the opportunity and risk report, which is based on figures in the internal management accounts.

- Furthermore, **equity investment risk** is recognized as a separate type of risk in the internal management accounts. Credit risk and equity investment risk are determined in the internal management accounts using their own portfolio models.

- The **market risk** disclosed using the methods in Pillar 1 essentially corresponds to the market risk managed on the basis of the rules of Pillar 2. In the context of the economic management of market risk, interest-rate risk also includes interest-rate risk in the banking book for which no backing with own funds is required for regulatory purposes under Pillar 1.

- In the DZ BANK banking group, the Standardized Approach was used as at December 31, 2018 to calculate the regulatory own funds (as described in section 1.2 above) for operational risk in accordance with article 317 et seq. CRR. In respect of the economic capital requirements, however, a statistical model is used for the management units (see section I.1 of the group management report, page 10) that satisfies the criteria for an Advanced Measurement Approach (AMA). The results from this portfolio model, combined with the materiality limits for collation of loss data, scenario-based risk self-assessments, and risk indicators, are used to manage operational risk.

1.4 Developments in relation to transparency rules in banking regulation

In December 2018, the Basel Committee on Banking Supervision (BCBS) finalized the revision of the Pillar 3 banking supervision disclosure requirements at international level when it published BCBS 455 'Pillar 3 disclosure requirements – updated framework', following on from the publications in January 2015 and March 2017. The revised framework reflects the additional disclosure requirements resulting from the finalization of

Basel III. These include the new disclosure requirements relating to credit risk, operational risk, the leverage ratio, credit valuation adjustments (CVAs) for exposures, and overview templates for risk management, risk-weighted assets, and regulatory key figures. There are also new disclosure requirements regarding asset encumbrance and capital distribution constraints. Initial application of the requirements relating to those in Basel III is expected to coincide with the introduction of CRR II, which is likely to come into force in January 2022 at the earliest. Application of the requirements regarding asset encumbrance, capital distribution constraints, and regulatory treatment of problem assets has been postponed until the end of 2020 on the basis of the feedback from the banking sector obtained during the consultation phase.

2 Risk management, objectives, and rules

2.1 Risk management objectives and policies

(ARTICLE 435 (1) CRR)

The principles and objectives of risk management and the methods used to manage risk are covered in the qualitative reporting, which – as stated in section 1.2 of this report – is based on the information in the opportunity and risk report. The governance structure of risk management in the DZ BANK Group is presented as a schematic diagram in figure 9 (page 77) in the opportunity and risk report. Supplementary disclosures relating to the DZ BANK Group and its management are described in chapter I 'DZ BANK Group fundamentals' (pages 10 to 20) in the group management report. The information required according to article 435 (2) CRR that is not presented in DZ BANK's 2018 Annual Report is set out in the following sections of this regulatory risk report.

FIG. 2 – DISCLOSURES IN THE REGULATORY RISK REPORT RELATING TO ARTICLE 435 (1) CRR

Article	Subject	Opportunity and risk report	
		Section	Page
Article 435 sentence 1 CRR	**Risk management objectives and policies** for each individual risk category	3.1	71
Article 435 sentence 1 letter a CRR	**Strategies and processes** for the management of risk	3.3 and 3.4	75 to 76
Article 435 sentence 1 letter b CRR	**Description of the structure and organization of the risk management function**, including **information on its authority and status or other appropriate arrangements**	3.5	76 to 81
Article 435 sentence 1 letter c CRR	**Scope and nature of risk measurement systems**	3.5 and 3.6	76 to 86
Article 435 sentence 1 letter d CRR	**Guidelines for mitigating and hedging risk as well as strategies and procedures for monitoring the ongoing effectiveness of the measures taken to mitigate and hedge risk**	3.6.5, 6.2.4, 8.4.8, 10.4.4, 14.4.4, 16.4, 17.2.2, 18.2.2, and 19.2	85 to 86, 96 to 97, 116 to 117, 134, 143, 153 to 154, 157 to 158, 163 to 164, and 164 to 165
Article 435 sentence 1 letter e CRR	**Adequacy declarations to be made by the Board of Managing Directors**	2.1.1	67
Article 435 sentence 1 letter f CRR	**Risk statement to be made by the Board of Managing Directors**	2.1.2	67 to 69

For the definitions of the individual risks, please see the relevant sections of the opportunity and risk report.

The **declaration on the appropriateness of the risk management agreements** pursuant to article 435 (1) letter f CRR, which the Board of Managing Directors is required to submit, confirms that the risk management systems in place are appropriate to the profile and strategy. This declaration can be found in section 3.6.7 (page 86) of the opportunity and risk report. Furthermore, sections 2 and 2.1.2 (page 67) contain the **concise risk declaration statement** approved by the Board of Managing Directors, which contains a description of the DZ BANK Group's **general risk profile associated with the business strategy** and significant key figures that ensure the Group has an **overview of the interaction between the risk profile and risk tolerance**.

2.2 Corporate governance arrangements

2.2.1 Number of executive or supervisory directorships held by members of the management body

(ARTICLE 435 (2) LETTERS A AND B CRR)

Fig. 3 to Fig. 6 provide an overview of the number of executive or supervisory directorships held by members of the Board of Managing Directors and Supervisory Board, counted in accordance with article 91 (3) and (4) CRD IV.

FIG. 3 – NUMBER OF EXECUTIVE OR SUPERVISORY DIRECTORSHIPS HELD BY MEMBERS OF THE BOARD OF MANAGING DIRECTORS AND SUPERVISORY BOARD

	Number of executive directorships		Number of supervisory directorships	
	Dec. 31, 2018[1]	Dec. 31, 2017	Dec. 31, 2018[1]	Dec. 31, 2017
Wolfgang Kirsch, Chief Executive Officer (until December 31, 2018)	1	1	2	4
Uwe Berghaus	1	1	2	1
Dr. Christian Brauckmann	1	1	2	5
Ulrike Brouzi (from September 1, 2018)	1	-	1	-
Wolfgang Köhler	1	1	2	3
Dr. Cornelius Riese	1	1	1	5
Michael Speth	1	1	2	9
Thomas Ullrich	1	1	2	4
Stefan Zeidler (until March 31, 2018)	-	1	-	3

1 Disclosure of directorships pursuant to article 91 (3) and (4) of Directive 2013/36/EU.

FIG. 4 – NUMBER OF EXECUTIVE OR SUPERVISORY DIRECTORSHIPS HELD BY MEMBERS OF THE BOARD OF MANAGING DIRECTORS AND SUPERVISORY BOARD

	Number of executive directorships	Number of supervisory directorships
	2019[1]	
Uwe Fröhlich Co-Chief Executive Officer (from January 1, 2019)	1	1
Dr. Cornelius Riese Co-Chief Executive Officer (from January 1, 2019)	1	1
Uwe Berghaus	1	2
Dr. Christian Brauckmann	1	2
Ulrike Brouzi	1	2
Wolfgang Köhler	1	2
Michael Speth	1	2
Thomas Ullrich	1	2

1 Disclosure of directorships pursuant to article 91 (3) and (4) of Directive 2013/36/EU.

FIG. 5– NUMBER OF EXECUTIVE OR SUPERVISORY DIRECTORSHIPS HELD BY GENERAL EXECUTIVE MANAGERS

	Number of executive directorships		Number of supervisory directorships	
	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017
Uwe Fröhlich (until December 31, 2018)	1	1	3	3

FIG. 6 – NUMBER[1] OF EXECUTIVE OR SUPERVISORY DIRECTORSHIPS HELD BY MEMBERS OF THE SUPERVISORY BOARD

	Number of executive directorships		Number of supervisory directorships	
	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017
Henning Deneke-Jöhrens[2]	1	1	1	1
Helmut Gottschalk[3]	-	-	1	1
Heiner Beckmann	-	-	1	1
Ulrich Birkenstock	-	-	1	1
Werner Böhnke[4]	-	-	-	1
Hermann Buerstedde	1	1	1	1
Martin Eul	1	1	1	1
Uwe Goldstein	1	1	1	1
Timm Häberle[5]	1	-	1	-
Dr. Peter Hanker	1	1	1	1
Marija Kolak	-	-	3	-

	Number of executive directorships		Number of supervisory directorships	
	Dec. 31, 2018	Dec. 31, 2017	**Dec. 31, 2018**	Dec. 31, 2017
Andrea Hartmann	-	-	1	1
Pilar Herrero Lerma	-	-	1	1
Dr. Dierk Hirschel	-	-	2	2
Renate Mack	-	-	1	1
Rainer Mangels	-	-	1	1
Stephan Schack	1	1	1	1
Gregor Scheller	1	1	1	1
Uwe Spitzbarth	-	-	2	2
Sigrid Stenzel	-	-	1	2
Ingo Stockhausen[5]	1	-	1	-
Dr. Wolfgang Thomasberger	1	1	1	1

1 As a significant institution, DZ BANK calculated the number of executive or supervisory directorships held by members of the Supervisory Board in 2017 and 2018 in accordance with clause 57 sentences 1 and 2 of EBA/GL/2016/11 in conjunction with article 91 (3) and (4) of Directive 2013/36/EU.
2 Chairman of the Supervisory Board since May 30, 2018.
3 Chairman/member of the Supervisory Board until May 30, 2018.
4 Deputy Chairman/member of the Supervisory Board until May 30, 2018.
5 Member of the Supervisory Board since May 30, 2018.

2.2.2 Recruitment policy for the selection of members of the management body and their actual knowledge, skills and expertise

(ARTICLE 435 (2) LETTER B CRR)

2.2.2.1 Supervisory Board

The Articles of Association of DZ BANK state that the Supervisory Board consists of 20 members, 9 of whom are elected by the Annual General Meeting and 10 of whom are elected by employees pursuant to the provisions of the 1976 German Codetermination Act (MitbestG). The Bundesverband der Deutschen Volksbanken und Raiffeisenbanken e. V., Berlin, (BVR) [National Association of German Cooperative Banks], has the right to delegate one member of its Board of Managing Directors to the Supervisory Board. Only members of the managing body of a cooperative enterprise that is a shareholder of DZ BANK may be elected as shareholder representatives on the Supervisory Board. The term of appointment of a Supervisory Board member is terminated prematurely

a) at the end of the next ordinary Annual General Meeting if the member no longer meets the above requirements, or
b) at the end of the ordinary Annual General Meeting in the calendar year in which the member reaches the age of 67.

In accordance with section 25d (11) sentence 2 no. 1 KWG, the Supervisory Board has adopted a process for preparing nominations for the election of members of the DZ BANK Supervisory Board that includes job descriptions and candidate profiles. This process is regularly put into practice when new Supervisory Board members are nominated.

In accordance with section 25d (11) sentence 2 nos. 3 and 4 KWG, a process has also been implemented by the Supervisory Board for regularly evaluating the Supervisory Board and its members. The self-evaluation conducted by the Supervisory Board in February 2019 found that the structure, size, composition, and performance of the Supervisory Board and the knowledge, skills, and experience of the individual Supervisory Board members and the Supervisory Board as a whole fulfilled the requirements laid down by law and in the Articles of Association. The Supervisory Board therefore confirmed the individual suitability of the individual members of the Supervisory Board and the collective suitability of the Supervisory Board as a whole. The Supervisory Board also signed off the profile of skills and expertise for the Supervisory Board.

Regardless of the period of time that they have been board members, DZ BANK also offers members of the Supervisory Board various training courses. These include internal training courses and a modular training program that is run by an external provider and tailored specifically to the needs of members of supervisory boards. The modular concept enables each member of the Supervisory Board to construct a program based on his or her own training needs that consists of various basic or specialist seminars relating to the work of a supervisory board. DZ BANK provides the necessary financial resources.

2.2.2.2 Board of Managing Directors

The Articles of Association of DZ BANK state that the Board of Managing Directors consists of at least 3 members. The number of members is determined by the Supervisory Board, which also appoints and removes members. The Supervisory Board can appoint up to 2 Chief Executive Officers and a Deputy Chief Executive Officer. As at the reporting date, the Board of Managing Directors of DZ BANK consisted of 8 full members of the Board of Managing Directors including one Chief Executive Officer. Detailed career histories of the members of the Board of Managing Directors are presented on the DZ BANK website.

Only persons who have the professional qualifications specified in section 25c KWG and comply with other regulatory and stock corporation law requirements can be appointed to the Board of Managing Directors. In accordance with the rules of procedure for the Supervisory Board, the Nominations Committee assists the Supervisory Board in determining suitable candidates for appointment to the Board of Managing Directors. For this purpose, the Supervisory Board has approved principles for the selection and appointment of managing directors, including job descriptions and candidate profiles as required by section 25d (11) nos. 1 and 2 KWG. When selecting suitable candidates, the Nominations Committee takes into account the balance and diversity of the knowledge, skills, and experience of all the members of the Board of Managing Directors.

In accordance with section 25d (11) sentence 2 nos. 3 and 4 KWG, a process has also been implemented for regularly evaluating the Board of Managing Directors as a whole. The evaluation conducted by the Supervisory Board in February 2019 found that the structure, size, composition, and performance of the Board of Managing Directors, and the knowledge, skills, and experience of the individual members and the Board of Managing Directors as a whole fulfilled the requirements laid down by law and in the Articles of Association. The Supervisory Board therefore confirmed the individual suitability of the individual members of the Board of Managing Directors and the collective suitability of the Board of Managing Directors as a whole. The Supervisory Board also signed off the profile of skills and expertise for the Board of Managing Directors.

Regardless of the period of time that they have been board members, DZ BANK also offers members of the Board of Managing Directors various training courses. For example, they can undertake training through DZ BANK's Corporate Campus for Management & Strategy. This is an interactive platform with the objective of facilitating the development of new perspectives and ideas at top-management level, thereby reinforcing the sustainability of the DZ BANK Group and the Volksbanken Raiffeisenbanken cooperative financial network.

2.2.3 Diversity policy for selecting members of the management body, its objectives, relevant targets and achievement of targets

(ARTICLE 435 (2) LETTER C CRR)

2.2.3.1 Supervisory Board

In accordance with section 25d (11) sentence 2 no. 2 KWG, the Supervisory Board has adopted a strategy aimed at promoting the nomination of women, who are currently under-represented on the DZ BANK Supervisory Board. In a resolution passed on November 29, 2018, the Supervisory Board modified this strategy and reset the target. Under this strategy, the Supervisory Board's objective is, by 2023, to stabilize the proportion of female members (who are currently under-represented) at the current level as a minimum (on the date of the adopted resolution and as at December 31, 2018: 5 members or 25 percent). This quota was met throughout 2018.

2.2.3.2 Board of Managing Directors

In a resolution passed on November 29, 2018, the Supervisory Board set a target of 12.5 percent for the proportion of women (who are currently under-represented) on the Board of Managing Directors of DZ BANK for the period up to October 31, 2023.

2.3 Disclosures regarding the formation of a risk committee and the number of times it has met

(ARTICLE 435 (2) LETTER D CRR)

The disclosures required pursuant to article 435 (2) letter d CRR are published in the 'Report of the Supervisory Board' (pages 409 to 414) in the 2018 Annual Report.

2.4 Information flow to the Supervisory Board

(ARTICLE 435 (2) LETTER E CRR)

The disclosures required pursuant to article 435 (2) letter e CRR are published in the 'Report of the Supervisory Board' (pages 409 to 414) in the 2018 Annual Report.

3 Scope of application

In the reporting, a disclosure is material if its omission or misstatement could change or influence the assessment or decision of a user who is relying on this disclosure to make economic decisions (use test).

The use test for regulatory risk reporting is enshrined in article 432 CRR, which sets out the information that does not have to be disclosed if it is not regarded as material pursuant to article 432 (1) CRR. However, this explicitly does not apply to the disclosures required pursuant to article 435 (2) letter c (diversity policy for members of the management body), article 437 (own funds), and article 450 (remuneration policy) CRR and the disclosures required pursuant to Part 8 Title III CRR that are not at the discretion of the individual institution. The disclosures in this risk report relate to all entities that are consolidated for regulatory purposes pursuant to article 432 (1) CRR. All entities consolidated for regulatory purposes are included in these disclosures to ensure that the key regulatory figures are consistent with the figures reported. The quantitative information presented (apart from the exceptions referred to above) relates to the significant entities in the DZ BANK banking group. The terms DZ BANK Group and DZ BANK financial conglomerate are synonymous and refer to all the management units together. The context dictates the choice of term. For example, in the case of disclosures relating to economic management, the focus is on the DZ BANK Group, whereas in the case of regulatory issues relating to all the management units in the DZ BANK Group, the appropriate term is DZ BANK financial conglomerate.

The DZ BANK financial conglomerate largely comprises the DZ BANK banking group and R+V. DZ BANK acts as the financial conglomerate's parent company.

As part of the DZ BANK financial conglomerate, the DZ BANK banking group and R+V are subject to the provisions of the German Supervision of Financial Conglomerates Act (FKAG). In conjunction with article 49 (1) CRR on the requirements for waiving capital deductions for long-term equity investments in insurance companies and the regulatory technical standards for the application of the calculation methods of capital adequacy requirements for financial conglomerates (Delegated Regulation (EU) No. 342/2014 dated January 21, 2014) published in April 2014, the FKAG governs the capital adequacy requirements for the DZ BANK financial conglomerate. The additional regulation of financial conglomerates applies to groups of financial institutions that operate to a large degree across both the banking and the insurance sectors and includes requirements for capital adequacy, for recording and monitoring material risk concentrations and transactions within the conglomerate, and for cross-sectoral risk management. In this regard, it has to meet the relevant requirements with respect to **financial conglomerates' solvency** and the establishment of an overarching risk management structure.

All entities in the financial conglomerate are integrated into the central risk management system and are included in the report, subject to the principle of materiality pursuant to article 432 (1) CRR. Materiality is determined on the basis of a concept that is also relevant to opportunity and risk reporting pursuant to commercial law. The concept takes into account the usefulness of disclosures in the decision-making process and the economic viability of preparing reports. It is based on risk management procedures that meet the requirement for a groupwide risk monitoring system as specified in section 91 (2) of the German Stock Corporation Act (AktG) and section 25a (1) KWG.

3.1 Differences between the scope of consolidation for accounting purposes and the scope of consolidation for regulatory purposes

(ARTICLE 436 SENTENCE 1 LETTER B CRR)

The entities in which DZ BANK has a direct or indirect long-term equity investment are aggregated and consolidated both for financial reporting purposes and in order to satisfy regulatory requirements. The commercial-law provisions to be applied for consolidation in accordance with IFRS differ in some regards from the provisions applicable to consolidation for regulatory purposes, in terms of both the consolidation methods used and the entities to be included. The consolidation matrix below (Fig. 7) shows the entities that are significant for internal risk management purposes and the companies that are consolidated for regulatory purposes. It is limited to the consolidated subgroup parent companies and other entities. As required by EBA/GL/2016/11, the description in column f of the matrix classifies the entities according to the nature of their business and based on the definitions in article 4 CRR. The entities are also categorized according to the nature of their treatment for regulatory purposes (columns b to e) and the nature of their consolidation for commercial-law purposes (column a).

FIG. 7 – EU LI3 – DIFFERENCES IN THE SCOPES OF CONSOLIDATION (ENTITY BY ENTITY) – CONSOLIDATION MATRIX

	a	b	c		d	e	f
Name of the entity	Method of accounting consolidation	Method of regulatory consolidation					Description of the entity
		Full consolidation	Proportional consolidation	Equity method	Neither consolidated nor deducted	Deducted	
DZ BANK AG Deutsche Zentral-Genossenschaftsbank, Frankfurt am Main, (DZ BANK)	Full consolidation	•					Credit institution
AGIMA Aktiengesellschaft für Immobilien-Anlage, Frankfurt am Main	Full consolidation	•					Rental and leasing of land and buildings
Bausparkasse Schwäbisch Hall AG, Schwäbisch Hall, (BSH)	Full consolidation	•					Credit institution
Beteiligungsgesellschaft Westend 1 mbH & Co. KG, Frankfurt am Main	Full consolidation	•					Management of long-term equity investments
Deutsche WertpapierService Bank AG, Frankfurt am Main, (dwpbank)	Equity method		•				Credit institution
DVB Bank SE, Frankfurt am Main, (DVB)	Full consolidation	•					Credit institution
DZ BANK Capital Funding LLC I, Wilmington, USA	Full consolidation	•					Other activities linked to financial services
DZ BANK Capital Funding LLC II, Wilmington, USA	Full consolidation	•					Other activities linked to financial services
DZ BANK Capital Funding LLC III, Wilmington, USA	Full consolidation	•					Other activities linked to financial services
DZ BANK Capital Funding Trust I, Wilmington, USA	Full consolidation	•					Other activities linked to financial services
DZ BANK Capital Funding Trust II, Wilmington, USA	Full consolidation	•					Other activities linked to financial services
DZ BANK Capital Funding Trust III, Wilmington, USA	Full consolidation	•					Other activities linked to financial services
DZ BANK Perpetual Funding (Jersey) Limited, St. Helier, Jersey	Full consolidation	•					Other activities linked to financial services
DZ BANK Perpetual Funding Issuer (Jersey) Limited, St. Helier, Jersey	Full consolidation				•		Other activities linked to financial services
DZ Beteiligungsgesellschaft mbH Nr. 18, Frankfurt am Main	Full consolidation	•					Management of long-term equity investments

	a	b	c		d	e	f
Name of the entity	**Method of accounting consolidation**	**Method of regulatory consolidation**					**Description of the entity**
		Full consolidation	**Proportional consolidation**	**Equity method**	**Neither consolidated nor deducted**	**Deducted**	
DZ HYP AG, Hamburg, (DZ HYP)	Full consolidation	•					Credit institution
DZ PRIVATBANK (Schweiz) AG, Zurich, Switzerland	Full consolidation	•					Credit institution
DZ PRIVATBANK S.A., Strassen, Luxembourg (DZ PRIVATBANK)	Full consolidation	•					Credit institution
DZ Vierte Beteiligungs-gesellschaft mbH, Frankfurt am Main	Full consolidation	•					Management of long-term equity investments
GAF Active Life 1 Rendite-beteiligungs-GmbH & Co. KG, Nidderau	Not consolidated	•					Other financial services
GAF Active Life 2 Rendite-beteiligungs-GmbH & Co. KG, Nidderau	Not consolidated	•					Other financial services
Immobilien-Gesellschaft 'DG Bank-Turm, Frankfurt am Main, Westend' mbH & Co. KG des genossenschaft-lichen Verbundes, Frankfurt am Main	Full consolidation	•					Rental and leasing of land and buildings
IMPETUS Bietergesellschaft mbH, Düsseldorf	Full consolidation	•					Management of long-term equity investments
IPConcept (Luxemburg) S.A., Strassen, Luxembourg	Full consolidation	•					Other financial services
IPConcept (Schweiz) AG, Zurich, Switzerland	Full consolidation	•					Other financial services
KBIH Beteiligungsgesellschaft für Industrie und Handel mbH, Frankfurt am Main	Full consolidation	•					Management of long-term equity investments
Phoenix Beteiligungs-gesellschaft mbH, Düsseldorf	Full consolidation	•					Management of long-term equity investments
R+V Versicherung AG, Wiesbaden, (R+V)	Full consolidation			•			Insurance company
ReiseBank Aktien-gesellschaft, Frankfurt am Main	Full consolidation	•					Credit institution
TeamBank AG Nürnberg, Nuremberg, (TeamBank)	Full consolidation	•					Credit institution
Union Asset Management Holding AG, Frankfurt am Main, (UMH)	Full consolidation	•					Financial services
VR Equitypartner GmbH, Frankfurt am Main	Full consolidation	•					Management of long-term equity investments
VR GbR, Frankfurt am Main	Full consolidation	•					Management of long-term equity investments
VR-LEASING Aktiengesellschaft, Eschborn, (VR LEASING)	Full consolidation	•					Financial services
VR Payment GmbH, Frankfurt am Main (until January 3, 2019: CardProcess GmbH, Karlsruhe)	Full consolidation	•					Other activities linked to financial services

The significant entities are consolidated for both regulatory and commercial-law purposes. However, insurance companies and companies not in the financial sector are not required to be consolidated in the banking group for regulatory purposes. In this context, R+V is fully consolidated for commercial-law purposes but is not directly subject to banking regulation. Instead, it is factored into the procedure used to determine the DZ BANK banking group's capital requirements and disclosures using the risk-weighted carrying amount of DZ BANK's investment in R+V. Furthermore, R+V is included in the cross-sectoral surveillance by the banking supervisory authority of the DZ BANK financial conglomerate at consolidated level in the legal framework applicable to financial conglomerates.

In both cases, the scope of consolidation includes a large number of other entities that are not shown because they are less material.

The LCR is based on the DZ BANK banking group's scope of consolidation pursuant to article 11 (3) CRR, which differs from the scope of consolidation used to determine regulatory own funds. The difference is that the provisions of article 18 (2) to (8) CRR are not used to determine the consolidated liquidity position pursuant to article 18 (1) CRR. Accordingly, certain types of entity (such as providers of related services and asset management companies), entities consolidated on a voluntary/pro-rata basis, and entities that are not subsidiaries are not consolidated for liquidity purposes. In addition, requests to waive consolidation of certain subsidiaries for the purposes of meeting liquidity requirements were granted by BaFin in 2014 and the ECB in 2016. This means that the regulators have agreed that subsidiaries that can be disregarded in the banking regulators' liquidity risk targets for the DZ BANK banking group do not have to be consolidated for liquidity purposes. This ruling applies specifically to entities that are almost entirely funded by equity or are funded to a large degree from within the group.

The following entities were **fully consolidated for regulatory purposes** pursuant to articles 11 to 20 and article 22 CRR as at December 31, 2018, including the entities listed in Fig. 7:

- 15 banks (September 30, 2018: 15)
- 14 financial services institutions (September 30, 2018: 18)
- 9 investment management companies (September 30, 2018: 9)
- 292 finance companies (September 30, 2018: 304)
  of which: 267 project companies belonging to VR-IMMOBILIEN-LEASING GmbH, Eschborn, (September 30, 2018: 273),
  and
- 6 providers of related services (September 30, 2018: 6).

In addition, 4 banks (September 30, 2018: 4) and 1 asset management company (September 30, 2018: 1) were consolidated on a pro-rata basis. The finance company that had been included in this list as at September 30, 2018 was not included as at the reporting date.

DZ BANK is either directly or indirectly the major shareholder in the long-term equity investments consolidated for regulatory purposes. Most of the companies are based either in Germany or elsewhere in the European Union. On the reporting date there were no **restrictions on the transfer of cash or own funds** as defined in article 436 sentence 1 letter c CRR within the DZ BANK banking group imposed by third-party individuals, private or public-sector companies, supranational organizations, or sovereign states.

The **waiver** according to which – provided certain conditions are met – the regulatory supervision of individual Germany-based institutions within a banking group may be replaced by supervision of the entire banking group, was used in the DZ BANK banking group for DZ HYP (group waiver pursuant to article 7 (1) CRR).

Deutsche Genossenschafts-Hypothekenbank AG, Hamburg (DG HYP), which was the predecessor institution of DZ HYP, reported this to the banking supervisory authority in November 2012 together with evidence that the application criteria had been met (article 436 sentence 1 letter e CRR). In the context of the merger of the former WL BANK with DG HYP, the ECB was notified that the waiver would continue to be used for DZ HYP. The prerequisites for this waiver continue to be met following this merger.

The **waiver** can only be used if the subordinate entity is closely integrated into the group structure. This is particularly assumed to be the case if the parent company is able to exercise control over the subordinated entity because it holds the majority of its voting rights and it has issued an unrestricted letter of comfort in relation to the subordinated entity. Furthermore, the regulatory management of the subordinated institution by the parent company must meet ECB requirements. The entity that is the subject of the waiver must be included in the strategy, risk-bearing capacity, and risk management processes of the parent institution. The parent company must also be able to issue direct instructions within the group in order to ensure the integration of the subordinated entity. DZ HYP is fully integrated into the internal processes and risk management of DZ BANK as the parent company of the banking group. In addition to legal, organizational, and structural integration, this particularly applies to the structure of its decision-making bodies, integrated risk and capital management, the strategic planning process, business and risk strategies, and the reporting and disclosure system. There are no current or foreseeable legal or actual material obstacles to the immediate transfer of own funds from DZ BANK to DZ HYP or to the repayment of liabilities to DZ HYP by DZ BANK.

Fig. 8 shows how the entities included in the DZ BANK banking group are integrated into the quantitative regulatory disclosures pursuant to article 432 (1) CRR. The effects of intragroup consolidation have been taken into account.

The disclosures for the management units on gross lending volume, loss allowances for loans and advances, and interest-rate risk in the banking book are based on economic risk management criteria, whereas other disclosures are based on the entities consolidated for regulatory purposes.

FIG. 8 – INCLUSION OF ENTITIES IN THE DZ BANK BANKING GROUP IN QUANTITATIVE REGULATORY DISCLOSURES

Entity	Liquidity ratios	Own funds	Capital requirements	Capital ratios	Indicators of global systemic importance	Loss allowances for loans and advances	Standardized Approach exposure	IRBA[1] exposure	Collateralized lending volume	Counterparty credit risk	Securitizations	Market risk (IMA)	Interest-rate risk in the banking book	Risk on long-term equity investments not included in the trading book	Countercyclical capital buffer	Indicators of global systemic importance	Leverage ratio	Asset encumbrance	Remuneration policy
DZ BANK	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BSH	•	•	•	•	•	•	•	•	•	•			•	•	•		•	•	•
DZ HYP	•	•	•	•	•	•	•	•	•	•	•		•	•	•		•	•	•
DVB	•	•	•	•	•	•	•	•	•	•			•	•	•		•	•	•
DZ PRIVATBANK	•	•	•	•	•	•	•	•	•	•	•		•	•	•		•	•	•
TeamBank	•	•	•	•	•	•	•	•					•	•	•		•	•	•
UMH		•	•	•	•	•	•			•			•	•	•		•	•	
VR LEASING	•	•	•	•	•	•	•		•	•			•	•	•		•	•	
Other companies of relevance for regulatory purposes	•	•	•	•	•	•	•	•							•		•	•	•

1 IRBA – internal ratings-based approach.
2 Interest-rate risk results from reviewing the funds held in own-account investments.

3.2 Differences in the basis of consolidation for accounting and regulatory purposes

(ARTICLE 436 SENTENCE 1 LETTER B CRR)

Fig. 9 compares the carrying amounts – as published in the DZ BANK Group's consolidated financial statements on the basis of the scope of consolidation for accounting purposes (column a) – with the carrying amounts resulting from application of the scope of consolidation for regulatory purposes (column b). Furthermore, the amounts stated in the consolidated financial statements and applied to the scope of consolidation for regulatory purposes are broken down by the risk categories described in Part 3 Title II CRR (columns c to g). The breakdown for columns c to f in the following table EU LI1 thus follows the frameworks for

– credit risk (column c),
– counterparty credit risk (column d),
– securitizations (column e), and
– market risk (column f).

Column g shows amounts that are subject to direct deduction or are not subject to capital requirements. Please note that the amounts in columns c to g do not necessarily match the carrying amounts disclosed in column b. This is due to the fact that, in the context of capital requirements, individual asset and liability items on the balance sheet are subject to more than one of the risk types described in Fig. 11. For reasons of consistency, securities financing transactions are assigned to the credit risk category. Consequently, securities subject to sale and repurchase agreements classed as investments are recognized twice in the credit risk category because not only the credit risk but also an existing counterparty risk is recognized for the underlying securities.

Equity components are reconciled separately, so they are not shown in Fig. 9. There is therefore no reconciliation of total assets to total equity and liabilities. For the reconciliation of the equity reported on the balance sheet with the regulatory own funds of the DZ BANK banking group, please see Fig. 20.

FIG. 9 – EU LI1 – DIFFERENCES BETWEEN ACCOUNTING AND REGULATORY SCOPES OF CONSOLIDATION AND RECONCILIATION OF FINANCIAL STATEMENTS CATEGORIES TO REGULATORY RISK CATEGORIES AS AT DECEMBER 31, 2018

	a	b	c	d	e	f	g
	Carrying amounts as reported in published consolidated financial statements	Carrying amounts under scope of regulatory consolidation	Carrying amounts of items				
€ million			Subject to the credit risk framework	Subject to the CCR framework	Subject to the securitization framework	Subject to the market risk framework	Subject to deduction from capital or not subject to capital requirements
Assets							
Cash and cash equivalents	51,845	52,010	52,010	-	-	287	-
Loans and advances to banks	91,627	91,496	91,496	-	-	564	-
Loans and advances to customers	174,438	179,019	177,474	-	1,545	14,600	-
Hedging instruments (positive fair values)	883	883	-	883	-	5	-
Financial assets held for trading	37,942	37,834	9,594	15,650	28	12,732	-
Investments	48,262	54,301	57,734	-	2,212	2,134	-
Investments held by insurance companies	100,840	-	-	-	-	-	-
Property, plant and equipment, and investment property	1,423	1,384	1,384	-	-	29	-
Income tax assets	1,457	1,102	1,094	-	-	6	8
Other assets	4,655	1,775	1,252	-	-	170	524
Loss allowances	-2,305	-2,375	-2,370	-	-6	-607	-
Non-current assets and disposal groups classified as held for sale	7,133	7,332	7,332	-	-	5,288	-
Fair value changes of the hedged items in portfolio hedges of interest-rate risk	533	539	539	-	-	6	-
Total assets	**518,733**	**425,300**	**397,539**	**16,533**	**3,779**	**35,214**	**532**
Liabilities							
Deposits from banks	142,486	142,783	3,470	-	-	293	139,021
Deposits from customers	132,548	138,533	-	-	-	5,194	133,339
Debt certificates issued including bonds	63,909	64,282	-	-	-	3,121	61,161
Hedging instruments (negative fair values)	2,516	2,524	-	847	-	10	1,677
Financial liabilities held for trading	44,979	44,984	-	15,541	2	381	29,441
Provisions	3,380	3,451	6	-	-	367	3,083
Insurance liabilities	93,252	-	-	-	-	-	-
Income tax liabilities	920	401	-	-	-	8	392
Other liabilities	7,919	2,146	-	-	-	94	2,053
Subordinated capital	2,897	2,918	-	-	-	-2	2,920
Liabilities included in disposal groups classified as held for sale	281	604	-	-	-	18	586
Fair value changes of the hedged items in portfolio hedges of interest-rate risk	134	134	-	-	-	-	134
Total liabilities	**495,221**	**402,760**	**3,476**	**16,388**	**2**	**9,484**	**373,807**

The difference of €93,433 million between the total assets in columns a and b is mainly the result of the deconsolidation of R+V (€107,351 million) and the recognition of this entity in the scope of consolidation for regulatory purposes at its carrying amount of €5,495 million calculated using the equity method. There are also differences totaling €4,613 million in the scopes of consolidation of the subgroups, mainly BSH and VR LEASING. The discrepancies between the scopes of consolidation also give rise to differences of €3,810 million in the consolidation of intragroup transactions.

FIG. 10 – EU LI1 – DIFFERENCES BETWEEN ACCOUNTING AND REGULATORY SCOPES OF CONSOLIDATION AND RECONCILIATION OF FINANCIAL STATEMENTS CATEGORIES TO REGULATORY RISK CATEGORIES AS AT DECEMBER 31, 2017

	a	b	c	d	e	f	g
	Carrying amounts as reported in published consolidated financial statements	Carrying amounts under scope of regulatory consolidation	Carrying amounts of items				
€ million			Subject to the credit risk framework	Subject to the CCR framework	Subject to the securitization framework	Subject to the market risk framework	Subject to deduction from capital or not subject to capital requirements
Assets							
Cash and cash equivalents	43,910[1]	44,498[1]	44,498[1]	-	-	105	-
Loans and advances to banks	89,414[1]	89,893[1]	88,577[1]	-	-	142	1,316
Loans and advances to customers	174,376	178,826	177,518	-	1,209	18,644	99
Loss allowances	-2,794	-2,961	-2,961	-	-	-960	-
Derivatives used for hedging (positive fair values)	1,096	1,095	-	1,095	-	8	-
Financial assets held for trading	38,709	38,437	10,640	17,113	151	11,354	-
Investments	57,486	63,402	68,578	-	2,165	1,756	-
Investments held by insurance companies	96,416	-	-	-	-	-	-
Property, plant and equipment, and investment property	1,498	1,397	1,381	-	-	2	14
Income tax assets	1,127	796	790	-	-	-	6
Other assets	4,546	1,833	1,153	-	-	8	680
Non-current assets and disposal groups classified as held for sale	84	34	34	-	-	5	-
Fair value changes of the hedged items in portfolio hedges of interest-rate risk	-274	-274	117	-	-	-	-391
Total assets	**505,594**	**416,976**	**390,325**	**18,208**	**3,525**	**31,064**	**1,724**
Liabilities							
Deposits from banks	136,122	136,755	-	-	-	61	136,694
Deposits from customers	126,319	133,033	-	-	-	651	132,382
Debt certificates issued including bonds	67,327	67,630	-	-	-	891	66,739
Derivatives used for hedging (negative fair values)	2,962	2,964	-	2,833	-	3	131
Financial liabilities held for trading	44,280	44,290	5,134	16,789	-	526	22,365
Provisions	3,372	3,447	6	-	-	32	3,409
Insurance liabilities	89,324	-	-	-	-	-	-
Income tax liabilities	848	304	-	-	-	2	302
Other liabilities	7,523	2,072	-	-	-	84	1,988
Subordinated capital	3,899	3,964	-	-	-	-	3,964
Liabilities included in disposal groups classified as held for sale	-	-	-	-	-	-	-
Fair value changes of the hedged items in portfolio hedges of interest-rate risk	113	113	-	-	-	-	113
Total liabilities	**482,089**	**394,572**	**5,140**	**19,622**	**-**	**2,250**	**368,087**

1 Amount restated.

As was also the case in the published IFRS consolidated financial statements as at December 31, 2018, the prior-year figure as at December 31, 2017 for the cash and cash equivalents line item has been increased by €31,075 million and the figure for the loans and advances to banks line item has been reduced by €31,075 million in columns a and b. The same applies to the related carrying amounts in the credit risk framework in column c. The changes are indicated by the footnote ‘Amount restated’.

3.3 Differences between the carrying amounts in the consolidated financial statements and the exposures recognized for regulatory purposes

(ARTICLE 436 SENTENCE 1 LETTER B CRR)

Fig. 11 shows the differences between the carrying amounts in the consolidated financial statements and the exposures used for regulatory purposes, unless already included in Fig. 9. To provide a comparison, Fig. 12 shows the same differences as at December 31, 2017.

FIG. 11 – EU LI2 – MAIN SOURCES OF DIFFERENCES BETWEEN REGULATORY EXPOSURE AMOUNTS AND CARRYING AMOUNTS IN FINANCIAL STATEMENTS AS AT DECEMBER 31, 2018

		a	b	c	d	e
		Total	Items subject to			
€ million			Credit risk framework	CCR framework	Securitization framework	Market risk framework
1	Carrying amount of assets under the scope of regulatory consolidation (as per template EU LI1)	424,772	397,543	16,533	3,779	35,214
2	Carrying amount of liabilities under the scope of regulatory consolidation (as per template EU LI1)	28,953	3,476	16,388	2	9,484
3	Total net amount under the regulatory scope of consolidation	395,819	394,068	145	3,777	25,730
4	Off-balance-sheet amounts	68,530	29,641	-	2,360	130
5	Adjustment due to use of conversion factors (off-balance-sheet transactions)	-	36,398	-	-	-
6	Adjustment for multiple recognition (SFTs[1], market risk)	27,901	-	-	-	-
7	Adjustment of exposures in the internal model (market risk)	-12,561	-	-	-	-12,561
8	Differences in valuations	893	968	17,013	5	-17,094
9	Differences due to different netting rules, other than those already included in row 2	-5,298	-9,426	-2,921	-	7,049
10	Differences due to consideration of provisions	2,275	2,273	-	2	-
11	Adjustment due to foreign currency exposures	74	1	-	-	73
12	Other reconciliation items	1,845	-	-	-	-
13	**Exposure amounts considered for regulatory purposes**	**479,480**	**454,308**	**16,222**	**6,180**	**2,770**

1 SFTs = securities financing transactions.

FIG. 12 – EU LI2 – MAIN SOURCES OF DIFFERENCES BETWEEN REGULATORY EXPOSURE AMOUNTS AND CARRYING AMOUNTS IN FINANCIAL STATEMENTS AS AT DECEMBER 31, 2017

		a	b	c	d	e
		Total	Items subject to			
€ million			Credit risk framework	CCR framework	Securitization framework	Market risk framework
1	Carrying amount of assets under the scope of regulatory consolidation (as per template EU LI1)	415,252	390,325	18,208	3,525	31,064
2	Carrying amount of liabilities under the scope of regulatory consolidation (as per template EU LI1)	26,485	5,140	19,622	-	2,250
3	Total net amount under the regulatory scope of consolidation	388,767	385,185	-1,414	3,525	28,814
4	Off-balance-sheet amounts	63,345	27,644	-	3,019	1
5	Adjustment due to use of conversion factors (off-balance-sheet transactions)	-	32,681	-	-	-
6	Adjustment for multiple recognition (SFTs[1], market risk)	27,343	-	-	-	-
7	Adjustment of exposures in the internal model (market risk)	-10,603	-	-	-	-10,603
8	Differences in valuations	-9,111	357	8,980	-	-18,448
9	Differences due to different netting rules, other than those already included in row 2	1,870	-8,202	7,832	-	2,240
10	Differences due to consideration of provisions	3,251	3,248	-	3	-
11	Adjustment due to foreign currency exposures	133	-3	-	-	136
12	Other reconciliation items	1,524	-	-	-	-
13	**Exposure amounts considered for regulatory purposes**	**466,519**	**441,097**	**16,667**	**6,552**	**2,203**

1 SFTs = securities financing transactions.

Rows 1 and 2 are attributable to the carrying amounts of the assets and liabilities under the regulatory scope of consolidation and are transferred from Fig. 9 to Fig. 11 without the exposures that are subject to direct deduction or are not subject to capital requirements (Fig. 9, column g).

Row 3 therefore shows the total net amount for these items under the regulatory scope of consolidation. In respect of the off-balance-sheet amounts (row 4), please note that the off-balance-sheet exposures in column a are recognized before application of the credit conversion factors (CCFs), whereas the CCFs have been applied in columns b to e. Consequently, an adjustment to the reconciliation is necessary in row 5 because the exposures recognized for regulatory purposes include off-balance-sheet exposures to which CCFs have not been applied.

To ensure consistency between column a and columns b to e, the carrying amounts of exposures are shown in column a that are assigned to multiple risk categories (row 6), for example credit risk exposures denominated in a foreign currency. Further differences between the regulatory and accounting amounts arise due to the disclosure of market risk exposures in the internal model in Fig. 9, because these exposures are not included in the regulatory basis of assessment for the market risk category. The related adjustment is made in row 7.

The reconciliation of the carrying amounts under the regulatory scope of consolidation to the total of the regulatory bases of assessment is continued with the determination of the valuation differences. Among other items, the add-on for derivative exposures is included in row 8. After the total net amount has been calculated in row 3 of Fig. 11, it has to be adjusted to reflect the actual regulatory netting (row 9). In the liquidation netting of derivatives, for example, a netting rule is used that differs from the simple calculation of the net amount in row 3.

Another difference affects the recognition of loan loss allowances and provisions in the IRB approach that are not part of the regulatory basis of assessment and are adjusted through row 10. Row 11 contains adjustments resulting, in particular, from foreign currency exposures for which different exchange rates are used in the accounts and for regulatory purposes. The other reconciliation items in row 12 include brokerage business not recognized on the balance sheet and regulatory risk adjustments to exposures in internal models.

4 Liquidity adequacy

Risks affecting liquidity resources are managed on the basis of groupwide liquidity risk management and groupwide risk capital management. The purpose of liquidity risk management is to ensure adequate levels of liquidity reserves are in place in respect of risks arising from future payment obligations (liquidity adequacy).

Liquidity risk is defined in section 2.3.2, fig. 7 (page 72) of the opportunity and risk report.

4.1 Management of liquidity adequacy

(ARTICLE 435 (1) CRR)

The principles for the management of liquidity adequacy and the risk management strategies and processes in respect of liquidity risk are presented in sections 6.1, 6.2.2, and 6.2.5 (pages 94, 95, and 97) of the opportunity and risk report. The structure and organization of the liquidity risk management function are described in sections 6.2.3 and 6.3.2 (pages 95 to 96 and 100) of the opportunity and risk report. Further details of the scope and nature of the liquidity risk measurement systems are provided in sections 6.2.3, 6.2.4, and 6.3.2 (pages 95 to 97 and 100) of the opportunity and risk report. Sections 6.2.2, 6.2.4, and 6.2.5 (pages 95 to 97) of the opportunity and risk report set out the strategies for hedging and mitigating liquidity risk and strategies and processes for monitoring the ongoing effectiveness of the measures taken to hedge liquidity risk. A declaration approved by the Board of Managing Directors on the appropriateness of the liquidity risk management agreements can be found in section 2.1.2 (page 67) of the opportunity and risk report. Section 2 in conjunction with section 6.2.7 (pages 98 to 99) contains the liquidity risk statement approved by the Board of Managing Directors, which describes the institution's entire liquidity risk profile relating to the business strategy.

4.2 Liquidity coverage ratio (LCR)

The **LCR** measures whether an adequate buffer is available in the form of liquid assets that enables an institution to compensate for a possible imbalance between inflows and outflows of cash in a 30-day stress scenario. The LCR is the ratio of liquid assets held ('liquidity buffer') to net cash outflows.

Since January 1, 2018, a minimum LCR of 100 percent has had to be maintained (2017: 80 percent). DZ BANK reports the LCR of the banking group, calculated in accordance with the CRR in conjunction with Delegated Regulation (EU) No. 2015/61 dated July 29, 2015, to the supervisory authority on a monthly basis.

The liquidity coverage ratio shown for the DZ BANK banking group in Fig. 13 is based on EBA/GL/2017/01 dated June 21, 2017, which has had to be applied since December 31, 2017. In accordance with EBA/GL/2017/01, the liquidity coverage ratio is disclosed quarterly at consolidated level in line with the descriptions in section 3. The disclosed line items are each calculated as the average of the month-end values for the previous 12 months.

The average LCR for the DZ BANK banking group as at December 31, 2018 calculated in accordance with this method was 148.04 percent (September 30, 2018: 148.96 percent), based on average liquid assets of €86,931 million (September 30, 2018: €87,699 million) and net liquidity outflows of €58,807 million (September 30, 2018: €59,040 million) (Fig. 13).

FIG. 13 – LIQUIDITY COVERAGE RATIO OF THE DZ BANK BANKING GROUP (AVERAGE)

		Total weighted value (average)	
		Dec. 31, 2018	Sep. 30, 2018
21	Liquidity buffer (€ million)	**86,931**	87,699
22	Net liquidity outflows (€ million)	**58,807**	59,040
23	Liquidity coverage ratio (%)	**148.04**	148.96

In addition, the DZ BANK banking group discloses the liquidity buffer, net liquidity outflows, and the liquidity coverage ratio as at the reporting date at the end of each six-month period in accordance with Delegated Regulation (EU) No. 2015/61. These are shown in Fig. 14. The LCR as at December 31, 2018 was 141.40 percent (June 30, 2018: 143.83 percent), based on liquid assets of €78,665 million (June 30, 2018: €95,583 million) and net liquidity outflows of €55,633 million (June 30, 2018: €66,455 million). The DZ BANK banking group's LCR is thus higher than the minimum ratio of 100 percent that has been mandatory since 2018.

FIG. 14 – LIQUIDITY COVERAGE RATIO OF THE DZ BANK BANKING GROUP (AS AT THE REPORTING DATE)

		Total weighted value (reporting date)	
		Dec. 31, 2018	Jun. 30, 2018
21	Liquidity buffer (€ million)	78,665	95,583
22	Net liquidity outflows (€ million)	55,633	66,455
23	Liquidity coverage ratio (%)	141.40	143.83

The decrease in the LCR measured for the DZ BANK banking group from 143.83 percent as at June 30, 2018 to 141.40 percent as at December 31, 2018 was largely attributable to lower excess cover at DZ BANK and DZ HYP. In the fourth quarter of 2018, DZ BANK's current and non-current liabilities declined compared with their level as at June 30, 2018. The excess cover for the LCR fell because the liquidity buffer contracted more sharply than the decrease in net liquidity outflows, which comprise solely outflows of liabilities with a term to maturity of no more than 30 days. There was also a decline in the liquidity buffer at DZ HYP because of an increase in the repo transactions for funding new business.

FIG. 15 – LEVEL AND COMPONENTS OF THE LCR IN 2018

Consolidated € million	Total unweighted value (average)				Total weighted value (average)			
Quarter ending on	Mar. 31, 2018	Jun. 30, 2018	Sep. 30, 2018	Dec. 31, 2018	Mar. 31, 2018	Jun. 30, 2018	Sep. 30, 2018	Dec. 31, 2018
Number of data points used in the calculation of the averages	12	12	12	12	12	12	12	12
High-quality liquid assets								
1 Total high-quality liquid assets (HQLA)					82,584	86,333	87,699	86,931
Cash outflows								
2 Retail deposits and deposits from small business customers, of which:	1,746	1,873	2,023	2,100	329	413	509	591
3 stable deposits	618	599	583	560	31	30	29	28
4 less stable deposits	947	1,026	1,112	1,137	118	134	152	160
5 Unsecured wholesale funding	84,911	87,124	87,935	88,238	53,696	55,498	55,880	56,147
6 Operational deposits (all counterparties) and deposits in networks of cooperative banks	31,974	32,816	33,907	34,314	7,993	8,204	8,477	8,579
7 Non-operational deposits (all counterparties)	45,517	46,522	46,387	46,766	38,283	39,508	39,762	40,410
8 Unsecured debt	7,420	7,786	7,641	7,158	7,420	7,786	7,641	7,158
9 Secured wholesale funding					117	129	107	139
10 Additional requirements	31,322	30,940	30,493	30,550	11,252	10,864	10,475	10,217
11 Outflows related to derivative exposures and other collateral requirements	5,401	5,151	5,011	4,943	4,655	4,388	4,178	3,998
12 Outflows related to	163	168	157	132	163	168	157	132

Consolidated € million	Total unweighted value (average)				Total weighted value (average)			
Quarter ending on	**Mar. 31, 2018**	**Jun. 30, 2018**	**Sep. 30, 2018**	**Dec. 31, 2018**	**Mar. 31, 2018**	**Jun. 30, 2018**	**Sep. 30, 2018**	**Dec. 31, 2018**
loss of funding on debt products								
13 Credit and liquidity facilities	25,758	25,621	25,325	25,475	6,434	6,308	6,140	6,087
14 Other contractual funding obligations	1,741	1,714	1,696	1,594	1,502	1,476	1,438	1,289
15 Other contingent funding obligations	43,678	44,733	45,579	45,961	79	83	89	94
16 Total cash outflows					**66,975**	**68,463**	**68,498**	**68,477**
Cash inflows								
17 Secured lending (e.g. reverse repos)	5,468	5,173	5,387	5,553	525	396	392	516
18 Inflows from fully performing exposures	9,216	9,211	9,207	9,438	6,659	6,687	6,706	6,851
19 Other cash inflows	3,046	3,128	2,943	2,867	2,381	2,524	2,359	2,303
EU-19a (Difference between total weighted inflows and total weighted outflows arising from transactions in third countries where there are transfer restrictions or which are denominated in non-convertible currencies)								
EU-19b (Excess inflows from a related specialized credit institution)								
20 Total cash inflows	**17,730**	**17,512**	**17,537**	**17,858**	**9,565**	**9,607**	**9,457**	**9,670**
EU-20a Fully exempt inflows	-	-	-	-	-	-	-	-
EU-20b Inflows subject to 90% cap	166	168	171	175	108	109	111	114
EU-20c Inflows subject to 75% cap	17,461	17,244	17,259	17,579	9,457	9,497	9,346	9,555
21 Liquidity buffer					82,584	86,333	87,699	86,931
22 Total net cash outflows					57,411	58,856	59,040	58,807
23 Liquidity coverage ratio (%)					144.13	146.98	148.96	148.04

4.3 Qualitative LCR disclosures

Further qualitative explanations regarding the LCR are provided below in accordance with the requirements of EBA/GL/2017/01.

4.3.1 Concentration of funding and liquidity sources

The DZ BANK banking group's main short-term and medium-term funding sources on the unsecured money markets essentially comprise deposits from local cooperative banks, deposits from corporate customers and institutional customers, and commercial paper held by institutional investors.

The DZ BANK banking group also obtains long-term funding through structured and non-structured capital market products that are mainly marketed to local cooperative banks and other institutional customers.

A large proportion of the long-term funding results from the issuance of covered bonds such as Pfandbriefe or DZ BANK BRIEFE, which are issued on a decentralized basis, in other words based on the different cover assets at DZ BANK, DZ HYP, and DVB. Another major source of funding is Bausparkasse Schwäbisch Hall's home savings deposits.

Within the LCR, deposits from corporate customers, deposits from local cooperative banks, and deposits from financial customers with a term to maturity of under 30 days have the biggest impact on the liquidity outflows of the DZ BANK banking group.

The liquidity sources included in the liquidity buffer for the LCR at the level of the DZ BANK banking group predominantly consist of balances with central banks and liquid securities. The dominant liquid securities under assets at level 1 (assets that are of extremely high liquidity and credit quality) are government and regional government bonds, bonds of public-sector entities and multilateral development banks, and extremely high-quality covered bonds. The assets at level 2 (assets that are of high liquidity and credit quality) largely comprise high-quality covered bonds and liquid corporate bonds.

4.3.2 Derivative exposures and potential collateral calls

Line item 11 in Fig. 15 – outflows related to derivative exposures and other collateral requirements – consists of potential outflows as a result of

- fluctuations in the fair value of derivatives and the related volatility of the collateral,
- subsequent collateral requirements caused by an assumed worsening of an entity's own credit rating by three notches,
- other potential collateral calls.

The biggest contribution to this line item is the simulation – using the historical look-back approach (HLBA) – of the effects of fluctuations in the fair value of derivatives on the collateral. This involves simulating a stress scenario specified by the supervisory authority.

The effects of subsequent collateral requirements owing to a simulated worsening of the credit rating of the entities in the DZ BANK banking group by three notches also have a significant influence on the aforementioned line item. This is because some OTC collateral agreements that entities in the DZ BANK banking group have concluded contain rating-based triggers. A downgrade in an entity's own credit rating would trigger collateral calls by counterparties.

4.3.3 Currency mismatch in the liquidity coverage ratio

At the level of the DZ BANK banking group, the US dollar is the only significant foreign currency as the liabilities in this currency exceed 5 percent of the total liabilities of the DZ BANK banking group. This gives rise to a requirement to disclose the LCR in US dollars on a monthly basis. However, there is no minimum LCR requirement for US dollars.

The currency mismatch in the liquidity coverage ratio for the US dollar, pound sterling, the Swiss franc, the Hong Kong dollar, and the Singapore dollar, which are the most significant currencies for the DZ BANK banking group besides the euro, is calculated and monitored monthly.

Details of the management of foreign-currency liquidity risk can be found in section 6.2.4 'Measurement of liquidity risk' (pages 96 to 97) of the opportunity and risk report.

4.3.4 Degree of centralization of liquidity management and interaction between the group's units

In the DZ BANK banking group, there is no group waiver pursuant to article 8 CRR that has been approved by the supervisory authority for the disclosure of, and compliance with, regulatory liquidity ratios. As a result, each subsidiary listed in Fig. 8 in the liquidity ratios column has to meet the LCR requirements itself.

Liquidity management of the entities in the DZ BANK banking group and the interaction between the individual entities in the banking group are described in the business report, section 5 'Financial position'.

Disclosures relating to the management of liquidity risk in the DZ BANK banking group can be found in section 6.2.4 'Management of limits for liquidity risk' (pages 96 to 97) of the opportunity and risk report.

4.3.5 Remarks about the LCR disclosure

Short-term deposits from major corporate customers and financial customers have a big impact on the level of liquidity outflows under the LCR of the DZ BANK banking group. The corresponding line items (Fig. 15, rows 5 and 6) are dominated by deposits from the local cooperative banks. DZ BANK performs the central cash-pooling function for these institutions. Local cooperative banks with available liquidity can invest it with DZ BANK, while those requiring liquidity can obtain it from DZ BANK.

The DZ BANK banking group also has inflows that, contrary to the fundamental eligibility cap of 75 percent pursuant to article 33 (4) of Delegated Regulation (EU) No. 2015/61, are subject to a cap of 90 percent (Fig. 15, row EU-20b). These are attributable to an entity in the DZ BANK banking group that has been granted approval by the competent supervisory authority to apply the aforementioned article in conjunction with article 33 (5) of Delegated Regulation (EU) No. 2015/61. This entity's liquidity inflows are therefore not subject to the usual cap on eligibility for the LCR.

4.4 Net stable funding ratio (NSFR)

Internal liquidity risk management is supplemented by the **net stable funding ratio (NSFR)**, which is based on the Basel III framework (BCBS 295).

Whereas the LCR relates to short-term liquidity with a 30-day time horizon, the **net stable funding ratio** has a long-term focus and is intended to ensure that institutions restrict mismatches between the maturity structures of their assets-side and liabilities-side business. This ratio is the amount of available stable funding (equity and liabilities) relative to the amount of required stable funding (assets-side business). The funding sources are weighted according to their degree of stability and assets are weighted according to their degree of liquidity based on factors defined by the supervisory authority. Unlike the liquidity coverage ratio, compliance with the NSFR is not expected to become mandatory before March 31, 2021, when the NSFR pursuant to CRR II will be adopted.

5 Capital adequacy

All material risks affecting capital resources are managed on the basis of groupwide risk capital management. The aim of risk capital management is to ensure the availability of capital resources that are commensurate with the risks assumed (capital adequacy).

5.1 Economic capital adequacy

(ARTICLE 438 SENTENCE 1 LETTER A CRR)

Information on the management of economic capital and on capital adequacy is disclosed in section 7.2 'Economic capital adequacy' (page 101) and section 7.3 (page 104) of the opportunity and risk report. Economic capital management is based on internal risk measurement methods that take into account all types of risk that are material from a capital adequacy perspective. The risk capital requirement is determined by aggregating the relevant risk types of all management units. The methods selected serve to meet the statutory requirements for a groupwide integrated risk capital management system.

In the **risk-bearing-capacity analysis**, the risk capital requirement (including capital buffer) is compared with the available internal capital in order to determine the economic capital adequacy. The Board of Managing Directors determines the upper loss limits for a particular year on the basis of the available internal capital. These limits then restrict the risk capital requirement (including capital buffer). If necessary, the upper loss limits can be adjusted during the year, e.g. if economic conditions change.

Available internal capital comprises equity and hidden reserves. It corresponds to the own funds, as defined using economic criteria, that are available to cover unexpected losses. It is reviewed on a quarterly basis.

5.2 Regulatory capital adequacy

Regulatory capital adequacy is defined as the holding of sufficient capital to cover the risks assumed by the business. At DZ BANK, the **Group Finance** division is responsible for monitoring regulatory capital adequacy. Regular monitoring is designed to ensure that the applicable minimum regulatory requirements for solvency are met at all times. Monitoring takes place monthly for the DZ BANK banking group and DZ BANK, and at least quarterly for the DZ BANK financial conglomerate and the R+V Versicherung AG insurance group. The Board of Managing Directors and the supervisory authority are notified of the results within the monthly reports on capital management.

5.2.1 Own funds

(ARTICLE 437 CRR)

The regulatory own funds of the DZ BANK banking group are derived from the provisions of the CRR/CRD IV. Pursuant to the provisions of the CRR (article 25 et seq.), regulatory eligible own funds consist of common equity Tier 1 capital (CET1), additional Tier 1 capital (AT1), and Tier 2 capital (T2). They are based on the carrying amounts recognized under IFRS and essentially comprise the equity reported on the balance sheet, hybrid capital instruments, and subordinated liabilities. In accordance with the applicable CRR rules, Tier 2 capital has to be amortized on a day-by-day basis in the last five years before the maturity date.

Fig. 16 shows the DZ BANK banking group's own funds as defined by article 437 (1) letters d and e CRR in conjunction with Commission Implementing Regulation (EU) No. 1423/2013 dated December 20, 2013. These disclosures relate to all the entities consolidated for regulatory purposes in the DZ BANK banking group.

The regulatory **own funds** of the **DZ BANK banking group** (Fig. 16, row 59) as at December 31, 2018 determined in accordance with the currently applicable CRR provisions amounted to a total of €22,210 million (September 30, 2018: €22,286 million). The composition of regulatory own funds is shown below.

FIG. 16 – STRUCTURE OF OWN FUNDS AS AT DECEMBER 31, 2018
(ARTICLE 437 (1) LETTERS D AND E CRR IN CONJUNCTION WITH ANNEX IV OF IMPLEMENTING REGULATION (EU) NO. 1423/2013)

		(A)	(A)	(B)
		Amount on disclosure reporting date	Amount on disclosure reporting date	Reference to article of Regulation (EU) No. 575/2013
€ million		**Dec. 31, 2018**	Sep. 30, 2018	
Common equity Tier 1 (CET1): instruments and reserves				
1	Capital instruments and related share premium accounts	10,478	10,478	26 (1), 27, 28, 29
1a	of which: financial instrument type 1	-	-	EBA list in accordance with article 26 (3)
1b	of which: financial instrument type 2	-	-	
1c	of which: financial instrument type 3	-	-	
2	Retained earnings	6,218	6,241	26 (1) (c)
3	Accumulated other comprehensive income (and other reserves)	2,036	2,034	26 (1)
3a	Fund for general banking risks	-	-	26 (1) (f)
4	Amount of qualifying items referred to in article 484 (3) CRR and the related share premium accounts subject to phase out from CET1	-	-	486 (2)
5	Non-controlling interests (amount allowed in consolidated CET1)	142	133	84
5a	Independently reviewed interim profits net of any foreseeable charge or dividend	541	437	26 (2)
6	**Common equity Tier 1 (CET1) before regulatory adjustments**	**19,415**	19,323	Sum of rows 1 to 5a
Common equity Tier 1 (CET1): regulatory adjustments				
7	Additional value adjustments (negative amount)	-316	-342	34, 105
8	Intangible assets (net of related tax liability) (negative amount)	-519	-657	36 (1) (b), 37
9	Empty set in the EU	●	●	
10	Deferred tax assets that rely on future profitability, excluding those arising from temporary differences (net of related tax liability where the conditions in article 38 (3) CRR are met) (negative amount)	-8	-6	36 (1) (c), 38
11	Fair value reserves related to gains and losses on cash flow hedges	0	2	33 (1) (a)
12	Negative amounts resulting from the calculation of expected loss amounts	-136	-142	36 (1) (d), 40, 159
13	Any increase in equity arising from securitized assets (negative amount)	-	-	32 (1)
14	Gains or losses on liabilities recognized at fair value resulting from changes in own credit standing	34	31	32 (1) (b)
15	Defined benefit pension fund assets (negative amount)	-2	0	36 (1) (e), 41
16	Direct and indirect holdings by an institution of own CET1 instruments (negative amount)	-	-	36 (1) (f), 42
17	Direct, indirect and synthetic holdings by the institution of the CET1 instruments of financial-sector entities where those entities have reciprocal cross-holdings with the institution designed to artificially inflate the institution's own funds (negative amount)	-2	-2	36 (1) (g), 44
18	Direct, indirect and synthetic holdings by the institution of CET1 instruments of financial-sector entities where the institution does not have a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)	-	-	36 (1) (h), 43, 45, 46, 49 (2) and (3), 79
19	Direct, indirect and synthetic holdings by the institution of CET1 instruments of financial-sector entities where the institution has a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)	-	-	36 (1) (i), 43, 45, 47, 48 (1) (b), 49 (1) to (3), 79
20	Empty set in the EU	●	●	
20a	Exposure arising from the following items qualifying for a risk weight of 1,250%, where the institution opts for the deduction alternative	-282	-	36 (1) (k)
20b	of which: qualifying holdings outside the financial sector (negative amount)	-	-	36 (1) (k) (i), 89 to 91
20c	of which: securitization exposures (negative amount)	-282	-	36 (1) (k) (ii), 243 (1) (b), 244 (1) (b), 258
20d	of which: free deliveries (negative amount)	-	-	36 (1) (k) (iii), 379 (3)
21	Deferred tax assets that rely on future profitability, arising from temporary differences (amount above 10% threshold, net of related tax liability where the conditions in article 38 (3) CRR are met) (negative amount)	-	-	36 (1) (c), 38, 48 (1) (a)
22	Amount exceeding the 15% threshold (negative amount)	-	-	48 (1)
23	of which: direct and indirect holdings by the institution of CET1 instruments of financial-sector entities where the institution has a significant investment in those entities	-	-	36 (1) (i), 48 (1) (b)

€ million	(A) Amount on disclosure reporting date Dec. 31, 2018	(A) Amount on disclosure reporting date Sep. 30, 2018	(B) Reference to article of Regulation (EU) No. 575/2013
24 Empty set in the EU	●	●	
25 of which: deferred tax assets that rely on future profitability, arising from temporary differences	-	-	36 (1) (c), 38, 48 (1) (a)
25a Losses for the current financial year (negative amount)	-	-	36 (1) (a)
25b Foreseeable tax charges relating to CET1 items (negative amount)	-	-	36 (1) (l)
27 Qualifying AT1 deductions that exceed the AT1 capital of the institution (negative amount)	-	-	36 (1) (j)
27a Other capital elements or deductions from common equity Tier 1	-24	-31	
28 Total regulatory adjustments to common equity Tier 1 (CET1)	**-1,257**	-1,146	Sum of rows 7 to 20a, 21, 22 and 25a to 27
29 Common equity Tier 1 (CET1)	**18,158**	18,176	Row 6 minus row 28
Additional Tier 1 capital (AT1): instruments			
30 Capital instruments and related share premium accounts	750	750	51, 52
31 of which: classified as equity under applicable accounting standards	750	750	
32 of which: classified as liabilities under applicable accounting standards	-	-	
33 Amount of qualifying items referred to in article 484 (4) CRR and the related share premium accounts subject to phase out from AT1	986	986	486 (3)
34 Qualifying Tier 1 capital instruments included in consolidated AT1 capital (including non-controlling interests not included in row 5) issued by subsidiaries and held by third parties	23	23	85, 86
35 of which: instruments issued by subsidiaries subject to phase out	-	-	486 (3)
36 Additional Tier 1 capital (AT1) before regulatory adjustments	**1,758**	1,759	Sum of rows 30, 33 and 34
Additional Tier 1 capital (AT1): regulatory adjustments			
37 Direct and indirect holdings by an institution of its own AT1 instruments (negative amount)	-65	-65	52 (1) (b), 56 (a), 57
38 Direct, indirect and synthetic holdings by the institution of the AT1 instruments of financial-sector entities where those entities have reciprocal cross-holdings with the institution designed to artificially inflate the institution's own funds (negative amount)	-	-	56 (b), 58
39 Direct, indirect and synthetic holdings by the institution of AT1 instruments of financial-sector entities where the institution does not have a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)	-	-	56 (c), 59, 60, 79
40 Direct, indirect and synthetic holdings by the institution of AT1 instruments of financial-sector entities where the institution has a significant investment in those entities (less than 10% and net of eligible short positions) (negative amount)	-	-	56 (d), 59, 79
41 Empty set in the EU[1]	-	-	
42 Qualifying T2 deductions that exceed the T2 capital of the institution (negative amount)	-	-	56 (e)
43 Total regulatory adjustments to additional Tier 1 capital (AT1)	**-65**	-65	Sum of rows 37 to 42
44 Additional Tier 1 capital (AT1)	**1,693**	1,694	Row 36 minus row 43
45 Tier 1 capital (T1 = CET1 + AT1)	**19,852**	19,871	Sum of rows 29 and 44
Tier 2 capital (T2): instruments and reserves			
46 Capital instruments and related share premium accounts	2,868	2,982	62, 63
47 Amount of qualifying items referred to in article 484 (5) CRR and the related share premium accounts subject to phase out from T2	-	1	486 (4)
48 Qualifying own funds instruments in consolidated T2 capital (including non-controlling interests and AT1 instruments not included in rows 5 or 34) issued by subsidiaries and held by third parties	124	102	87, 88
49 of which: instruments issued by subsidiaries subject to phase out	-	-	486 (4)
50 Credit risk adjustments	405	368	62 (c) and (d)
51 Tier 2 capital (T2) before regulatory adjustments	**3,396**	3,452	
Tier 2 capital (T2): regulatory adjustments			
52 Direct and indirect holdings by an institution of its own T2 instruments and subordinated loans (negative amount)	-51	-51	63 (b) (i), 66 (a), 67
53 Holdings of T2 instruments and subordinated loans of financial-sector entities where those entities have reciprocal cross-holdings with the institution designed to artificially inflate the institution's own funds	-	-	66 (b), 68

€ million		(A) Amount on disclosure reporting date Dec. 31, 2018	(A) Amount on disclosure reporting date Sep. 30, 2018	(B) Reference to article of Regulation (EU) No. 575/2013
	(negative amount)			
54	Direct and indirect holdings by the institution of T2 instruments and subordinated loans of financial-sector entities where the institution does not have a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)	-	-	66 (c), 69, 70, 79
55	Direct and indirect holdings by the institution of T2 instruments and subordinated loans of financial-sector entities where the institution has a significant investment in those entities (net of eligible short positions) (negative amount)	-1	-1	66 (d), 69, 79
56	Empty set in the EU[1]	-986	-986	
57	**Total regulatory adjustments to Tier 2 capital (T2)**	**-1,037**	**-1,037**	Sum of rows 52 to 56
58	**Tier 2 capital (T2)**	**2,359**	**2,415**	Row 51 minus row 57
59	**Total capital (TC = T1 + T2)**	**22,210**	**22,286**	Sum of rows 45 and 58
60	**Total risk-weighted assets**	**132,152**	**136,263**	
Capital ratios and buffers				
61	Common equity Tier 1 capital ratio (as a percentage of total exposure)	13.74	13.34	92 (2) (a)
62	Tier 1 capital ratio (as a percentage of total exposure)	15.02	14.58	92 (2) (b)
63	Total capital ratio (as a percentage of total exposure)	16.81	16.35	92 (2) (c)
64	Institution-specific capital buffer requirement (minimum CET1 requirement pursuant to article 92 (1) letter a CRR, plus capital conservation and countercyclical capital buffer requirements, systemic risk buffer and systemically important institution buffer (G-SII or O-SII buffer), expressed as a percentage of total exposure) [2]	8.81	8.80	CRD 128, 129, 130, 131, 133
65	of which: capital conservation buffer	1.88	1.88	
66	of which: countercyclical capital buffer	0.05	0.02	
67	of which: systemic risk buffer	0.66	0.66	
67a	of which: buffer for global systemically important institutions (G-SII) or other systemically important institutions (O-SII)	0.66	0.66	
68	Common equity Tier 1 available to meet buffers (as a percentage of total exposure)	4.93	4.54	CRD 128
69	Not relevant in EU regulation	●	●	
70	Not relevant in EU regulation	●	●	
71	Not relevant in EU regulation	●	●	
Amounts below threshold for deductions (before risk weight)				
72	Direct and indirect holdings by the institution of capital instruments of financial-sector entities where the institution does not have a significant investment in those entities (less than 10% and net of eligible short positions)	1,123	1,016	36 (1) (h), 46, 45, 56 (c), 59, 60, 66 (c), 69, 70
73	Direct and indirect holdings by the institution of CET1 instruments of financial-sector entities where the institution holds a significant investment in those entities (above 10% and net of eligible short positions)	455	467	36 (1) (i), 45, 48
74	Empty set in the EU	●	●	
75	Deferred tax assets that rely on future profitability, arising from temporary differences (amount below 10% threshold, net of related tax liability where the conditions in article 38 (3) CRR are met)	820	527	36 (1) (c), 38, 48
Applicable caps on the inclusion of provisions in Tier 2 capital				
76	Credit risk adjustments included in Tier 2 capital in respect of exposures subject to the standardized approach (prior to application of cap)	-	-	62
77	Cap on inclusion of credit risk adjustments in Tier 2 capital under standardized approach	304	322	62
78	Credit risk adjustments included in Tier 2 capital in respect of exposures subject to internal ratings-based approach (prior to application of cap)	405	368	62
79	Cap on inclusion of credit risk adjustments in Tier 2 capital under internal ratings based approach	501	519	62
Capital instruments subject to phase-out arrangements (only applicable between January 1, 2014 and January 1, 2022)				
80	Current cap on CET1 instruments subject to phase-out arrangements	-	-	484 (3), 486 (2) and (5)
81	Amount excluded from CET1 due to cap (excess over cap after redemptions and maturities)	-	-	484 (3), 486 (2) and (5)
82	Current cap on AT1 instruments subject to phase-out arrangements	986	986	484 (4), 486 (3) and (5)

€ million	(A) Amount on disclosure reporting date Dec. 31, 2018	(A) Amount on disclosure reporting date Sep. 30, 2018	(B) Reference to article of Regulation (EU) No. 575/2013
83 Amount excluded from AT1 due to cap (excess over cap after redemptions and maturities)	425	425	484 (4), 486 (3) and (5)
84 Current cap on T2 instruments subject to phase-out arrangements	0	23	484 (5), 486 (4) and (5)
85 Amount excluded from T2 due to cap (excess over cap after redemptions and maturities)	-	-	484 (5), 486 (4) and (5)

1 Since January 1, 2018: additional Tier 1 capital instruments that, although subject to the provisions of article 486 CRR, were still eligible as additional Tier 1 capital as at the reporting date.
2 Including the Pillar 2 requirement of 1.75 percent.

As at December 31, 2018, **common equity Tier 1 capital (CET1)** (Fig. 16, row 29) amounted to €18,158 million (September 30, 2018: €18,176 million).

It largely consisted of paid-in capital plus the capital reserve, retained earnings, and non-controlling interests. Under the CRR, certain assets have to be deducted directly from capital. Apart from a few exceptions, all of these deductions have to be made from common equity Tier 1 capital. They largely result from prudent valuation, intangible assets including goodwill, deferred income tax assets, and reciprocal cross-holdings. Since the start of 2018, 100 percent of the deductions from common equity Tier 1 capital have had to be recognized, as the transitional guidance no longer applies. As at December 31, 2018, common equity Tier 1 capital was down by €18 million compared with September 30, 2018. This decrease was predominantly due to the deduction for the first time of securitization exposures in an amount of €282 million from common equity Tier 1 capital (as an alternative, these exposures can be given a risk weight of 1,250 percent). The effect of this deduction was partly offset by the €138 million decrease in the deduction relating to goodwill and by the €104 million increase in profit retention.

Common equity Tier 1 capital plus **additional Tier 1 capital (AT1)** equals **Tier 1 capital (T1)**. Tier 1 capital consists, in particular, of profit-sharing rights and subordinated capital that is bound by certain conditions. There was only a small reduction in additional Tier 1 capital (Fig. 16, row 44) from €1,694 million to €1,693 million as at December 31, 2018. There were no changes in the period under review in the portfolio of issued additional Tier 1 capital instruments (AT1 bonds).

At the reporting date, **Tier 2 capital (T2)** pursuant to article 62 CRR and before capital deductions (Fig. 16, row 51) amounted to €3,396 million (September 30, 2018: €3,452 million). Subordinated capital pursuant to article 63 CRR (Fig. 16, row 46) constitutes a significant component of Tier 2 capital. The total decrease in Tier 2 capital of €114 million was largely due to the effects of the reduced level of eligibility of subordinated capital under the CRR in the last five years before the maturity date (Fig. 16, row 46).

Fig. 17 shows the **items, features, and terms and conditions** of the additional Tier 1 capital instruments classified as **additional Tier 1 capital** (AT1) before consolidation.

FIG. 17 – ADDITIONAL TIER 1 CAPITAL INSTRUMENTS AS AT DECEMBER 31, 2018 (PURSUANT TO ANNEX II OF IMPLEMENTING REGULATION (EU) NO. 1423/2013)

Issuer	Volume (€ million)	Interest rate (%)[1]	Start date	Maturity	Next call date
DZ BANK Capital Funding LLC, Wilmington[2]	300	3m EURIBOR + 250bp	Nov. 7, 2003	Perpetual	Feb. 7, 2019
DZ BANK Capital Funding LLC II, Wilmington[2]	500	3m EURIBOR + 160bp	Nov. 22, 2004	Perpetual	Feb. 22, 2019
DZ BANK Capital Funding LLC III, Wilmington[2]	350	3m EURIBOR + 150bp	Jun. 6, 2005	Perpetual	Mar. 6, 2019
DZ BANK Perpetual Funding (Jersey) Limited, St. Helier[2]	45	3m EURIBOR + 110bp	Jan. 9, 2006	Perpetual	Jan. 9, 2019
DZ BANK Perpetual Funding (Jersey) Limited, St. Helier[2]	84	3m EURIBOR + 80bp	Feb. 13, 2006	Perpetual	Feb. 13, 2019
DZ BANK Perpetual Funding (Jersey) Limited, St. Helier[2]	4	3m EURIBOR + 100bp	Mar. 17, 2006	Perpetual	Mar. 18, 2019
DZ BANK Perpetual Funding (Jersey) Limited, St. Helier[2]	87	3m EURIBOR + 80bp	Sep. 4, 2006	Perpetual	Mar. 6, 2019
DZ BANK Perpetual Funding (Jersey) Limited, St. Helier[2]	40	3m EURIBOR + 50bp	Apr. 16, 2007	Perpetual	Jan. 16, 2019
Subtotal I	**1,410[2]**				
DZ BANK	221	12m EURIBOR + 420bp	Nov. 11, 2015	Perpetual	Aug. 1, 2021
DZ BANK	221	12m EURIBOR + 420bp	Nov. 11, 2015	Perpetual	Aug. 1, 2021
DZ BANK	74	4.85%, from Aug. 1, 2021 12m EURIBOR + 420bp	Nov. 11, 2015	Perpetual	Aug. 1, 2021
DZ BANK	134	5.5%, from Aug. 1, 2026 12m EURIBOR + 420bp	Nov. 11, 2015	Perpetual	Aug. 1, 2026
DZ BANK	100	4.85%, from Aug. 1, 2021 fixed rate based on 5-year euro mid-swap rate + 440bp	Nov. 11, 2015	Perpetual	Aug. 1, 2021
Subtotal II	**750**				
Total	**2,160**				

1 bp = basis points.
2 Instruments subject to phase-out arrangements pursuant to articles 484 and 486 CRR.

At the reporting date, **Tier 2 capital (T2)** predominantly comprised open-ended own funds instruments without redemption incentives with a volume of €2,160 million (September 30, 2018: €2,160 million). In the last five years before their maturity date, these components of Tier 2 capital can only be included after they have been amortized on a straight-line basis.

Fig. 18 provides an overview of the items, features, and terms and conditions related to this subordinated capital.

FIG. 18 – SUBORDINATED CAPITAL AS AT DECEMBER 31, 2018 (PURSUANT TO ANNEX II OF IMPLEMENTING REGULATION (EU) NO. 1423/2013)

Issuer	Volume		Interest rate (%)[1]	Start date	Maturity
	€ million	Currency million			
DZ BANK	63	EUR 63	7.1000	2008	2020
DZ BANK	340	EUR 340	2.433 to 7.410	1999 to 2009	2019
DZ BANK	285	EUR 285	2.200 to 3.00	2013	2019
DZ BANK	7	USD 8	4.000	2013	2019
DZ BANK	371	EUR 371	3.574 to 7.150	2004 to 2010	2020
DZ BANK	20	EUR 20	3.100 to 3.200	2013	2020
DZ BANK	15	EUR 15	7.000 to 7.070	2009	2021
DZ BANK	224	EUR 224	3.640 to 5.000	2013	2021
DZ BANK	156	EUR 156	3.300 to 6.350	2009 to 2013	2022
DZ BANK	30	EUR 30	4.039 to 7.250	2003	2023
DZ BANK	281	EUR 281	3.230 to 4.370	2013	2023
DZ BANK	106	CHF 120	3.240	2013	2023
DZ BANK	6	USD 7	2.600	2015	2021
DZ BANK	38	EUR 38	1.7500	2015	2023
DZ BANK	72	EUR 72	6.500	2009	2024
DZ BANK	3	EUR 3	5.700	2010	2025
DZ BANK	278	EUR 278	2.25 to 2.89/EURIBOR + 1.25 to 1.75	2015	2025
DZ BANK	1	EUR 2	3.080	2015	2027
DZ BANK	64	EUR 64	3.085 to 3.300	2015	2030
DZ BANK	50	EUR 50	3.5 fixed, then 6m EURIBOR + 1.3 variable	2015	2030
DZ BANK	87	USD 100	4.800 to 4.900	2015	2030
DZ PRIVATBANK	15	EUR 15	6.100	1999	2019
DVB	40	EUR 40	2.640 to 2.750	2014	2019
DVB	75	EUR 75	2.200	2014	2019
DVB	100	EUR 100	2.000	2015	2021
DVB	77	EUR 77	2.300 to 2.560	2015	2022
DVB	50	EUR 50	2.000	2015	2023
Total	**2,854**				

1 bp = basis points.

Another component of own funds derives from the **comparison of loan loss allowances** pursuant to article 159 CRR, which DZ BANK carries out at banking group level. In this comparison, the expected losses computed on the IRBA exposure classes of central governments and central banks, institutions, corporates, and retail business are compared with the amounts that can effectively be recognized in the annual or interim financial statements for actual or potential impairment losses (split into receivables that are in default and not in default).

This **comparison of loan loss allowances for receivables that are in default and not in default** produced a **write-down surplus**, i.e. the loss allowances recognized for the IRBA exposures in the exposure classes listed above exceeded the expected losses for these exposures.

The bank classifies the **write-down surplus** computed for the DZ BANK banking group for **receivables that are in default and not in default** as Tier 2 capital in accordance with article 62 sentence 1 letter d CRR. This classification is consequently capped at 0.6 percent of the risk-weighted IRBA exposure amounts. This cap had no effect as at December 31, 2018. The total eligible amount (Fig. 16, row 50) for the DZ BANK banking group was calculated at €405 million (September 30, 2018: €368 million).

As at the reporting date, there was a **write-down deficit** (Fig. 16, row 12) totaling €136 million (September 30, 2018: €142 million) for **long-term equity investments** that was deducted from common equity Tier 1 capital pursuant to article 36 (1) letter d CRR.

With very few exceptions, the CRR requires all capital deductions to be made from common equity Tier 1 capital. Since the start of 2018, 100 percent of the deduction from CET1 has had to be recognized, as the transitional guidance no longer applies. The deductions largely result from prudent valuation, intangible assets including goodwill, deferred income tax assets, reciprocal cross-holdings, and securitizations.

Pursuant to article 437 (1) letter b CRR, the DZ BANK banking group is obliged to disclose a description of the **main features of the common equity Tier 1, additional Tier 1, and Tier 2 capital instruments issued** in accordance with Implementing Regulation (EU) No. 1423/2013.

This description is published in a separate annex on DZ BANK's website in the Investor Relations section under Bondholder Information, subsection Capital Instruments, together with the **full terms and conditions connected with these capital instruments**, whose publication is required pursuant to article 437 (1) letter c CRR
https://www.dzbank.de/content/dzbank_de/de/home/unser_profil/investorrelations/info_fuer_fremdkapitalgeber/kapitalinstrumente.disclaimer.disclaimer_kapitalinstrumente.html).

5.2.2 Reconciliation of equity reported on the balance sheet with regulatory own funds of the DZ BANK banking group

(ARTICLE 437 (1) LETTER A CRR)

One of the disclosure requirements is a reconciliation of equity reported under IFRS with equity reported for companies consolidated for regulatory purposes (Financial Reporting, FINREP) and regulatory own funds (Common Reporting, COREP). This reconciliation as at the reporting date is shown in Fig. 19.

FIG. 19 – RECONCILIATION OF EQUITY REPORTED ON THE BALANCE SHEET WITH REGULATORY OWN FUNDS AS AT DECEMBER 31, 2018 (ARTICLE 437 (1) LETTER A CRR IN CONJUNCTION WITH ANNEX I OF IMPLEMENTING REGULATION (EU) NO. 1423/2013)

€ million	Carrying amounts on consolidated balance sheet in accordance with financial reporting (IFRS)	Consolidation/deconsolidation of entities	Carrying amounts under scope of regulatory consolidation (FINREP)	Regulatory law (COREP)	Reference to Fig. 16 – Structure of own funds
Assets					
Cash and cash equivalents	51,845	165	52,010	-	
Loans and advances to banks	91,627	-131	91,496	-	
Loans and advances to customers	174,438	4,581	179,019	-	
Hedging instruments (positive fair values)	883	0	883	-	
Financial assets held for trading	37,942	-108	37,834	-	
Investments	48,262	6,039	54,301	-	
Investments held by insurance companies	100,840	-100,840	0	-	
Property, plant and equipment, and investment property	1,423	-39	1,384	-	
Income tax assets	1,457	-355	1,102	823	
Other assets	4,655	-2,880	1,775	524	
Loss allowances	-2,305	-70	-2,375	-	
Non-current assets and disposal groups classified as held for sale	7,133	199	7,332	-	
Fair value changes of the hedged items in portfolio hedges of interest-rate risk	533	6	539	-	
Total assets	**518,733**	**-93,433**	**425,300**	**-**	
Equity and liabilities					
Deposits from banks	142,486	297	142,783	-	
Deposits from customers	132,548	5,985	138,533	-	
Debt certificates issued including bonds	63,909	373	64,282	-	
Hedging instruments (negative fair values)	2,516	8	2,524	-	
Financial liabilities held for trading	44,979	5	44,984	-	
Provisions	3,380	71	3,451	-	

€ million	Carrying amounts on consolidated balance sheet in accordance with financial reporting (IFRS)	Consolidation/deconsolidation of entities	Carrying amounts under scope of regulatory consolidation (FINREP)	Regulatory law (COREP)	Reference to Fig. 16 – Structure of own funds
Insurance liabilities	93,252	-93,252	0	-	
Income tax liabilities	920	-519	401	4	
Other liabilities	7,919	-5,773	2,146	-	
Subordinated capital	2,897	21	2,918	-	
Liabilities included in disposal groups classified as held for sale	281	323	604	-	
Fair value changes of the hedged items in portfolio hedges of interest-rate risk	134	0	134	-	
Common equity Tier 1 (CET1) before regulatory adjustments					
Subscribed capital	4,926	0	4,926	4,926	1
Capital reserve	5,551	0	5,551	5,551	1
Retained earnings	8,530	-801	7,729	6,219	2
Reserve from other comprehensive income	599	206	805	2,036	3
Non-controlling interests	2,737	-916	1,821	142	5
Unappropriated earnings	324	539	863	541	6
Total common equity Tier 1 (CET1) before regulatory adjustments				**19,415**	**6**
Common equity Tier 1 (CET1): regulatory adjustments					
Capital deductions					
Loan loss allowances resulting from prudent valuation requirements (negative amount)				-316	7
Intangible assets (negative amount)	-506	-18	-524	-524	8
Deferred taxes related to other intangible assets (negative amount)	4	0	4	4	8
Deferred tax assets that rely on future profitability, not arising from temporary differences (negative amount)	-39	31	-8	-8	10
Hedge reserve (cash flow hedge reserve)			0	0	11
Negative amounts resulting from the calculation of expected loss amounts			-	-136	12
Effects resulting from measurement of own liabilities			-	34	14
Defined benefit pension fund assets			-	-2	15
Holdings of the CET1 instruments of financial-sector entities where those entities have reciprocal cross-holdings with the institution			-	-2	17
Exposure arising from the following items qualifying for a risk weight of 1,250%, where the institution opts for the deduction alternative			-	-282	20a 20c
Deductible deferred tax assets that rely on future profitability, arising from temporary differences (negative amount)	-1,016	201	-815	-2	21
Other capital elements or deductions from common equity Tier 1			-	-24	27a
Total regulatory adjustments to common equity Tier 1 (CET1)			**-**	**-1,257**	**28**
Common equity Tier 1 (CET1) after regulatory adjustments				**18,158**	**29**
Additional Tier 1 capital (AT1) before regulatory adjustments: instruments					
Capital instruments and related share premium accounts (additional equity components)	845	0	845	750	30
Amount of qualifying items referred to in article 484 (4) CRR and the related share premium accounts subject to phase out from AT1	1,410	0	1,410	986	33
Non-controlling interests in subsidiaries				-	33a

€ million	Carrying amounts on consolidated balance sheet in accordance with financial reporting (IFRS)	Consolidation/deconsolidation of entities	Carrying amounts under scope of regulatory consolidation (FINREP)	Regulatory law (COREP)	Reference to Fig. 16 – Structure of own funds
Qualifying Tier 1 capital instruments included in consolidated AT1 capital (including non-controlling interests not included in row 5) issued by subsidiaries and held by third parties				23	34 and 35
Additional Tier 1 capital (AT1) before regulatory adjustments				**1,759**	**36**
Additional Tier 1 capital (AT1): regulatory adjustments					
Direct and indirect holdings by an institution of its own AT1 instruments (negative amount)	34	-20	14	-65	37
Holdings of AT1 instruments of financial-sector entities where those entities have reciprocal cross-holdings with the institution designed to artificially inflate the institution's own funds (negative amount)			-	-	38
Direct and indirect holdings by the institution of AT1 capital instruments of financial-sector entities where the institution does not have a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)			-	-	39
Direct and indirect holdings by the institution of AT1 capital instruments of financial-sector entities where the institution has a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)			-	-	40
Qualifying T2 deductions that exceed the T2 capital of the institution (negative amount)			-	-	42
Total regulatory adjustments to additional Tier 1 capital (AT1)				**-65**	**43**
Additional Tier 1 capital (AT1) after regulatory adjustments				**1,694**	**44**
Tier 1 capital (T1 = CET1 + AT1)				**19,852**	**45**
Tier 2 capital (T2): instruments and reserves					
Capital instruments and related share premium accounts	2,897	21	2,918	2,868	46
Amount of qualifying items referred to in article 484 (5) CRR and the related share premium accounts subject to phase out from T2				0	47
Qualifying own funds instruments in consolidated T2 capital (including non-controlling interests and AT1 instruments not included in rows 5 or 34) issued by subsidiaries and held by third parties				124	48
of which: instruments issued by subsidiaries subject to phase out				-	49
Credit risk adjustments				405	50
IRB excess of provisions over expected losses, eligible				-	50
Tier 2 capital (T2) before regulatory adjustments				**3,396**	**51**
Tier 2 capital (T2): regulatory adjustments					
Direct and indirect holdings by an institution of its own T2 instruments and subordinated loans (negative amount)				-51	52
Holdings of T2 instruments and			-	-	53

€ million	Carrying amounts on consolidated balance sheet in accordance with financial reporting (IFRS)	Consolidation/deconsolidation of entities	Carrying amounts under scope of regulatory consolidation (FINREP)	Regulatory law (COREP)	Reference to Fig. 16 – Structure of own funds
subordinated loans of financial-sector entities where those entities have reciprocal cross-holdings with the institution designed to artificially inflate the institution's own funds (negative amount)					
Direct and indirect holdings by the institution of T2 instruments and subordinated loans of financial-sector entities where the institution does not have a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)			-	-	54
of which: new holdings not subject to transitional arrangements			-	-	54a
of which: holdings existing before January 1, 2013 and subject to transitional arrangements			-	-	54b
Direct and indirect holdings by the institution of T2 instruments and subordinated loans of financial-sector entities where the institution has a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)			-	-1	55
Regulatory adjustments to Tier 2 capital in respect of amounts subject to pre-CRR treatment and transitional treatments subject to phase out pursuant to Regulation (EU) No. 575/2013 (i.e. CRR residual amounts)			-	-986	56
Total regulatory adjustments to Tier 2 capital (T2)				**-1,037**	**57**
Tier 2 capital (T2) after regulatory adjustments				**2,359**	**58**
Equity (IFRS/FINREP)/ own funds (COREP)	**23,512**	**-972**	**22,540**	**22,210**	**59**
Total equity and liabilities	**518,733**	**-93,433**	**425,300**		

1 See Fig. 7.

FIG. 20 – RECONCILIATION OF EQUITY REPORTED ON THE BALANCE SHEET WITH REGULATORY OWN FUNDS AS AT JUNE 30, 2018 (ARTICLE 437 (1) LETTER A CRR IN CONJUNCTION WITH ANNEX I OF IMPLEMENTING REGULATION (EU) NO. 1423/2013)

€ million	Carrying amounts on consolidated balance sheet in accordance with financial reporting (IFRS)	Consolidation/deconsolidation of entities	Carrying amounts under scope of regulatory consolidation (FINREP)	Regulatory law (COREP)	Reference to Fig. 16 – Structure of own funds
Assets					
Cash and cash equivalents	69,240	171	69,411	-	
Loans and advances to banks	92,791	612	93,403	-	
Loans and advances to customers	177,601	4,229	181,830	-	
Hedging instruments (positive fair values)	1,131	1	1,132	-	
Financial assets held for trading	40,900	-109	40,791	-	
Investments	49,816	6,196	56,012	0	
Investments held by insurance companies	101,112	-101,112	0	-	
Property, plant and equipment, and investment property	1,458	-83	1,375	-	
Income tax assets	1,151	-337	814	505	
Other assets	5,074	-3,239	1,835	671	

€ million	Carrying amounts on consolidated balance sheet in accordance with financial reporting (IFRS)	Consolidation/deconsolidation of entities	Carrying amounts under scope of regulatory consolidation (FINREP)	Regulatory law (COREP)	Reference to Fig. 16 – Structure of own funds
Loss allowances	-2,606	-102	-2,708	-	
Non-current assets and disposal groups classified as held for sale	120	-66	54	-	
Fair value changes of the hedged items in portfolio hedges of interest-rate risk	446	-2	444	-	
Total assets	**538,234**	**-93,841**	**444,393**	**-**	
Equity and liabilities					
Deposits from banks	144,346	675	145,021	-	
Deposits from customers	137,598	6,236	143,834	-	
Debt certificates issued including bonds	69,881	381	70,262	-	
Hedging instruments (negative fair values)	2,987	0	2,987	-	
Financial liabilities held for trading	50,750	2	50,752	-	
Provisions	3,153	61	3,214	-	
Insurance liabilities	93,823	-93,823	0	-	
Income tax liabilities	969	-631	338	29	
Other liabilities	7,358	-5,703	1,655	-	
Subordinated capital	3,420	64	3,484	-	
Liabilities included in disposal groups classified as held for sale	7	0	7	-	
Fair value changes of the hedged items in portfolio hedges of interest-rate risk	117	0	117	-	
Common equity Tier 1 (CET1) before regulatory adjustments					
Subscribed capital	4,926	0	4,926	4,926	1
Capital reserve	5,551	0	5,551	5,551	1
Retained earnings	8,139	-294	7,845	6,302	2
Reserve from other comprehensive income	899	200	1,099	2,360	3
Non-controlling interests	2,817	-1,017	1,800	127	5
Unappropriated earnings	648	8	656	437	6
Total common equity Tier 1 (CET1) before regulatory adjustments				**19,704**	**6**
Common equity Tier 1 (CET1): regulatory adjustments					
Capital deductions					
Loan loss allowances resulting from prudent valuation requirements (negative amount)				-348	7
Intangible assets (negative amount)	-654	-17	-671	-671	8
Deferred taxes related to other intangible assets (negative amount)	25	4	29	29	8
Deferred tax assets that rely on future profitability, not arising from temporary differences (negative amount)	-75	69	-6	-6	10
Hedge reserve (cash flow hedge reserve)			2	2	11
Negative amounts resulting from the calculation of expected loss amounts			-	-142	12
Effects resulting from measurement of own liabilities			-	31	14
Holdings of the CET1 instruments of financial-sector entities where those entities have reciprocal cross-holdings with the institution			-	-2	17
Deductible deferred tax assets that rely on future profitability, arising from temporary differences (negative amount)	-667	168	-499	-	21
Other capital elements or deductions from common equity Tier 1			-	-24	27a
Total regulatory adjustments to common equity Tier 1 (CET1)			-	**-1,131**	**28**

€ million	Carrying amounts on consolidated balance sheet in accordance with financial reporting (IFRS)	Consolidation/deconsolidation of entities	Carrying amounts under scope of regulatory consolidation (FINREP)	Regulatory law (COREP)	Reference to Fig. 16 – Structure of own funds
Common equity Tier 1 (CET1) after regulatory adjustments				**18,573**	**29**
Additional Tier 1 capital (AT1) before regulatory adjustments: instruments					
Capital instruments and related share premium accounts (additional equity components)	845	0	845	750	30
Amount of qualifying items referred to in article 484 (4) CRR and the related share premium accounts subject to phase out from AT1	1,410	0	1,410	986	33
Non-controlling interests in subsidiaries				-	33a
Qualifying Tier 1 capital instruments included in consolidated AT1 capital (including non-controlling interests not included in row 5) issued by subsidiaries and held by third parties				22	34 and 35
Additional Tier 1 capital (AT1) before regulatory adjustments				**1,758**	**36**
Additional Tier 1 capital (AT1): regulatory adjustments					
Direct and indirect holdings by an institution of its own AT1 instruments (negative amount)	21	-21	0	-65	37
Holdings of AT1 instruments of financial-sector entities where those entities have reciprocal cross-holdings with the institution designed to artificially inflate the institution's own funds (negative amount)			-	-	38
Direct and indirect holdings by the institution of AT1 capital instruments of financial-sector entities where the institution does not have a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)			-	-	39
Direct and indirect holdings by the institution of AT1 capital instruments of financial-sector entities where the institution has a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)			-	-	40
Qualifying T2 deductions that exceed the T2 capital of the institution (negative amount)			-	-	42
Total regulatory adjustments to additional Tier 1 capital (AT1)				**-65**	**43**
Additional Tier 1 capital (AT1) after regulatory adjustments				**1,693**	**44**
Tier 2 capital (T2): instruments and reserves					
Capital instruments and related share premium accounts	3,420	64	3,484	3,087	46
Amount of qualifying items referred to in article 484 (5) CRR and the related share premium accounts subject to phase out from T2				3	47
Qualifying own funds instruments in consolidated T2 capital (including non-controlling interests and AT1 instruments not included in rows 5 or 34) issued by subsidiaries and held by third parties				122	48
of which: instruments issued by subsidiaries subject to phase out				-	49
Credit risk adjustments				346	50

€ million	Carrying amounts on consolidated balance sheet in accordance with financial reporting (IFRS)	Consolidation/deconsolidation of entities	Carrying amounts under scope of regulatory consolidation (FINREP)	Regulatory law (COREP)	Reference to Fig. 16 – Structure of own funds
IRB excess of provisions over expected losses, eligible				-	50
Tier 2 capital (T2) before regulatory adjustments				**3,558**	**51**
Tier 2 capital (T2): regulatory adjustments					
Direct and indirect holdings by an institution of its own T2 instruments and subordinated loans (negative amount)				-51	52
Holdings of T2 instruments and subordinated loans of financial-sector entities where those entities have reciprocal cross-holdings with the institution designed to artificially inflate the institution's own funds (negative amount)			-	-	53
Direct and indirect holdings by the institution of T2 instruments and subordinated loans of financial-sector entities where the institution does not have a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)			-	-	54
of which: new holdings not subject to transitional arrangements			-	-	54a
of which: holdings existing before January 1, 2013 and subject to transitional arrangements			-	-	54b
Direct and indirect holdings by the institution of T2 instruments and subordinated loans of financial-sector entities where the institution has a significant investment in those entities (above 10% and net of eligible short positions) (negative amount)			-	-1	55
Regulatory adjustments to Tier 2 capital in respect of amounts subject to pre-CRR treatment and transitional treatments subject to phase out pursuant to Regulation (EU) No. 575/2013 (i.e. CRR residual amounts)			-	-986	56
Total regulatory adjustments to Tier 2 capital (T2)				**-1,038**	**57**
Tier 2 capital (T2) after regulatory adjustments				**2,520**	**58**
Equity (IFRS/FINREP)/ own funds (COREP)	**23,825**	**-1,103**	**22,722**	**22,786**	**59**
Total equity and liabilities	**538,234**	**-93,841**	**444,393**		

1 See Fig. 7.

The differences between the assets and the equity and liabilities reported in the IFRS consolidated financial statements and the DZ BANK banking group's assets and equity and liabilities under FINREP arose from different entities being included in each scope of consolidation and from different consolidation methods.

The variance in the consolidation methods relates to R+V, which was consolidated using the equity method in the DZ BANK banking group's financial statements under FINREP but was fully consolidated in the consolidated financial statements. As a result, the figure for non-controlling interests was €951 million lower (June 30, 2018: €1,054 million lower).

Differences in the scope of consolidation also arose at the level of the consolidated subgroups DVB, UMH, and VR LEASING.

The differences between the equity under FINREP and the common equity Tier 1 capital under the CRR/COREP arise solely from the provisions of the CRR. The reconciliation figures shown in Fig. 20 are explained below.

- The retained earnings according to FINREP includes the losses arising from revaluation of defined benefit pension plans in an amount of €580 million. In COREP, this line item is included in accumulated other comprehensive income (row 3 in the structure of own funds). The retained earnings according to FINREP also include other reserves in an amount of €1,809 million that, under COREP, are also recognized in accumulated other comprehensive income (row 3 in the structure of own funds). According to COREP, the fund for home savings risk is not eligible as CET1 and must therefore be deducted in an amount of €282 million.
- According to article 35 CRR in conjunction with article 468 CRR, 100 percent of the total volume of the reserve from other comprehensive income is eligible as CET1.
- The capital instruments and related share premium accounts amounting to €845 million contain the €750 million included in additional Tier 1 capital (AT1) under COREP and further instruments of €95 million that have to be shown as Tier 2 capital according to article 63 CRR.
- The non-controlling interests contain further AT1 capital instruments of €1,410 million that, under COREP, have to be shown as additional Tier 1 capital in an amount of €986 million according to the transitional guidance.

The Tier 2 capital (T2) mainly consists of subordinated capital instruments. Under IFRS, these are included in the 'capital instruments and related share premium accounts' line item on the balance sheet. The eligibility of the instruments under the CRR is limited if their term to maturity is less than five years. This is the main reason for the reduction in eligibility for regulatory purposes. Furthermore, use of the pro rata interest reported on the balance sheet is not permitted according to the regulatory requirements.

5.2.3 Capital requirements
(ARTICLE 438 CRR)

Fig. 22 and Fig. 23 give an overview of risk-weighted assets and the corresponding capital requirements.

The **DZ BANK banking group's** regulatory **capital requirements** totaled €10,572 million as at the reporting date (September 30, 2018: €10,901 million).

Fig. 21 provides an overview of risk-weighted assets and the associated capital requirements in accordance with the stipulations in EBA/GL/2016/11. The capital requirements in the table below are shown for **credit risk excluding counterparty credit risk** in accordance with the **Standardized Approach to credit risk (CRSA)** and in accordance with the **internal ratings-based approach (IRB approach)** and for **counterparty credit risk (CCR)**. The capital requirement for **securitizations** also differs under the Standardized Approach and under the IRB approach. The exposures reported under the IRB approach are further broken down by ratings-based approach and Internal Assessment Approach. The capital requirement for **market risk** is determined using the **Standardized Approach** and **internal models approach (IMA)**; for **operational risk**, only the Standardized Approach is used. Row 27 contains amounts below the thresholds for deductions that relate to significant long-term equity investments within the financial sector that are subject to a risk weight of 250 percent and deductions for deferred taxes resulting from temporary differences.

FIG. 21 – EU OV1 – OVERVIEW OF RISK-WEIGHTED ASSETS (RWAS)

Reference to CRR			Dec. 31, 2018		Sep. 30, 2018	
€ million			Risk-weighted assets	Capital requirements	Risk-weighted assets	Capital requirements
	1	**Credit risk (excluding CCR)**	**102,098**	**8,168**	**103,241**	**8,259**
Article 438 (c) and (d)	2	of which: Standardized Approach	20,058	1,605	19,768	1,581
	3	of which: foundation IRB (FIRB) approach	45,469	3,638	46,139	3,691
	4	of which: advanced IRB (AIRB) approach	15,576	1,246	15,548	1,244
Article 438 (d)	5	of which: long-term equity investments in the IRB approach under the simple risk-weighted approach or IMA	20,995	1,680	21,786	1,743
Article 107 Article 438 (c) and (d)	**6**	**Counterparty credit risk (CCR)**	**4,714**	**377**	**5,450**	**436**
Article 438 (c) and (d)	7	of which: mark-to-market method	3,298	264	3,910	313
	8	of which: original exposure method	-	-	-	-
	9	of which: Standardized Approach	-	-	-	-
	10	of which: internal model method (IMM)	-	-	-	-
Article 438 (c) and (d)	11	of which: risk exposure amount for contributions to the default fund of a central counterparty (CCP)	191	15	178	14
	12	of which: credit valuation adjustments (CVA)	1,224	98	1,363	109
Article 438 (e)	**13**	**Settlement risk**	**0**	**0**	**0**	**0**
Article 449 (o) and (i)	**14**	**Securitization exposure in the banking book (after the cap)**	**2,529**	**202**	**6,979**	**558**
	15	of which: IRB approach	348	28	2,823	226
	16	of which: IRB Supervisory Formula Approach (SFA)	-	-	-	-
	17	of which: Internal Assessment Approach (IAA)	1,323	105	1,198	96
	18	of which: Standardized Approach	858	69	2,958	237
Article 438 (e)	**19**	**Market risk**	**9,104**	**728**	**7,613**	**609**
	20	of which: Standardized Approach	2,320	186	1,801	144
	21	of which: IMA	6,783	543	5,811	465
Article 438 (e)	**22**	**Large exposures**	**-**	**-**	**-**	**-**
Article 438 (f)	**23**	**Operational risk**	**10,623**	**850**	**10,623**	**850**
	24	of which: Basic Indicator Approach	-	-	-	-
	25	of which: Standardized Approach	10,623	850	10,623	850
	26	of which: Advanced Measurement Approach	-	-	-	-
Article 437 (2), article 48, and article 60	27	Amounts below the thresholds for deduction (subject to 250% risk weight)	3,085	247	2,356	189
Article 500	28	Floor adjustment	-	-	-	-
	29	**Total**	**132,152**	**10,572**	**136,263**	**10,901**

With a capital requirement of €8,168 million, credit risk is particularly important within the DZ BANK banking group. The €329 million reduction in risk-weighted assets compared with the previous reporting date (row 29) was largely due to the exercising of the option to deduct securitization exposures from capital (row 14), the increase under the internal market risk model (row 21), the first-time recognition of BSH's currency risk (row 20), the rise in deferred tax assets (row 27), and the decrease in the carrying amount of the equity investment in R+V (row 3).

Fig. 22 and Fig. 23 show the capital requirements in relation to the risk types of relevance for regulatory purposes (credit risk, market risk, and operational risk) as at December 31, 2018. These disclosures cover all the entities consolidated for regulatory purposes in the DZ BANK banking group.

FIG. 22 – CAPITAL REQUIREMENTS (PART 1)

€ million	Dec. 31, 2018 Capital requirements	Dec. 31, 2018 Risk-weighted assets	Sep. 30, 2018 Capital requirements	Sep. 30, 2018 Risk-weighted assets
1 Credit risk				
1.1 Standardized Approach to credit risk				
Central governments and central banks	170	2,127	112	1,396
Regional governments or local authorities	23	283	20	251
Other public-sector entities	5	66	5	60
Multilateral development banks	0	3	0	3
International organizations	-	-	-	-
Institutions	41	509	45	560
Corporates	806	10,078	815	10,191
Retail business	290	3,620	272	3,396
Exposures secured by mortgages on immovable property	200	2,497	200	2,495
Exposures in default	23	293	20	244
Exposures associated with particularly high risk	86	1,073	85	1,063
Covered bonds	3	43	4	47
Institutions and corporates with a short-term credit assessment	0	0	0	-
Units or shares in collective investment undertakings ('CIUs')	130	1,630	135	1,689
Other items	90	1,119	107	1,343
Total credit risk under the Standardized Approach	**1,867**	**23,342**	**1,819**	**22,738**
1.2 IRB approaches to credit risk				
Central governments and central banks	89	1,114	105	1,314
Institutions	572	7,156	599	7,491
Corporates	3,062	38,281	3,041	38,018
of which: SMEs	203	2,536	196	2,445
Retail business	1,064	13,303	1,054	13,170
of which: mortgage-backed	662	8,272	649	8,107
qualified revolving	-	-	-	-
other retail business	403	5,032	405	5,063
Other non-credit-obligation assets	145	1,814	201	2,509
Total under IRB approaches to credit risk	**4,933**	**61,668**	**5,000**	**62,502**
1.3 Securitizations				
Securitizations under the Standardized Approach to credit risk	69	858	237	2,958
of which: re-securitizations	-	-	-	-
Securitizations under IRB approaches	134	1,671	322	4,021
of which: re-securitizations	-	-	0	1
Total securitizations	**202**	**2,529**	**558**	**6,979**
1.4 Long-term equity investments				
Long-term equity investments under IRB approaches	1,772	22,151	1,835	22,939
of which: internal modeling approach	-	-	-	-
PD/LGD approaches	10	120	9	116
simple risk-weight approach	1,680	20,995	1,743	21,786
of which: exchange-traded equity investments	0	1	0	1
equity investments not exchange-traded, but part of a diversified portfolio	4	54	4	54
other equity investments	1,675	20,940	1,738	21,301
Equity investments exempted from IRB approaches and included in Standardized Approach to credit risk	7	83	7	57
of which: grandfathering	-	-	-	-
Total long-term equity investments	**1,779**	**22,234**	**1,842**	**23,024**
1.5 Exposure amount for contributions to default fund of a CCP	15	191	14	178
1.6 Credit valuation adjustments (CVA charge)	98	1,224	109	1,363
1.7 Exposure amount for counterparty and settlement risk	0	0	0	0
1.8 Large exposure excess amounts in the trading book	-	-	-	-
Total credit risk	**8,895**	**111,188**	**9,343**	**116,784**

FIG. 23– CAPITAL REQUIREMENTS (PART 2)

	Dec. 31, 2018	Sep. 30, 2018

€ million	Capital requirements	Risk-weighted assets	Capital requirements	Risk-weighted assets
2 Market risk				
Standardized approach	**186**	**2,320**	**144**	**1,801**
of which: trading book risk exposures	7	94	5	59
of which: interest-rate risk	8	97	5	59
of which: general and specific price risk (net interest-rate exposure)	8	97	5	59
of which: specific price risk for securitization exposures in trading book	7	94	4	55
specific price risk in CTP	0	3	0	3
equity risk	0	0	0	0
special approach for position risk from CIUs	12	146	13	168
currency risk	165	2,063	125	1,560
commodity risk	1	15	1	14
Internal modeling approach	**543**	**6,783**	**465**	**5,811**
Total market risk	**728**	**9,104**	**609**	**7,613**
3 Operational risk				
Operational risk under Basic Indicator Approach	-	-	-	-
Operational risk under Standardized Approach	850	10,623	850	10,623
Operational risk under Advanced Measurement Approach (AMA)	-	-	-	-
Total operational risk	**850**	**10,623**	**850**	**10,623**
4 Other				
Additional exposure pursuant to article 3 CRR	99	1,237	99	1,243
Total other exposures	**99**	**1,237**	**99**	**1,243**
Sum total	**10,572**	**132,152**	**10,901**	**136,263**

Fig. 21 is based on the disclosure requirements in EBA/GL/2016/11 and provides a condensed summary of the risk-weighted assets and the associated capital requirements.

Under the Standardized Approach to credit risk, risk-weighted assets had risen by €604 million as at the reporting date compared with September 30, 2018. This rise was mainly attributable to two effects: the approximately €730 million increase in deferred tax assets at the level of the DZ BANK banking group, which was partly offset by an approximately €200 million reduction in the assessment basis for guarantee products at UMH. There was also a moderate decrease in risk-weighted assets in the DZ BANK banking group at the end of the year.

The €748 million fall in R+V's carrying amount, calculated in accordance with the equity method, can be seen in row 1.4 (long-term equity investments in the IRB approach under the simple risk-weighted approach).
The increase in market risk – Standardized Approach of €503 million was due to the first-time recognition of Bausparkasse Schwäbisch Hall's currency risk and the increase under the internal market risk model, which was primarily attributable to an increase in the 60-day average under the sVaR.

The fall in the total risk amount was largely due to a change regarding the option to deduct securitization exposures from capital. As at December 31, 2018, securitization exposures with poor credit ratings (B+ or worse) were deducted directly from own funds. Previously, these exposures were given a risk weight of 1,250 percent and included in risk-weighted assets. As a result of this change, risk-weighted assets went down by roughly €4,400 million.

Risk-weighted exposure amounts for specialized lending and long-term equity investments
(ARTICLE 438 SENTENCE 2 CRR)

Fig. 24 shows the risk exposures contained in the portfolio as at the reporting date for the banking group's specialized lending under the supervisory slotting approach (assignment of risk weights prescribed by the supervisory authority). It also contains exposures for long-term equity investments under the simple risk-weighted approach, for which prescribed risk weights have to be used.

FIG. 24 – EU CR10 – IRB (SPECIALIZED LENDING AND LONG-TERM EQUITY INVESTMENTS)

Specialized lending

€ million

Regulatory categories	Remaining maturity	On-balance-sheet amount	Off-balance-sheet amount	Risk weight (%)	Exposure amount	RWAs	Expected losses
Category 1	Less than 2.5 years	229	9	50	236	118	
	Equal to or more than 2.5 years	793	27	70	847	593	3
Category 2	Less than 2.5 years	79	8	70	83	58	0
	Equal to or more than 2.5 years	854	60	90	906	815	7
Category 3	Less than 2.5 years	20	28	115	40	46	1
	Equal to or more than 2.5 years	389	58	115	445	511	12
Category 4	Less than 2.5 years	-	-	250	-	-	-
	Equal to or more than 2.5 years	-	-	250	-	-	-
Category 5	Less than 2.5 years	-	-	-	-	-	-
	Equal to or more than 2.5 years	-	-	-	-	-	-
Total as at Dec. 31, 2018	**Less than 2.5 years**	**328**	**44**		**359**	**222**	**1**
	Equal to or more than 2.5 years	**2,037**	**145**		**2,197**	**1,919**	**23**
Total as at Jun. 30, 2018	Less than 2.5 years	357	75		409	235	1
	Equal to or more than 2.5 years	2,161	131		2,299	1,966	21

Long-term equity investments under the simple risk-weighted approach

Regulatory categories	On-balance-sheet amount	Off-balance-sheet amount	Risk weight	Exposure amount	RWAs	Capital requirements
Private long-term equity investments	28	0	190	29	54	4
Exchange-traded long-term equity investments	0	-	290	0	1	0
Other long-term equity investments	3,418	-	370	3,409	12,612	1,009
Total as at Dec. 31, 2018	**3,446**	**0**		**3,409**	**12,666**	**1,013**
Total as at Jun. 30, 2018	3,451	0		5,905	21,797	1,744

DZ BANK has a significant long-term equity investment in R+V. The carrying amount (before risk weight) of this long-term equity investment is not deducted from DZ BANK's own funds. Instead, it is deemed a risk-weighted asset and backed by own funds. Fig. 25 summarizes the effects for the DZ BANK banking group of the long-term equity investment in R+V.

FIG. 25 – EU INS1 – NON-DEDUCTED PARTICIPATIONS IN INSURANCE UNDERTAKINGS

	Value	
€ million	**Dec. 31, 2018**	Jun. 30, 2018
Holdings of own funds instruments of a financial-sector entity where the institution has a significant investment not deducted from own funds (before risk-weighting)	5,495	5,698
Total risk-weighted assets (RWAs)	20,333	21,081

The €748 million decrease in risk-weighted assets was mainly the result of the adjustment to R+V's carrying amount, calculated in accordance with the equity method.

5.2.4 Capital ratios

The **total capital ratio** of the **DZ BANK banking group** rose to 16.8 percent as at December 31, 2018 (September 30, 2018: 16.4 percent). The **Tier 1 capital ratio** of 15.0 percent as at the reporting date was also higher than the figure of 14.6 percent as at September 30, 2018. And at 13.7 percent as at the reporting date, the **common equity Tier 1 capital ratio** exceeded the ratio of 13.3 percent as at September 30, 2018.

FIG. 26 – REGULATORY CAPITAL RATIOS OF THE DZ BANK BANKING GROUP IN ACCORDANCE WITH THE CRR

%	Total capital ratio			Tier 1 capital ratio			Common equity Tier 1 capital ratio		
Entity	**Dec. 31, 2018**	Sep. 30, 2018	Dec. 31, 2017	**Dec. 31, 2018**	Sep. 30, 2018	Dec. 31, 2017	**Dec. 31, 2018**	Sep. 30, 2018	Dec. 31, 2017
DZ BANK banking group	**16.8**	16.4	17.2	**15.0**	14.6	15.2	**13.7**	13.3	13.8
DZ BANK (individual institution)	19.7		22.4	16.3		18.2	15.4		17.4
BSH (banking group)	30.4		28.2	30.4		28.2	30.4		28.2
DVB (banking group)	36.1		31.5	27.0		21.8	27.0		21.8
DZ PRIVATBANK (banking group)	22.7		22.3	22.7		22.2	22.7		22.2
TeamBank (banking group)	15.0		11.8	12.7		9.5	12.0		8.7

This increase in the DZ BANK banking group's capital ratios was primarily attributable to the effects described in sections 5.2.1 and 5.2.4. There were no other material changes to the DZ BANK banking group's capital adequacy compared with December 31, 2017.

Article 13 (1) CRR requires the significant subsidiaries of the DZ BANK banking group and those of material significance for their local market to disclose the information specified in articles 437 CRR (own funds), 438 CRR (capital requirements), 440 CRR (capital buffers), 442 CRR (credit risk adjustments and loss allowances), 450 CRR (remuneration), 451 CRR (leverage ratio), and 453 CRR (risk mitigation) on an individual or subconsolidated basis to the extent necessary.

Based on the above categorization of management units, the disclosure requirements set out in article 13 CRR apply to the following entities:

– BSH
– DVB
– DZ PRIVATBANK
– TeamBank.

The disclosures required by article 13 CRR can be found in the regulatory risk reports on the websites of the group's significant subsidiaries in the form of partial disclosure reports.

Pursuant to article 7 CRR, this disclosure requirement is waived for DZ HYP on an individual basis. For UMH and VR LEASING, this disclosure requirement is waived on an individual basis in accordance with section 2 (7a) KWG.

In July 2016, TeamBank carried out a capital increase of approximately €150 million against cash contributions, laying the foundations for achieving its growth strategy while fulfilling regulatory and economic capital adequacy requirements and replacing expiring capital components. The ECB has confirmed that the capital increase is fully eligible as common equity Tier 1 capital during a transition phase that ends in 2020; the capital increase was factored into the regulatory capital ratios as at December 31, 2018. As at December 31, 2017, the capital increase had not been factored into the regulatory capital ratios because, at that time, the ECB had not yet confirmed whether it was eligible.

As at the reporting data, there were no unconsolidated subsidiaries whose own funds fell short of the level of own funds currently stipulated.

5.2.5 Regulatory minimum capital requirements

The minimum capital requirements that the DZ BANK banking group had to comply with in 2018 comprised those components of Pillar 1 laid down as mandatory by law and those individually specified by the banking supervisor. Institution-specific requirements under the additional capital requirements in Pillar 2, determined in the outcome of the Supervisory Review and Evaluation Process (SREP) conducted for the DZ BANK banking group in 2017, also have to be satisfied.

Since 2017, the ECB has used a modified approach for determining the additional capital requirements under Pillar 2. In the new approach, the supervisor specifies a mandatory add-on (Pillar 2 requirement) that is factored into the basis of calculation for the maximum distributable amount (MDA). The add-on is determined from the findings of the SREP.

In 2016, BaFin issued a decision that DZ BANK would continue to be classified as an other systemically important institution (O-SII). The DZ BANK banking group had to comply with an **O-SII capital buffer** (comprising common equity Tier 1 capital) as defined in section 10g (1) KWG at a level of 0.66 percent in 2018.

The mandatory minimum requirements and their components applicable to 2018 and 2017 are shown in Fig. 27.

FIG. 27 – REGULATORY MINIMUM REQUIREMENTS

%	Dec. 31, 2018	Sep. 30, 2018
Minimum requirement for common equity Tier 1 capital	4.50	4.50
Additional Pillar 2 capital requirement[1]	1.75	1.75
Capital conservation buffer	1.88	1.88
Countercyclical capital buffer	0.05	0.02
O-SII capital buffer	0.66	0.66
Mandatory minimum requirement for common equity Tier 1 capital	**8.84**	**8.80**
Minimum requirement for additional Tier 1 capital[2]	1.50	1.50
Mandatory minimum requirement for Tier 1 capital	**10.34**	**10.30**
Minimum requirement for Tier 2 capital[3]	2.00	2.00
Mandatory minimum requirement for total capital	**12.34**	**12.30**

1 Disclosure pursuant to article 438 sentence 1 letter b CRR.
2 The minimum requirement can also be satisfied with common equity Tier 1 capital.
3 The minimum requirement can also be satisfied with common equity Tier 1 or additional Tier 1 capital.

In addition to these mandatory minimum requirements, there is a recommended own funds amount under Pillar 2 (Pillar 2 guidance), which likewise is determined from the SREP, but unlike the mandatory minimum requirements relates only to common equity Tier 2 capital. Although failure to comply with the own funds guidance under Pillar 2 does not constitute a breach of regulatory capital requirements, this figure is relevant as an early warning indicator for capital planning.

The mandatory and the recommended minimum capital requirements were complied with throughout 2018. The internal minimum targets for the common equity Tier 1 capital ratio, the Tier 1 capital ratio, and the total capital ratio were satisfied at all times during the reporting period.

5.2.6 Financial conglomerate solvency

DZ BANK was classified as a financial conglomerate by way of a decision issued by BaFin on December 2, 2015; DZ BANK AG acts as the financial conglomerate's parent company. **Financial conglomerate solvency** is the amount equating to the difference between the total of eligible own funds and the total of solvency requirements for the financial conglomerate. The coverage ratio is calculated by dividing own funds by the solvency requirement. This ratio must be at least 100 percent.

The additional capital requirements for the financial conglomerate were calculated in accordance with the provisions of sections 17 and 18 FKAG and Commission Delegated Regulation (EU) No. 342/2014 dated

January 21, 2014 to set technical standards for the calculation methods of capital adequacy requirements for financial conglomerates. Financial conglomerate solvency is reported to the supervisory authority annually and is based on the requirements in Circular 04/2018 from BaFin on financial conglomerate solvency.

The solvency ratios as at December 31, 2017 were finalized in the first half of 2018. On the basis of a provisional calculation, the DZ BANK financial conglomerate's eligible own funds as at December 31, 2018 amounted to €26,938 million (December 31, 2017: confirmed final eligible own funds of €26,811 million). On the other side of the ratio, the solvency requirement based on a provisional calculation was €15,330 million (December 31, 2017: confirmed final solvency requirements of €14,661 million). This gives a coverage ratio based on a provisional calculation of 175.7 percent (December 31, 2017: confirmed final coverage ratio of 182.9 percent), which is significantly in excess of the regulatory minimum requirement of 100 percent.

6 Credit risk

Credit risk is defined in section 2.3.2, fig. 7 (page 71) of the opportunity and risk report.

6.1 Credit risk management objectives and policies

(ARTICLE 435 (1) CRR)

The principles for the management of credit risk and the strategies and processes in respect of credit risk management (article 435 (1) CRR) are presented in sections 8.1.2, 8.2, 8.4, and 8.5 (pages 110 to 118) of the opportunity and risk report. The structure and organization of the credit risk management function are described in section 8.3 (pages 84 to 85) of the opportunity and risk report. The scope and nature of the credit risk reporting and measuring systems are presented in sections 8.3 and 8.5 (pages 110 to 111 and 118) of the opportunity and risk report, while sections 8.4.5 to 8.4.9 (pages 113 to 118) of the opportunity and risk report set out the strategies for hedging and mitigating credit risk and the strategies and processes for monitoring the ongoing effectiveness of the measures taken to hedge credit risk.

6.2 Credit risk information

Sections 6.2 to 6.5 of this risk report contain information about credit risk attaching to the instruments subject to Part 3 Title II Chapter 2 (Standardized Approach) and Chapter 3 (IRB approach) CRR. Risk-weighted exposures arising from DZ BANK's trading activities are not covered here; please refer to section 8 'Market risk' in this report instead. Disclosures on exposures with counterparty credit risk (section 6.6) are not covered here either. In line with the requirements in EBA/GL/2016/11, disclosures on securitizations are also not included here. Instead, they are covered in section 7 'Securitizations'. Moreover, securities financing transactions are included in these sections on credit risk rather than in those on counterparty credit risk.

6.2.1 Qualitative information on credit risk

(ARTICLE 442 SENTENCE 1 LETTERS A AND B CRR)

The amount and structure of the lending volume are key factors in determining credit risk. For external risk reporting in the DZ BANK banking group, the lending volume is broken down pursuant to article 442 sentence 1 letters c to f CRR by the exposure classes used for the Standardized Approach to credit risk and the internal ratings-based approach.

In accordance with article 442 sentence 1 letters c to i CRR, the exposures after accounting offsets and without taking into account the effects of credit risk mitigation are broken down by geographical distribution, industry, and residual maturity so that volume concentrations can be identified. Non-performing and past-due exposures as well as specific and general credit risk adjustments are broken down in the same way.

The **policies and procedures governing the recognition of loss allowances** applicable to the entities in the DZ BANK banking group (article 442 sentence 1 letter b CRR) and other **accounting-related details on credit risk** (article 442 sentence 1 letter a CRR) are described in section 8.4.9 (page 118) of the opportunity and risk report. Non-performing loans (NPLs) are also described in that section. The scope of the receivables that are past due but not impaired, and the grounds for this classification, are presented in section 8.9 (pages 127 to 128) of the opportunity and risk report.

Distressed restructuring, which, according to article 178 (3) letter d CRR, is an indication that a liability is unlikely to be settled, is defined as follows at DZ BANK: The distressed debt rescheduling or restructuring of the liability results in the bank forgoing part of the principal, interest, or fees (i.e. an economic loss). In the future, DZ BANK plans to explicitly define the term 'distressed restructuring' in accordance with the definition of a forborne exposure in Annex V of Commission Implementing Regulation (EU) No. 680/2014 and to define the economic loss in accordance with the EBA guidelines on the application of the definition of default as a present value loss of more than 1 percent (valid from January 1, 2021).

6.2.2 Quantitative information on credit risk

6.2.2.1 Total and average amounts of net exposures by exposure class

(ARTICLE 442 SENTENCE 1 LETTER C CRR)

Fig. 28 compares the net exposures at the reporting date with the average amount of the net exposures over the course of the reporting year, broken down by exposure class and by risk approach. The average exposure is shown for each exposure class as the average for the four quarterly reporting dates of the year. For on-balance-sheet items, the net value is the gross carrying amount of the exposure (after write-offs) less allowances/impairments. Off-balance-sheet items are shown at their gross carrying amount, i.e. nominal amount without application of a credit conversion factor (CCF), less provisions.

FIG. 28 – EU CRB-B – TOTAL AND AVERAGE NET AMOUNT OF EXPOSURES

	Exposure class	a	b	a	b
		Dec. 31, 2018		Dec. 31, 2017	
	€ million	Net value of exposures at the end of the period	Average net exposures over the period	Net value of exposures at the end of the period	Average net exposures over the period
1	Central governments and central banks	9,802	14,178	8,929	12,911
2	Institutions	29,756	30,592	29,157	29,757
3	Corporates	105,237	103,604	102,664	94,135
4	of which: specialized lending	27,418	26,950	27,203	24,901
5	of which: SMEs	8,946	8,890	8,723	7,832
6	Retail business	73,541	71,807	68,247	66,892
7	Exposures secured by mortgages on immovable property	58,978	57,354	54,060	52,513
8	of which: SMEs	-	0	-	-
9	of which: non-SMEs	58,978	57,354	54,060	52,513
10	Qualified revolving	-	0	-	-
11	Other retail business	14,564	14,453	14,187	14,379
12	of which: SMEs	1	2	2	2
13	of which: non-SMEs	14,563	14,452	14,185	14,377
14	Equity exposures	3,519	3,574	5,759	5,433
15	Other non-credit-obligation assets	1,814	2,272	2,103	2,042
16	**Total IRB approach**	**223,669**	**226,029**	**216,860**	**211,171**
17	Central governments and central banks	51,565	54,987	45,408	43,757
18	Regional governments or local authorities	32,935	34,031	39,120	41,039
19	Public-sector entities	8,901	9,753	10,873	11,245
20	Multilateral development banks	415	424	426	453
21	International organizations	585	617	898	899
22	Institutions	94,559	93,068	90,799	76,287
23	Corporates	15,268	14,872	14,854	13,549
24	of which: SMEs	2,265	2,378	2,381	2,269
25	Retail business	9,478	8,729	7,251	6,917
26	of which: SMEs	1,886	1,675	1,271	1,242
27	Exposures secured by mortgages on immovable property	5,325	5,280	5,220	5,162
28	of which: SMEs	2,709	2,707	2,735	2,695
29	Exposures in default	233	228	209	195
30	Exposures associated with particularly high risk	607	588	888	715
31	Covered bonds	496	391	197	112
32	Exposures to institutions and corporates with a short-term credit assessment	0	0	0	0
33	CIUs	2,545	2,527	2,662	2,504
34	Equity exposures	79	80	409	356
35	Other items	192	245	304	297
36	**Total Standardized Approach**	**223,183**	**260,519**	**219,521**	**203,488**
37	**Total**	**446,852**	**596,930**	**436,380**	**414,659**

The changes in the exposures under the Standardized Approach were predominantly attributable to the exposure classes of central governments and central banks and institutions. The changes in the exposures under the IRB approach were mainly due to the increase in the retail business exposure class. The overall increase was the result of the sharp rise in new business in the DZ BANK banking group.

6.2.2.2 Geographical structure of the exposure classes

(ARTICLE 442 SENTENCE 1 LETTER D CRR)

Fig. 29 gives a geographical breakdown of the credit-risk-bearing exposures by country group. The lending volume is assigned to the individual country groups using the breakdown of the International Monetary Fund (IMF), which is updated annually. A country is deemed material if its share of the total exposure (Standardized Approach to credit risk and IRB approach) exceeds the materiality threshold of 5 percent. This system is essentially applied to all country-group breakdowns related to credit risk that follow in this regulatory risk report.

Whereas the table below shows the exposures broken down by sector and aggregated into country groups, annex 2 of this report contains a full, detailed breakdown of the exposures by geographical area and material country. Annex 3 of this report contains the disclosures for the countries categorized as non-material, which have been allocated to the Other countries column here.

FIG. 29 – EU CRB-C – GEOGRAPHICAL BREAKDOWN OF EXPOSURES (SUMMARY)

Exposure class		Geographical area							
		a	b	c	d	e	f	g	g
€ million		Germany	Other industrialized countries	Advanced economies	Emerging markets	Supranational organizations	Not allocated to a geographical area	Total as at Dec. 31, 2018	Total as at Dec. 31, 2017
1	Central governments and central banks	152	7,105	707	1,384	455	-	9,802	8,929
2	Institutions	9,478	16,668	695	2,914	-	-	29,756	29,157
3	Corporates	72,317	21,753	2,661	8,506	-	-	105,237	102,664
3a	of which: specialized lending	20,090	6,589	134	606	-	-	27,418	27,203
3b	of which: SMEs	8,926	17	1	2	-	-	8,946	8,723
4	Retail business	71,013	381	2,126	21	-	-	73,541	68,247
4a	Exposures secured by mortgages on immovable property	57,095	278	1,586	19	-	-	58,978	54,060
	of which: SMEs	-	-	-	-	-	-	-	-
	of which: non-SMEs	57,095	278	1,586	19	-	-	58,978	54,060
4b	Qualified revolving	-	-	-	-	-	-	-	-
4c	Other retail business	13,919	102	540	2	-	-	14,564	14,187
	of which: SMEs	1	-	-	-	-	-	1	2
	of which: non-SMEs	13,918	102	540	2	-	-	14,563	14,185
5	Equity exposures	3,363	95	0	61	-	-	3,519	5,759
	Other non-credit-obligation assets	1,059	8	13	-	-	880	1,960	2,103
6	**Total IRB approach**	**157,384**	**46,010**	**6,201**	**12,886**	**455**	**880**	**223,815**	**216,860**
7	Central governments and central banks	42,667	7,677	366	841	-	13	51,565	45,408
8	Regional governments or local authorities	29,806	3,120	-	2	-	7	32,935	39,120
9	Public-sector entities	8,082	820	0	-	-	-	8,901	10,873
10	Multilateral development banks	-	28	-	-	387	-	415	426
11	International organizations	-	-	-	-	585	-	585	898
12	Institutions	94,240	211	79	29	-	0	94,559	90,799
13	Corporates	10,614	3,590	149	705	-	211	15,268	14,854
13a	of which: SMEs	2,191	25	43	6	-	-	2,265	2,381

Exposure class		Geographical area							
		a	b	c	d	e	f	g	g
€ million		Germany	Other industrialized countries	Advanced economies	Emerging markets	Supranational organizations	Not allocated to a geographical area	Total as at Dec. 31, 2018	Total as at Dec. 31, 2017
14	Retail business	7,480	927	670	401	-	-	9,478	7,251
14a	of which: SMEs	1,880	3	3	-	-	-	1,886	1,271
15	Exposures secured by mortgages on immovable property	3,518	274	47	1,485	-	-	5,325	5,220
15a	of which: SMEs	2,528	179	2	-	-	-	2,709	2,735
16	Exposures in default	129	42	23	39	0		233	209
17	Exposures associated with particularly high risk	547	60	-	-	-	-	607	888
18	Covered bonds	298	154	44	-	-	-	496	197
19	Exposures to institutions and corporates with a short-term credit assessment	-	0	-	-	-	-	0	0
20	CIUs	297	2,128	5	115	0	0	2,545	2,662
21	Equity exposures	73	0	6	0	-	-	79	409
22	Other items	54	31	14	20	5	69	192	304
23	**Total Standardized Approach**	**197,803**	**19,063**	**1,402**	**3,637**	**977**	**301**	**223,183**	**219,521**
24	**Total as at Dec. 31, 2018**	**355,187**	**65,072**	**7,603**	**16,523**	**1,432**	**1,181**	**446,999**	
	Total as at Dec. 31, 2017	344,585	65,562	7,631	15,701	1,804	1,096		436,380

As at December 31, 2018, the DZ BANK banking group's total exposure was concentrated in Germany with a total of €355,187 million (December 31, 2017: €344,585 million); other industrialized countries accounted for €60,072 million (December 31, 2017: €65,562 million).

6.2.2.3 Exposure classes by sector

(ARTICLE 442 SENTENCE 1 LETTER E CRR)

Fig. 30 shows the breakdown of on-balance-sheet and off-balance-sheet exposures by sector; the exposures are assigned solely on the basis of the direct counterparties. They are assigned to the individual sectors based on the industry codes used by Deutsche Bundesbank. This system also applies to all other sector breakdowns related to risk in this report.

FIG. 30 – EU CRB-D – CONCENTRATION OF EXPOSURES BY INDUSTRY OR COUNTERPARTY TYPE

	Exposure class	a	b	c	d	e	e
	€ million	Financial sector	Public sector	Corporates and retail customers	Other	Total as at Dec. 31, 2018	Total as at Dec. 31, 2017
1	Central governments and central banks	7,738	1,305	759	-	9,802	8,929
2	Institutions	29,754	-	2	-	29,756	29,157
3	Corporates	8,216	3	97,018	-	105,237	102,664
3a	of which: specialized lending	1,843	3	25,572	-	27,418	27,203
3b	of which: SMEs	44	-	8,902	-	8,946	8,723
4	Retail business	893	695	71,953	-	73,541	68,247
4a	Exposures secured by mortgages on immovable property	860	684	57,433	-	58,978	54,060
	of which: SMEs	-	-	-	-	-	-
	of which: non-SMEs	860	684	57,433	-	58,978	54,060
4b	Qualified revolving	-	-	-	-	-	-
4c	Other retail business	33	11	14,520	-	14,564	14,187
	of which: SMEs	-	-	1	-	1	2
	of which: non-SMEs	33	11	14,519	-	14,563	14,185
5	Equity exposures	3,466	-	53	-	3,519	5,759
	Other non-credit-obligation assets	8	-	540	1,412	1,960	2,103
6	**Total IRB approach**	**50,074**	**2,004**	**170,325**	**1,412**	**223,815**	**216,860**
7	Central governments and central banks	44,951	6,599	1	13	51,565	45,408
8	Regional governments or local authorities	-	30,951	1,977	7	32,935	39,120
9	Public-sector entities	7,287	1,392	223	-	8,901	10,873
10	Multilateral development banks	290	125	-	-	415	426
11	International organizations	43	543	-	-	585	898
12	Institutions	94,504	0	54	-	94,559	90,799
13	Corporates	5,423	165	9,436	243	15,268	14,854
13a	of which: SMEs	297	6	1,963	-	2,265	2,381
14	Retail business	73	1	9,404	-	9,478	7,251
14a	of which: SMEs	27	1	1,859	-	1,886	1,271
15	Exposures secured by mortgages on immovable property	2,303	0	3,021	-	5,325	5,220
15a	of which: SMEs	1,695	0	1,014	-	2,709	2,735
16	Exposures in default	0	16	216	-	233	209
17	Exposures associated with particularly high risk	180	-	427	-	607	888
18	Covered bonds	496	-	-	-	-	496
19	Exposures to institutions and corporates with a short-term credit assessment	0	-	-	-	0	0
20	CIUs	526	58	684	1,277	2,545	2,662
21	Equity exposures	2	-	77		79	409
22	Other items	5	0	14	173	192	304
23	**Total Standardized Approach**	**156,085**	**39,850**	**25,535**	**1,714**	**223,183**	**219,521**
24	**Total as at Dec. 31, 2018**	**206,159**	**41,854**	**195,860**	**3,126**	**446,999**	
	Total as at Dec. 31, 2017	191,954	51,719	189,333	3,373		436,380

As at December 31, 2018, a high proportion of the DZ BANK banking group's lending volume (46 percent) was concentrated in the financial sector, representing only a very slight change on the volume a year earlier (December 31, 2017: 44 percent). In addition to the local cooperative banks, the borrowers in this customer segment comprised banks from other sectors of the banking industry and other financial institutions. The volume attributable to public-sector entities decreased to €41,854 million as at December 31, 2018 (December 31, 2017: €51,719 million); the volume of lending to private individuals and companies grew to €195,860 million as at the reporting date (December 31, 2017: €189,333 million).

In its role as central institution for the Volksbanken Raiffeisenbanken cooperative financial network, DZ BANK provides funding for the entities in the DZ BANK Group and for the cooperative banks. For this reason, the cooperative banks account for one of the largest receivables items in the DZ BANK Group's credit portfolio. DZ BANK also supports the cooperative banks in the provision of larger-scale funding to corporate customers.

The resulting syndicated business, DZ BANK, DZ HYP and DVB's direct business with corporate customers in Germany and abroad, the retail real-estate business under the umbrella of BSH, TeamBank's consumer finance business, and DZ HYP's real-estate lending and local authority loans businesses determine the sectoral breakdown of the remainder of the portfolio.

6.2.2.4 Lending volume by maturity band and exposure class

(ARTICLE 442 SENTENCE 1 LETTER F CRR)

Fig. 31 shows the on-balance-sheet and off-balance-sheet exposures net of loss allowances broken down by contractual residual maturity and by CRR exposure class in order to comply with both the CRR and EBA/GL/2016/11. The disclosure is based on the IFRS carrying amounts for the companies consolidated for regulatory purposes. The table is limited to the material exposure classes pursuant to articles 112 and 147 CRR and applying EBA/GL/2014/14; non-material exposures are aggregated under Other items. Unlike the report as at December 31, 2017, this report contains a separate table showing only the residual maturities of on-balance-sheet exposures. However, there is also a table showing the on-balance-sheet and off-balance-sheet exposures and SFTs, as before.

FIG. 31 – EU CRB-E – MATURITY OF EXPOSURES (ONLY ON-BALANCE-SHEET EXPOSURES)

	Exposure class	a	b	c	d	e	f
		Net exposure value					
€ million		On demand	≤ 1 year	> 1 year ≤ 5 years	> 5 years	No stated maturity	Total as at Dec. 31, 2018
1	Central governments or central banks	5,107	2,448	550	810	3	8,918
2	Institutions	707	9,555	10,418	4,672	640	25,992
3	Corporates	3,838	8,885	25,727	38,566	50	77,067
3a	of which: specialized lending	1,465	936	7,176	13,765	-	23,342
3b	of which: SMEs	156	1,004	407	5,806	-	7,373
4	Retail business	22	5,815	10,796	51,038	-	67,671
4a	Exposures secured by mortgages on immovable property	17	2,029	8,802	42,541	-	53,389
	of which: SMEs	-	-	-	-	-	-
	of which: non-SMEs	17	2,029	8,802	42,541	-	53,389
4b	Qualified revolving					-	
4c	Other retail business	6	3,786	1,994	8,497	-	14,283
	of which: SMEs		1			-	1
	of which: non-SMEs	6	3,785	1,994	8,497	-	14,282
5	Equity exposures	17	0	0	0	3,502	3,519
	Other non-credit-obligation assets	426	0	350	-	1,182	1,958
6	**Total IRB approach**	**10,117**	**26,702**	**47,842**	**95,085**	**5,379**	**185,125**
7	Central governments or central banks	8,839	35,928	985	5,180	292	51,225
8	Regional governments or local authorities	6	2,276	9,792	20,398	179	32,651
9	Public-sector entities	6	1,157	4,099	3,586	2	8,850
10	Multilateral development banks	-	84	57	273	-	415
11	International organizations	-	32	97	457	-	586
12	Institutions	338	6,836	12,233	55,576	787	75,770
13	Corporates	915	2,625	2,183	4,298	444	10,465
13a	of which: SMEs	40	318	772	896	1	2,026
14	Retail business	45	404	2,205	2,109	2	4,765
14a	of which: SMEs	3	86	1,130	504		1,722
15	Secured by mortgages on immovable property	9	411	1,678	3,168	0	5,266
15a	of which: SMEs	0	126	903	1,642		2,672
16	Exposures in default	77	9	59	47	20	213
17	Exposures associated with particularly high risk	143	124	86	55	0	408
18	Covered bonds		36	185	275	-	496
19	Exposures to institutions and corporates with a short-term credit assessment	0	-	-	-	-	0
20	CIUs	-	-	36	1,240	1,270	2,545
21	Equity exposures	0	-	-	0	79	79
22	Other items	11	18	15	13	69	127
23	**Total Standardized Approach**	**10,389**	**49,977**	**33,737**	**95,603**	**3,144**	**192,850**
24	**Total as at Dec. 31, 2018**	**20,506**	**76,678**	**81,579**	**190,689**	**8,523**	**377,975**
	Total as at Dec. 31, 2017	25,603	70,042	79,698	190,825	2,340	

1 The presentation in the report as at December 31, 2017 was the same as in Fig. 32; a different format is used in this report (corresponding comparative figures not available).

FIG. 32 – EU CRB-E – MATURITY OF EXPOSURES (ON-BALANCE-SHEET AND OFF-BALANCE-SHEET EXPOSURES AND SFTS)

Exposure class		a	b	c	d	e	f	f
		Net exposure value						
€ million		On demand	≤ 1 year	> 1 year ≤ 5 years	> 5 years	No stated maturity	Total as at Dec. 31, 2018	Total as at Dec. 31, 2017
1	Central governments or central banks	5,107	3,203	678	811	3	9,802	8,929
2	Institutions	710	12,394	10,645	5,367	640	29,756	29,157
3	Corporates	4,309	17,114	36,409	45,688	1,717	105,237	102,664
3a	of which: specialized lending	1,734	1,144	7,924	15,115	1,501	27,418	27,203
3b	of which: SMEs	159	1,610	592	6,585	-	8,946	8,723
4	Retail business	41	10,609	10,876	52,015	-	73,541	68,247
4a	Exposures secured by mortgages on immovable property	35	6,695	8,840	43,407	-	58,978	54,060
	of which: SMEs	-	-	-	-	-	-	-
	of which: non-SMEs	35	6,695	8,840	43,407	-	58,978	54,060
4b	Qualified revolving					-		-
4c	Other retail business	6	3,914	2,036	8,608	-	14,564	14,187
	of which: SMEs	-	1	-	-	-	1	2
	of which: non-SMEs	6	3,913	2,036	8,608	-	14,563	14,185
5	Equity exposures	17	0	0	0	3,502	3,519	5,759
	Other non-credit-obligation assets	426	0	350	-	1,184	1,960	2,103
6	**Total IRB approach**	**10,610**	**43,321**	**58,958**	**103,880**	**7,046**	**223,815**	**216,860**
7	Central governments and central banks	8,839	36,235	998	5,201	292	51,565	45,408
8	Regional governments or local authorities	6	2,295	9,981	20,474	179	32,935	39,120
9	Public-sector entities	6	1,209	4,099	3,586	2	8,901	10,873
10	Multilateral development banks	-	84	57	273	-	415	426
11	International organizations	-	32	97	457	-	586	898
12	Institutions	459	24,833	12,568	55,912	787	94,559	90,799
13	Corporates	943	4,239	3,568	6,075	444	15,268	14,854
13a	of which: SMEs	40	376	832	1,017	1	2,265	2,381
14	Retail business	46	472	2,298	4,828	1,834	9,478	7,251
14a	of which: SMEs	3	132	1,199	552		1,886	1,271
15	Secured by mortgages on immovable property	9	413	1,680	3,222	0	5,325	5,220
15a	of which: SMEs	0	126	905	1,677	-	2,709	2,735
16	Exposures in default	77	10	61	65	20	233	209
17	Exposures associated with particularly high risk	172	238	93	63	42	607	888
18	Covered bonds		36	185	275	-	496	197
19	Exposures to institutions and corporates with a short-term credit assessment	0	-	-	-	-	0	0
20	CIUs	-	-	36	1,240	1,270	2,545	2,662
21	Equity exposures	0	-	-	0	79	79	409
22	Other items	11	22	45	45	69	192	304
23	**Total Standardized Approach**	**10,568**	**70,118**	**35,764**	**100,561**	**5,017**	**223,183**	**219,521**
24	**Total as at Dec. 31, 2018**	**21,177**	**113,439**	**94,722**	**204,441**	**12,064**	**446,999**	
	Total as at Dec. 31, 2017	32,483	103,976	92,111	205,470	2,340		436,380

The increase in the exposures to €446,999 million (December 31, 2017: €436,380 million) was attributable to new business in the exposure classes of retail business, institutions, and corporates. The receivables in the DZ BANK banking group are mainly concentrated in non-current receivables with a residual maturity of more than 5 years, which had a volume of €204,441 million (December 31, 2017: €205,470 million).

6.2.2.5 Credit quality, past-due, non-performing, and forborne exposures

(ARTICLE 442 SENTENCE 1 LETTERS G AND H CRR)

The following sections of this regulatory risk report disclose the credit quality of on-balance-sheet and off-balance-sheet exposures by exposure class and by risk approach. Following implementation of EBA/GL/2016/11, exposures in the overviews EU CR1-A (Fig. 33) to EU CR1-C (Fig. 35) have to be broken down according to whether they are in default pursuant to article 178 CRR or not. Section 6.6 contains disclosures on counterparty credit risk. In accordance with the guidelines mentioned above, information on securitizations has not been included in the credit risk disclosures; this is provided in section 7.

Pursuant to Delegated Regulation (EU) No. 183/2014 dated December 20, 2013 specifying the calculation of specific and general credit risk adjustments, specific credit risk adjustments (SCRA) and general credit risk adjustments (GCRA) must be classified as types of provision in accordance with IFRS. The DZ BANK Group prepares consolidated financial statements and interim consolidated financial statements as at the reporting date in accordance with IFRS. All impairment losses recognized at group level therefore have to be classified as specific credit risk adjustments.

The tables below provide a comprehensive picture of the credit quality of the DZ BANK banking group's on-balance-sheet and off-balance-sheet exposures. The past-due or impaired exposures contained in the COREP report are examined separately, as are the loss allowances recognized. These exposures are broken down by the Standardized Approach to credit risk and the IRB approach and by exposure class, sector, and region.

Fig. 33 contains details of exposures in default and in arrears, broken down by the Standardized Approach to credit risk and the IRB approach. Exposures are deemed to be in default if they meet the IRB approach's definition of default pursuant to article 178 CRR, which also applies to the Standardized Approach. They are in arrears if they are past due by more than 90 days.

As well as the requirements in the EBA guidelines, Fig. 33 also reflects the EBA's recommendation to list the following original exposure classes used for the Standardized Approach to credit risk: corporates, retail business, and exposures secured by mortgages on immovable property (in accordance with Questions & Answers (Q&A) 2017_3481 dated January 2018). Fig. 34 and Fig. 35 below also reflect the criteria of this recommendation from the EBA.

FIG. 33 – EU CR1-A – CREDIT QUALITY OF EXPOSURES BY EXPOSURE CLASS AND INSTRUMENT

					Dec. 31, 2018				Jun. 30, 2018
Exposure class		**a**	**b**	**c**	**d**	**e**	**f**	**g**	g
		Gross carrying amounts of		**Specific credit risk adjustments**	**General credit risk adjustments**	**Accumulated write-offs**	**Credit risk adjustment charges in the reporting period**	**Net values**	Net values
€ million		**Defaulted exposures**	**Non-defaulted exposures**					**(a+b-c-d-e)**	
1	Central governments and central banks	-	9,806	4	-	1	2	9,802	16,534
2	Institutions	80	29,687	12	-	62	9	29,756	30,681
3	Corporates	3,177	103,506	1,447	-	88	561	105,237	103,899
4	of which: specialized lending	492	27,191	265	-	16	232	27,418	26,907
5	of which: SMEs	72	8,924	50	-	0	30	8,946	8,900
6	Retail business	944	73,141	544	-	15	352	73,541	71,241
7	Exposures secured by mortgages on immovable property	625	58,528	175	-	10	57	58,978	56,828
8	of which: SMEs	-	-	-	-	-	-	-	-

	Exposure class	Dec. 31, 2018							Jun. 30, 2018
		a	b	c	d	e	f	g	g
		Gross carrying amounts of		Specific credit risk adjustments	General credit risk adjustments	Accumulated write-offs	Credit risk adjustment charges in the reporting period	Net values	Net values
	€ million	Defaulted exposures	Non-defaulted exposures					(a+b-c-d-e)	
9	of which: non-SMEs	625	58,528	175	-	10	57	58,978	56,828
10	Qualified revolving	-	-	-	-	-	-	-	-
11	Other retail business	319	14,614	369	-	5	296	14,564	14,412
12	of which: SMEs	-	1	-	-	0	-	1	2
13	of which: non-SMEs	319	14,613	369	-	5	296	14,563	14,410
14	Equity exposures	0	3,519	-	-	-	-	3,519	6,120
	Other non-credit-obligation assets	-	1,960	-	-	0	-	1,960	28,138
15	**Total IRB approach**	**4,201**	**221,620**	**2,006**	**-**	**165**	**925**	**223,815**	**256,612**
	of which: loans	3,970	161,991	1,898	-	165	845	164,063	167,631
	of which: debt securities	-	18,804	2	-	0	5	18,801	19,039
	of which: off-balance-sheet receivables	232	35,807	105	-	-	61	35,934	35,380
16	Central governments and central banks	-	51,567	3	-	0	1	51,565	63,347
17	Regional governments or local authorities	16	32,979	44	-	0	45	32,952	34,382
18	Public-sector entities	0	8,903	2	-	0	1	8,901	10,483
19	Multilateral development banks	-	415	0	-	0	-	415	419
20	International organizations	-	586	0	-	0	0	585	605
21	Institutions	0	94,562	3	-	0	3	94,559	93,964
22	Corporates	307	15,293	194	-	148	189	15,406	13,950
23	of which: SMEs	71	2,273	50	-	1	47	2,295	2,513
24	Retail business	159	9,521	134	-	51	97	9,546	8,404
25	of which: SMEs	58	1,899	46	-	46	38	1,911	1,746
26	Exposures secured by mortgages on immovable property	15	5,337	19	-	-	1	5,334	5,299
27	of which: SMEs	-	2,711	1	-	-	-	2,709	2,731
28	Exposures in default	498	-	265	-	153	207	233	240
29	Exposures associated with particularly high risk	-	609	1	-	1	2	607	295
30	Covered bonds	-	496	0	-	-	0	496	523
31	Exposures to institutions and corporates with a short-term credit assessment	-	-	-	-	-	-	0	0
32	CIUs	-	2,546	0	-	-	-	2,545	2,390
33	Equity exposures	-	79	-	-	-	-	79	93
34	Other items	1	193	1	-	0	0	193	170
35	**Total Standardized Approach**	**562**	**223,085**	**400**	**-**	**200**	**340**	**223,183**	**234,323**
	of which: loans	450	151,285	320	-	199	259	151,415	160,355
	of which: debt securities	-	38,963	45	-	0	44	38,918	40,985
	of which: off-balance-sheet receivables	43	29,958	28	-	-	24	29,973	29,494
36	**Total as at Dec. 31, 2018**	**4,699**	**444,705**	**2,405**	**-**	**365**	**1,265**	**446,999**	
37	of which: loans	4,420	313,276	2,218	-	365	1,104	315,478	314,240
38	of which: debt securities	-	57,766	47	-	0	48	57,719	51,103
39	of which: off-balance-sheet receivables	276	65,765	134	-	-	85	65,907	59,203
36	Total as at Jun. 30, 2018	5,361	488,196	2,621	-	316	2,556		490,935

The gross carrying amounts of the exposures not in default decreased from €490,935 million as at June 30, 2018 to €446,999 million as at the reporting date. This change was due to transactions that had matured as at December 31, 2018 in the banking group.

6.2.2.6 Past-due and non-performing exposures by sector

(ARTICLE 442 SENTENCE 1 LETTER G CRR)

Fig. 34 shows **exposures** in default and not in default, broken down by **sector**. Sectors of little significance to the DZ BANK banking group are aggregated in the 'other' row in Fig. 34.

FIG. 34 – EU CR1-B – CREDIT QUALITY OF EXPOSURES BY INDUSTRY

		a	b	c	d	e	f	g	g
					Dec. 31, 2018				Jun. 30, 2018
		Gross carrying amounts of		Specific credit risk adjustments	General credit risk adjustments	Accumulated write-offs	Credit risk adjustment charges	Net values	Net values
€ million		Defaulted exposures	Non-defaulted exposures					(a+b-c-d-e)	
1	Financial sector	91	206,107	39	-	66	32	206,159	218,853
2	Public sector	16	41,885	48	-	1	48	41,854	48,424
3	Corporates and retail customers	4,591	193,587	2,318	-	298	1,185	195,860	220,820
4	Other		3,126	0	-	-	-	3,126	2,838
5	Total as at Dec. 31, 2018	4,699	444,705	2,405	-	365	1,265	446,999	
	Total as at Jun. 30, 2018	5,361	488,196	2,621	-	316	2,556		490,935

The lower gross carrying amounts for corporates and retail customers were the result of the decrease in business activity at the end of the year under review. By contrast, the gross carrying amounts for the public sector, financial sector, and 'other' changed only moderately, reflecting normal fluctuation.

6.2.2.7 Past-due and non-performing exposures by country group

(ARTICLE 442 SENTENCE 1 LETTER H CRR)

Fig. 35 provides an overview of exposures in default and not in default, broken down into major geographical areas. Areas of little significance are aggregated in rows 11, 19, 28, and 34 of this table as 'other countries' or 'other'. Row 35 shows the institutions that are not assigned to a geographical area. The individual volumes in these rows do not exceed the limit of 5 percent of the entire exposure.

FIG. 35 – EU CR1-C – CREDIT QUALITY OF EXPOSURES BY GEOGRAPHY

	a	b	c	d	e	f	g	
	Dec. 31, 2018							Jun. 30, 2018
	Gross carrying amounts of							
€ million	Defaulted exposures	Non-defaulted exposures	Specific credit risk adjustments of non-defaulted exposures	General credit risk adjustments	Accumulated write-offs	Credit risk adjustment charges	Net values (a+b-c-d-e)	Net values
1 Germany	**2,195**	**354,319**	**1,327**	**-**	**281**	**1,044**	**355,187**	389,836
2 Other industrialized countries	**1,124**	**64,495**	**547**	**-**	**36**	**142**	**65,072**	73,711
3 France	46	5,286	19	-	0	1	5,313	5,309
4 United Kingdom	118	7,564	51	-	11	25	7,630	10,167
5 Luxembourg	4	7,111	5	-	0	5	7,109	5,431
6 Italy	10	3,059	12	-	0	11	3,058	
7 Netherlands	93	3,896	59	-	0	14	3,930	4,009
8 Austria	21	3,764	30	-	0	22	3,755	3,652
9 Switzerland	29	8,682	2	-	24	1	8,710	9,963
10 United States	41	8,254	19	-	0	16	8,276	13,447
11 Other countries	763	16,736	350	-	0	47	17,149	21,733
12 Advanced economies	**447**	**7,345**	**188**	**-**	**43**	**15**	**7,603**	**7,596**
13 Hong Kong	70	555	19	-	0	0	606	573
14 Korea	-	607	0	-	-	0	607	572
15 Malta	28	439	12	-	0	0	455	487
16 Singapore	188	1,668	85	-	6	3	1,771	1,748
17 Slovakia	36	1,041	23	-	-	6	1,055	1,012
18 Czech Republic	95	2,688	47	-	2	6	2,736	2,673
19 Other countries	29	346	2	-	36	0	373	529
20 Emerging markets	**933**	**15,933**	**343**	**-**	**4**	**63**	**16,523**	**16,335**
21 Bermuda	109	631	81	-	-	0	659	789
22 China	3	1,750	11	-	0	0	1,741	1,610
23 India	184	553	23		0	1	715	
24 Liberia	132	1,367	29	-	-	0	1,470	1,333
25 Marshall Islands	266	2,642	82	-	-	0	2,826	3,459
26 Turkey	0	968	2	-	0	1	966	925
27 Hungary	25	1,783	16	-	0	7	1,793	1,641
28 Other countries	213	6,238	98	-	4	54	6,353	6,578
29 Supranational organizations	**-**	**1,433**	**0**	**-**	**0**	**0**	**1,432**	**2,524**
30 Other European institutions, governing bodies, and organizations	-	390	0	-	0	0	390	411
31 European Financial Stability Facility	-	48	0	-	0	0	48	48
32 European Investment Bank	-	732	0	-	0	0	732	749
33 European Broadcasting Union	-	-	-	-	-	-	-	
34 Other	-	263	0	-	0	0	263	1,317
35 Not allocated to a geographical area	**-**	**1,181**	**0**	**-**	**-**	**-**	**1,181**	**934**
36 Total as at Dec. 31, 2018	**4,699**	**444,705**	**2,405**	**-**	**365**	**1,265**	**446,999**	
37 Total as at Jun. 30, 2018	5,361	488,196	2,621	-	316	2,556		490,935

Whereas the exposures in emerging markets, advanced economies, and supranational organizations remained largely unchanged, the exposures in Germany and other industrialized countries fell sharply due to transactions that had matured at DZ BANK.

6.2.2.8 Maturity structure of past-due exposures

(ARTICLE 442 SENTENCE 1 LETTERS G AND H CRR)

Fig. 36 presents the maturity structure of past-due on-balance-sheet exposures in accordance with FINREP (Implementing Regulation (EU) No. 680/2014 dated April 16, 2014 amended by Implementing Regulation (EU) No. 2017/1443 dated June 29, 2017), disregarding whether they are impaired or not. In this table, the gross carrying amounts of past-due exposures are broken down by the number of days by which the longest past-due exposure of each customer is past due.

FIG. 36 – EU CR1-D – AGEING OF PAST-DUE EXPOSURES

		a	b	c	d	e	f
		Gross carrying amounts					
€ million		≤ 30 days	> 30 days ≤ 60 days	> 60 days ≤ 90 days	> 30 days ≤ 90 days	> 90 days ≤ 180 days	> 180 days ≤ 1 year	> 1 year
1	Loans	320,359	-	-	174	504	329	1,461
2	Debt securities	43,939	-	-	-	-	-	-
3	**Total exposures as at Dec. 31, 2018**	**364,298**	**-**	**-**	**174**	**504**	**329**	**1,461**
	Total exposures as at Jun. 30, 2018	388,037	-	-	140	397	403	1,418

Here too, the changes to the gross carrying amounts are attributable to the reduction in business activity at DZ BANK at the end of the year under review.

6.2.2.9 Non-performing and forborne exposures

(ARTICLE 442 SENTENCE 1 LETTERS G AND I CRR)

Fig. 37 contains details of impaired and past-due exposures in accordance with FINREP, which are supplemented – in line with Implementing Regulation (EU) No. 680/2014 amended by Implementing Regulation (EU) No. 2017/1443 – by information about non-performing and forborne receivables. The exposures are broken down into the following categories: debt securities, loans and advances, and off-balance-sheet exposures.

A loan is classified as a forborne exposure (FBE = receivables where concessions have been made owing to financial difficulties) if the circumstances listed below occur:

– The borrower is in financial difficulties or is at risk of getting into financial difficulties and the bank makes a concession, for which the bank does not receive compensation from the borrower. This concession is made due to the borrower's financial difficulties.

Debt restructuring is defined as a crisis-induced, possibly loss-making, but unavoidable change to existing borrowing arrangements. It is not aimed at reducing the amount owed. Instead, the interest payments and the repayments of principal are usually lowered. The objective is to enable the customer or the customer's individual receivables to recover.

FIG. 37 – EU CR1-E – NON-PERFORMING AND FORBORNE EXPOSURES AS AT DECEMBER 31, 2018

	a	b	c	d	e	f	g	h	i	j	k	l	m
	Gross carrying amounts of performing and non-performing exposures							Accumulated impairment, provisions, and negative fair value adjustments due to credit risk				Collateral and financial guarantees received	
		Of which: performing but past due > 30 days and ≤ 90 days	Of which: performing, forborne	Of which: non-performing				On performing exposures		On non-performing exposures		On non-performing exposures	of which: forborne exposures
€ million					of which: in default	of which: impaired	of which: forborne		of which: forborne		of which: forborne		
010 Debt securities	43,939	-	-	191	179	152	0	44	33	0	-	-	-
020 Loans and advances	322,828	174	928	5,055	4,958	4,342	3,172	130	41	1,077	630	2,373	1,645
030 Off-balance-sheet exposures	62,316	-	3	1,117	383	800	1,451	24	9	81	15	106	-

FIG. 38 – EU CR1-E – NON-PERFORMING AND FORBORNE EXPOSURES AS AT JUNE 30, 2018

	a	b	c	d	e	f	g	h	i	j	k	l	m
	Gross carrying amounts of performing and non-performing exposures							Accumulated impairment, provisions, and negative fair value adjustments due to credit risk				Collateral and financial guarantees received	
		Of which: performing but past due > 30 days and ≤ 90 days	Of which: performing, forborne	Of which: non-performing				On performing exposures		On non-performing exposures		On non-performing exposures	of which: forborne exposures
€ million					of which: in default	of which: impaired	of which: forborne		of which: forborne		of which: forborne		
010 Debt securities	45,445	-	-	213	99	172	0	-	-	98	-	-	-
020 Loans and advances	344,950	140	1,012	5,858	5,667	5,071	3,765	-	-	2,299	-	2,910	2,038
030 Off-balance-sheet exposures	63,281	9	845	21,304	451	17,914	1,026	-	-	199	-	33	-

As can be seen by comparing Fig. 37 as at December 31, 2018 with Fig. 38 as at June 30, 2018, the gross carrying amounts of the non-performing and performing receivables decreased from €453,676 million to €439,360 million; the reduction for loans and advances was particularly pronounced.

6.2.2.10 Changes in loss allowances for loans and advances

(ARTICLE 442 SENTENCE 1 LETTER I CRR)

Fig. 39 below focuses only on the changes in the balance of specific and general credit risk adjustments for defaulting or impaired exposures. Only specific credit risk adjustments are relevant in the DZ BANK banking group. Consequently, no values are shown in column b of Fig. 39.

FIG. 39 – EU CR2-A – CHANGES IN THE STOCK OF GENERAL AND SPECIFIC CREDIT RISK ADJUSTMENTS

		a	b	a	b
		Dec. 31, 2018		Jun. 30, 2018	
€ million		Accumulated specific credit risk adjustment	Accumulated general credit risk adjustment	Accumulated specific credit risk adjustment	Accumulated general credit risk adjustment
1	**Opening balance**	**2,714**		3,086	
2	Increases due to amounts set aside for estimated loan losses during the period	-165		27	
3	Decreases due to amounts reversed for estimated loan losses during the period	-33		-28	
4	Decreases due to amounts taken against accumulated credit risk adjustments	75		-18	
5	Transfers between credit risk adjustments	-		0	
6	Impact of exchange rate differences	3		6	
7	Business combinations, including acquisitions and disposals of subsidiaries	-		-	
8	Other adjustments	-219		-359	
9	**Closing balance**	**2,374**		2,714	
10	Recoveries on credit risk adjustments recorded directly to the income statement	-92		-32	
11	Specific credit risk adjustments recorded directly to the income statement	42		15	
12	Direct write-downs or write-offs	5		19	
13	Recoveries on direct write-downs or write-offs	-		-	

There were no transfers between the individual credit risk adjustments in 2018 (Fig. 39, row 5). However, the income statement was directly affected by income from derecognized receivables amounting to €92 million (June 30, 2018: €32 million), expenses arising on changes to the balances of specific credit risk adjustments in an amount of €42 million (June 30, 2018: €15 million), and directly recognized impairment losses of €5 million (June 30, 2018: €19 million).

The balance of specific credit risk adjustments decreased by a total of €340 million in 2018. This largely reflected the decrease in loss allowances at DZ BANK. In particular, the increase due to amounts set aside for estimated loan losses during the reporting period (Fig. 39, row 2) fell substantially compared with June 30, 2018. Supplementing the flow statement for credit risk adjustments in Fig. 39, Fig. 40 shows the balance of defaulting and impaired loans and debt securities, thereby providing a flow statement for exposures in default. Based on the scope of consolidation for regulatory purposes, the values disclosed correspond to the IFRS carrying amounts at the reporting date after deduction of impairment losses.

FIG. 40 – EU CR2-B – CHANGES IN THE STOCK OF DEFAULTED AND IMPAIRED LOANS AND DEBT SECURITIES

€ million		Dec. 31, 2018 Gross carrying amount of defaulted exposures	Jun. 30, 2018 Gross carrying amount of defaulted exposures
1	**Opening balance**	**5,361**	**6,610**
2	Loans and debt securities that have defaulted or been impaired since the last reporting period	1,712	914
3	Returned to non-defaulted status	221	309
4	Amounts written off	985	941
5	Other changes	-1,168	-914
6	**Closing balance**	**4,699**	**5,361**

Loans and debt securities in default (row 2) decreased by €662 million compared with June 30, 2018, primarily due to the reduction in loss allowances in the banking group. As at the reporting date, amounts written off (row 4) were down by €44 million compared with June 30, 2018.

6.3 Use of credit risk mitigation techniques

6.3.1 Qualitative information on credit risk mitigation

(ARTICLE 452 SENTENCE 1 LETTER B (III) AND ARTICLE 453 SENTENCE 1 LETTERS A TO E CRR)

The methods used by the DZ BANK banking group to mitigate credit risk are described in section 8.4.8 (pages 116 to 117) of the opportunity and risk report. The description is divided into the following topics:

- Collateral strategy and secured transactions
- Types of collateral
- Management of traditional loan collateral
- Collateral management
- Central counterparties (CCPs).

Sections 8.4.6, 8.4.8, and 8.6.1 (pages 114 to 119) of the opportunity and risk report contain a description of the credit risk mitigation rules and processes applicable to on-balance-sheet and off-balance-sheet netting. This is supplemented in section 8.4.8 (pages 116 to 117) of the opportunity and risk report by details of the rules and processes for the measurement and management of collateral as well as details of the most important types of collateral. The most important types of guarantor and counterparty for credit derivatives, and their creditworthiness, are disclosed in section 8.4.8 (page 116) of the opportunity and risk report. Concentrations of market risk or credit risk within credit risk mitigation are outlined in section 8.4.7 (pages 115 to 116) of the opportunity and risk report.

6.3.2 Quantitative information on credit risk mitigation

(ARTICLE 453 SENTENCE 1 LETTERS F AND G CRR)

This section contains information about exposures backed by financial collateral, other collateral, guarantees, and credit derivatives.

Fig. 41 and Fig. 42 provide an overview of the extent to which credit risk mitigation techniques are used in the DZ BANK banking group. The tables also show the secured and unsecured exposures. All collateral, financial guarantees, and credit derivatives used to mitigate the credit risk of the secured exposures are listed, irrespective of whether the risk-weighted assets are calculated under the Standardized Approach (simple and comprehensive method of recognizing financial collateral) or under the IRB approach. The figures shown for credit risk mitigation in each case are the regulatory risk-weighted values.

Disclosures about the use of credit risk mitigation techniques under the Standardized Approach can be found in section 6.4 of this risk report, whereas information about credit risk mitigation techniques under the IRB approach is provided in section 6.5.

For certain IRBA assets held by BSH, DZ HYP, and DVB, the mortgage-related or real-estate collateral recognized for credit risk mitigation purposes is included in the calculation of capital requirements as LGD.

FIG. 41 – EU CR3 – CREDIT RISK MITIGATION TECHNIQUES – OVERVIEW AS AT DECEMBER 31, 2018

Exposure class		a	b	c	d	e
€ million		Unsecured exposures – carrying amount	Secured exposures – carrying amount	Exposures secured by collateral	Exposures secured by financial guarantees	Exposures secured by credit derivatives
1	Central governments and central banks	8,696	1,111	742	325	-
2	Institutions	19,304	10,168	1,916	434	-
3	Corporates	62,141	43,878	36,972	3,065	-
4	of which: specialized lending	17,792	9,907	6,733	936	-
5	of which: SMEs	3,166	5,830	5,403	342	-
6	Retail business	12,859	60,687	53,430	71	-
7	Exposures secured by mortgages on immovable property	795	58,187	52,826	26	-
8	of which: SMEs	-	-	-	-	-
9	of which: non-SMEs	795	58,187	52,826	26	-
10	Qualified revolving					-
11	Other retail business	12,064	2,500	604	45	-
12	of which: SMEs	1	-	-	-	-
13	of which: non-SMEs	12,063	2,500	604	45	-
14	Equity exposures	3,512	7	7		-
15	Other non-credit-obligation assets	1,952	8	-	-	-
16	**Total IRB approach**	**108,464**	**115,859**	**93,068**	**3,895**	**-**
17	of which: loans	60,487	104,361	86,691	3,146	-
18	of which: debt securities	14,792	3,656	1,644		-
19	of which: in default	1,014	3,210	2,530	216	-
20	Central governments and central banks	51,329	235	224	-	-
21	Regional governments or local authorities	32,872	63	3	3	-
22	Public-sector entities	7,901	1,001	3	607	-
23	Multilateral development banks	415	-	-	-	-
24	International organizations	585	-	-	-	-
25	Institutions	94,384	175	2	-	-
26	Corporates	11,258	4,010	513	1,386	-
27	of which: SMEs	1,971	295	20	202	-
28	Retail business	6,717	2,761	350	2	-
29	of which: SMEs	1,876	10	4	1	-
30	Secured by mortgages on immovable property	-	5,325	5,325	-	-
31	of which: SMEs	-	2,709	2,709	-	-
32	Exposures in default	210	23	12	6	-
33	Exposures associated with particularly high risk	570	37	-	-	-
34	Covered bonds	496	-	-	-	-
35	Exposures to institutions and corporates with a short-term credit assessment	0	-	-	-	-
36	CIUs	2,545	-	-	-	-
37	Equity exposures	79	-		-	-
38	Other items	193	0	-	-	-
39	**Total Standardized Approach**	**209,554**	**13,629**	**6,431**	**2,003**	**-**
40	of which: loans	142,296	9,119	5,707	1,485	-
41	of which: debt securities	38,257	660	7	432	-
42	of which: in default	210	234	10	6	-
43	**Total exposures**	**318,018**	**129,489**	**99,500**	**5,898**	**-**
44	of which: loans	202,783	113,480	92,399	4,631	-
45	of which: debt securities	53,049	4,316	1,652	432	-
46	of which: in default	1,223	3,444	2,540	222	-

FIG. 42 – EU CR3 – CREDIT RISK MITIGATION TECHNIQUES – OVERVIEW AS AT JUNE 30, 2018

	Exposure class	a	b	c	d	e
	€ million	Unsecured exposures – carrying amount	Secured exposures – carrying amount	Exposures secured by collateral	Exposures secured by financial guarantees	Exposures secured by credit derivatives
1	Central governments and central banks	14,505	2,032	1,742	248	-
2	Institutions	20,763	9,990	7,225	444	-
3	Corporates	56,971	44,890	29,682	2,609	-
4	of which: specialized lending	13,773	10,670	7,464	1,004	-
5	of which: SMEs	3,200	5,732	108	332	-
6	Retail business	13,386	57,860	41,084	66	-
7	Exposures secured by mortgages on immovable property	942	55,892	40,510	26	-
8	of which: SMEs	-	-	-	-	-
9	of which: non-SMEs	942	55,892	40,510	26	-
10	Qualified revolving	-	-	-	-	-
11	Other retail business	12,444	1,968	575	41	-
12	of which: SMEs	2	-	-	-	-
13	of which: non-SMEs	12,442	1,968	575	41	-
14	Equity exposures	2,661	7	7	-	-
15	Other non-credit-obligation assets	28,134	4	-	-	-
16	**Total IRB approach**	**136,420**	**114,784**	**79,740**	**3,368**	**-**
17	of which: loans	62,819	105,319	72,099	2,946	-
18	of which: debt securities	15,572	3,472	3,077	-	-
19	of which: in default	1,359	3,446	3,071	179	-
20	Central governments and central banks	63,326	21	5	-	-
21	Regional governments or local authorities	34,258	108	75	2	-
22	Public-sector entities	9,479	1,004	235	611	-
23	Multilateral development banks	419	-	-	-	-
24	International organizations	605	-	-	-	-
25	Institutions	93,711	253	160		-
26	Corporates	11,052	2,924	970	1,312	-
27	of which: SMEs	2,157	345	19	223	-
28	Retail business	7,598	765	399	1	-
29	of which: SMEs	3,689	16	3	1	-
30	Exposures secured by mortgages on immovable property	-	5,090	1,384	-	-
31	of which: SMEs	-	2,704	-	-	-
32	Exposures in default	217	23	7	6	-
33	Exposures associated with particularly high risk	262	33	-	-	-
34	Covered bonds	523	-	-	-	-
35	Exposures to institutions and corporates with a short-term credit assessment	0	-	-	-	-
36	CIUs	2,390	-	-	-	-
37	Equity exposures	93	-	-	-	-
38	Other items	169	-	-	-	-
39	**Total Standardized Approach**	**224,103**	**10,220**	**3,236**	**1,933**	**-**
40	of which: loans	154,278	8,426	2,483	1,404	-
41	of which: debt securities	40,152	833	171	442	-
42	of which: in default	218	23	7	6	-
43	**Total exposures**	**360,523**	**125,005**	**82,976**	**5,300**	**-**
44	of which: loans	217,098	113,745	74,582	4,350	-
45	of which: debt securities	55,724	4,306	3,248	442	-
46	of which: in default	1,578	3,468	3,078	185	-

Whereas the unsecured exposures fell by €42,505 million to €318,018 million as at the reporting date (June 30, 2018: €360,523 million), the secured exposures increased by only €4,484 million to €129,489 million as at

December 31, 2018 (June 30, 2018: €125,005 million) and the exposures secured by collateral rose by only €16,524 million to €99,500 million (June 30, 2018: €82,976 million). The changes in these three categories were caused by transactions that had matured as at the end of the reporting year. By contrast, there were only minimal changes in the exposures secured by financial guarantees compared with the position as at June 30, 2018 and these were the result of fluctuation within the normal range.

6.4 Credit risk and techniques for mitigating credit risk under the Standardized Approach

6.4.1 Qualitative information on use of the Standardized Approach

(ARTICLE 444 SENTENCE 1 LETTER A CRR)

As in previous years, the rating agencies below are used to help determine the capital requirements for all exposure classes under the Standardized Approach to credit risk for which credit ratings are used (see also section 4.2.3 'Credit ratings' in the opportunity and risk report (page 88)).

- Standard & Poor's Ratings Services
  (Standard & Poor's)
- Moody's Investors Service
  (Moody's) and
- Fitch Ratings, Ltd.
  (Fitch).

The rating agency DBRS Limited (DBRS) was used for the first time in 2018. Competing external ratings are only included in the calculation of risk-weighted exposures in accordance with articles 138 and 139 CRR.

6.4.1.1 Transfer of credit ratings for bond issues to assets

(ARTICLE 444 SENTENCE 1 LETTERS B, C, AND D CRR)

External credit ratings awarded by recognized rating agencies or export insurance agencies are applied to assets of the DZ BANK banking group in accordance with the requirements of articles 137 to 141 CRR and apply to all exposure classes used for the Standardized Approach to credit risk listed in article 112 CRR in which external credit ratings are used (article 444 sentence 1 letter b CRR). To assess creditworthiness, the DZ BANK banking group draws on all of the main external rating sources that are available in the reporting software. The logic used by this software is described below.

In cases where an exposure-specific credit rating is not available for an exposure, and only an issuer-specific credit rating or a credit rating for another of the issuer's issues is available, DZ BANK applies this credit rating to the unrated exposure in accordance with the criteria of article 139 CRR. The available credit rating is applied if it produces a higher risk weight than for the unrated exposure and the unrated exposure's ranking is equal to or lower than that of the rated exposure, or if it produces a lower risk weight than for the unrated exposure and the unrated exposure's ranking is equal to or higher than that of the rated exposure (article 139 (2) sentence 1 letter b CRR). If these conditions are not met, the exposure is treated as unrated pursuant to article 139 (2) sentence 2 CRR.

No bond issue credit ratings are transferred to comparable exposures of equal or higher ranking.

Currently, the DZ BANK banking group does not use the aforementioned process for applying credit ratings of issuers and issues to exposures in the banking book as it is not relevant.
DZ BANK uses the standard assignment of credit ratings as published by the EBA. Therefore, no separate disclosure pursuant to article 444 sentence 1 letter d CRR is required.

6.4.2 Quantitative information on use of the Standardized Approach

(ARTICLE 444 LETTER E AND ARTICLE 453 SENTENCE 1 LETTERS F AND G CRR)

Fig. 43 shows the exposures broken down by exposure class under the Standardized Approach to credit risk where such exposures are secured by financial collateral, life insurance, or guarantees. The figures for credit risk mitigation in each case are the regulatory risk-weighted values.

In this context, the exposures assigned to the exposure classes under the Standardized Approach to credit risk are shown before and after credit risk mitigation under the Standardized Approach. The classification of transactions in the regulatory risk weight categories depends on how the transactions are classified in the regulatory exposure classes, on the credit ratings of borrowers and transactions, and on the particular collateral provided. The sum total of exposures after credit risks have been mitigated under the Standardized Approach to credit risk arises from the provision of personal collateral for IRBA transactions by protection providers treated according to the Standardized Approach to credit risk.

In some cases, the exposures reported after credit risk mitigation are larger than exposures before credit risk mitigation. This is because exposures after credit risks have been mitigated include exposures reported under the IRB approach that are backed by protection providers, in particular guarantors, treated according to the Standardized Approach to credit risk.

FIG. 43 – CRSA EXPOSURES BEFORE CREDIT RISK MITIGATION BY RATING CATEGORY

€ million	Risk weight (%)															
Exposure class	**0**	**2**	**4**	**10**	**20**	**35**	**50**	**70**	**75**	**100**	**150**	**250**	**370**	**1,250**	**Other**	**Capital deduction**
Exposure before credit risk mitigation																
Central governments and central banks	51,293	-	-	-	262	-	15	-	-	3	-	-	-	-	0	-
Regional governments or local authorities	32,101	-	-	-	985	-	172	-	-	2	-	-	-	-	0	-
Other public-sector entities	8,416	-	-	-	402	-	210	-	0	306		-	-	-	-	-
Multilateral development banks	402	-	-	-	13	-		-	-	-	-	-	-	-	-	-
International organizations	587	-	-	-	-	-		-	-	-	-	-	-	-	-	-
Institutions	81,192	-	-	-	1,250	-	11	-	-	24		-	-	-	0	-
Corporates	0	-	-	-	1,018	-	1,410	-	-	11,905	0	-	-	-	3	-
Retail business	-	-	-	-	-	-	-	-	7,555	-	-	-	-	-	-	-
Exposures secured by mortgages on immovable property	-	-	-	-	-	2,499	2,797	-	-	-	-	-	-	-	-	-
Past-due exposures	-	-	-	-	-	-	-	-	-	129	102	-	-	-	-	-
Exposures associated with particularly high risk	-	-	-	-	-	-	-	-	-	-	446	-	-	-	-	-
Covered bonds	279	-	-	-	217	-	-	-	-	-	-	-	-	-	-	-
Institutions and corporates with a short-term credit assessment	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
CIUs	58	-	-	-	-	-	-	-	-	11	-	-	-	0	2,476	-
Long-term equity investments		-	-	-		-	-	-		79	-	-	-		-	-
Other items	7	-	-	-	5	-	-	-		114	-	-	-	66	-	-
Total as at Dec. 31, 2018	**174,336**	**-**	**-**	**-**	**4,152**	**2,499**	**4,615**	**-**	**7,555**	**12,573**	**549**	**-**	**-**	**66**	**2,480**	**-**
Total as at Jun. 30, 2018	187,861	-	-	61	3,770	2,387	4,810	-	4,870	11,607	282	545	-	90	2,381	-

The reduction in the exposures in the 0 percent risk weight class is based on the sharp fall in business activity in the central governments and central banks exposure class at the end of the reporting year. The fluctuation in the other risk weight classes compared with June 30, 2018 was normal.

6.4.2.1 Credit risk and the effects of credit risk mitigation under the Standardized Approach

(ARTICLE 453 LETTERS F AND G CRR)

Fig. 44 shows the effect of all the credit risk mitigation techniques used by DZ BANK as at the reporting date resulting from the recognition of financial collateral when calculating the capital requirements under the Standardized Approach in the DZ BANK banking group. In accordance with the requirements, receivables subject to counterparty credit risk or the frameworks for securitizations are not included in this table. RWA density is calculated by dividing exposures after credit conversion factor and credit risk mitigation by the total sum of risk-weighted assets. The values in this table are based on the regulatory figures according to the COREP report.

FIG. 44 – EU CR4 – STANDARDIZED APPROACH – CREDIT RISK EXPOSURE AND CREDIT RISK MITIGATION EFFECTS

	a	b	c	d	e	f

Exposure class		Exposures before credit conversion factor and credit risk mitigation		Exposures after credit conversion factor and credit risk mitigation		RWAs and RWA density	
€ million		On-balance-sheet amount	Off-balance-sheet amount	On-balance-sheet amount	Off-balance-sheet amount	RWAs	RWA density (%)
1	Central governments and central banks	52,350	34	53,629	332	2,127	3.94
2	Regional governments or local authorities	32,651	284	32,993	165	282	0.85
3	Public-sector entities	8,901	0	8,120	0	66	0.81
4	Multilateral development banks	415	0	415	0	3	0.63
5	International organizations	585	0	585	0	0	0.00
6	Institutions	75,886	18,673	76,696	2,093	265	0.34
7	Corporates	9,561	5,789	7,841	2,508	8,511	82.24
8	Retail business	4,541	4,954	4,568	838	3,599	66.57
9	Secured by mortgages on immovable property	5,290	35	5,147	31	2,209	42.66
10	Exposures in default	190	20	204	19	272	121.69
11	Exposures associated with particularly high risk	393	200	408	39	670	150.00
12	Covered bonds	496	0	496	0	43	8.75
13	Institutions and corporates with a short-term credit assessment	0	0	0	0	0	50.00
14	CIUs	2,546	0	2,546	0	1,580	62.07
15	Long-term equity investments	79	0	79	0	79	100.00
16	Other items	130	66	291	66	941	263.63
17	**Total as at Dec. 31, 2018**	**194,015**	**30,078**	**194,018**	**6,091**	**20,646**	**10.32**
	Total as at Jun. 30, 2018	206,536	30,714	207,237	5,698	20,339	9.55

In Fig. 44, the on-balance-sheet and off-balance-sheet exposure values before credit conversion factor and credit risk mitigation fell sharply overall, by €13,157 million, (columns a and b) in the reporting period due to transactions that had matured as at the end of the reporting year at DZ BANK. Here too, the main factor was the decrease in business activity with central governments and central banks. Because the risk assets in this exposure class are given a weight of zero, the risk-weighted assets increased only moderately, by €307 million.

The biggest changes in the risk-weighted assets outside the risk categories mentioned above were registered in the following components of the risk-weighted assets:

– Central governments and central banks: up by €29 million (June 30, 2018: €1,398 million),
– Retail business: up by €409 million (June 30, 2018: €3,190 million), and
– Other items: down by €414 million (June 30, 2018: €1,355 million).

6.4.2.2 Breakdown of exposures by risk weight under the Standardized Approach

(ARTICLE 444 LETTER E CRR)

Fig. 45 provides a breakdown of the DZ BANK banking group's regulatory exposures at the reporting date, broken down by risk weight under the Standardized Approach. The table also shows the exposures broken down by credit conversion factor and credit risk mitigation techniques.

FIG. 45 – EU CR5 – STANDARDIZED APPROACH – CREDIT RISK BY EXPOSURE CLASS AND RISK WEIGHT

Exposure class		**Risk weight (%)**																**Total**	**of which: unrated**
€ million		**0**	**2**	**4**	**10**	**20**	**35**	**50**	**70**	**75**	**100**	**150**	**250**	**370**	**1,250**	**Other**	**Deducted**		
1	Central governments and central banks	53,650	-	-	-	262	-	46	-	-	3	-	-	-	-	0	-	53,961	46,799
2	Regional governments or local authorities	32,009	-	-	-	977	-	172	-	-	1	-	-	-	-	0	-	33,158	20,276
3	Public-sector entities	7,759	-	-	-	310	-	35	-	0	17	-	-	-	-	-	-	8,120	7,777
4	Multilateral development banks	402	-	-	-	13	-		-	-	-	-	-	-	-	-	-	415	125
5	International organizations	585	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	585	433
6	Institutions	77,580	-	-	-	1,174	-	11	-	-	24	-	-	-	-	0	-	78,789	78,226
7	Corporates	0	-	-	-	787	0	873	4	-	8,682	0	-	-	-	3	-	10,349	7,185
8	Retail business	-	-	-	-	-	-	-	-	5,407	-	-	-	-	-	-	-	5,407	5,031
9	Exposures secured by mortgages on immovable property	-	-	-	-	-	2,381	2,797	-	-	-	-	-	-	-	-	-	5,178	5,178
10	Exposures in default	-	-	-	-	-	-	-	-	-	126	97	-	-	-	-	-	223	197
11	Exposures associated with particularly high risk	-	-	-	-	-	-	-	-	-	-	446	-	-	-	-	-	446	446
12	Covered bonds	279	-	-	-	217	-	-	-	-	-	-	-	-	-	-	-	496	323
13	Institutions and corporates with a short-term credit assessment	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	0	0
14	Collective investment undertakings	58	-	-	-	-	-	-	-	-	11	-	-	-	0	2,476	-	2,545	2,545
15	Long-term equity investments	-	-	-	-	-	-	-	-	-	79	-	-	-	-	-	-	79	79
16	Other items	171	-	-	-	5	-	-	-	0	115	-	-	-	66	-	-	357	333
17	**Total as at Dec. 31, 2018**	**172,493**	**-**	**-**	**-**	**3,745**	**2,381**	**3,933**	**4**	**5,407**	**9,057**	**543**	**-**	**-**	**66**	**2,480**	**-**	**200,109**	**174,953**
	Total as at Jun. 30, 2018	186,360	-	-	61	3,147	2,245	4,071	4	4,658	8,762	579	527	-	90	2,431	-	212,935	196,296

Fig. 45 shows exposures of €212,935 million as at December 31, 2018 (June 30, 2018: €212,935 million). The increase in the exposures in the 0 percent risk weight class mainly results from transactions that had matured as at the end of the financial year in the central governments and central banks exposure class. The fluctuation in the other risk weight classes compared with June 30, 2018 was within the normal range.

6.5 Credit risk and techniques for mitigating credit risk under the IRB approach

(ARTICLE 452 SENTENCE 1 LETTER A CRR)

This section of the DZ BANK banking group's regulatory risk report contains only disclosures relating to the use of IRBA models to determine credit risk.

Exposures subject to the framework for securitizations or to counterparty credit risk are not included in the tables in this section.

6.5.1 Qualitative information on use of the IRB approach

In this section, information is provided about the IRB models used in the DZ BANK banking group to calculate the RWAs. The main features of these IRB models are described and their particular scope of application is defined. The percentage for the RWAs is listed in section 6.6.1.2 of the regulatory risk report. This indicates the degree to which each regulatory portfolio is covered by the relevant model.

6.5.2 Rating systems

Characteristics of the rating systems

The generation of internal credit ratings for the counterparties of entities in the DZ BANK banking group helps to provide a solid basis for lending decisions in the management of transactions, in that the expected losses from defaults in the lending business are then factored into pricing. In addition, internal ratings are used to incorporate the credit quality of the counterparties when calculating unexpected losses in the credit portfolio.

The **VR rating system** used as standard throughout the cooperative financial network ensures that all the entities in the network apply a sophisticated uniform methodology producing ratings that are comparable.

DZ BANK primarily uses VR rating systems in its credit risk management system to assess large and medium-sized companies, major corporate customers, banks, and countries, as well as project finance, asset finance, acquisition financing, and investment funds. The internal assessment approach is also used to evaluate the liquidity lines and credit enhancements made available by DZ BANK to programs for the issuance of asset-backed commercial paper (ABCP). These rating systems have been approved by the competent supervisory authority for the purposes of calculating regulatory capital using the **foundation IRB approach**. In addition, the rating systems for open-ended real estate funds and for commercial real estate used by the former WGZ BANK Group have also been approved for use under the IRB approach.

For **internal management purposes**, DZ BANK uses further rating systems to assess SMEs (German Mittelstand), agricultural businesses, public-sector entities, not-for-profit organizations, foreign SMEs, and insurance companies. Although these systems satisfy the requirements for the foundation IRB approach in the opinion of DZ BANK, they are deemed to be of less significance and have not been reviewed by the supervisory authority.

Most of the other entities in the DZ BANK banking group use the DZ BANK rating systems for banks, countries, and major corporate customers. Rating systems for specific business segments are also used by individual subsidiaries.

6.5.3 Development and expansion of rating systems

All internal **rating systems** approved by the banking supervisor for solvency reporting were **validated** in 2018. The revision of the rating system for **project finance** used by DZ BANK for internal management purposes has been completed. The same also applies to the development of the supervisory **slotting approach for project finance**, which is scheduled to be used from 2020 onward to calculate the regulatory capital requirement. The regulatory review of the slotting approach is planned for the second quarter of 2019. In addition, the supervisory authority carried out an IRB review of the enhanced **rating system for banks** in the reporting year. At the time of publication of this report, a provisional decision approving the revised procedure was available from the supervisory authority. Furthermore, the Targeted Review of Interim Models (TRIM) took place in the fourth quarter of 2018 in respect of the **VR rating for major corporate customers**.

In 2019, the rating systems used for the IRB approach will be revised in accordance with the EBA's Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures (EBA/GL/2017/16) and the EBA's Guidelines on the application of the definition of default (EBA/GL/2016/07).

Further information about the rating systems for the exposure classes used for the Standardized Approach to credit risk and the IRB approach can be found in sections 6.4.1 and 6.5.1 of this report.

6.5.3.1 Summary of internal rating systems

(ARTICLE 452 SENTENCE 1 LETTER A CRR)

In 2007, the DZ BANK banking group received official approval from the competent supervisory authority to calculate its own funds using the foundation IRB approach and the IRB approach for retail business. Fig. 47, Fig. 48, and Fig. 49 show the approved internal rating systems used by the DZ BANK banking group to determine the parameters for calculating its regulatory capital requirements based on the IRB approaches. The overviews cover the rating systems developed and applied by DZ BANK that are also made available to BSH, DZ HYP, and DVB, as well as those specially customized to the respective business models of BSH and DZ HYP. TeamBank uses a proprietary rating system for retail business, while DVB uses proprietary rating systems for the corporates exposure class.

As at the reporting date, the degree of coverage by the IRBA according to the implementation plan was 94 percent measured in terms of exposures (EAD) and 86 percent in relation to RWAs according to the requirements of section 11 of the Solvency Regulation (SolvV). This represents an increase compared with the position as at December 31, 2017, when coverage stood at 93.1 percent (EAD) and 85.9 percent (RWAs). DVB is not included in the above values. In accordance with section 13 (2) no. 6 SolvV, the banking supervisor has given permission for this entity to be excluded from the calculation of the percentage of coverage. The degree of coverage in relation to the RWAs was below the 92 percent threshold required by the supervisory authority. However, the authority tolerates this insufficient coverage because of the systematic changes that are about to be made to the partial use rules in the context of the TRIM.

Fig. 46 provides an overview of the exposure classes of the entire DZ BANK banking group under the Standardized Approach to credit risk, FIRB approach, and AIRB approach, and their share of the total EAD.

FIG. 46 – DISTRIBUTION OF THE EXPOSURE CLASSES AND THEIR PERCENTAGE OF COVERAGE UNDER THE STANDARDIZED APPROACH TO CREDIT RISK, FIRB APPROACH, AND AIRB APPROACH (SHARE OF TOTAL EAD)

%	CRSA	FIRB	AIRB	Total
IRB approach exposure class				
Central governments and central banks		2.12	0.00	2.12
Institutions		7.69	0.15	7.83
Corporates		19.52	3.56	23.08
Retail business		0.00	15.75	15.75
Exposures secured by mortgages on immovable property		0.00	12.58	12.58
Qualified revolving		0.00	0.00	0.00
Other retail business		0.00	3.18	3.18
Equity exposures		1.23	0.00	1.23
Other non-credit-obligation assets		0.39	0.00	0.39
Standardized approach exposure class				
Central governments and central banks	11.15			11.15
Regional governments or local authorities	7.11			7.11
Public-sector entities	1.99			1.99
Multilateral development banks	0.09			0.09
International organizations	0.12			0.12
Institutions	21.13			21.13
Corporates	3.76			3.76
Retail business	2.04			2.04
Exposures secured by mortgages on immovable property	1.20			1.20
Exposures in default	0.15			0.15
Exposures associated with particularly high risk	0.19			0.19
Covered bonds	0.11			0.11
Exposures to institutions and corporates with a short-term credit assessment	0.00			0.00
CIUs	0.55			0.55
Equity exposures	0.02			0.02
Other items	0.10			0.10
Total as at Dec. 31, 2018	**49.70**	**30.94**	**19.46**	**100.00**
Total as at Dec. 31, 2017	48.88	30.01	21.11	100.00

The ECB, which is the competent supervisory authority, is notified of the percentage of coverage at regular intervals. If required, necessary action steps are agreed in the event of any potential changes to the regulatory requirements.

The figures below show the rating systems used by the DZ BANK banking group.

FIG. 47 – RATING SYSTEMS DEVELOPED BY DZ BANK AND THEIR USE BY OTHER ENTITIES IN THE DZ BANK BANKING GROUP

					Exposure class										
									Corporates				Retail business		
Rating system	**DZ BANK**	**BSH**	**DZ HYP**	**DVB**	**Central governments and central banks**	**Institutions**	**Long-term equity investments**	**Securitizations**	**Corporates (narrow sense)**	**SMEs**	**Specialized lending**	**Receivables purchased**	**Mortgage-backed**	**Qualified revolving**	**Other**
VR rating for large and medium-sized companies	•		•						•	•					
VR rating for major corporate customers	•								•						
VR rating for banks	•	•	•	•	•	•	•								
VR rating for countries	•	•	•	•	•										
Project finance	•										•				
Asset finance	•										•				
Acquisition finance	•								•						
Internal Assessment Approach	•							•							
Investment fund rating	•								•						

FIG. 48 – PROPRIETARY RATING SYSTEMS DEVELOPED BY BSH

	Exposure class										
					Corporates				Retail business		
Rating system	**Central governments and central banks**	**Institutions**	**Long-term equity investments**	**Securitizations**	**Corporates (narrow sense)**	**SMEs**	**Specialized lending**	**Receivables purchased**	**Mortgage-backed**	**Qualified revolving**	**Other**
Mortgage-backed retail business											
Application scoring									•		
Behavioral scoring									•		
LGD scoring									•		
EAD									•		
Non-mortgage-backed retail business											
Application scoring											•
Behavioral scoring											•
LGD scoring											•
EAD											•

FIG. 49 – PROPRIETARY RATING SYSTEMS DEVELOPED BY DZ HYP

	Exposure class										
					Corporates				Retail business		
Rating system	**Central governments and central banks**	**Institutions**	**Long-term equity investments**	**Securitizations**	**Corporates (narrow sense)**	**SMEs**	**Specialized lending**	**Receivables purchased**	**Mortgage-backed**	**Qualified revolving**	**Other**
VR rating systems											
VR rating for developers							•				
VR rating for investors					•						
VR rating for real-estate companies							•				
VR rating for project developers							•				
VR rating for housing companies					•						
VR rating for open-ended real estate funds					•						
VR rating for retail-customer building loans									•		
Rating systems for retail business with non-self-employed customers											
Application scoring (retail)/behavioral scoring (retail)									•		
Estimated LGD (retail IRB)									•		
Rating systems for retail business with self-employed customers											
Application scoring (retail)/behavioral scoring (retail)									•		
Estimated LGD (retail IRB)									•		
Rating for business customers, freelancers, and investors (WL GFI rating)									•		
LGD grading									•		
CCF									•		
Estimated LGD (retail IRB)											
Other rating systems											
Specialized real estate lending (outside Germany)							•				

In addition to the rating systems developed by DZ BANK, DVB uses separate rating systems for the following segments in order to classify the risks for the exposure class of corporates (in the narrow sense of the term):

- Aviation (aircraft)
- Aviation (aircraft engines)
- Land transport
- Leasing companies
- Shipping (containers)
- Shipping (vessels).

When using DZ BANK's VR rating system for banks, DVB applies its own LGD estimates.

TeamBank generally uses its consumer-finance rating system to determine the credit ratings for loan exposures in its retail business exposure class. However, the following retail products are currently covered by the Standardized Approach to credit risk:

- Purchased but not yet settled credit card transactions that, in total, are below the activation threshold for conversion into consumer finance
- Loan commitments in connection with the Finanzreserve loan facility
- Special easyCredit subportfolios: easyCredit loans to self-employed people (run-down portfolio) and easyCredit with an account overview ('easyCredit mit Kontoblick')
- Receivables purchased in connection with the integrated e-commerce finance solution and at the point of sale ('ratenkauf by easyCredit')
- Consumer loans marketed to retail customers in Austria ('fairer Credit').

6.5.3.2 Description of internal rating systems

(ARTICLE 452 SENTENCE 1 LETTERS B (I) AND C CRR)

Application of the IRB approaches requires the use of internal rating systems to classify the risks of the exposures measured using the IRB approaches and to classify guarantors. Internal rating systems are considered suitable if they meet the minimum requirements for use of the IRB approaches pursuant to article 143 CRR. Apart from meeting the requirements relating to methodology and process organization, the rating systems must have demonstrated their suitability for classifying existing and new business. Rating systems are defined by article 142 (1) no. 1 CRR as all of the methods, processes, controls, and data collection and IT systems that support the assessment of credit risk, the assignment of exposures to rating grades or pools, and the quantification of default and loss estimates that have been developed for a certain type of exposure.

Most of the internal rating systems have been developed as the standard for the entire cooperative financial network by DZ BANK. This uniform approach for the entire cooperative network brings substantial efficiency gains for DZ BANK as the cooperative central institution and for the local cooperative banks. If DZ BANK requires rating systems for specialist segments that go beyond the scope of the rating systems developed for the cooperative network, DZ BANK will develop any such rating systems itself.

The internal rating systems used by the entities in the DZ BANK banking group feature a modular construction; they generally consist of a quantitative module and a qualitative module (although TeamBank, for example, does not use a qualitative module in standardized retail business). When rating systems are developed, various factors affecting credit ratings are identified and initially developed in isolation. The next stage is to take account of interdependencies between individual modules at the level of the overall model. The advantage of this approach is that individual modules of a particular rating system can be revised, for example, in the light of new methodical-conceptual or empirical findings, without any other module being affected by this. This reduces the cost of developing and refining rating systems.

The PD/LGD approach pursuant to article 155 (3) CRR is used for equity exposures if the equity exposure falls within the scope of a rating system approved for the IRBA and for which approval has been given. Otherwise, the simple risk weight approach pursuant to article 155 (2) CRR is used.

The **VR rating system** standardizes rating methods and ensures comparability of rating results within the cooperative financial network. The VR rating system is differentiated by customer segment and is gradually being extended to cover all relevant customer groups.

The section below presents the main rating systems used by the DZ BANK banking group. These rating systems have been approved by the competent supervisory authority for the purposes of calculating regulatory own funds using the foundation IRB approach. Each of these rating systems differentiates between a total of 25 rating categories; 20 of these categories are for non-defaulting counterparties and 5 are for defaulting counterparties. The regulatory lower limits for the probability of default to be used in the calculation of capital requirements, known as PD floors, are taken into account for the relevant exposure class in accordance with the provisions of the CRR.

The **VR rating for large and medium-sized companies** is used for the exposure class of corporates (in the narrow sense of the term) and small and medium-sized enterprises and therefore applies to 28 percent and 58 percent respectively of the RWAs in the corresponding exposure class in the DZ BANK banking group. This rating system covers the central institution’s typical corporate customers that generate revenue of up to €1.0 billion. It is applied, among other things, to loans jointly extended by entities in the DZ BANK banking group to local cooperative banks or their customers and, in addition, is used by all local cooperative banks in Germany throughout the cooperative network. A characteristic of the VR rating system devised for large and medium-sized companies is the large number of historical data records of defaulting and non-defaulting customers that were collected throughout the cooperative financial network. Given this ideal data scenario, a good/bad analysis was selected as the development method.

The **VR rating for major corporate customers** is used for large domestic and international customers that generate revenue in excess of €1.0 billion and belong to the exposure class of corporates (in the narrow sense of the term). It applies to 41 percent of the RWAs in this exposure class in the DZ BANK banking group. A characteristic of the VR rating system devised for major corporate customers is the small number of defaulting customers. Given this data scenario, the external rating method was selected as the development method. Under this approach, data was collected from many financial years for a large number of externally rated international companies from various sectors.

The **VR rating for banks** is used for the exposure class of central governments and central banks, institutions, and equity exposures and therefore applies to 58 percent, 100 percent, and 100 percent respectively of the RWAs in the corresponding exposure class in the DZ BANK banking group. This rating system is applied to German and international banks (including central banks), irrespective of legal structure or size. The external rating method was again chosen as the development method. Under this approach, data was collected from externally rated banks worldwide.

The **VR rating for countries** is used for the exposure class of central governments and central banks and therefore applies to 40 percent of the RWAs in the corresponding exposure class in the DZ BANK banking group. Given the international orientation of the DZ BANK banking group, the country rating is very important for risk-based management of the business conducted by the entities in the DZ BANK banking group. The country rating segment is concerned exclusively with credit ratings for central governments and not with credit ratings for central banks, other foreign public-sector entities, or international institutions. Under this rating system design, which is also based on the external rating method, countries are broken down into industrialized and developing nations. The reasons for this breakdown are the different risk factors and the need for a different interpretation of the factors relevant to credit quality when analyzing industrialized and developing nations' ability and willingness to pay.

The internal rating systems specified below are used exclusively by DZ BANK within the banking group to calculate capital requirements:

– The **project finance rating system** is used to assess complex transport and infrastructure projects. It therefore applies to 26 percent of the RWAs in the specialized lending exposure class in the DZ BANK banking group. As there are only a small number of external ratings available for project finance and an insufficient number of internal data sets, a combination of ratings by experts, cash flow simulations, and the external rating method were selected to develop the rating model.

– The **asset finance rating system** is used to assess investment projects in the transportation sector (currently exclusively shipping) that are financed on the basis of the cash flows generated by the asset. It therefore applies to 2 percent of the RWAs in the specialized lending exposure class in the DZ BANK banking group. This system is based on ratings by experts.

– The **acquisition finance rating system** is used in the provision of funding for acquisitions of companies or parts of companies and majority and minority stakes, irrespective of the legal structure of the transaction. It therefore applies to 5 percent of the RWAs in the exposure class of corporates (in the narrow sense of the term) in the DZ BANK banking group. As there is also an insufficient number of external ratings available for acquisition financing and, similarly, an insufficient quantity of internal data on defaults, a rating method based on the assessments of internal experts was chosen to develop this rating system.

– The **Internal Assessment Approach (IAA)** is used to rate liquidity lines and credit enhancements that are made available to programs for the purpose of issuing ABCP.

– The **investment fund rating system** is used for funds in Germany and Luxembourg that mainly invest in liquid fixed assets. It therefore applies to 1 percent of the RWAs in the exposure class of corporates (in the narrow sense of the term) in the DZ BANK banking group. Because neither default data for funds in this scope of application nor external credit ratings for investment funds are available, a simulation-based approach using time series of fund returns combined with a qualitative sub-module were selected to develop this rating system.

A reconciliation of external and internal ratings, which illustrates the relationship between internal allocations to rating categories and external credit ratings, is presented in section 8.4.1, fig. 24 (page 112) of the opportunity and risk report.

6.5.3.3 Approved transitional rules for IRB approaches (partial use)

(ARTICLE 452 SENTENCE 1 LETTER A CRR)

Capital requirements for credit risk in the entities within the DZ BANK banking group are always calculated using the IRB approaches as well as the Standardized Approach to credit risk (partial use). In accordance with article 150 CRR, use of the Standardized Approach to credit risk by institutions that use the IRB approach is limited, and threshold values must be complied with. In order to monitor compliance, the cover ratio as defined by article 143 CRR in conjunction with section 11 SolvV is calculated on an ongoing basis. Because DVB has been using the advanced IRB approach to report its capital requirements for credit risk since January 1, 2008, it is exempted under section 13 (2) no. 6 SolvV from the calculation of the DZ BANK banking group's cover ratio.

The individual IRBA institutions use internal rating systems to cover their main business lines. Only segments that are immaterial in terms of their level of credit risk will continue to use the Standardized Approach to credit risk indefinitely. The other entities use the Standardized Approach to credit risk.

In the foundation IRB approach, the PD is estimated by the institutions themselves, while the loss given default (LGD) is specified by law. LGD values in the IRB approach for retail business and the advanced IRB approach are also based on the institutions' own estimates. By contrast, the Standardized Approach to credit risk is based on risk weights that either depend on external ratings or are set in accordance with regulatory requirements.

Validation activities are carried out depending on the method chosen for a rating system (see 'Description of internal rating systems' in this section). For example, the Gini coefficient is calculated in order to assess the discriminant power of the rating systems with a good/bad analysis, whereas the hit rate is used with the external rating method. The minimum data history of five years as required by article 180 et seq. CRR is maintained for both the estimates and the validation of risk parameters. Validation also involves comparing the expected probability of default with the actual default rate for each rating system and, in the event of significant discrepancies, describing the underlying causes.

For each institution that uses the IRB approach there is an implementation plan that ensures compliance with the thresholds prescribed by the CRR or approved by the supervisory authority. Compliance with these thresholds is one of the preconditions for using the IRB approaches.

6.5.3.4 Use of internal estimates for purposes other than calculating risk-weighted exposures under the IRB approach

(ARTICLE 452 SENTENCE 1 LETTER B (II) CRR)

Internal rating systems are at the heart of credit risk management for the entities in the DZ BANK banking group. The credit ratings used for internal management purposes and regulatory reporting purposes are identical. Internal rating systems are used in the following areas:

– The **exposure limits** for lending or trading transactions for which there is a risk of default are partly determined by internal ratings.

– The profit-contribution-based **pre-analysis of loans** carried out in the course of pricing is based on key cost determinants such as sales commission, standard risk costs, and the regulatory and economic capital costs involved in covering expected and unexpected losses. The two latter cost components are based on internal ratings.

- The **level of authority** for decision-makers in both front-office and back-office divisions to approve loan applications is also determined by internal ratings.

- When **loans are analyzed ex-post** after an agreement has been concluded, the profit contributed by individual transactions, customers, and profit centers is primarily determined (similarly to the pre-analysis of loans) by the standard risk costs and the regulatory and economic capital costs based on internal ratings.

- During the term of the loan, internal ratings determine the extent to which **credit ratings are monitored**.

- Taking the overall economic situation into account, **specific and portfolio loan loss allowances are planned** on the basis of the calculation of standard risk costs and credit risk (expected loss). The level of costs depends on internal ratings and, if applicable, loss rates.

- The risk of unexpected losses is measured using **credit value-at-risk systems** that are based on internal credit ratings and the corresponding default probabilities as well as further risk parameters.

- And finally, internal ratings play a key role in internal **credit risk reporting**.

6.5.3.5 Control mechanisms for the rating systems

(ARTICLE 452 SENTENCE 1 LETTER B (IV) CRR)

The internal rating systems used are validated once a year on the basis of internal and external data. **Validation** consists partly of quantitative analysis aimed at measuring the rating systems' discriminant power and stability and at calibrating them. It also includes qualitative analysis that tests the use of these rating systems for internal management purposes with respect to their model design and data quality. In addition, pool validation is carried out on the standard rating systems used throughout the cooperative financial network. When pool validation is conducted, the rating-related data of all banks that use the rating system concerned is collected and analyzed in the same way as in the internal bank validation process. If validations reveal any room for improvement, improvements are made when the rating systems are refined.
The monitoring function also includes checking that the rating systems are being properly used, regularly estimating the risk parameters derived from them, and reviewing these estimates. The findings of these monitoring activities are integrated into the internal reporting system.

The rating systems used by DZ BANK have been approved by its Board of Managing Directors.

The independent validation unit at DZ BANK acts as the credit risk monitoring unit for the rating systems in the Group Risk Controlling division. It operates independently of the personnel and management functions that are responsible for originating and renewing exposures. It reports directly to senior management and is responsible for monitoring DZ BANK's rating systems. Because the development and validation of rating systems have to be kept separate in accordance with regulatory requirements, some of the tasks of the credit risk monitoring unit relating to development of the systems are carried out by another unit.

The Internal Audit function is independent of this process and regularly reviews the adequacy of internal rating systems, including compliance with the minimum requirements for using these systems.

Similar arrangements are in place in all entities in the DZ BANK banking group.

As well as the internal rating systems (PD models), all of the DZ BANK banking group's LGD and CCF models are validated once a year on the basis of internal and external data. This task is the responsibility of the independent validation units of the various subsidiaries in the DZ BANK banking group.

As a rule, validation of the LGD and CCF models consists of quantitative analysis aimed at measuring predictive power and stability and at calibrating the procedures. It also includes qualitative analysis that tests the use of the models for internal management purposes with respect to their model design and data quality. Furthermore, the analysis focuses on gauging whether the observations are representative of loss events that are expected in the future.

Process validation is another key aspect of the review of the LGD and CCF models. In this case, the focus is on checking the correct technical implementation of the parameters in all of the systems in which they are applied.

6.5.3.6 Process of assigning exposures and borrowers to rating categories and risk pools

(ARTICLE 452 SENTENCE 1 LETTER C CRR)

Every borrower clearly falls into a defined area of an internal rating system based on industrial sector codes, revenue characteristics, and business specifics. As a rule, it is not possible to conduct business that bears a default risk with borrowers who do not have an internal rating. All rating systems are assigned – without any overlaps – to one regulatory exposure class. The relevant rating models are used as part of the credit application and approval process to classify the applicant or the guarantor. The classification of every borrower or guarantor must be reviewed at least once a year. All relevant input factors and ratings conducted are saved in the data processing systems so that there is a complete rating history for every customer and every transaction.

6.5.4 Quantitative information on use of the IRB approach

(ARTICLE 452 SENTENCE 1 LETTERS D TO H CRR)

This section focuses on default risk for exposures under the IRB approach.
Fig. 50 and Fig. 51 show the lending volumes under the IRB approach for borrowers and transactions that are classified on the basis of internal credit ratings. The rating systems used internally are unambiguously assigned to one regulatory exposure class. The borrowers/transactions are assigned to a credit rating category based on their individual rating in the form of their specific default probability or the expected loss for a rating category. Classification as ‘investment grade’, ‘non-investment grade’, or ‘default’ is based on the corresponding default probabilities for each rating category on the standardized groupwide master scale of the DZ BANK banking group. This rating scale is described in section 8.4.1, fig. 24 (page 112) of the opportunity and risk report.

6.5.4.1 Lending volume broken down by PD category under the foundation IRB approach

(ARTICLE 452 SENTENCE 1 LETTERS D TO G CRR)

Fig. 50 shows the parameters used in the DZ BANK banking group to calculate the capital requirements on the basis of IRB rating systems. The exposure classes are broken down by PD category so that the credit quality of the portfolio can be assessed. The on-balance-sheet exposures before credit conversion factor and the off-balance-sheet exposures before credit risk mitigation are disclosed in columns a and b, while columns c to l contain the regulatory values, e.g. average values for PD, LGD, and term to maturity, as well as the RWAs and their density, expected loss (EL), and loan loss allowances and provisions for each exposure class.

The disclosures are based on the exposure classes (central governments and central banks, institutions, corporates, and long-term equity investments) under the IRB approach and are also broken down by PD category. The exposure for undrawn credit lines is calculated by applying the credit conversion factors to the carrying amount. The average risk weights reveal borrowers’ credit ratings and the extent to which transactions are collateralized. The number of borrowers in each exposure class is also stated.

Fig. 50 does not contain any disclosures regarding securitization exposures. Information on these exposures is presented separately in section 7.

FIG. 50 – EU CR6 – IRB APPROACH – CREDIT RISK EXPOSURES BY EXPOSURE CLASS AND PD RANGE (FIRB)

PD scale	a	b	c	d	e	f	g	h	i	j	k	l
€ million (unless indicated otherwise)	Original on-balance-sheet gross exposures	Off-balance-sheet exposures pre-CCF	Average CCF (percent)	EAD after credit risk mitigation and after CCF	Average PD (percent)	Number of borrowers	Average LGD (percent)	Average maturity (days)	RWAs	RWA density (percent)	EL	Loan loss allowances and provisions
Central governments and central banks												
0.00 to < 0.15	8,468	13	92.21	9,138	0.01	47	45.00	852	798	8.74	1	0
0.15 to < 0.25	44	29	78.77	66	0.23	4	45.00	900	33	50.17	0	0
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	70	53	75.00	75	0.50	10	45.00	900	55	73.79	0	0
0.75 to < 2.50	769			769	1.09	18	2.94	211	42	5.46	0	0
2.50 to < 10.00	180	45	74.98	101	5.68	40	39.91	900	147	145.35	2	-4
10.00 to < 100.00	133	3	53.94	7	13.50	18	45.00	900	16	227.30	0	0
100.00 (default)	-	-	-	-	-	2	-	-	-	-	-	-
Subtotal	**9,664**	**143**	**76.90**	**10,157**	**0.17**	**71**	**41.76**	**805**	**1,092**	**10.75**	**4**	**-5**
Institutions												
0.00 to < 0.15	19,165	1,336	45.61	20,256	0.06	833	25.82	756	3,068	15.15	3	-2
0.15 to < 0.25	3,617	35	22.72	3,632	0.19	263	14.73	781	657	18.09	1	-2
0.25 to < 0.50	1,578	23	74.62	1,596	0.62	93	18.00	888	481	30.13	1	-1
0.50 to < 0.75	1,042	76	54.42	1,030	0.50	130	21.81	893	467	45.32	1	-1
0.75 to < 2.50	775	102	17.72	621	1.04	161	33.79	897	544	87.67	2	-1
2.50 to < 10.00	499	121	30.36	391	3.54	157	41.73	900	605	154.71	5	-2
10.00 to < 100.00	3	32	20.02	10	24.70	232	44.62	900	27	280.65	1	-1
100.00 (default)	113	26	74.83	96	100.00	9	44.24	900	-	-	43	-64
Subtotal	**26,793**	**1,752**	**43.21**	**27,631**	**0.55**	**1,026**	**24.24**	**778**	**5,848**	**21.17**	**57**	**-73**
Corporates – total												
0.00 to < 0.15	24,233	6,272	66.81	28,391	0.07	2,906.00	40.29	903.09	5,793	20.41	7	-4
0.15 to < 0.25	12,663	7,789	61.48	17,312	0.19	2,577.00	42.63	900.65	7,303	42.19	14	-7
0.25 to < 0.50	6,571	3,801	57.43	8,503	0.35	1,880.00	43.14	901.15	4,919	57.85	12	-7
0.50 to < 0.75	4,968	3,566	49.81	6,391	0.50	1,889.00	43.89	900.65	4,523	70.77	14	-22
0.75 to < 2.50	8,313	4,741	51.40	9,947	1.03	3,998.00	43.65	900.71	9,170	92.18	44	-33
2.50 to < 10.00	1,480	692	57.08	1,168	3.64	975.00	43.87	900.34	1,567	134.18	18	-20
10.00 to < 100.00	439	51	68.68	139	20.04	1,671.00	41.52	900.17	309	222.80	11	-10
100.00 (default)	1,274	127	76.11	1,198	100.00	796.00	44.28	900.02	0	0.00	530	-671
Subtotal	**59,942**	**27,039**	**58.81**	**73,048**	**2.03**	**8,461.00**	**42.07**	**901.65**	**33,584**	**45.98**	**651**	**-774**
Corporates – of which: SMEs												
0.00 to < 0.15	4,203	385	71.15	4,477	0.07	507	36.27	913	601	13.43	1	0
0.15 to < 0.25	771	183	54.14	870	0.23	504	38.73	909	229	26.33	0	0
0.25 to < 0.50	613	178	51.40	704	0.35	399	38.46	909	234	33.28	1	0
0.50 to < 0.75	290	148	55.73	371	0.50	395	40.94	905	190	51.13	1	0
0.75 to < 2.50	943	534	52.46	1,214	1.09	1,257	42.08	903	914	75.30	5	-4
2.50 to < 10.00	207	126	62.37	284	4.00	422	42.57	901	331	116.46	5	-4
10.00 to < 100.00	338	5	85.49	12	21.25	1,444	41.79	902	23	193.46	1	0
100.00 (default)	36	36	80.82	65	100.00	85	44.41	900	-	-	29	-41
Subtotal	**7,402**	**1,594**	**58.87**	**7,997**	**1.27**	**2,345**	**38.13**	**910**	**2,522**	**31.54**	**42**	**-50**
Corporates – of which: specialized lending												
0.00 to < 0.15	7,615	774	77.16	8,201	0.06	912	40.46	900	1,789	21.82	2	-1
0.15 to < 0.25	4,812	856	76.84	5,401	0.20	618	42.04	900	2,345	43.41	5	-3
0.25 to < 0.50	2,995	1,199	74.33	3,773	0.35	504	43.34	900	2,288	60.65	6	-3
0.50 to < 0.75	1,570	388	74.75	1,709	0.50	428	44.40	900	1,255	73.47	4	-3
0.75 to < 2.50	2,968	601	74.80	2,973	0.96	688	44.14	900	2,808	94.46	13	-11
2.50 to < 10.00	270	48	76.30	114	3.88	124	43.19	900	160	140.35	2	-2
10.00 to < 100.00	21	17	73.88	33	13.67	128	43.57	900	75	225.42	2	-4

PD scale	a	b	c	d	e	f	g	h	i	j	k	l
€ million (unless indicated otherwise)	Original on-balance-sheet gross exposures	Off-balance-sheet exposures pre-CCF	Average CCF (percent)	EAD after credit risk mitigation and after CCF	Average PD (percent)	Number of borrowers	Average LGD (percent)	Average maturity (days)	RWAs	RWA density (percent)	EL	Loan loss allowances and provisions
100.00 (default)	502	6	81.33	490	100.00	230	43.94	900	-	-	215	-241
Subtotal	**20,753**	**3,890**	**75.59**	**22,694**	**2.49**	**1,816**	**42.19**	**900**	**10,721**	**47.24**	**248**	**-270**
Corporates – of which: purchased receivables												
0.00 to < 0.15	34	-	-	34	0.10	13	45.00	900	11	31.43	0	0
0.15 to < 0.25	15	-	-	15	0.23	6	43.99	900	7	49.04	0	0
0.25 to < 0.50	7	-	-	6	0.35	8	45.00	900	3	52.94	0	0
0.50 to < 0.75	33	-	-	33	0.50	19	43.52	900	23	70.82	0	0
0.75 to < 2.50	17	-	-	17	1.07	24	44.45	900	17	96.67	0	0
2.50 to < 10.00	3	-	-	3	3.30	18	45.00	900	3	125.68	0	0
10.00 to < 100.00	-	-	-	-	-	2	-	-	-	-	-	-
100.00 (default)	3	-	-	3	100.00	3	45.00	900	-	-	2	-
Subtotal	**112**	**-**	**-**	**111**	**3.51**	**65**	**44.33**	**900**	**64**	**58.11**	**2**	**0**
Corporates – of which: other												
0.00 to < 0.15	12,381	5,112	64.92	15,678	0.07	1,474	41.33	902	3,392	21.63	4	-2
0.15 to < 0.25	7,065	6,750	59.73	11,026	0.19	1,449	43.23	900	4,722	42.83	9	-4
0.25 to < 0.50	2,957	2,424	49.51	4,021	0.35	969	43.77	901	2,394	59.53	6	-3
0.50 to < 0.75	3,075	3,029	46.32	4,278	0.50	1,047	43.94	901	3,054	71.39	9	-18
0.75 to < 2.50	4,385	3,607	47.35	5,743	1.06	2,029	43.73	901	5,431	94.57	26	-18
2.50 to < 10.00	1,000	518	54.01	767	3.47	411	44.44	900	1,073	139.85	12	-14
10.00 to < 100.00	80	29	62.98	94	22.16	97	40.75	900	211	225.54	8	-5
100.00 (default)	732	86	73.81	639	100.00	478	44.52	900	-	-	285	-389
Subtotal	**31,675**	**21,555**	**55.78**	**42,247**	**1.93**	**4,235**	**42.75**	**901**	**20,277**	**48.00**	**359**	**-454**
Long-term equity investments												
0.00 to < 0.15	40	-	-	40	0.09	15	73.52	1,800	32	78.82	0	-
0.15 to < 0.25	0	-	-	0	0.23	19	90.00	1,800	0	151.42	0	-
0.25 to < 0.50	1	-	-	1	0.35	8	90.00	1,800	1	181.71	0	-
0.50 to < 0.75	-	-	-	-	-	5	-	-	-	-	-	-
0.75 to < 2.50	30	-	-	30	1.10	4	90.00	1,800	82	270.01	0	-
2.50 to < 10.00	1	-	-	1	5.57	4	90.00	1,800	6	392.45	0	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	0	-	-	0	100.00	4	90.00	5	-	-	0	-
Subtotal	**73**	**-**	**-**	**73**	**0.63**	**36**	**80.88**	**1,800**	**120**	**165.67**	**0**	**-**
Total of all portfolios as at Dec. 31, 2018	**96,471**	**28,934**	**57.96**	**110,908**	**3.34**	**9,594**	**37.63**	**862**	**40,645**	**36.65**	**712**	**-851**
Total of all portfolios as at Jun. 30, 2018	96,916	27,615	58.08	111,021	1.46	10,649	37.31	851	39,158	35.27	695	-765

The growth of on-balance-sheet and off-balance-sheet exposures is due to the larger volume of new business at DZ BANK. Despite the moderate fall in exposure values, the RWAs went up due to the higher average PDs. Expected losses (EL) increased compared with June 30, 2018 as a result of the higher average PDs and LGDs. This was met with a moderate rise in loss allowances.

6.5.4.2 Lending volume broken down by PD category under the advanced IRB approach

(ARTICLE 452 SENTENCE 1 LETTERS D TO G CRR)

Fig. 51 shows the transactions assigned to the advanced IRB approach, broken down by exposure class pursuant to article 147 CRR. Within the exposure classes, they are allocated to one of 8 PD categories.

FIG. 51 – EU CR6 – AIRB APPROACH – CREDIT RISK EXPOSURES BY EXPOSURE CLASS AND PROBABILITY OF DEFAULT

PD scale	a	b	c	d	e	f	g	h	i	j	k	l
€ million (unless indicated otherwise)	Original on-balance-sheet gross exposures	Off-balance-sheet exposures pre-CCF	Average CCF (%)	EAD after credit risk mitigation and after CCF	Average PD (%)	Number of borrowers	Average LGD (%)	Average maturity (days)	RWAs	RWA density (%)	EL	Loan loss allowances and provisions
Central governments and central banks												
0.00 to < 0.15	-	-	-	-	-	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	-
Institutions												
0.00 to < 0.15	139	-	-	139	0.07	10	81.00	1	11	8.03	0	-
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	98	-	-	98	0.50	2	81.00	2	3	3.01	0	-
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	237	-	-	237	0.25	12	81.00	1	14	5.96	0	-
Corporates – total												
0.00 to < 0.15	104	-	-	104	0.06	6	16.56	911	3	2.54	0	0
0.15 to < 0.25	1,428	-	-	1,428	0.19	54	5.53	1,004	91	6.39	0	0
0.25 to < 0.50	2,697	260	100.00	2,958	0.36	105	3.91	1,168	194	6.55	1	0
0.50 to < 0.75	107	34	100.00	141	0.64	2	6.55	1,786	24	16.73	0	0
0.75 to < 2.50	3,777	283	100.00	4,060	1.47	166	5.18	1,194	590	14.54	3	-3
2.50 to < 10.00	5,057	194	100.00	5,252	6.39	245	2.96	1,106	618	11.78	11	-8
10.00 to < 100.00	725	188	100.00	912	26.31	60	2.96	972	153	16.79	7	-6
100.00 (default)	1,775	74	100.00	1,849	100.23	83	41.58	998	-	-	749	-732
Subtotal	15,670	1,034	100.00	16,705	14.99	721	8.28	1,115	1,673	10.02	772	-750
Corporates – of which: SMEs												
0.00 to < 0.15	-	-	-	-	-	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	-
Corporates – of which: specialized lending												
0.00 to < 0.15	-	-	-	-	-	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	-
Corporates – of which: purchased receivables												
0.00 to < 0.15	-	-	-	-	-	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	-

PD scale	a	b	c	d	e	f	g	h	i	j	k	l
€ million (unless indicated otherwise)	Original on-balance-sheet gross exposures	Off-balance-sheet exposures pre-CCF	Average CCF (%)	EAD after credit risk mitigation and after CCF	Average PD (%)	Number of borrowers	Average LGD (%)	Average maturity (days)	RWAs	RWA density (%)	EL	Loan loss allowances and provisions
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	-
Corporates – of which: other												
0.00 to < 0.15	104	-	-	104	0.06	6	16.56	911	3	2.54	0	0
0.15 to < 0.25	1,428	-	-	1,428	0.19	54	5.53	1,004	91	6.39	0	0
0.25 to < 0.50	2,697	260	100.00	2,958	0.36	105	3.91	1,168	194	6.55	1	0
0.50 to < 0.75	107	34	100.00	141	0.64	2	6.55	1,786	24	16.73	0	0
0.75 to < 2.50	3,777	283	100.00	4,060	1.47	166	5.18	1,194	590	14.54	3	-3
2.50 to < 10.00	5,057	194	100.00	5,252	6.39	245	2.96	1,106	618	11.78	11	-8
10.00 to < 100.00	725	188	100.00	912	26.31	60	2.96	972	153	16.79	7	-6
100.00 (default)	1,775	74	100.00	1,849	100.23	83	41.58	998	-	-	749	-732
Subtotal	**15,670**	**1,034**	**100.00**	**16,705**	**14.99**	**721**	**8.28**	**1,115**	**1,673**	**10.02**	**772**	**-750**
Retail business – total												
0.00 to < 0.15	6,508	72	70.85	6,559	0.12	153,032	19.30	322.68	373	5.68	2	-1
0.15 to < 0.25	3,612	130	68.81	3,701	0.18	226,229	14.93	655.63	206	5.57	1	-1
0.25 to < 0.50	3,385	336	72.66	3,629	0.35	124,832	11.23	435.41	197	5.43	1	-1
0.50 to < 0.75	12,653	892	88.96	13,446	0.51	485,424	14.33	339.69	1,481	11.01	9	-10
0.75 to < 2.50	33,146	3,956	94.53	36,885	1.08	811,650	13.76	245.82	6,461	17.52	56	-53
2.50 to < 10.00	6,448	441	89.48	6,842	4.03	254,669	21.30	648.76	2,944	43.02	56	-73
10.00 to < 100.00	1,483	42	99.94	1,525	33.06	61,282	18.64	462.03	1,039	68.14	79	-97
100.00 (default)	980	7	93.40	987	100.00	56,917	31.17	414.01	603	61.15	259	-312
Subtotal	**68,215**	**5,874**	**91.23**	**73,574**	**3.07**	**2,136,934**	**15.33**	**344.00**	**13,303**	**18.08**	**462**	**-548**
Retail business – SMEs, secured by mortgages on immovable property												
0.00 to < 0.15	-	-	-	-	-	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	-
Retail business – non-SMEs, secured by mortgages on immovable property												
0.00 to < 0.15	2,772	55	66.06	2,808	0.10	65,713	10.83	748	60	2.12	0	0
0.15 to < 0.25	2,928	95	60.42	2,985	0.17	68,457	12.00	661	113	3.78	0	-1
0.25 to < 0.50	2,945	295	70.67	3,153	0.35	51,907	10.82	496	157	4.97	1	-1
0.50 to < 0.75	10,164	861	89.40	10,933	0.50	152,750	9.56	160	771	7.05	5	-3
0.75 to < 2.50	28,729	3,833	94.81	32,362	1.06	414,120	10.69	71	4,573	14.13	35	-24
2.50 to < 10.00	4,329	409	89.43	4,695	4.05	64,483	11.89	76	1,588	33.82	21	-19
10.00 to < 100.00	1,036	39	99.94	1,075	36.22	18,058	10.90	24	654	60.82	41	-33
100.00 (default)	659	7	93.84	665	100.00	12,845	23.74	74	357	53.66	128	-96
Subtotal	**53,561**	**5,593**	**91.48**	**58,677**	**2.83**	**830,954**	**10.81**	**172**	**8,272**	**14.10**	**232**	**-177**
Retail business – qualified revolving												
0.00 to < 0.15	-	-	-	-	-	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	-
Retail business – other SMEs												

PD scale	a	b	c	d	e	f	g	h	i	j	k	l
€ million (unless indicated otherwise)	Original on-balance-sheet gross exposures	Off-balance-sheet exposures pre-CCF	Average CCF (%)	EAD after credit risk mitigation and after CCF	Average PD (%)	Number of borrowers	Average LGD (%)	Average maturity (days)	RWAs	RWA density (%)	EL	Loan loss allowances and provisions
0.00 to < 0.15	1	-	-	1	0.14	4	26.00	-	0	6.50	0	0
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	**1**	**-**	**-**	**1**	**0.14**	**2**	**26.00**	**-**	**0**	**6.50**	**0**	**0**
Retail business – other non-SMEs												
0.00 to < 0.15	3,735	17	86.06	3,750	0.13	87,315	25.63	4	313	8.35	1	0
0.15 to < 0.25	684	35	91.78	716	0.23	157,772	27.13	631	93	13.05	0	-1
0.25 to < 0.50	441	41	86.91	476	0.35	72,925	13.98	35	40	8.49	0	0
0.50 to < 0.75	2,489	31	76.67	2,513	0.54	332,674	35.08	1,124	710	28.25	5	-7
0.75 to < 2.50	4,417	123	85.80	4,522	1.21	397,530	35.70	1,496	1,887	41.73	21	-29
2.50 to < 10.00	2,119	32	90.10	2,147	3.97	190,186	41.88	1,901	1,356	63.14	35	-54
10.00 to < 100.00	447	3	100.00	450	25.52	43,224	37.10	1,507	385	85.62	37	-64
100.00 (default)	321	0	77.15	321	100.00	44,072	46.55	1,118	246	76.66	130	-216
Subtotal	**14,653**	**281**	**86.34**	**14,895**	**4.01**	**1,305,978**	**33.12**	**1,020**	**5,032**	**33.78**	**230**	**-371**
Other non-credit-obligation assets												
0.00 to < 0.15	-	-	-	-	-	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Total of all portfolios as at Dec. 31, 2018	**84,122**	**6,909**	**92.54**	**90,515**	**18.71**	**2,137,667**	**14.20**	**485**	**14,991**	**16.56**	**1,233**	**-1,297**
Total of all portfolios as at Jun. 30, 2017	83,512	7,041	91.76	89,973	6.14	1,788,251	14.04	509	15,071[1]	17.07	1,395	-1,520

1 Amount for prior-year period restated.

The growth of on-balance-sheet and off-balance-sheet exposures in Fig. 51 is attributable to normal business activity at DZ BANK. The risk-weighted assets increased only moderately due to the low average PDs. The reduction in the risk-weighted assets was the result of fluctuation in the subportfolios that was within the normal range. The reduction in loan loss allowances and provisions is attributable to the winding down of exposures in default in the 'corporates – other' subportfolio.

6.5.4.3 Collateralized lending volume under the IRB approaches

(ARTICLE 453 SENTENCE 1 LETTER G CRR)

This section presents the impact of credit derivatives on the calculation of capital requirements under the IRB approach. To this end, Fig. 52 shows the RWAs before credit risk has been mitigated using credit derivatives and compares them with the actual RWAs (i.e. after risk mitigation using credit derivatives and guarantees). The RWA disclosures are also based on on-balance-sheet and off-balance-sheet exposures. However, exposures subject to counterparty credit risk are not included in the following table.

FIG. 52 – EU CR7 – IRB APPROACH – EFFECT ON THE RWAS OF CREDIT DERIVATIVES USED AS CREDIT RISK MITIGATION TECHNIQUES

		a	b	a	b
		Dec. 31, 2018		Jun. 30, 2018	
€ million		RWAs before credit derivatives	Actual RWAs	RWAs before credit derivatives	Actual RWAs
1	FIRB approach exposure class	43,578	43,578	40,578	40,578
2	Central governments and central banks	1,092	1,092	1,411	1,411
3	Institutions	5,855	5,855	5,961	5,855
	Corporates – total	36,630	36,630	33,206	33,206
4	Corporates – SMEs	2,522	2,522	1,472	1,472
5	Corporates – specialized lending	13,761	13,761	13,145	13,145
6	Corporates – other	20,347	20,347	18,589	18,589
7	AIRB approach exposure class	38,956	38,956	40,048	40,048
8	Central governments and central banks	-	-	-	-
9	Institutions	14	14	41	41
	Corporates – total	1,673	1,673	-	-
10	Corporates – of which: SMEs	-	-	-	-
11	Corporates – of which: specialized lending	-	-	-	-
12	Corporates – of which: other	1,673	1,673	2,243	2,243
	Retail business – total	13,303	13,303	-	-
13	Retail business – SMEs, secured by mortgages on immovable property	-	-	-	-
14	Retail business – non-SMEs, secured by mortgages on immovable property	8,272	8,272	7,253	7,253
15	Retail business – qualified revolving	-	-	-	-
16	Retail business – other SMEs	0	0	0	0
17	Retail business – other non-SMEs	5,032	5,032	5,023	5,023
18	Long-term equity investments under the IRB approach	22,151	22,151	23,058	23,058
19	Other non-credit-obligation assets[1]	1,814	1,814	2,431	2,431
20	Total	82,533	82,533	80,627	80,627

1 Other assets are assigned to the FIRB approach and form part of the total in row 1.

The RWAs under the IRB approach in Fig. 52 went up in the second half of the year under review, primarily because of normal business activity.

In the DZ BANK banking group, no credit derivatives were used for risk mitigation under the IRB approach. As a result, the RWAs before the mitigation of credit risk using credit derivatives are the same as the actual RWAs.

6.5.4.4 RWA flow statement for credit risk under the IRB approach

(ARTICLE 438 SENTENCE 1 LETTER D CRR)

Fig. 53 explains the fluctuation in the RWAs of risk-weighted exposure amounts under the IRB approach. The associated capital requirements during the reporting period are also shown.

FIG. 53 – EU CR8 – RWA FLOW STATEMENT OF CREDIT RISK EXPOSURES UNDER THE IRB APPROACH

		a	b	a	b
		Dec. 31, 2018		Sep. 30, 2018	
€ million		RWA amounts	Capital requirements	RWA amounts	Capital requirements
1	**Total RWAs as at the end of the previous reporting period**	**84,510**	**6,761**	**84,477**	**6,758**
2	Asset size	-2,109	-169	119	10
3	Asset quality	-	-	-514	-41
4	Model updates	-	-	-	-
5	Methodology and policy	-	-	346	28
6	Acquisitions and disposals	-	-	-	-
7	Foreign exchange movements	25	2	67	5
8	Other	107	8	15	1
9	**Total RWAs as at the end of the reporting period**	**82,533**	**6,603**	**84,510**	**6,761**

The RWA amounts declined from €84,510 million as at September 30, 2018 to €82,533 million as at the reporting date. This decrease in the RWAs of €1,977 million predominantly comprised two effects: Firstly, the risk exposures went down by €2,109 million owing to a decline in business activity at the end of 2018 and, secondly, the RWAs increased by €25 million due to higher US dollar exchange rates.

6.5.4.5 Actual specific credit risk adjustments and factors influencing losses incurred in lending business

(ARTICLE 452 SENTENCE 1 LETTERS G AND H CRR)

Fig. 54 contains information about the losses in the past 5 years in the following exposure classes: central governments and central banks, institutions, corporates (including SMEs, specialized lending, and purchased receivables that are treated as corporate loans), long-term equity investments that are backed by own funds based on individual probabilities of default (PD/LGD approach), and retail business (broken down into mortgage-backed exposures, qualified revolving, and other exposures under the IRB approach).

The calculations of losses presented in Fig. 54 are based on the carrying amounts recognized under IFRS. Market-price-related write-downs on securities portfolios and long-term equity investments managed according to their default probabilities are not taken into account.

An actual loss of €295 million for the reporting period (2017: €912 million) was calculated for the subportfolios presented in accordance with the IRB approach (IRBA) in Fig. 54.

The information disclosed in the regulatory risk report includes the changes in loss allowances, provisions for loan commitments, and provisions for financial guarantee contracts that are reported in the following notes to the consolidated financial statements in DZ BANK's 2018 Annual Report: note 43 'Loss allowances' (pages 258 to 259), note 59 'Loss allowances' (page 273), and note 67 'Provisions' (page 286).

Fig. 54 compares the expected losses with the losses actually incurred in the period January 1 to December 31 of the 2014 to 2018 financial years for the following IRBA exposure classes:

- Central governments and central banks
- Institutions
- Corporates (including SMEs, specialized lending, and purchased receivables that are treated as corporate loans)
- Long-term equity investments recognized under the PD/LGD approach

– Retail business.

The estimate of the expected losses for 2018 relates to the non-defaulting risk-weighted assets in the traditional lending business. The losses shown that have actually been incurred also relate to the exposures that had not yet defaulted at the beginning of the year under review. The definition of 'loss' corresponds to the definition used in Fig. 54. The supervisory authority intends this comparison to be the basis for measuring the efficiency of the process for allocating exposures or borrowers to rating categories as required by section 452 sentence 1 letter i CRR. In this respect, the table can be seen as a supplement to the description of the internal validation processes in the section 'Control mechanisms for the rating systems' in this report.

However, the comparison of expected and actual losses in the form described above should be viewed with the reservation that, due to methodology reasons, very few of the figures are directly comparable with each other. Furthermore, the expected losses relate to a static portfolio of risk-weighted assets, whereas the losses incurred are the result of a credit portfolio that is subject to change over the course of the year.

FIG. 54 – YEAR-ON-YEAR CHANGE IN THE ACTUAL LOSSES IN THE TOTAL CREDIT PORTFOLIO UNDER THE IRB APPROACH BY EXPOSURE CLASS

€ million

Exposure class	Jan. 1, 2018 to Dec. 31, 2018	Jan. 1, 2017 to Dec. 31, 2017	Jan. 1, 2016 to Dec. 31, 2016	Jan. 1, 2015 to Dec. 31, 2015	Jan. 1, 2014 to Dec. 31, 2014
Central governments and central banks	-	-	-	-	-
Institutions	0	-	5	-5	-8
Corporates	101	830	356	72	113
Equity exposures	-	-	-	-	-
Mortgage-backed retail IRBA receivables	-1	28	9	45	22
Qualified revolving retail IRBA receivables	-	-	-	-	-
Other retail IRBA receivables	195	55	48	65	68
Total	**295**	**912**	**419**	**178**	**194**

6.5.4.6 Validation results

(ARTICLE 452 SENTENCE 1 LETTER I CRR)

The findings of the reviews conducted as part of validations during the reporting year were largely unremarkable. The validation results are set out in the following table, broken down by risk parameter (PD, LGD, and CCF).

FIG. 55 – VAL2 – VALIDATION RESULTS OF THE DZ BANK BANKING GROUP AS AT DECEMBER 31, 2018

	PD		LGD		CCF	
Validation	**Number**	**EAD (%)**	**Number**	**EAD (%)**	**Number**	**EAD (%)**
Adequate	47	97	10	78	1	100
Too conservative – adjustment recommended	3	1	1	8	0	0
Too progressive – adjustment recommended	3	3	1	13	0	0
Total	**53**	**100**	**12**	**100**	**1**	**100**

The validation results are regarded as adequate if the validation has confirmed that the calibration is appropriate. If a trigger in the calibration test is activated, the calibration is given a red warning light, or action is recommended (recalibration), the validation results are regarded as inadequate and have to be shown as too conservative or too progressive, as applicable. PD validations classified three models as too progressive and three models as too conservative. The validation reports recommended that the models be recalibrated. This will be reported to the supervisory authority during the year and is likely to be implemented in 2019.

LGD validations classified one model as too progressive. The validation report recommended that the model be revised. This will probably be done during 2019. As an initial response, the model parameters were recalibrated and adjusted in September 2018. An LGD model was also classified as too conservative. The validation report recommended that the method be revised. A revised LGD model was reported to the supervisory authority in the fourth quarter of 2017 and is likely to be implemented during 2019.

Fig. 56 and Fig. 58 compare the PD determined per exposure class for the calculation of capital requirements with the effective default rates of the DZ BANK banking group's borrowers, under the FIRB and AIRB approaches respectively.

The gray fields in Fig. 56 to Fig. 59 indicate that no external rating is available for the particular row.
The following tables show DZ BANK's credit rating master scale, in which internal credit ratings are matched to the ratings used by Moody's, Standard & Poor's, and Fitch. It should be noted that some internal ratings cannot be matched with a particular external rating because of the greater degree of refinement in the credit rating master scale.

FIG. 56 – EU CR9 – FIRB APPROACH – BACKTESTING OF THE PROBABILITY OF DEFAULT (PD) PER EXPOSURE CLASS AS AT DECEMBER 31, 2018

€ million (unless indicated otherwise)

a	b			c	d	e		f	g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD (%)	Arithmetic average PD by borrower (%)	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate (%)
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
Central governments and central banks											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	0.01	0.00	32	122	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	0.02	0.00	2	3	-	-	0.00
1C	0.02 – 0.03				0.01	0.00	1	4	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.04	0.00	-	5	-	-	0.00
1E	0.04 – 0.06				0.13	0.02	2	2	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.07	0.00	26	2	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.10	0.00	-	2	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	1	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.23	0.02	18	22	-	-	0.00
2E	0.28 – 0.42				9.75	0.06	17	4	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.50	0.01	16	12	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.50	0.02	25	14	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.09	0.02	28	35	-	-	0.00
3D	1.42 – 2.12				1.10	0.01	4	13	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	2.60	0.03	5	7	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	5.94	0.05	11	27	-	-	0.00
4B	4.78 – 7.17	B2	B	B	6.00	0.06	15	25	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	8.99	0.09	13	10	-	-	0.00
4D	10.75 – 16.13				13.50	0.14	7	33	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	30.00	0.30	1	3	-	-	0.00
Default											
5	100.00				-	-	1	-	-	-	0.00
Institutions											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	7	-	1	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	1	-	-	-	0.00
1C	0.02 – 0.03				0.03	0.00	1,356	819	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.04	0.00	54	228	-	-	0.00
1E	0.04 – 0.06				0.05	0.00	54	418	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.07	0.00	105	1,267	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.10	0.00	117	1,081	-	-	0.00

€ million (unless indicated otherwise)

a	b			c	d	e		f	g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD (%)	Arithmetic average PD by borrower (%)	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate (%)
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.14	0.00	111	453	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.22	0.00	64	410	-	-	0.00
2E	0.28 – 0.42				0.36	0.01	75	186	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.49	0.00	69	278	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.72	0.01	60	267	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.17	0.02	53	248	-	-	0.00
3D	1.42 – 2.12				1.66	0.02	19	55	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	2.60	0.03	17	192	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	4.00	0.04	16	66	-	-	0.00
4B	4.78 – 7.17	B2	B	B	8.90	0.10	9	13	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	9.00	0.09	14	73	-	-	0.00
4D	10.75 – 16.13				13.44	0.13	24	62	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	33.35	0.35	35	188	30	2	0.39
Default											
5	100.00				100.00	1.00	5	70	52	49	0.00
Corporates											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	0.35	0.00	1	1	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				0.03	0.00	218	981	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.04	0.00	60	389	-	-	0.00
1E	0.04 – 0.06				0.05	0.00	104	657	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.13	0.00	502	1,941	2	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.11	0.00	414	1,677	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.24	0.00	509	2,246	4	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.40	0.01	743	3,538	2	-	0.00
2E	0.28 – 0.42				0.50	0.01	996	4,106	7	2	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.66	0.01	996	3,987	2	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.84	0.01	971	4,076	6	2	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.67	0.02	758	2,830	20	5	0.01
3D	1.42 – 2.12				2.52	0.03	543	1,945	14	5	0.01
3E	2.12 – 3.19	Ba3	BB-	BB-	2.86	0.03	266	1,008	1	-	0.02
4A	3.19 – 4.78	B1	B+	B+	4.35	0.04	182	526	1	-	0.00
4B	4.78 – 7.17	B2	B	B	8.33	0.10	69	178	7	2	0.04
4C	7.17 – 10.75	B3	B-	B-	22.68	0.17	46	142	15	7	0.09
4D	10.75 – 16.13				13.11	0.10	14	58	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	17.90	0.30	1,294	1,647	2	-	0.01
Default											
5	100.00				99.19	0.99	385	1,882	67	63	0.00
Corporates – of which: SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	1	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				0.05	0.00	-	63	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.07	0.00	-	289	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.10	0.00	6	153	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.21	0.01	48	123	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.88	0.02	109	443	2	-	0.00
2E	0.28 – 0.42				0.38	0.00	170	618	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	1.10	0.01	202	579	2	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.81	0.01	243	852	-	-	0.00

€ million (unless indicated otherwise)

a	b			c	d	e		f	g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD (%)	Arithmetic average PD by borrower (%)	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate (%)
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
3C	0.94 – 1.42	Ba2	BB	BB	1.40	0.02	231	668	6	2	0.00
3D	1.42 – 2.12				1.90	0.02	202	608	1	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	2.82	0.02	107	308	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	5.30	0.05	66	179	1	-	0.00
4B	4.78 – 7.17	B2	B	B	12.45	0.15	36	91	7	2	0.08
4C	7.17 – 10.75	B3	B-	B-	10.56	0.09	17	40	-	-	0.00
4D	10.75 – 16.13				11.58	0.09	7	24	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	18.57	0.30	1,223	1,481	-	-	0.00
Default											
5	100.00				96.81	0.93	56	168	14	10	0.00
Corporates – of which: specialized lending											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	1	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				0.03	0.00	2	2	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.04	0.00	-	52	-	-	0.00
1E	0.04 – 0.06				0.05	0.00	1	102	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.23	0.01	409	1,141	2	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.14	0.00	192	518	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.53	0.01	143	428	4	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.27	0.00	209	1,140	-	-	0.00
2E	0.28 – 0.42				0.33	0.01	270	1,022	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.81	0.01	192	953	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.82	0.01	245	1,008	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.77	0.02	118	664	4	-	0.03
3D	1.42 – 2.12				1.36	0.01	67	326	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	3.80	0.04	48	177	-	-	0.03
4A	3.19 – 4.78	B1	B+	B+	2.87	0.04	27	79	-	-	0.00
4B	4.78 – 7.17	B2	B	B	5.58	0.04	14	46	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	38.20	0.34	19	50	15	7	0.24
4D	10.75 – 16.13				13.50	0.14	6	3	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	10.75	0.29	44	122	2	-	0.12
Default											
5	100.00				100.00	1.00	107	554	9	9	0.00
Corporates – of which: purchased receivables											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	0.10	0.00	-	2	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.10	0.00	3	1	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.23	0.00	3	5	-	-	0.00
2E	0.28 – 0.42				0.41	0.00	2	3	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.50	0.00	10	19	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.75	0.01	3	4			0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.04	0.01	7	7	-	-	0.00
3D	1.42 – 2.12				71.54	0.21	3	5	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	1.70	0.02	-	1	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	3.30	0.03	4	6	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	0.75	0.01	1	3	-	-	0.00

€ million (unless indicated otherwise)

a	b			c	d	e		f	g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD (%)	Arithmetic average PD by borrower (%)	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate (%)
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	-	-	-	-	-
Corporates – of which: other											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	0.35	0.00	-	1	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				0.03	0.00	215	979	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.04	0.00	60	337	-	-	0.00
1E	0.04 – 0.06				0.05	0.00	103	492	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.07	0.00	93	511	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.10	0.00	216	1,004	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.15	0.00	315	1,694	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.40	0.01	422	1,950	-	-	0.00
2E	0.28 – 0.42				0.68	0.01	554	2,463	7	2	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.58	0.01	592	2,436	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.86	0.01	480	2,212	6	2	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.68	0.03	402	1,491	10	3	0.01
3D	1.42 – 2.12				2.81	0.04	271	1,006	13	5	0.02
3E	2.12 – 3.19	Ba3	BB-	BB-	2.73	0.04	111	522	1	-	0.03
4A	3.19 – 4.78	B1	B+	B+	4.39	0.04	85	262	-	-	0.01
4B	4.78 – 7.17	B2	B	B	6.38	0.07	19	41	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	10.38	0.07	9	49	-	-	0.00
4D	10.75 – 16.13				13.45	0.10	1	31	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	27.82	0.27	27	44	-	-	0.04
Default											
5	100.00				98.79	0.99	222	1,160	44	44	0.00
Long-term equity investments											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	0.09	0.00	-	1	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	
1C	0.02 – 0.03				0.09	0.00	1	6	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.09	0.00	-	1	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	
2A	0.06 – 0.08	A2	A	A	0.00	0.00	-	3	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.10	0.00	4	1	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.15	0.00	3	4	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.23	0.00	6	9	-	-	0.00
2E	0.28 – 0.42				0.35	0.01	3	6	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	0.01	1	3	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	1	-	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	1.10	0.04	-	2	-	-	0.00
3D	1.42 – 2.12				-	-	1	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	4.00	0.12	1	1	-	-	0.00
4B	4.78 – 7.17	B2	B	B	6.00	0.18	1	1	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	4	-	-	-	-

Fig. 57 – EU CR9 – FIRB APPROACH – BACKTESTING OF THE PROBABILITY OF DEFAULT (PD) PER EXPOSURE CLASS AS AT DECEMBER 31, 2017

€ million (unless indicated otherwise)

a	b			c	d	e		f	g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD (%)	Arithmetic average PD by borrower (%)	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate (%)
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
Central governments and central banks											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	0.05	0.00	36	32	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	0.26	0.01	2	2	-	-	0.00
1C	0.02 – 0.03				0.30	0.00	1	1	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				0.05	0.00	4	2	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.07	0.03	19	26	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	1	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.23	0.00	-	1	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	2.23	0.05	4	18	-	-	0.00
2E	0.28 – 0.42				4.60	0.03	3	17	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	1.47	0.02	5	16	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.75	0.02	7	25	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.68	0.03	6	28	-	-	0.00
3D	1.42 – 2.12				1.61	0.01	1	4	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	1.70	0.02	1	5	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	3.89	0.04	4	11	-	-	0.00
4B	4.78 – 7.17	B2	B	B	4.23	0.05	4	15	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	9.01	0.10	5	13	-	-	0.00
4D	10.75 – 16.13				13.50	0.12	5	7	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	0.30	1	1	-	-	0.00
Default											
5	100.00				-	1.00	-	1	1	-	0.00
Institutions											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	0.20	0.00	-	7	1	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	0.03	0.00	1	1	-	-	0.00
1C	0.02 – 0.03				0.04	0.00	1,349	1,356	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.06	0.00	33	54	-	-	0.00
1E	0.04 – 0.06				0.05	0.00	41	54	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.12	0.00	90	105	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.20	0.00	93	117	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.28	0.00	74	111	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.25	0.00	50	64	-	-	0.00
2E	0.28 – 0.42				0.66	0.00	66	75	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.01	0.01	53	69	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.01	0.01	42	60	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.10	0.01	42	53	-	-	0.00
3D	1.42 – 2.12				1.21	0.02	15	19	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	2.63	0.02	12	17	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	4.00	0.04	14	16	-	-	0.00
4B	4.78 – 7.17	B2	B	B	6.02	0.06	8	9	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	9.00	0.09	9	14	-	-	0.00
4D	10.75 – 16.13				13.64	0.16	18	24	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	2.26	0.28	31	35	-	-	0.00
Default											
5	100.00				99.51	0.88	5	5	1	1	0.00
Corporates – of which: SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-

€ million (unless indicated otherwise)

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD (%)	Arithmetic average PD by borrower (%)	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate (%)
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
1C	0.02 – 0.03				16.23	0.04	-	1	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	17.00	0.05	-	-	-	-	0.00
1E	0.04 – 0.06				18.00	0.05	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	19.00	0.07	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	20.10	0.09	6	6	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	21.17	0.11	24	48	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	22.40	0.07	67	109	-	-	0.00
2E	0.28 – 0.42				23.34	0.06	103	170	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	24.52	0.05	132	202	-	-	0.03
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	25.77	0.04	126	243	-	-	0.02
3C	0.94 – 1.42	Ba2	BB	BB	27.32	0.03	137	231	-	-	0.01
3D	1.42 – 2.12				29.10	0.03	105	202	1	1	0.05
3E	2.12 – 3.19	Ba3	BB-	BB-	30.97	0.04	71	107	1	-	0.02
4A	3.19 – 4.78	B1	B+	B+	36.68	0.09	26	66	2	2	0.06
4B	4.78 – 7.17	B2	B	B	35.28	0.10	20	36	-	-	0.04
4C	7.17 – 10.75	B3	B-	B-	42.74	0.31	12	17	5	2	0.15
4D	10.75 – 16.13				13.50	0.14	3	7	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	33.59	0.30	1,209	1,223	1	-	0.00
Default											
5	100.00				131.00	1.57	52	56	14	12	0.00
Corporates – of which: SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	1.70	0.02	-	1	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				0.03	0.00	1	2	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				0.05	0.00	-	1	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.17	0.00	416	409	1	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.13	0.00	155	192	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.15	0.01	121	143	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.23	0.00	179	209	-	-	0.00
2E	0.28 – 0.42				0.39	0.01	234	270	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.53	0.01	166	192	1	-	0.01
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	1.31	0.02	205	245	2	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.05	0.01	87	118	-	-	0.00
3D	1.42 – 2.12				1.77	0.02	43	67	-	-	0.04
3E	2.12 – 3.19	Ba3	BB-	BB-	6.66	0.07	35	48	2	-	0.04
4A	3.19 – 4.78	B1	B+	B+	59.50	0.27	24	27	6	-	0.02
4B	4.78 – 7.17	B2	B	B	13.46	0.10	11	14	1	-	0.10
4C	7.17 – 10.75	B3	B-	B-	14.86	0.43	21	19	1	1	0.11
4D	10.75 – 16.13				20.68	0.23	6	6	1	-	0.09
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	47.06	0.26	41	44	2	-	0.00
Default											
5	100.00				99.82	0.98	110	107	17	16	0.00
Corporates – of which: SMEs											
Investment grade											
1A	0.00 - 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.00 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.02				-	-	-	-	-	-	-
1D	0.02 – 0.03	A1	A+	A+	-	-	-	-	-	-	-
1E	0.03 – 0.04				-	-	-	-	-	-	-
2A	0.04 – 0.06	A2	A	A	-	-	-	-	-	-	-
2B	0.06 – 0.08	A3	A-	A-	-	-	-	-	-	-	-
2C	0.08 – 0.12	Baa1	BBB+	BBB+	0.19	0.00	3	3	-	-	0.00

€ million (unless indicated otherwise)

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD (%)	Arithmetic average PD by borrower (%)	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate (%)
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
2D	0.12 – 0.19	Baa2	BBB	BBB	0.23	0.00	2	3	-	-	0.00
2E	0.19 – 0.28				0.35	0.00	4	2	-	-	0.00
3A	0.28 – 0.42	Baa3	BBB-	BBB-	0.50	0.00	7	10	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.52	0.01	5	3	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.78	0.01	4	7	-	-	0.00
3D	1.42 – 2.12				1.12	0.02	4	3	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	4.00	0.04	-	4	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	9.00	0.09	-	1	-	-	0.00
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	-	-	-	-	-
Corporates – other											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	5	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				0.94	0.00	188	215	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	3.22	0.03	31	60	-	-	0.00
1E	0.04 – 0.06				3.59	0.03	70	103	-	-	0.00
2A	0.06 – 0.08	A2	A	A	2.69	0.03	54	93	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	1.28	0.02	142	216	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	1.09	0.01	170	315	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.89	0.01	242	422	-	-	0.00
2E	0.28 – 0.42				1.03	0.01	314	554	1	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	1.47	0.01	376	592	-	-	0.04
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	3.98	0.03	325	480	2	2	0.01
3C	0.94 – 1.42	Ba2	BB	BB	1.17	0.01	255	402	-	-	0.00
3D	1.42 – 2.12				1.62	0.02	185	271	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	7.08	0.09	76	111	1	1	0.06
4A	3.19 – 4.78	B1	B+	B+	4.56	0.19	34	85	1	-	0.00
4B	4.78 – 7.17	B2	B	B	18.26	0.10	20	19	1	-	0.00
4C	7.17 – 10.75	B3	B-	B-	10.38	0.12	8	9	1	-	0.00
4D	10.75 – 16.13				13.50	0.14	4	1	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	29.15	0.27	27	27	-	-	0.00
Default											
5	100.00				127.04	1.16	204	222	26	25	0.00
Long-term equity investments											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				0.09	0.00	-	1	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	0.07	0.00	7	4	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	0.00	3	3	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.23	0.01	4	6	-	-	0.00
2E	0.28 – 0.42				-	0.01	5	3	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	0.01	1	1	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	0.01	-	1	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-		1	-	-	-	0.00

€ million (unless indicated otherwise)

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD (%)	Arithmetic average PD by borrower (%)	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate (%)
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
3D	1.42 – 2.12				-	0.03	-	1	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	4.00	0.12	1	1	-	-	0.00
4B	4.78 – 7.17	B2	B	B	6.00	0.18	1	1	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				0.00	1.5	1	4	-	-	0.00

FIG. 58 – EU CR9 – AIRB APPROACH – BACKTESTING OF THE PROBABILITY OF DEFAULT (PD) PER EXPOSURE CLASS AS AT DECEMBER 31, 2018

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
Central governments and central banks											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				-	-	-	-	-	-	-
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	-
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	-	-	-	-	-
Institutions											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
2E	0.28 – 0.42				0.03	0.00	-	1	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.08	0.00	-	9	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.50	0.00	-	4	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	-	-	-	-	-
Corporates											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				0.13	0.00	-	5	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.11	0.00	-	2	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.46	0.01	-	168	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	1.89	0.02	-	153	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	8.09	0.08	-	173	6	-	0.00
4D	10.75 – 16.13				6.30	0.07	-	5	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	13.15	0.15	-	86	-	-	0.00
Default											
5	100.00				64.07	0.61	-	149	33	25	0.00
Corporates – of which: SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				-	-	-	-	-	-	-
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	-
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	-	-	-	-	-
Corporates – of which: specialized lending											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				-	-	-	-	-	-	-
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	-
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	-	-	-	-	-
Corporates – of which: purchased receivables											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				-	-	-	-	-	-	-
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	-
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
5	100.00				-	-	-	-	-	-	-
Corporates – of which: other											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				0.13	0.00	-	5	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.11	0.00	-	2	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.46	0.01	-	168	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	1.89	0.02	-	153	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	8.09	0.08	-	173	6	-	0.00
4D	10.75 – 16.13				6.30	0.07	-	5	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	13.15	0.15	-	86	-	-	0.00
Default											
5	100.00				64.07	0.61	-	149	33	25	0.00
Retail business – SMEs, secured by mortgages on immovable property											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				-	-	-	-	-	-	-
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	-
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	-	-	-	-	-
Retail business – non-SMEs, secured by mortgages on immovable property											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				0.03	0.00	-	624	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.07	0.15	-	17,116	54	1,481	0.00

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
1E	0.04 – 0.06				0.10	0.06	-	47,979	21	-	0.00
2A	0.06 – 0.08	A2	A	A	0.16	0.00	-	32,280	9	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.27	0.13	-	36,929	107	1,886	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.35	0.11	-	54,418	98	1,135	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.50	0.04	-	166,487	345	13	0.00
2E	0.28 – 0.42				0.03	0.00	-	624	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.07	0.15	-	17,116	54	1,481	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.76	0.03	-	229,414	814	1,537	0.00
3C	0.94 – 1.42	Ba2	BB	BB	1.11	0.03	-	198,037	1,007	71	0.00
3D	1.42 – 2.12				1.71	0.04	-	98,213	897	2,244	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	2.62	0.08	-	37,206	535	15	0.01
4A	3.19 – 4.78	B1	B+	B+	4.01	0.10		22,748	568	566	0.01
4B	4.78 – 7.17	B2	B	B	6.04	0.16	-	10,582	399	8	0.01
4C	7.17 – 10.75	B3	B-	B-	9.02	0.24	-	8,773	650	267	0.02
4D	10.75 – 16.13				13.56	0.63	-	4,724	468	1	0.03
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	43.22	2.78	-	16,676	4,569	120	0.09
Default											
5	100.00				99.31	0.97	-	15,454	11	-	0.00
Retail business – qualified revolving											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	-
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				-	-	-	-	-	-	-
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	-
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	-	-	-	-	-
Retail business – other SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				-	-	-	-	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	-
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	-
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.14	0.00	-	2	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	-
2E	0.28 – 0.42				-	-	-	-	-	-	-
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	-

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	-
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	-
3D	1.42 – 2.12				-	-	-	-	-	-	-
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	-
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	-
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Retail business – other non-SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	-
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	-
1C	0.02 – 0.03				0.03	0.00	-	850	-	-	-
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	-
1E	0.04 – 0.06				-	-	-	-	-	-	-
2A	0.06 – 0.08	A2	A	A	0.45	0.01	-	39,890	68	1,192	0.83
2B	0.08 – 0.12	A3	A-	A-	0.10	0.00	-	41,021	10	195	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.14	0.00	-	42,286	17	0	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.23	0.00	-	87,692	130	2,694	0.00
2E	0.28 – 0.42				0.35	0.00	-	76,788	233	1,363	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	1.42	0.01	-	483,478	1,494	180	0.73
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.75	0.01	-	76,911	464	1,798	0.01
3C	0.94 – 1.42	Ba2	BB	BB	1.10	0.01	-	34,507	274	21	0.01
3D	1.42 – 2.12				1.70	0.02	-	21,923	204	5,992	0.01
3E	2.12 – 3.19	Ba3	BB-	BB-	3.83	0.03	-	281,797	2,274	14	0.98
4A	3.19 – 4.78	B1	B+	B+	4.00	0.05	-	9,353	269	1,115	0.02
4B	4.78 – 7.17	B2	B	B	6.00	0.06	-	8,570	275	18	0.03
4C	7.17 – 10.75	B3	B-	B-	9.93	0.10	-	40,401	1,288	349	0.84
4D	10.75 – 16.13				14.69	0.15	-	14,035	700	2	0.79
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	44.08	0.44	-	13,263	3,454	215	0.29
Default											
5	100.00				100	0.72		55,419	7,754	560	0.84

FIG. 59 – EU CR9 – AIRB APPROACH – BACKTESTING OF THE PROBABILITY OF DEFAULT (PD) PER EXPOSURE CLASS AS AT DECEMBER 31, 2017

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
Central governments and central banks											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	0.00

a	b	c			d	e	f		g	h	i
Exposure class	**PD range**	**External rating equivalent**			**Weighted average PD**	**Arithmetic average PD by borrower**	**Number of borrowers**		**Defaulted borrowers in the year**		**Average historical annual default rate**
		Moody's	**Standard & Poor's**	**Fitch**			**End of previous year**	**End of the year**		**Of which: new borrowers**	
2E	0.28 – 0.42				-	-	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	0.00
4D	10.75 – 16.13				-	-	-	-	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	0.00
Default											
5	100.00				-	-	-	-	-	-	0.00
Institutions											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	0.00
2E	0.28 – 0.42				0.00	0.0005	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.0826	0.0010	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.5000	0.0050	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	0.00
4D	10.75 – 16.13				-	-	-	-	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	0.00
Default											
5	100.00				-	-	-	-	-	-	0.00
Corporates – of which: SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	0.00
2E	0.28 – 0.42				-	-	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00

a	b	c			d	e	f		g	h	i
Exposure class	**PD range**	**External rating equivalent**			**Weighted average PD**	**Arithmetic average PD by borrower**	**Number of borrowers**		**Defaulted borrowers in the year**		**Average historical annual default rate**
		Moody's	**Standard & Poor's**	**Fitch**			**End of previous year**	**End of the year**		**Of which: new borrowers**	
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	0.00
4D	10.75 – 16.13				-	-	-	-	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	0.00
Default											
5	100.00				-	-	-	-	-	-	0.00
Corporates – of which: specialized lending											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	0.00
2E	0.28 – 0.42				-	-	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	0.00
4D	10.75 – 16.13				-	-	-	-	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	0.00
Default											
5	100.00				-	-	-	-	-	-	0.00
Corporates – of which: purchased receivables											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	0.00
2E	0.28 – 0.42				-	-	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	0.00
4D	10.75 – 16.13				-	-	-	-	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	0.00
Default											

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
5	100.00				-	-	-	-	-	-	0.00
Corporates – of which: other											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	0.00
2E	0.28 – 0.42				0.0400	0.0004	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.1402	0.0025	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.2874	0.0029	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	1.4240	0.0145	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	5.2206	0.0522	-	-	-	-	0.00
4D	10.75 – 16.13				7.0082	0.0692	-	-	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	9.4672	0.0945	-	-	-	-	0.00
Default											
5	100.00				69.0456	0.6560	-	-	-	-	0.08
Retail business – SMEs, secured by mortgages on immovable property											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	0.00
2E	0.28 – 0.42				-	-	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	-
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	-
4D	10.75 – 16.13				-	-	-	-	-	-	-
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	-
Default											
5	100.00				-	-	2	-	-	-	0.00
Retail business – non-SMEs, secured by mortgages on immovable property											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				0.03	0.00	4,169,398	27,673,991	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	0.00	0.00	5	-	-	-	0.00

a	b	c			d	e		f	g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
1E	0.04 – 0.06				0.00	0.00	11	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.00	0.07	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.10	0.10	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.29	0.15	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.30	0.23	-	-	-	-	0.00
2E	0.28 – 0.42				0.38	0.35	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.01	0.51	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.01	0.76	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	0.01	1.11	-	-	-	-	0.00
3D	1.42 – 2.12				0.02	1.72	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	0.03	2.63	-	-	-	-	0.02
4A	3.19 – 4.78	B1	B+	B+	0.04	4.04	-	-	-	-	0.03
4B	4.78 – 7.17	B2	B	B	0.06	6.06	-	-	-	-	0.03
4C	7.17 – 10.75	B3	B-	B-	0.09	9.09	-	-	-	-	0.02
4D	10.75 – 16.13				0.13	13.63	-	-	-	-	0.09
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	0.44	30.42	-	-	-	-	0.16
Default											
5	100.00				1.00	101.00	-	-	-	-	0.00
Retail business – qualified revolving											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	-	-	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	-	-	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	-	-	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	-	-	-	-	-	-	0.00
2E	0.28 – 0.42				-	-	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	-	-	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	0.00
4D	10.75 – 16.13				-	-	-	-	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	0.00
Default											
5	100.00				-	-	-	-	-	-	0.00
Retail business – other SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				-	-	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.13	0.00	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.00	0.00	1	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.00	0.00	1	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	0.00	0.00	2	-	-	-	0.00
2E	0.28 – 0.42				0.00	0.00	1	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.00	0.00	1	-	-	-	0.00

a	b	c			d	e	f		g	h	i
Exposure class	PD range	External rating equivalent			Weighted average PD	Arithmetic average PD by borrower	Number of borrowers		Defaulted borrowers in the year		Average historical annual default rate
		Moody's	Standard & Poor's	Fitch			End of previous year	End of the year		Of which: new borrowers	
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	-	-	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	-	-	-	-	-	-	0.00
3D	1.42 – 2.12				-	-	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	-	-	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	-	-	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	-	-	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	-	-	-	-	-	-	0.00
4D	10.75 – 16.13				-	-	-	-	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	-	-	-	-	-	-	0.00
Retail business – other non-SMEs											
Investment grade											
1A	0.00 – 0.02	Aaa-Aa2	AAA-AA	AAA-AA	-	-	-	-	-	-	0.00
1B	0.02 – 0.02	Aa3	AA-	AA-	-	-	-	-	-	-	0.00
1C	0.02 – 0.03				-	-	-	-	-	-	0.00
1D	0.03 – 0.04	A1	A+	A+	-	-	-	-	-	-	0.00
1E	0.04 – 0.06				0.03	0.00	-	-	-	-	0.00
2A	0.06 – 0.08	A2	A	A	0.00	0.07	-	-	-	-	0.00
2B	0.08 – 0.12	A3	A-	A-	0.00	0.10	-	-	-	-	0.00
2C	0.12 – 0.19	Baa1	BBB+	BBB+	0.14	0.15	-	-	-	-	0.00
2D	0.19 – 0.28	Baa2	BBB	BBB	7.59	0.23	-	-	-	-	0.00
2E	0.28 – 0.42				0.35	0.35	-	-	-	-	0.00
3A	0.42 – 0.63	Baa3	BBB-	BBB-	0.01	0.52	-	-	-	-	0.00
Non-investment grade											
3B	0.63 – 0.94	Ba1	BB+	BB+	0.01	0.76	-	-	-	-	0.00
3C	0.94 – 1.42	Ba2	BB	BB	0.01	1.11	-	-	-	-	0.00
3D	1.42 – 2.12				0.02	1.75	-	-	-	-	0.00
3E	2.12 – 3.19	Ba3	BB-	BB-	0.03	2.65	-	-	-	-	0.00
4A	3.19 – 4.78	B1	B+	B+	0.04	0.04	-	-	-	-	0.00
4B	4.78 – 7.17	B2	B	B	0.06	4.09	-	-	-	-	0.00
4C	7.17 – 10.75	B3	B-	B-	0.09	0.09	-	-	-	-	0.00
4D	10.75 – 16.13				0.14	13.60	-	2	-	-	0.00
4E	16.13 – 100.00	Caa1 or lower	CCC+ or lower	CCC+ or lower	0.57	30.60	-	1	1	-	0.00
Default											
5	100.00				1.00	100.73	-	-	-	-	0.00

FIG. 60 – COMPARISON OF LOSS ESTIMATES AND ACTUAL LOSSES IN NON-DEFAULTING EXPOSURE CLASSES UNDER THE IRB APPROACH

€ million

Exposure class	Expected Dec. 31, 2017	Actual 2018	Expected Dec. 31, 2016	Actual 2017	Expected Dec. 31, 2015	Actual 2016	Expected Dec. 31, 2014	Actual 2015	Expected Dec. 31, 2013	Actual 2014
Central governments and central banks	4	-	6	-	9	-	4	-	4	-
Institutions	15	0	17	-	22	5	29	2	25	17
Corporates	173	71	263	442	298	203	220	166	101	123
Equity exposures	-	-	-	-	6	-	1	-	-	
Mortgage-backed retail IRBA receivables	103	25	105	18	201	23	46	32	229	20
Qualified revolving retail IRBA receivables	-	-	-	-	-	-	-	-	-	-
Other retail IRBA receivables	101	131	101	86	198	78	100	86	158	91
Total	**395**	**227**	**493**	**547**	**652**	**233**	**400**	**286**	**517**	**251**

Fig. 60 shows that the losses of €227 million actually incurred in 2018 (2017: €547 million) across all exposure classes were lower than the expected figure of €395 million (December 31, 2017: €493 million).

6.5.4.7 Average risk parameters by country of domicile of borrowing entity and exposure class

(ARTICLE 452 SENTENCE 1 LETTER J CRR)

The information in Fig. 61 relates to the following exposure classes: central governments and central banks, institutions, corporates (including small and medium-sized enterprises (SMEs), specialized lending, and purchased receivables that are treated as corporate loans), and long-term equity investments that are backed by own funds based on individual probabilities of default (PD/LGD approach). Using the foundation IRB approach, the average exposure-weighted PD per country in which loans and advances are granted (country of asset) is disclosed as a percentage.

FIG. 61 – AVERAGE PD BY COUNTRY AND EXPOSURE CLASS UNDER THE FOUNDATION IRB APPROACH

Average PD (percent)	Exposure class								
	Central governments and central banks	Institutions	Corporates				Long-term equity investments	Total	Total as at Dec. 31, 2017
			of which:						
			SMEs	Specialized lending	Receivables purchased	Other			
Country	Dec. 31, 2018								
Germany	0.03	0.20	1.27	2.81	4.53	2.10	0.12	1.90	2.67
Egypt	13.50	13.50	-	100.00	-	-	-	62.13	59.40
Algeria	0.75	1.82	-	-	-	-	-	1.05	1.28
Angola	9.00	9.00	-	-	-	-	-	9	9.00
Argentina	6.00	-	-	-	-	-	-	6.00	4.00
Armenia	-	-	-	-	-	-	-	-	9.00
Azerbaijan	1.70	-	-	-	-	-	-	1.70	1.70
Australia	-	0.03	-	0.49	-	0.14	-	0.19	0.28
Bahamas	-	-	-	1.10	-	-	-	1.1	1.70
Bangladesh	6.00	-	-	-	-	-	-	6.00	6.00
Belgium	-	0.08	-	1.15	-	0.19	0.10	0.19	0.21
Bermuda	-	-	-	-	-	5.61	-	5.61	3.77
Bosnia and Herzegovina	13.50	-	-	-	-	-	-	13.5	1.34
Brazil	1.10	1.13	-	-	-	0.50	-	1.06	1.13
British Virgin Islands	-	-	-	0.04	-	0.15	-	0.04	0.07
Bulgaria	-	0.50	-	4.00	-	-	-	3.99	5.96
Burundi	-	-	-	-	-	-	-	0	4.00
Cayman Islands	9.00	-	-	-	-	-	-	9.00	9.00

Average PD (percent)	Exposure class								
	Central governments and central banks	Institutions	Corporates				Long-term equity investments	Total	Total as at Dec. 31, 2017
			of which:						
			SMEs	Specialized lending	Receivables purchased	Other			
Country	**Dec. 31, 2018**								
Chile	0.05	0.07	-	-	-	-	-	0.067	0.05
China	-	0.12	-	-	0.07	-	-	0.12	0.09
Costa Rica	1.10	-	-	-	-	-	-	1.10	1.10
Denmark	-	0.44	-	31.95	-	2.79	-	3.34	3.14
Ecuador	13.50	-	-	-	-	-	-	13.50	13.50
Estonia	-	0.35	-	-	-	-	-	0.35	0.07
Finland	-	0.06	-	-	-	0.26	-	0.08	0.08
France	-	0.07	-	0.32	0.09	0.15	-	0.11	0.12
Georgia	-	-	-	-	-	-	-	0	2.60
Ghana	6.00	9.00	-	-	-	1.70	-	5.42	8.41
Greece	9.00	-	-	-	-	-	-	9	-
United Kingdom	-	0.07	0.50	4.16	0.10	0.27	-	0.38	0.26
Guatemala	2.6	-	-	-	-	-	-	2.60	2.60
Guernsey	-	-	-	0.14	-	-	-	0.14	0.40
Hong Kong	0.03	0.06	-	-	-	0.91	-	0.50	0.18
India	-	0.58	-	-	1.49	2.75	-	1.71	3.68
Indonesia	0.5	0.5	-	-	0.5	-	-	0.5	1.07
Iran	-	-	-	-	-	100.00	-	100.00	100.00
Ireland	-	0.07	0.50	4.16	0.10	0.27	-	0.38	0.33
Iceland	-	96.16	-	-	-	-	-	96.16	95.38
Isle of Man	-	0.03	-	0.07	-	-	-	0.06	0.07
Israel	0.07	0.07	-	-	-	0.35	-	0.11	0.15
Italy	-	1.43	-	-	-	0.40	1.10	1.11	0.99
Japan	-	0.06	-	-	-	-	-	0.06	0.14
Jersey	-	-	-	0.26	-	-	-	0.26	0.23
Jordan	4.00	4.00	-	-	-	-	-	4.00	4.00
Cameroon	6.00	-	-	-	-	-	-	6.00	6.00
Canada	-	0.03	-	0.73	-	0.20	-	0.15	0.20
Kazakhstan	-	1.44	-	-	-	-	-	1.43	1.70
Qatar	-	0.09	-	0.56	0.09	-	-	0.26	0.54
Kenya	-	30.00	-	-	-	-	-	30.00	30.00
Colombia	-	0.50	-	-	-	-	-	0.5	0.36
Croatia	1.10	1.10	-	-	-	-	-	1.10	1.10
Cuba	-	98.47	-	-	100.00	-	-	98.47	30.00
Kuwait	0.04	1.22	-	-	-	-	-	0.05	0.11
Liberia	-	30.00	-	-	-	0.23	-	24.33	30.00
Liechtenstein	-	-	0.35	-	-	0.15	-	0.22	0.18
Lithuania	-	-	-	-	-	-	-	0.00	0.00
Luxembourg	-	0.17	30.00	0.17	-	0.55	0.10	0.22	0.25
Malaysia	-	0.15	-	-	-	-	-	0.15	0.21
Mali	-	-	-	-	-	-	-	-	30.00
Malta	-	-	-	1.70	-	-	-	1.70	1.74
Morocco	-	1.68	-	-	-	-	-	1.68	0.80
Marshall Islands	-	-	-	6.00	-	-	-	6.00	5.95
Mauritius	-	0.07	-	-	-	-	-	0.07	0.07
Mexico	0.23	0.34	1.10	-	-	0.40	0.35	0.27	0.28
Moldova	-	30.00	-	-	-	-	-	30.00	30.00
Mongolia	-	9.00	-	-	9.00	-	-	9.00	9.00
Myanmar	-	-	-	1.70	-	-	-	1.70	2.60
Namibia	-	0.75	-	-	-	-	-	0.75	0.75
New Zealand	-	0.03	-	0.35	-	-	-	0.12	0.13
Netherlands	0.02	0.08	0.50	3.64	-	0.47	-	1.01	1.02
Nigeria	6.00	-	-	-	-	-	-	6.00	9.00
Norway	-	0.07	-	1.10	-	-	-	1.10	0.10
Oman	-	0.50	-	1.81	-	-	-	1.81	1.11
Austria	0.01	0.27	0.75	0.13	-	0.38	1.10	0.26	9.05
Pakistan	13.50	13.50	-	-	-	-	-	13.50	13.19

Average PD (percent)	Exposure class								
	Central governments and central banks	Institutions	Corporates				Long-term equity investments	Total	Total as at Dec. 31, 2017
			of which:						
			SMEs	Specialized lending	Receivables purchased	Other			
Country	**Dec. 31, 2018**								
Panama	-	0.50	-	-	-	0.07	-	0.07	0.20
Peru	0.50	0.24	-	-	-	0.50	-	0.50	0.63
Philippines	-	0.75	-	1.10	-	-	-	1.10	2.59
Poland	0.10	0.16	1.10	0.35	-	33.03	5.57	13.73	4.40
Portugal	0.75	0.16	-	1.03	0.15	-	-	0.99	1.06
Romania	-	0.74	-	-	-	-	-	0.74	0.13
Russia	0.50	0.57	-	-	0.57	2.65	-	0.81	1.33
Saudi Arabia	-	0.10	-	0.69	-	0.50	-	0.66	0.62
Sweden	-	0.06	-	0.22	-	0.13	-	0.08	0.08
Switzerland	0.01	2.63	-	0.08	-	0.38	-	0.73	0.73
Senegal	4.00	4.00	-	-	-	-	-	4.00	4.00
Serbia and Kosovo	1.10	1.10	-	-	-	-	-	1.10	1.71
Singapore	0.01	0.03	-	4.34	-	0.55	-	0.83	0.24
Slovenia	-	-	-	-	-	0.15	-	0.15	0.23
Spain	-	0.42	-	0.35	-	0.27	-	0.39	0.48
Sri Lanka	6.00	6.00	-	-	-	-	-	6.00	6.00
South Africa	0.75	0.75	-	-	-	-	-	0.75	0.75
Sudan	-	30.00	-	-	30.00	-	-	30.00	30.00
South Korea	0.07	0.08	-	-	-	0.04	-	0.08	0.12
Taiwan	-	0.06	-	-	-	-	-	0.06	0.07
Tanzania	-	13.50	-	-	-	-	-	13.50	13.50
Thailand	0.23	0.23	-	0.23	-	-	-	0.23	0.50
Togo	-	30.00	-	-	-	-	-	30.00	30.00
Czech Republic	0.01	0.07	-	-	-	12.13	-	0.07	0.07
Tunisia	6.00	6.63	-	-	-	-	-	6.59	4.68
Turkey	2.60	2.57	-	6.56	2.56	2.60	-	2.68	0.90
Turkmenistan	-	9.00	-	-	-	-	-	9.00	6.00
Ukraine	30.00	21.36	-	-	-	-	-	21.45	30.00
Hungary	0.75	2.32	-	0.98	-	0.75	-	0.89	1.57
USA	0.01	0.10	-	3.19	-	0.41	-	0.46	0.49
United Arab Emirates	-	0.07	-	0.57	-	0.07	-	0.39	0.54
Vietnam	4.00	4.00	-	63.75	-	-	-	17.05	61.16
Belarus	-	9.00	-	-	9.00	-	-	9.00	30.00
Cyprus	-	30.00	-	-	-	0.75	-	1.03	0.75
Total average PD as at Dec. 31, 2018	**0.16**	**0.50**	**1.27**	**2.51**	**3.49**	**1.87**	**0.63**	**1.43**	
Total average PD as at Dec. 31, 2017	0.17	0.48	1.34	2.88	1.79[1]	3.22	0.30		1.99

1 Prior-year value corrected.

The information given in Fig. 62 relates to the following exposure classes: central governments and central banks, institutions, corporates (including SMEs, specialized lending, and purchased receivables that are treated as corporate loans), long-term equity investments that are backed by own funds based on individual probabilities of default (PD/LGD approach), and retail business (broken down into mortgage-backed IRBA exposures, qualified revolving IRBA exposures, and other IRBA exposures). Using the advanced IRB approach, the average exposure-weighted PD and LGD per country in which loans and advances are granted (country of asset) is disclosed as a percentage.

FIG. 62 – AVERAGE PD AND LGD BY COUNTRY AND EXPOSURE CLASS UNDER THE ADVANCED IRB APPROACH

Country		Exposure class											
				Corporates				Retail business					
				of which:				of which:					
%	Risk parameter	Central governments and central banks	Institutions	SMEs	Specialized lending	Receivables purchased	Other	Mortgage-backed IRBA exposures	Qualified revolving	Other IRBA exposures	Mortgage-backed IRBA exposures	Total as at Dec. 31, 2018	Total as at Dec. 31, 2017
Germany	Average PD	-	0.47	-	-	-	3.35	2.56	-	3.67	-	**2.78**	2.92
	Average LGD	-	81.00	-	-	-	3.77	10.63	-	33.71	-	**15.59**	15.67
Egypt	Average PD	-	-	-	-	-	-	-	-	-	-	**-**	-
	Average LGD	-	-	-	-	-	-	-	-	-	-	**-**	-
Andorra	Average PD	-	-	-	-	-	-	-	-	0.15	-	**0.15**	0.15
	Average LGD	-	-	-	-	-	-	-	-	26.00	-	**26.00**	27.28
Argentina	Average PD	-	-	-	-	-	-	1.58	-	2.57	-	**1.6**	3.97
	Average LGD	-	-	-	-	-	-	17.47	-	44.22	-	**18.02**	20.84
Australia	Average PD	-	-	-	-	-	4.62	1.29	-	1.41	-	**4.52**	10.41
	Average LGD	-	-	-	-	-	2.24	11.93	-	27.17	-	**2.65**	2.33
Bahamas	Average PD	-	-	-	-	-	74.16	-	-	-	-	**74.16**	62.28
	Average LGD	-	-	-	-	-	1.76	-	-	-	-	**1.76**	10.22
Barbados	Average PD	-	-	-	-	-	-	2.60	-	-	-	**2.6**	2.60
	Average LGD	-	-	-	-	-	-	11.82	-	-	-	**11.82**	11.76
Belgium	Average PD	-	-	-	-	-	3.97	3.95	-	12.38	-	**4.09**	5.15
	Average LGD	-	-	-	-	-	0.95	11.29	-	27.38	-	**2.92**	4.01
Bermuda	Average PD	-	-	-	-	-	19.22	-	-	-	-	**19.22**	15.86
	Average LGD	-	-	-	-	-	13.21	-	-	-	-	**13.21**	9.99
Bolivia	Average PD	-	-	-	-	-	-	-	-	-	-	**-**	-
	Average LGD	-	-	-	-	-	-	-	-	-	-	**-**	-
Bosnia and Herzegovina	Average PD	-	-	-	-	-	-	-	-	90.72	-	**90.72**	79.84
	Average LGD	-	-	-	-	-	-	-	-	47.64	-	**47.64**	49.95
Brazil	Average PD	-	-	-	-	-	14.10	0.66	-	8.10	-	**13.99**	31.21
	Average LGD	-	-	-	-	-	24.56	7.87	-	47.25	-	**24.44**	17.90
British Virgin Islands	Average PD	-	-	-	-	-	40.77	-	-	-	-	**40.77**	44.47
	Average LGD	-	-	-	-	-	20.91	-	-	-	-	**20.91**	13.93
Bulgaria	Average PD	-	-	-	-	-	-	-	-	21.05	-	**21.05**	2.60
	Average LGD	-	-	-	-	-	-	-	-	47.89	-	**47.89**	55.32
Cayman Islands	Averag	-	-	-	-	-	17.57	-	-	-	-	**17.57**	17.40

	e PD												
	Average LGD	-	-	-	-	-	11.51	-	-	-	-	11.51	9.59
Chile	Average PD	-	-	-	-	-	0.75	-	-	-	-	0.75	0.78
	Average LGD	-	-	-	-	-	0.20	-	-	-	-	0.2	1.96
China	Average PD	-	-	-	-	-	1.01	1.39	-	1.50	-	1.01	0.98
	Average LGD	-	-	-	-	-	5.78	8.35	-	5.49	-	5.80	3.24
Denmark	Average PD	-	0.05	-	-	-	40.74	1.75	-	2.45	-	18.65	25.73
	Average LGD	-	81.00	-	-	-	0.87	9.39	-	29.22	-	42.9	54.25
Ecuador	Average PD	-	-	-	-	-	-	-	-	-	-	-	-
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	-
Côte d'Ivoire	Average PD	-	-	-	-	-	-	-	-	-	-	-	-
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	-
Estonia	Average PD	-	-	-	-	-	-	-	-	27.16	-	27.16	2.60
	Average LGD	-	-	-	-	-	-	-	-	57.58	-	57.58	55.32
Faroe Islands	Average PD	-	-	-	-	-	100.00	-	-	-	-	100	100.00
	Average LGD	-	-	-	-	-	54.44	-	-	-	-	54.44	12.58
Finland	Average PD	-	-	-	-	-	9.00	12.25	-	2.89	-	9.037	2.69
	Average LGD	-	-	-	-	-	0.20	10.37	-	14.57	-	0.33	2.22
France	Average PD	-	0.05	-	-	-	15.94	9.85	-	4.55	-	9.91	4.90
	Average LGD	-	81.00	-	-	-	10.07	10.37	-	26.69	-	32.68	24.07
Greece	Average PD	-	-	-	-	-	52.25	2.54	-	66.70	-	51.82	16.51
	Average LGD	-	-	-	-	-	4.21	13.51	-	39.47	-	4.34	3.23
United Kingdom	Average PD	-	0.11	-	-	-	29.60	3.39	-	3.43	-	23.88	21.82
	Average LGD	-	81.00	-	-	-	21.21	11.20	-	26.99	-	30.78	23.38
Guatemala	Average PD	-	-	-	-	-	-	100.00	-	-	-	100	100.00
	Average LGD	-	-	-	-	-	-	26.20	-	-	-	26.19	27.92
Guernsey	Average PD	-	-	-	-	-	-	-	-	-	-	-	-
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	-
Hong Kong	Average PD	-	-	-	-	-	26.71	7.42	-	0.75	-	26.63	46.51
	Average LGD	-	-	-	-	-	9.56	13.01	-	12.63	-	9.58	17.96
India	Average PD	-	-	-	-	-	48.45	0.63	-	-	-	48.32	54.06
	Average LGD	-	-	-	-	-	27.34	7.65	-	-	-	27.28	22.48
Indonesia	Average PD	-	-	-	-	-	13.50	1.10	-	30.00	-	13.44	13.03
	Average LGD	-	-	-	-	-	2.70	6.81	-	55.32	-	2.73	2.48
Iran	Average PD	-	-	-	-	-	-	4.00	-	-	-	4	4.00
	Averag	-	-	-	-	-	-	6.67	-	-	-	6.67	6.65

	e LGD												
Ireland	Average PD	-	-	-	-	-	12.86	4.37	-	35.92	-	12.84	12.70
	Average LGD	-	-	-	-	-	5.60	11.05	-	42.92	-	5.61	4.88
Iceland	Average PD	-	-	-	-	-	-	1.10	-	-	-	1.1	0.50
	Average LGD	-	-	-	-	-	-	9.48	-	-	-	9.48	0.00
Isle of Man	Average PD	-	-	-	-	-	20.61	-	-	-	-	20.61	19.14
	Average LGD	-	-	-	-	-	11.00	-	-	-	-	10.99	9.74
Israel	Average PD	-	-	-	-	-	9.00	2.09	-	-	-	8.59	4.09
	Average LGD	-	-	-	-	-	10.05	11.58	-	-	-	10.14	9.57
Italy	Average PD	-	-	-	-	-	35.81	4.72	-	42.14	-	32.67	15.03
	Average LGD	-	-	-	-	-	0.93	11.11	-	43.00	-	2.39	3.32
Jamaica	Average PD	-	-	-	-	-	-	1.70	-	-	-	1.7	1.70
	Average LGD	-	-	-	-	-	-	7.37	-	-	-	7.37	7.51
Japan	Average PD	-	-	-	-	-	3.64	7.09	-	-	-	3.64	4.61
	Average LGD	-	-	-	-	-	2.15	11.97	-	-	-	2.16	3.29
Jersey	Average PD	-	-	-	-	-	13.50	-	-	-	-	13.5	12.57
	Average LGD	-	-	-	-	-	2.70	-	-	-	-	2.7	2.08
Jordan	Average PD	-	-	-	-	-	13.50	9.00	-	-	-	13.50	13.50
	Average LGD	-	-	-	-	-	2.70	7.32	-	-	-	2.71	2.45
Canada	Average PD	-	-	-	-	-	5.49	6.33	-	2.05	-	5.49	8.09
	Average LGD	-	-	-	-	-	6.66	8.89	-	26.19	-	6.70	4.80
Qatar	Average PD	-	-	-	-	-	0.75	1.08	-	-	-	0.77	0.75
	Average LGD	-	-	-	-	-	2.70	9.43	-	-	-	2.82	11.76
Kenya	Average PD	-	-	-	-	-	-	-	-	-	-	-	1.10
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	8.54
Kyrgyzstan	Average PD	-	-	-	-	-	-	-	-	-	-	-	-
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	-
Colombia	Average PD	-	-	-	-	-	-	-	-	-	-	-	0.75
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	2.45
Croatia	Average PD	-	-	-	-	-	-	3.05	-	19.05	-	17.44	16.52
	Average LGD	-	-	-	-	-	-	6.54	-	39.78	-	36.44	19.37
Cuba	Average PD	-	-	-	-	-	-	-	-	0.75	-	0.75	0.75
	Average LGD	-	-	-	-	-	-	-	-	14.25	-	14.25	15.38
Kuwait	Average PD	-	-	-	-	-	9.00	0.76	-	-	-	8.83	8.83
	Average LGD	-	-	-	-	-	0.21	13.53	-	-	-	0.49	3.01
Latvia	Averag	-	-	-	-	-	-	-	-	33.61	-	33.61	0.54

	e PD												
	Average LGD	-	-	-	-	-	-	-	-	23.19	-	23.19	16.01
Lebanon	Average PD	-	-	-	-	-	-	-	-	-	-	-	1.70
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	7.95
Liberia	Average PD	-	-	-	-	-	14.39	-	-	-	-	14.39	11.19
	Average LGD	-	-	-	-	-	3.94	-	-	-	-	3.94	7.16
Liechtenstein	Average PD	-	-	-	-	-	-	1.41	-	0.15	-	1.183	0.53
	Average LGD	-	-	-	-	-	-	10.15	-	26.02	-	12.98	11.92
Lithuania	Average PD	-	-	-	-	-	-	-	-	1.10	-	1.1	-
	Average LGD	-	-	-	-	-	-	-	-	44.07	-	44.07	-
Luxembourg	Average PD	-	-	-	-	-	0.89	7.10	-	18.16	-	1.94	11.61
	Average LGD	-	-	-	-	-	6.16	11.53	-	17.13	-	7.02	12.08
Malaysia	Average PD	-	-	-	-	-	21.67	0.65	-	9.00	-	21.56	18.33
	Average LGD	-	-	-	-	-	10.03	13.05	-	44.07	-	10.06	7.15
Malta	Average PD	-	-	-	-	-	14.42	1.17	-	29.24	-	14.38	19.98
	Average LGD	-	-	-	-	-	8.23	20.68	-	43.28	-	8.27	11.53
Morocco	Average PD	-	-	-	-	-	-	-	-	-	-	0	65.19
	Average LGD	-	-	-	-	-	-	-	-	-	-	0	35.86
Marshall Islands	Average PD	-	-	-	-	-	16.90	-	-	-	-	16.90	33.63
	Average LGD	-	-	-	-	-	4.63	-	-	-	-	4.63	12.68
Mauritius	Average PD	-	-	-	-	-	-	6.00	-	-	-	6.00	9.00
	Average LGD	-	-	-	-	-	-	14.88	-	-	-	14.88	16.35
Macedonia	Average PD	-	-	-	-	-	-	-	-	100.00	-	100	100.00
	Average LGD	-	-	-	-	-	-	-	-	51.49	-	51.49	51.49
Mexico	Average PD	-	-	-	-	-	22.38	1.10	-	0.15	-	22.21	20.96
	Average LGD	-	-	-	-	-	28.01	6.70	-	7.07	-	27.83	18.67
Mongolia	Average PD	-	-	-	-	-	-	100.00	-	-	-	100	100.00
	Average LGD	-	-	-	-	-	-	43.54	-	-	-	43.54	43.54
Montenegro	Average PD	-	-	-	-	-	-	1.10	-	-	-	1.1	1.70
	Average LGD	-	-	-	-	-	-	8.63	-	-	-	8.63	9.00
Namibia	Average PD	-	-	-	-	-	-	0.62	-	100.00	-	14.90	15.95
	Average LGD	-	-	-	-	-	-	9.84	-	39.79	-	14.14	6.23
New Zealand	Average PD	-	-	-	-	-	-	1.70	-	1.91	-	1.726	3.88
	Average LGD	-	-	-	-	-	-	6.68	-	33.43	-	10.06	11.43
Netherlands	Average PD	-	-	-	-	-	41.65	5.61	-	4.66	-	35.12	36.44
	Averag	-	-	-	-	-	35.21	11.24	-	27.25	-	31.12	20.94

	e LGD												
Nigeria	Average PD	-	-	-	-	-	9.00	-	-	-	-	9	8.97
	Average LGD	-	-	-	-	-	44.66	-	-	-	-	44.66	30.18
Norway	Average PD	-	-	-	-	-	46.89	1.22	-	8.98	-	46.75	44.04
	Average LGD	-	-	-	-	-	27.38	10.74	-	28.85	-	27.33	19.03
Oman	Average PD	-	-	-	-	-	-	0.75	-	-	-	0.75	0.75
	Average LGD	-	-	-	-	-	-	8.77	-	-	-	8.77	10.11
Austria	Average PD	-	-	-	-	-	0.75	2.96	-	6.57	-	1.9	7.61
	Average LGD	-	-	-	-	-	10.83	13.48	-	27.15	-	12.76	5.10
Panama	Average PD	-	-	-	-	-	8.57	-	-	0.15	-	8.56	17.23
	Average LGD	-	-	-	-	-	2.14	-	-	26.00	-	2.17	5.56
Philippines	Average PD	-	-	-	-	-	14.14	100.00	-	1.04	-	14.31	8.06
	Average LGD	-	-	-	-	-	2.70	26.20	-	46.58	-	2.76	2.49
Poland	Average PD	-	-	-	-	-	13.50	2.43	-	30.68	-	13.46	20.67
	Average LGD	-	-	-	-	-	2.70	9.81	-	36.57	-	3.20	20.03
Portugal	Average PD	-	-	-	-	-	13.50	1.70	-	6.91	-	13.26	6.53
	Average LGD	-	-	-	-	-	2.70	6.15	-	29.85	-	3.50	22.25
Romania	Average PD	-	-	-	-	-	-	-	-	36.58	-	36.58	46.20
	Average LGD	-	-	-	-	-	-	-	-	44.27	-	44.27	45.97
Russia	Average PD	-	-	-	-	-	-	5.36	-	0.50	-	5.35	5.53
	Average LGD	-	-	-	-	-	-	18.21	-	44.07	-	18.22	13.96
Saudi Arabia	Average PD	-	-	-	-	-	-	1.10	-	-	-	1.1	0.15
	Average LGD	-	-	-	-	-	-	7.61	-	-	-	7.61	27.28
Sweden	Average PD	-	-	-	-	-	2.60	13.85	-	20.44	-	3.02	9.09
	Average LGD	-	-	-	-	-	12.62	11.21	-	32.81	-	12.71	8.61
Switzerland	Average PD	-	0.35	-	-	-	2.01	2.86	-	1.39	-	2.07	1.95
	Average LGD	-	81.00	-	-	-	1.90	12.29	-	26.58	-	14.23	14.64
Serbia and Kosovo	Average PD	-	-	-	-	-	-	-	-	49.55	-	49.55	23.23
	Average LGD	-	-	-	-	-	-	-	-	51.68	-	51.68	50.38
Singapore	Average PD	-	-	-	-	-	24.04	2.09	-	0.19	-	23.99	21.04
	Average LGD	-	-	-	-	-	10.47	12.39	-	25.13	-	10.47	9.31
Slovakia	Average PD	-	-	-	-	-	-	-	-	45.88	-	45.88	9.20
	Average LGD	-	-	-	-	-	-	-	-	44.14	-	44.14	11.27
Slovenia	Average PD	-	-	-	-	-	-	1.26	-	44.66	-	16.26	6.20
	Average LGD	-	-	-	-	-	-	8.07	-	42.90	-	20.12	16.08
Spain	Averag	-	-	-	-	-	0.75	7.53	-	3.26	-	1.55	1.55

	e PD												
	Average LGD	-	-	-	-	-	2.70	9.13	-	28.16	-	5.98	6.56
Sri Lanka	Average PD	-	-	-	-	-	-	-	-	0.75	-	0.75	-
	Average LGD	-	-	-	-	-	-	-	-	16.26	-	16.26	-
South Africa	Average PD	-	-	-	-	-	-	1.43	-	100.00	-	1.45	1.31
	Average LGD	-	-	-	-	-	-	8.87	-	39.79	-	8.88	6.16
South Korea	Average PD	-	-	-	-	-	10.48	-	-	1.10	-	10.48	11.96
	Average LGD	-	-	-	-	-	3.21	-	-	20.67	-	3.21	4.24
Taiwan	Average PD	-	-	-	-	-	-	0.39	-	-	-	0.39	0.19
	Average LGD	-	-	-	-	-	-	9.48	-	-	-	9.48	0.00
Thailand	Average PD	-	-	-	-	-	2.60	43.96	-	9.95	-	2.96	2.67
	Average LGD	-	-	-	-	-	5.02	12.66	-	35.35	-	5.14	8.32
Czech Republic	Average PD	-	-	-	-	-	-	5.02	-	7.11	-	5.56	4.98
	Average LGD	-	-	-	-	-	-	16.94	-	19.28	-	17.54	17.14
Tunisia	Average PD	-	-	-	-	-	-	0.75	-	-	-	0.75	0.35
	Average LGD	-	-	-	-	-	-	9.48	-	-	-	9.48	0.00
Turkey	Average PD	-	-	-	-	-	5.69	3.72	-	35.13	-	5.70	5.15
	Average LGD	-	-	-	-	-	2.32	10.77	-	47.10	-	2.36	2.41
Hungary	Average PD	-	-	-	-	-	-	0.21	-	42.27	-	29.46	30.78
	Average LGD	-	-	-	-	-	-	9.33	-	43.10	-	32.82	34.36
Ukraine	Average PD	-	-	-	-	-	-	0.50	-	1.10	-	0.63	0.35
	Average LGD	-	-	-	-	-	-	9.48	-	46.08	-	17.20	0.00
Uruguay	Average PD	-	-	-	-	-	-	-	-	0.35	-	0.35	0.75
	Average LGD	-	-	-	-	-	-	-	-	16.46	-	16.46	13.78
USA	Average PD	-	-	-	-	-	4.04	3.38	-	2.75	-	4.03	6.00
	Average LGD	-	-	-	-	-	3.89	10.22	-	27.01	-	3.97	3.29
Venezuela	Average PD	-	-	-	-	-	-	-	-	-	-	-	30.00
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	3.65
United Arab Emirates	Average PD	-	-	-	-	-	8.58	0.97	-	0.23	-	8.21	6.31
	Average LGD	-	-	-	-	-	0.90	9.90	-	26.90	-	1.45	2.40
Vietnam	Average PD	-	-	-	-	-	9.00	-	-	0.50	-	9.004	9.00
	Average LGD	-	-	-	-	-	7.22	-	-	55.32	-	7.22	4.55
Wallis and Futuna	Average PD	-	-	-	-	-	-	-	-	-	-	-	2.60
	Average LGD	-	-	-	-	-	-	-	-	-	-	-	44.07
Cyprus	Average PD	-	-	-	-	-	4.23	3.35	-	-	-	4.22	11.41
	Averag	-	-	-	-	-	0.20	16.22	-	-	-	0.35	11.93

e LGD												
Total average PD as at Dec. 31, 2018	-	**0.35**	-	-	-	**16.46**	**2.63**	-	**4.38**	-	**6.83**	-
Total average LGD as at Dec. 31, 2018	-	**81.00**	-	-	-	**8.29**	**10.32**	-	**33.50**	-	**14.52**	-
Total average PD as at Dec. 31, 2017	-	0.34	-	-	-	20.40	2.63	-	4.38	-	-	6.83
Total average LGD as at Dec. 31, 2017	-	81.00	-	-	-	9.09	10.32	-	33.50	-	-	14.52

6.6 Counterparty credit risk

6.6.1 Required qualitative disclosures

(ARTICLE 439 SENTENCE 1 LETTERS A TO D CRR)

The following disclosures on managing derivative counterparty risk exposure in the banking book and trading book of the DZ BANK banking group can be found in the opportunity and risk report.

FIG. 63 – DISCLOSURES IN THE REGULATORY RISK REPORT RELATING TO ARTICLE 439 SENTENCE 1 LETTERS A TO D CRR

Article	Subject	Opportunity and risk report	
		Section	Page
Article 439 sentence 1 letter a CRR	**Internal procedure for allocating capital** to cover derivative counterparty risk exposures and **procedure for determining the upper limits** for individual counterparties	3.5, 8.4.5, and 8.4.6	76 to 81 and 113 to 115
Article 439 sentence 1 letter b CRR	**Procedure for obtaining collateral** (rules for guarantees and other measures for mitigating risk and for the measurement of counterparty credit risk)	3.6.5, 6.2.4, 8.4.8, 10.4.4, 14.4.4, 16.4, 17.2.2, 18.2.2, and 19.2	85 to 86, 961 to 97, 116 to 117, 134, 143, 153 to 154, 157 to 158, 163 to 164, and 164 to 165
Article 439 sentence 1 letter c CRR	**Handling of correlations** of market risk and counterparty risk	8.4.7	115 to 116

In the derivatives business, there are master agreements entered into with individual counterparties that contractually require additional collateral to be provided to the counterparty in the event of DZ BANK's external credit rating being downgraded (article 439 sentence 1 letter d CRR). A three-notch downgrade as at December 31, 2018 would have led to additional collateral being provided in a total amount of around €85 million. This additional collateral would increase the risk-weighted assets resulting from counterparty credit risk pursuant to Fig. 64 by approximately €44 million (1.7 percent).

6.6.2 Regulatory measures

(ARTICLE 439 SENTENCE 1 LETTERS E, F, AND I CRR)

6.6.2.1 Analysis of counterparty credit risk

Fig. 64 presents the methods used to calculate the regulatory requirements for counterparty credit risk as well as the main parameters of each method.

FIG. 64 – EU CCR1 – ANALYSIS OF COUNTERPARTY CREDIT RISK BY APPROACH

€ million		a	b	c	d	e	f	g
Method		Notional	Replacement cost/current market value	Potential future credit exposure	Effective expected positive exposure (EEPE)	Multiplier	EAD after credit risk mitigation	RWAs
1	Mark-to-market method		7,851	4,487			9,257	2,524
2	Original exposure method	-					-	-
3	Standardized Approach		-			-	-	-
4	IMM (for derivatives and securities financing transactions)				-	-	-	-
5	of which: securities financing transactions				-	-	-	-
6	of which: derivatives and long-settlement transactions				-	-	-	-
7	of which: from contractual cross-product netting				-	-	-	-
8	Financial collateral simple method (for securities financing transactions)						-	-
9	Financial collateral comprehensive method (for securities financing transactions)						-	-
10	VaR for securities financing transactions						-	-
11	**Total as at Dec. 31, 2018**							**2,524**
	Total as at Jun. 30, 2018							2,929

The RWAs resulting from counterparty credit risk were lower than as at June 30, 2018 owing to reduced add-ons on the reporting date.

6.6.2.2 Capital requirement for adjustment of the credit valuation

(ARTICLE 439 SENTENCE 1 LETTERS E AND F CRR)

The exposure value and the risk-weighted asset amount for transactions subject to capital requirements for credit valuation adjustments (CVA charge) must be disclosed separately. Based on the requirements in the CRR, Fig. 65 shows the regulatory calculations for adjustment of the credit valuation (broken down into the foundation and advanced approaches).

FIG. 65 – EU CCR2 – CVA CAPITAL CHARGE

		a	b	a	b
		Dec. 31, 2018		Jun. 30, 2018	
€ million		Exposure value	RWAs	Exposure value	RWAs
1	Total portfolios subject to the advanced method	-	-	-	-
2	i) VaR component (including the 3x multiplier)	-	-	-	-
3	ii) Stressed VaR component (sVaR, including the 3x multiplier)	-	-	-	-
4	All portfolios subject to the standardized method	2,614	1,224	2,891	1,323
EU4	Based on the original exposure method				
5	**Total subject to the CVA capital charge**	**2,614**	**1,224**	2,891	1,323

The capital requirement for adjustment of the credit valuation as at December 31, 2018 varied only slightly from the requirement as at June 30, 2018.

6.6.2.3 Exposures to central counterparties

(ARTICLE 439 SENTENCE 1 LETTERS E AND F CRR)

Specific information about credit risk arising from derivatives with central counterparties (CCPs) and associated exposures are shown in Fig. 66, which provides a comprehensive picture of the DZ BANK banking group's exposures. Only exposures to qualifying CCPs are included.

FIG. 66 – EU CCR8 – EXPOSURES TO CCPS

		a	b	a	b
		Dec. 31, 2018		Jun. 30, 2018	
€ million		EAD after credit risk mitigation	RWAs	EAD after credit risk mitigation	RWAs
1	**Total exposures to qualified CCPs**		**257**		**381**
2	Exposures for trades at qualified CCPs (excluding initial margin and default fund contributions); of which:	1,536	23	316	213
3	i) OTC derivatives	698	14	-	-
4	ii) Exchange-traded derivatives	298	6	2,840	56
5	iii) Securities financing transactions	541	3	-1	0
6	iv) Netting sets where cross-product netting has been approved	-	-	-	-
7	Segregated initial margin	-		-	
8	Non-segregated initial margin	2,151	43	1,686	166
9	Prefunded default fund contributions	156	191	68	1
10	Alternative calculation of capital requirements for exposures		-		-
11	**Total exposures to non-qualified CCPs**		**62**		**42**
12	Exposures for trades at non-qualified CCPs (excluding initial margin and default fund contributions); of which:	62	62	42	42
13	i) OTC derivatives	62	62	42	42
14	ii) Exchange-traded derivatives	-	-	-	-
15	iii) Securities financing transactions	-	-	-	-
16	iv) Netting sets where cross-product netting has been approved	-	-	-	-
17	Segregated initial margin	-		-	
18	Non-segregated initial margin	-	-	-	-
19	Prefunded default fund contributions	-	-	-	-
20	Unfunded default fund contributions	-	-	-	-

Exposures to qualifying central counterparties are not subject to significant changes.

6.6.3 Counterparty credit risk exposures: Standardized Approach

(ARTICLE 444 SENTENCE 1 LETTER E IN CONJUNCTION WITH ARTICLE 92 SENTENCE 3 LETTER F CRR)

Fig. 67 shows the counterparty credit risk exposures after credit risk mitigation, broken down by portfolio (type of counterparty) and risk weight (risk content attributed according to the Standardized Approach).

FIG. 67 – EU CCR3 – STANDARDIZED APPROACH – COUNTERPARTY CREDIT RISK EXPOSURES BY REGULATORY PORTFOLIO AND RISK

€ million		Risk weight (%)											Total	of which: unrated
Exposure class		0	2	4	10	20	50	70	75	100	150	Other		
1	Central governments and central banks	11	-	-	-	-	-	-	-	-	-	-	11	10
2	Regional governments or local authorities	295	-	-	-	5	-	-	-	-	-	-	299	278
3	Public-sector entities	232	-	-	-	-	-	-	-	-	-	-	232	231
4	Multilateral development banks	-	-	-	-	-	-	-	-	-	-	-	-	-
5	International organizations	1	-	-	-	-	-	-	-	-	-	-	1	1
6	Institutions	2,770	-	-	-	611	0	-	-	-	-	-	3,381	2,835
7	Corporates	-	-	-	-	300	192	-	-	1,040	-	-	1,531	1,037
8	Retail business	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Institutions and corporates with a short-term credit assessment	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Other items	-	-	-	-	-	-	-	-	0	0	-	0	0
11	Secured by mortgages on immovable property	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Exposures in default	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Exposures associated with particularly high risk	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Covered bonds	-	-	-	-	-	-	-	-	-	-	-	-	-
15	CIUs	-	-	-	-	-	-	-	-	-	-	-	-	-
16	Equity exposures	-	-	-	-	-	-	-	-	-	-	-	-	-
17	**Total as at Dec. 31, 2018**	**3,308**	**-**	**-**	**-**	**915**	**192**	**-**	**-**	**1,040**	**0**	**-**	**5,455**	**4,392**
17	Total as at Jun. 30, 2018	3,334	-	-	-	1,198	245	-	-	1,347	0	-	6,124	4,926

The decrease in the total exposure compared with June 30, 2018 was primarily attributable to the corporates exposure class. While this fall was due to the decline in business with this customer group, the changes between the reporting dates of June 30, 2018 and December 31, 2018 in the other exposure classes were the result of fluctuation within the normal range.

6.6.4 Counterparty credit risk exposures: IRB approach

(ARTICLE 452 SENTENCE 1 LETTER E IN CONJUNCTION WITH ARTICLE 92 SENTENCE 3 LETTER F CRR)

Fig. 68 and Fig. 69 show key parameters used to calculate the capital requirements for counterparty credit risk in the IRB models.

FIG. 68 – EU CCR4 – FIRB APPROACH – COUNTERPARTY CREDIT RISK EXPOSURES BY PORTFOLIO AND PD SCALE

€ million (unless indicated otherwise)	a	b	c	d	e	f	g
PD scale by exposure class	EAD after credit risk mitigation	Average PD (%)	Number of borrowers	Average LGD (%)	Average maturity (days)	RWAs	RWA density (%)
Central governments and central banks							
0.00 to < 0.15	145	0.01	10	45.00	900	12	7.98
0.15 to < 0.25	13	0.23	2	45.00	900	6	50.17
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	6	0.50	2	45.00	900	4	73.79
0.75 to < 2.50	0	0.75	2	45.00	900	0	87.74
2.50 to < 10.00	-	-	-	-	-	-	-

€ million (unless indicated otherwise) PD scale by exposure class	a EAD after credit risk mitigation	b Average PD (%)	c Number of borrowers	d Average LGD (%)	e Average maturity (days)	f RWAs	g RWA density (%)
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	**163**	**0.05**	**16.00**	**45.00**	**900**	**22**	**13.73**
Institutions							
0.00 to < 0.15	1,947	0.24	280	29.26	899	411	21.10
0.15 to < 0.25	532	1.60	106	35.25	901	218	40.92
0.25 to < 0.50	173	1.95	40	33.92	901	102	58.67
0.50 to < 0.75	396	0.95	35	9.56	900	79	19.83
0.75 to < 2.50	51	51.46	27	28.24	905	31	60.51
2.50 to < 10.00	3	4.28	12	23.25	900	3	93.42
10.00 to < 100.00	13	13.30	6	0.39	900	0	1.51
100.00 (default)	-	-	-	-	-	-	-
Subtotal	**3,115**	**1.56**	**506.00**	**27.89**	**900**	**842**	**27.04**
Corporates							
0.00 to < 0.15	865	0.04	372.00	43.69	900.00	188	21.77
0.15 to < 0.25	232	0.19	398.00	44.87	900.00	105	45.39
0.25 to < 0.50	51	0.35	250.00	44.99	900.00	33	64.70
0.50 to < 0.75	58	0.50	326.00	42.35	900.00	40	69.46
0.75 to < 2.50	191	0.95	736.00	44.88	900.00	179	93.73
2.50 to < 10.00	28	2.91	170.00	44.90	900.00	37	132.57
10.00 to < 100.00	2	20.41	18.00	39.27	900.00	4	226.49
100.00 (default)	8	100.00	54.00	45.00	900.00	0	0.00
Subtotal	**1,436**	**0.87**	**2,324.00**	**44.05**	**900.00**	**588**	**40.94**
of which: SMEs							
0.00 to < 0.15	0	0.10	8	45.00	900	0	28.70
0.15 to < 0.25	1	0.23	62	45.00	900	0	43.22
0.25 to < 0.50	4	0.35	74	45.00	900	2	47.36
0.50 to < 0.75	2	0.50	50	45.00	900	1	63.26
0.75 to < 2.50	10	0.98	196	44.64	900	8	80.73
2.50 to < 10.00	2	4.50	80	43.58	900	3	121.76
10.00 to < 100.00	0	13.50	2	45.00	900	0	156.74
100.00 (default)	0	100.00	8	45.00	900	-	-
Subtotal	**19**	**1.16**	**480.00**	**44.65**	**900**	**14**	**74.34**
Corporates – of which: specialized lending							
0.00 to < 0.15	17	0.09	24	44.99	900	5	29.01
0.15 to < 0.25	42	0.19	44	45.00	900	19	44.45
0.25 to < 0.50	9	0.35	40	44.93	900	6	62.19
0.50 to < 0.75	22	0.50	98	44.79	900	16	73.45
0.75 to < 2.50	67	1.01	170	44.70	900	64	96.71
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	7	100.00	22	45.00	900	-	-
Subtotal	**164**	**4.70**	**398.00**	**44.84**	**900**	**110**	**67.06**
Corporates – of which: other							
0.00 to < 0.15	848	0.04	340	43.66	900	183	21.62
0.15 to < 0.25	189	0.19	292	44.85	900	86	45.62
0.25 to < 0.50	37	0.35	136	45.00	900	25	67.25
0.50 to < 0.75	35	0.50	178	40.68	900	23	67.21
0.75 to < 2.50	114	0.90	370	45.00	900	107	93.17
2.50 to < 10.00	26	2.78	90	45.00	900	35	133.43
10.00 to < 100.00	2	20.48	16	39.22	900	4	227.20
100.00 (default)	1	100.00	24	45.00	900	-	-
Subtotal	**1,252**	**0.37**	**1,446.00**	**43.94**	**900**	**463**	**37.00**
Long-term equity investments							
0.00 to < 0.15	0	0.09	8	90.00	1,800	0	96.45
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-

€ million (unless indicated otherwise) PD scale by exposure class	a EAD after credit risk mitigation	b Average PD (%)	c Number of borrowers	d Average LGD (%)	e Average maturity (days)	f RWAs	g RWA density (%)
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	**0**	**0.09**	**8.00**	**90.00**	**1,800**	**0**	**96.45**
Total (all portfolios) as at Dec. 31, 2018	**4,714**	**1.30**	**2,854.00**	**33.41**	**900.02**	**1,453**	**30.81**
Total (all portfolios) as at June 30, 2018	5,917	0.92	1,520	32.28	900	1,886	31.87

The EADs decreased between the two reporting dates as a result of the reduction in business activity in the second half of the year. This caused the RWAs to go down, despite the higher average PDs. The 'institutions' and 'corporates – other' exposure classes continue to be significant.

FIG. 69 – EU CCR4 – AIRB APPROACH – COUNTERPARTY CREDIT RISK EXPOSURES BY PORTFOLIO AND PD SCALE

€ million (unless indicated otherwise) PD scale by exposure class	a EAD after credit risk mitigation	b Average PD (%)	c Number of borrowers	d Average LGD (%)	e Average maturity (days)	f RWAs	g RWA density (%)
Central governments and central banks							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Institutions							
0.00 to < 0.15	160	0.08	7	81.00	1,149	100	62.52
0.15 to < 0.25	45	0.20	2	81.00	1,695	18	38.90
0.25 to < 0.50	26	0.35	1	81.00	616	22	86.45
0.50 to < 0.75	9	0.50	2	81.00	883	16	172.40
0.75 to < 2.50							
2.50 to < 10.00							
10.00 to < 100.00							
100.00 (default)							
Subtotal	**239**	**0.15**	**12.00**	**81.00**	**1,185**	**155**	**64.85**
Corporates – of which: SMEs							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Corporates – of which: specialized lending							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-

€ million (unless indicated otherwise) PD scale by exposure class	a EAD after credit risk mitigation	b Average PD (%)	c Number of borrowers	d Average LGD (%)	e Average maturity (days)	f RWAs	g RWA density (%)
Subtotal	-	-	-	-	-	-	-
Corporates – of which: other							
0.00 to < 0.15	8	0.10	1	65.00	1,232	6	75.33
0.15 to < 0.25	1	0.20	3	0.51	1,800	0	0.75
0.25 to < 0.50	3	0.35	4	2.48	1,800	0	5.03
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	1	1.44	5	10.25	922	0	25.23
2.50 to < 10.00	6	8.61	18	8.96	1,759	3	43.47
10.00 to < 100.00	-	-	2	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	**19**	**2.87**	**33.00**	**29.92**	**1,503**	**9**	**46.12**
Retail business – SMEs, secured by mortgages on immovable property							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-
Retail business – non-SMEs, secured by mortgages on immovable property							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-
Retail business – qualified revolving							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-
Retail business – other SMEs							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-
Retail business – other non-SMEs							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-

€ million (unless indicated otherwise) PD scale by exposure class	a EAD after credit risk mitigation	b Average PD (%)	c Number of borrowers	d Average LGD (%)	e Average maturity (days)	f RWAs	g RWA density (%)
Subtotal	-	-	-	-	-	-	-
Other non-credit-obligation assets							
0.00 to < 0.15	-	-	-	-	-	-	-
0.15 to < 0.25	-	-	-	-	-	-	-
0.25 to < 0.50	-	-	-	-	-	-	-
0.50 to < 0.75	-	-	-	-	-	-	-
0.75 to < 2.50	-	-	-	-	-	-	-
2.50 to < 10.00	-	-	-	-	-	-	-
10.00 to < 100.00	-	-	-	-	-	-	-
100.00 (default)	-	-	-	-	-	-	-
Subtotal	-	-	-	-	-	-	-
Total (all portfolios) as at June 30, 2018	**259**	**0.35**	**45.00**	**77.18**	**1,208.57**	**164**	**63.44**
Total (all portfolios) as at December 31, 2017	534	0.58	53	79.79	1,362	244	45.69

The changes shown in Fig. 69 in the total exposure compared with June 30, 2018 were primarily attributable to the institutions exposure class. The RWAs shown are attributable to the fall in the average PDs. The total exposure also decreased because of transactions that had matured.

6.6.5 Further information on counterparty credit risk

(ARTICLE 439 SENTENCE 1 LETTERS E, G, AND H CRR)

6.6.5.1 Impact of netting and collateral held on exposure values

(ARTICLE 439 LETTER E CRR)

Fig. 70 shows the aggregate derivative counterparty risk exposure in the banking book and trading book in the form of positive fair values before and after the offsetting of net derivatives exposures and collateral. Exposures that are processed directly via a central counterparty (clearing house) are not shown in Fig. 70. Fig. 70 therefore primarily shows listed derivatives that are traded via an intermediary, such as a broker, and over-the-counter (OTC) derivatives.

FIG. 70 – EU CCR5-A – IMPACT OF NETTING AND COLLATERAL HELD ON EXPOSURE VALUES

	€ million	a Gross positive fair value or net carrying amount	b Netting benefits	c Netted current credit exposure	d Collateral held	e Net credit exposure
1	Derivatives	27,587	20,120	7,467	3,800	3,668
2	Securities financing transactions	-	-	-	-	-
3	Cross-product netting	-	-	-	-	-
4	**Total as at Dec. 31, 2018**	**27,587**	**20,120**	**7,467**	**3,800**	**3,668**
	Total as at Jun. 30, 2018	27,995	20,031	7,964	3,836	4,128

The change in the gross positive fair value over the second half of 2018 was due to the volatile market environment, while the smaller impact of netting was attributable to normal fluctuation in the derivatives business. The table above therefore shows a decrease in the net credit exposure.

6.6.5.2 Composition of collateral for exposures subject to counterparty credit risk

(ARTICLE 439 LETTER E CRR)

Fig. 71 provides a breakdown for all types of collateral (cash collateral, sovereign debt, corporate bonds, etc.) posted or received by DZ BANK or the DZ BANK banking group in order to reduce counterparty credit risk related to derivatives transactions or securities financing transactions, including transactions cleared through a central counterparty.

FIG. 71 – EU CCR5-B – COMPOSITION OF COLLATERAL FOR EXPOSURES TO COUNTERPARTY CREDIT RISK

	a	b	c	d	e	f
	Collateral used in derivatives transactions				Collateral used in securities financing transactions	
	Fair value of collateral received		Fair value of collateral posted		Fair value of collateral received	Fair value of collateral posted
€ million	Segregated	Unsegregated	Segregated	Unsegregated		
Derivatives	-	4,045	-	9,785	-	-
of which: cash collateral	-	3,578	-	251	-	-
of which: bonds of non-German borrowers	-	11	-		-	-
of which: other bonds	-	8	-		-	-
of which: long-term equity investments	-	182	-		-	-
of which: other collateral	-	177	-	8,451	-	-
Securities financing transactions	-	-	-	-	-	-
Cross-product netting	-	-	-	-	-	-
Total as at Dec. 31, 2018	**-**	**4,045**	**-**	**9,785**	**-**	**-**
Total as at Jun. 30, 2018	-	1,747	-	7,644	-	-

The changes to the values presented in Fig. 71 were caused by the volatile market environment in the second half of 2018.

6.6.5.3 Exposures secured by credit derivatives

(ARTICLE 439 LETTERS G AND H CRR)

Fig. 72 shows the notional amounts of credit derivatives bought and sold, broken down by type of credit derivative. As had been the case at the end of previous reporting periods, no credit derivatives from the intermediary operations of DZ BANK banking group entities were held as at December 31, 2018.

FIG. 72 – EU CCR6 – CREDIT DERIVATIVES EXPOSURES

	a	b	c	d
	Credit derivative hedges		Other credit derivatives	Intermediary operations
€ million	Protection bought	Protection sold		
Notionals				
Single-name credit default swaps	-	-	17,090	-
Index credit default swaps	-	-	-	-
Total return swaps	-	-	80	-
Credit options	-	-	-	-
Other credit derivatives	-	-	10,249	-
Total notionals as at December 31, 2018	**-**	**-**	**27,419**	**-**
Total notionals as at June 30, 2016	-	-	28,132	-
Fair values				
Positive fair values (assets)	-	-	229	-
Negative fair values (equity and liabilities)	-	-	-74	-
Total fair value as at December 31, 2018	**-**	**-**	**155**	**-**
Total fair value as at June 30, 2018	0	-	208	-

The notionals for the exposures secured by credit derivatives decreased as a result of the business that had matured as at the end of the reporting year in the DZ BANK banking group.

7 Securitizations

7.1 Scope, objectives, and risks of securitization

(ARTICLE 449 SENTENCE 1 LETTERS A, D, E, AND I CRR)

The securitization activities of the DZ BANK banking group comprise not only asset-backed commercial paper (ABCP) programs but also investing, trading, and funding activities involving asset-backed securities (ABSs). In the first half of 2017, DZ BANK opened up its credit risk strategy to new investments in ABSs, albeit with significant restrictions, in order to give itself greater flexibility when investing in high-quality liquid assets (HQLAs). Investing activities continue to include the legacy portfolios of investor-related exposures dating back to the period prior to the financial crisis. As before, ABSs are held as part of trading activities in order to pass on exposures within a short period of time and funding activities are still carried out for selected customers.

As a sponsor, DZ BANK uses special-purpose entities, which are funded by issuing money market-linked ABCP. The ABCP programs are made available for DZ BANK customers who then securitize their own assets via these companies. In these programs, the customers sell their assets to a separate special-purpose entity, the consideration normally including a purchase price reduction. The purchase of the assets is funded by issuing money market-linked ABCP and using liquidity lines of DZ BANK. The redemption of the ABCP is covered by the asset pool in the program. The contractual structure of the transactions ensures that the assets are not included in the asset seller's insolvency proceedings.

The CORAL ABCP program has been set up to provide securitization of assets predominantly from European entities. This program is funded by liquidity lines and by the issuance of ABCP. DZ BANK is also the sponsor of the AUTOBAHN ABCP program, which offers securitization for assets from North American customers and is funded by ABCP issues and liquidity lines.

DZ BANK's investor-related exposures are assigned to the banking book, and to a lesser extent to the trading book, and are actively managed with the aim of optimizing the portfolio, risk, and own funds.

Fig. 73 provides an overview of DZ BANK's securitization activities as sponsor in accordance with article 449 sentence 1 letter i CRR. The DZ BANK banking group no longer acts as an originator and, at the moment, does not plan to do so in the future.

FIG. 73 – SECURITIZATION EXPOSURES AS ORIGINATOR AND SPONSOR

<table>
<tr><th>Entity / transaction</th><th>Type of transaction</th><th>Role</th><th>Purpose of transaction</th><th>Type of assets</th><th colspan="2">Volume[1]</th><th colspan="2">Retained exposures</th><th>Explanatory notes</th></tr>
<tr><td>€ million</td><td></td><td></td><td></td><td></td><td>Dec. 31, 2018</td><td>Dec. 31, 2017</td><td>Dec. 31, 2018</td><td>Dec. 31, 2017</td><td></td></tr>
<tr><td colspan="10">DZ BANK</td></tr>
<tr><td>CORAL</td><td rowspan="2">ABCP conduit</td><td rowspan="2">Sponsor</td><td rowspan="2">Generation of commission income</td><td>Loans and advances to European corporates</td><td>1,832</td><td>1,671</td><td>Commitments of 1,832, of which 1,246 has been utilized</td><td>Commitments of 1,671, of which 926 has been utilized</td><td rowspan="2">Provision of liquidity lines</td></tr>
<tr><td>AUTOBAHN</td><td>Loans and advances to North American customers</td><td>1,745</td><td>1,976</td><td>Commitments of 1,745, of which 152 has been utilized</td><td>Commitments of 1,976, of which 96 has been utilized</td></tr>
</table>

In accordance with article 449 sentence 1 letter i CRR, DZ BANK does not advise or manage any other entities that are invested in securitization exposures originated by the DZ BANK banking group or by special-purpose entities sponsored by DZ BANK.

7.2 Risk management in respect of securitizations

(ARTICLE 449 SENTENCE 1 LETTERS B, C, F, AND G CRR)

Exposures to ABSs, which constitute investor-related exposures within the meaning of the CRR, are managed by the relevant group entities and are subject to the groupwide risk management standards. One of the requirements in these standards is that securitization exposures are analyzed individually and have separate limits.

The structure of transactions is analyzed and the external credit ratings awarded by the rating agencies are validated as part of a defined process. Furthermore, all major ABS asset classes at DZ BANK are subjected to an annual portfolio analysis process that assesses the macroeconomic and asset-class-specific risks involved.

At sectoral level, portfolio risk exposures are included each quarter in the credit risk report submitted to the credit risk management function and to DZ BANK's Board of Managing Directors. This reporting process covers the total exposure and provides the basis for managing the risks incurred from structured products.

Securitization exposures that are not held so that they can be passed on within a short period of time are monitored independently of whether they are assigned to the banking book or the trading book. Besides continuous monitoring of external credit ratings, exposures are classified on a quarterly basis using stress tests specific to each asset class. A particular feature of the tests is that factors such as payment delays, defaults, and degree of loss are balanced against the existing credit enhancements in each transaction. If an exposure does not pass a stress test, the expected loss is determined using a model particular to the asset class concerned.

The credit risk arising in connection with the transactions in the ABCP programs is monitored using performance reports prepared at least monthly by the asset seller. The purchased assets are generally subject to regular due diligence in the form of random sample tests.

Re-securitization exposures are monitored in much the same way as other asset classes. Expected losses on these exposures are modeled using portfolio models from rating agencies that particularly factor in the range of ratings in the securitized portfolio and the assumptions made by the agencies with regard to the extent of losses and industry correlations. When modeling the expected losses, DZ HYP looks through the securitized portfolio.

The economic stress tests encompass both the credit risk and the spread risk arising from the Bank sector's entire securitization exposure.

7.2.1 Managing credit risk arising from securitizations

Credit risk in connection with securitizations in the banking book arises primarily from investments in securitizations and the provision of liquidity facilities for ABCP.

The liquidity facilities provided as part of the ABCP programs are managed in the banking book. The resulting risk largely depends on the quality of the asset pool.

In the context of the portfolio as a whole, the re-securitization exposures and related risks are of minor significance. Re-securitizations are structures in which the securitized exposure in turn comprises one or more other securitization exposures.

7.2.2 Managing market risk arising from securitizations

For the purposes of internal management, market risk associated with securitizations (for example, interest-rate risk, spread risk, or currency risk) is included in DZ BANK and DZ HYP's internal market risk models, regardless of whether the securitizations are posted in the banking book or the trading book. The regulatory capital requirement for general price risk is also calculated for securitizations in DZ BANK's trading book using the internal model. At DZ BANK, the risk exposure arising from securitizations in the banking book and the trading book forms an integral part of the daily market risk report and is reflected in the values used for the weekly stress scenario calculations for market risk.

In the case of securitizations, extreme scenarios are also simulated for the weighted average lifetime and recovery assumptions. DZ HYP holds all securitizations in its banking book. They are included in the daily measurement of market risk and in reporting.

7.2.3 Managing other risk arising from securitizations

In addition to credit risk and market risk, the securitization activities of the DZ BANK banking group also give rise to liquidity risk and operational risk. These risks form an integral part of the group's standard risk management system. Disclosures related to these risks have been included in the relevant sections of the opportunity and risk report, as follows:

- Liquidity risk management:
  section 2.2.2 (page 69) and section 6 (page 94) in the opportunity and risk report
- Operational risk management:
  section 14 (pages 141 to 148) in the opportunity and risk report.

7.2.4 Risk mitigation

In ABCP programs managed exclusively in the banking book, the risk arising from some of the purchased asset portfolios is covered by credit insurance in addition to the discount on the purchase price already referred to above.

As the DZ BANK banking group has no securitization exposures where it acts as originator, which means no hedging operations are necessary, this risk report does not contain any disclosures pursuant to article 449 letter g CRR.

7.3 Accounting policies applied to securitizations

7.3.1 Recognition methods

(ARTICLE 449 SENTENCE 1 LETTER J (I), (III), (IV), AND (VI) CRR)

The accounting treatment of securitizations does not distinguish between the regulatory categories of banking book and trading book. As required by IFRS 9, the DZ BANK banking group's investor exposures are either held in the 'hold to collect' or 'hold to collect and sell' business models or held in the trading book. In general, the holding of debt instruments results in measurement at amortized cost (AC), whereas in the 'hold to collect and sell' business model it leads to measurement at fair value through other comprehensive income (FVOCI). Exercise of the fair value option and assignment to the trading book both result in measurement at fair value through profit or loss (FVTPL). Drawn liquidity facilities are recognized as loans and advances to customers and measured at amortized cost. Undrawn liquidity facilities and loan guarantees are not recognized on the balance sheet; if they give rise to any imminent risks, loss allowances are determined in accordance with IFRS 9 and recognized as provisions in the amount of the expected loss in accordance with IAS 37. Derivative instruments such as swaps that are used to hedge interest-rate or currency risks are assigned to the trading book in accordance with IFRS 9 and measured at fair value.

The special-purpose entities involved in the ABCP programs are unconsolidated structured entities. According to IFRS 10, an investor controls an entity and must consolidate the entity if the investor directs relevant activities, is exposed to variable returns from its involvement, and has the ability to affect those returns through its power over the investee. As at December 31, 2018, the DZ BANK banking group did not exercise control as defined in IFRS 10 over the special-purpose entities involved in the ABCP programs.
Legal asset sales – which are known as true-sale securitizations – are derecognized from the balance sheet to the extent that the opportunities and risks arising from the asset portfolio have been transferred to the buyer. There are currently no true-sale securitizations that have been originated by an entity in the DZ BANK banking group. Consequently, no gains on sale are recognized.

There are no liabilities arising from obligations to support securitized assets.

7.3.2 Measurement methods

(ARTICLE 449 SENTENCE 1 LETTER J (II) AND (V) CRR)

Over the course of 2018, the positive trend in the securitizations market continued. The volume of sales in the primary market increased sharply year on year, but spreads in the secondary market widened up to the end of the year – in some cases significantly. However, this was caused not by credit quality problems in the securitizations' underlying collateral portfolios but by concerns about the economy in general, the ECB's announced move away from ultra-expansionary monetary policy and, above all, political headline risks. In 2018, both markets were still being boosted by the support provided by the ECB's asset-backed securities purchase program (ABSPP), which was then terminated at the end of the year.

Securitizations are measured on the basis of externally available market data. The validity of the measurement method used can be verified by regular comparison with the external market prices offered by other market participants. This ensures that an appropriate measurement method based on level 2 input data in the fair value hierarchy is used to determine the fair value of securitizations. Cash CDOs are measured on the basis of credit spreads, which are derived from the underlying assets using a copula model. These assets largely comprise corporate loans.

There are currently no exposures at DZ BANK for which securitization is planned. The valuation methods used for this purpose are therefore not presented in this report.

7.4 Regulatory treatment of securitizations

7.4.1 Procedure for determining risk-weighted exposures

(ARTICLE 449 SENTENCE 1 LETTER H CRR)

When acting as sponsor, the DZ BANK banking group uses the IAA specified in article 259 CRR, which has been both tested and approved by the supervisory authority for calculating the risk-weighted exposure of securitizations in ABCP programs for which there is no external credit rating. To a lesser extent, the Standardized Approach to credit risk as specified in articles 251 to 258 CRR and the IRB approach specified in article 261 CRR are also used to determine the capital requirement for exposures forming part of the group's activities as a sponsor.
Most of the investor-related exposures in the banking book are subject to the Standardized Approach to credit risk in accordance with articles 251 to 258 CRR, in particular the look-through approach as specified in article 253 CRR within the context of the Standardized Approach to credit risk. To a lesser extent, the IRB approach in accordance with article 261 CRR is also used.

Since December 31, 2011, it has been a requirement to use the regulatory Standardized Market Risk Approach to assess the specific risk of investor-related securitization positions held in the trading book.

The Standardized Approach is based on the securitization risk weights in the banking book. These exposures are rated for regulatory purposes using the Standardized Approach to credit risk, the IRB approach, the Supervisory Formula Method, or the IAA with the corresponding rating categories and risk weights. Securitization exposures with an external rating below the defined second-best rating are not weighted but deducted from own funds. The minimum thresholds are BB- for Standard & Poor's, Ba3 for Moody's, and BB- for Fitch. Under the regulatory Standardized Approach, the total of long and short positions is backed by own funds.

A modified Standardized Approach is available for the CTP in addition to the Standardized Approach. For regulatory purposes, only securitizations and nth-to-default credit derivatives must be allocated to the CTP. Under the modified Standardized Approach, the capital requirement for the CTP is always calculated on the basis of the higher of the eligible amounts for long positions or short positions. However, only nth-to-default credit derivatives are currently allocated to the CTP.

DZ BANK has notified the ECB that, in 2019, it will exercise the option pursuant to article 254 (3) CRR, as amended by Regulation (EU) No. 2017/2401. This means that, for 2019 at least, the Securitization External

Ratings-based Approach (SEC-ERBA) – instead of the Securitization Standardized Approach (SEC-SA) – will be used to calculate the risk-weighted exposures for all rated exposures and for all exposures for which a derived rating may be used.

7.4.2 External ratings

(ARTICLE 449 SENTENCE 1 LETTER K CRR)

During its securitization activities, the DZ BANK banking group uses the classifications prescribed by the rating agencies Standard & Poor's, Moody's, and Fitch for rating the regulatory asset classes listed below. DZ BANK also uses the classifications prescribed by DBRS.

- Receivables from home loans
- Lease receivables originated or purchased (retail and commercial)
- Other receivables from retail loans
- Receivables from loans on wholly or partially commercial real estate
- Other receivables from corporates, e.g. from corporate loans.

External credit ratings awarded by these recognized rating agencies are applied to the securitization exposures of the DZ BANK banking group in accordance with the requirements of article 251 et seq. CRR (under the Standardized Approach to credit risk) and article 259 CRR (under the IRB approach). Competing external ratings are included in the calculation of risk-weighted exposures in accordance with articles 138 and 139 CRR. Section 8.4.1 (pages 111 to 112) and figure 24 (page 112) of the opportunity and risk report shows a reconciliation of external and internal ratings and Fig. 74 below shows a reconciliation of external and internal ratings for ABSs.

FIG. 74 – RECONCILIATION OF EXTERNAL AND INTERNAL ABS RATINGS

	Asset class				
External rating	**ABSs**	**US RMBSs**	**RoW RMBSs**	**CMBSs and CLOs**	**CDOs excl. CLOs**
AAA	1A	3B	1C	1C	3B
AA+	1A	3C	1E	1E	3B
AA	1B	3C	2B	2A	3C
AA-	1C	3D	2B	2A	3C
A+	1E	3D	2B	2A	3D
A	2A	3E	2C	2B	3D
A-	2C	3E	2C	2C	3E
BBB+	2D	4A	2C	2D	3E
BBB+	2E	4A	2D	2E	4A
BBB-	3A	4B	3A	3A	4A
BB+	3B	4B	3B	3B	4B
BB	3C	4C	3D	3C	4B
BB-	3E	4C	4A	3D	4C
B+	4A	4D	4B	3E	4C
B	4B	4E	4C	4A	4C
B-	4C	4E	4D	4C	4D
CCC+ or lower	4E	4E	4E	4E	4E

7.4.3 Internal ratings

(ARTICLE 449 SENTENCE 1 LETTER L CRR)

The IAA in accordance with article 259 CRR, which has been tested and approved by the supervisory authority, is used to determine ratings for liquidity facilities provided for ABCP programs if such facilities have not been rated by external agencies. This arrangement relates solely to the banking book because the entities in the DZ BANK banking group do not have any such exposures in the trading book.

When used to assess risk in accordance with regulatory requirements, the IAA closely follows the models used by external rating agencies. Depending on the assets securitized in an ABCP transaction, one of a number of submodels within the IAA may be used to ensure that the measurement is appropriate to the risk. Lease receivables, trade receivables, and other items are securitized. In compliance with article 259 CRR, the stress factors used to measure the relevant cushions against potential loss and the resulting rating categories are at least as conservative as those used by external rating agencies. The stress factors used for determining internal ratings are used in a similar way by the rating agencies in their procedures. In addition, the IAA is used for portfolios of individually assessed loans and advances. Likewise, the resulting credit ratings in this case are no less conservative than would be expected from the use of credit portfolio models by external rating agencies. Besides being used for determining capital requirements, the IAA is also used for the purposes of internal risk management and pricing in the lending business.

The IAA is comprehensively validated each year. The employees responsible for this task receive extensive training and are familiar with current developments relating to the area of securitization. Suitable organizational structures are in place to ensure that front office, back office, model development, and model validation are segregated. Credit procedures and rating models are also subject to regular review by both internal and external auditors.

7.5 Securitization exposure and capital requirements

7.5.1 Total amount of asset securitizations

(ARTICLE 449 SENTENCE 1 LETTERS M, N (I), AND Q CRR)

There are no longer any activities with the DZ BANK banking group as originator. Furthermore, there were no true-sale securitizations in the banking book, neither were there any securitizations of assets associated with market risk exposures in the trading book. Fig. 75 therefore shows the total amount of sponsorship activities. If granted lines are drawn, exposures to the CORAL and AUTOBAHN special-purpose entities arise.

The year-on-year change in sponsor exposures was largely due to new transactions and the expansion of exposures.

FIG. 75 – TOTAL AMOUNT OF SECURITIZATIONS WITH DZ BANK BANKING GROUP AS ORIGINATOR AND SPONSOR

	Securitizations in the banking book	
€ million	Sponsor	
Exposure class	Dec. 31, 2018	Dec. 31, 2017
Liquidity facilities[1]	3,693	3,651
Derivatives (e.g. for hedging purposes)	70	26
Total	**3,764**	**3,677**

1 Total amount, with no distinction between loan facility and drawdown.

7.5.2 Impaired securitizations, securitizations in arrears, and losses realized during the reporting period

(ARTICLE 449 SENTENCE 1 LETTERS P AND M CRR)

There are only activities with the DZ BANK banking group as sponsor, and none with it as originator at present. Consequently, no disclosures on the portions of the group’s own asset securitizations that are past due or at risk of default are provided, nor are the losses on such exposures realized during the reporting year presented.

FIG. 76 – IMPAIRED SECURITIZATIONS, OWN SECURITIZATIONS IN ARREARS, AND LOSSES REALIZED DURING THE REPORTING PERIOD

€ million	Past-due or non-	Losses during the reporting period

Exposure class	performing assets Dec. 31, 2018	Dec. 31, 2017	2018	2017	2016	2015	2014
Receivables from home loans	-	-	-	-	-	-	8
Receivables from other retail loans	-	-	-	-	-	-	4
Receivables from loans on wholly or partially commercial real estate	-	-	-	-	-	-	-
Receivables from corporate loans	-	-	-	-	-	-	-
Lease receivables originated or purchased	-	-	-	-	-	-	-
Receivables from vehicle finance (excluding leases)	-	-	-	-	-	-	-
Receivables from CDOs and ABSs	-	-	-	-	-	-	-
Re-securitizations	-	-	-	-	-	-	-
Other exposure reported on the balance sheet	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	12

7.5.3 Securitizations during the reporting period

(ARTICLE 449 SENTENCE 1 LETTERS N (VI), M, AND R CRR)

No assets were effectively securitized with the DZ BANK banking group as originator during 2018. There are still no securitization structures with an early amortization approach.

In the reporting period, the DZ BANK banking group did not provide any implicit support within the meaning of article 248 CRR.

7.5.4 Retained, purchased or off-balance-sheet securitization exposures

(ARTICLE 449 SENTENCE 1 LETTERS N (II) AND M CRR)

Fig. 77 shows the securitization exposures retained, purchased, or held off balance sheet by the entities in the DZ BANK banking group in their capacity as sponsor or investor, broken down by the type of securitization. Securitization exposure is recognized at its risk-weighted carrying amount. The underlying receivables are classified according to the categories used for internal management purposes.

FIG. 77 – RETAINED, PURCHASED OR OFF-BALANCE-SHEET SECURITIZATION EXPOSURES

€ million **Securitization exposure**	**Banking book**				**Trading book**		**Total**	
	Standardized Approach to credit risk		**IRB approach**					
Exposure reported on the balance sheet	**Dec. 31, 2018**	Dec. 31, 2017	**Dec. 31, 2018**	Dec. 31, 2017	**Dec. 31, 2018**	Dec. 31, 2017	**Dec. 31, 2018**	Dec. 31, 2017
Receivables from home loans	1,488	1,647	-	-	159	96	1,647	1,743
Receivables from other retail loans	16	19	-	-	6	34	22	52
Receivables from loans on wholly or partially commercial real estate	-	-	64	120	-	-	64	120
Receivables from corporate loans	-	-	6	36	139	124	145	160
Lease receivables originated or purchased	46	30	139	119	41	19	226	168
Receivables from vehicle finance (excluding leases)	376	184	-	45	133	185	509	413
Receivables from CDOs and ABSs	-	-	7	-	-	-	7	-
Re-securitizations	-	0	0	3	-	4	0	7
Other exposure reported on the balance sheet	-	-	-	-	-	-	-	-
Receivables from special-purpose entities and other credit enhancements reported on the balance sheet	115	77	1,430	1,131	-	-	1,545	1,209
Total exposure reported on the balance sheet	**2,040**	**1,957**	**1,646**	**1,453**	**479**	**462**	**4,165**	**3,872**
Exposure not reported on the balance sheet								
Liquidity facilities	160	307	2,075	2,515	-	-	2,236	2,822
Derivatives (e.g. for hedging purposes)	38	8	35	29	-	-	73	37
Exposure specific to synthetic transactions	-	-	-	-	-	-	-	-
Re-securitizations	-	-	-	-	-	-	-	-
Other exposure not reported on the balance sheet	-	3	125	197	2	3	127	200
Total exposure not reported on the balance sheet	**198**	**314**	**2,235**	**2,741**	**2**	**3**	**2,435**	**3,058**
Sum total	**2,238**	**2,272**	**3,881**	**4,194**	**481**	**465**	**6,600**	**6,930**

7.5.5 Exposures and capital requirements for retained or purchased securitizations broken down by the approach used to calculate the capital requirement

(ARTICLE 449 SENTENCE 1 LETTERS O (I) AND M CRR)

Fig. 78 shows the securitization exposures and the respective capital requirements for the banking book and the trading book. This includes a breakdown by the approach used to calculate the capital requirement and by the risk-weight band for regulatory purposes.

The level of securitization exposures fell compared with December 31, 2017 due to portfolio changes and redemptions/sales. The capital requirement decreased significantly because the option to recognize the securitization exposures with a risk weight of 1,250 percent as a deduction from own funds was used for the first time. This meant that the capital requirement for these exposures was no longer necessary.

FIG. 78 – EXPOSURES AND CAPITAL REQUIREMENTS FOR RETAINED OR PURCHASED SECURITIZATIONS

	Banking book											
€ million	Securitizations				Re-securitizations				Total			
Regulatory approach	Exposures		Capital requirement		Exposures		Capital requirement		Exposures		Capital requirement	
Risk-weight band	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017
Standardized Approach	**1,929**	1,880	**52**	230	**0**	0	**0**	0	**1,929**	1,880	**52**	230
20%	1,224	926	20	15	-	-	-	-	1,224	926	20	15
40%	-	-	-	-	-	-	-	-	-	-	-	-
50%	428	587	17	23	-	-	-	-	428	587	17	23
100%	108	142	9	11	0	0	0	0	108	143	9	11
225%	-	-	-	-	-	-	-	-	-	-	-	-
350%	23	62	6	17	-	-	-	-	23	62	6	17
650%	-	-	-	-	-	-	-	-	-	-	-	-
1,250%	146	163	-	163	-	-	-	-	146	163	-	163
Standardized Approach, look-through	**149**	23	**9**	1	**-**	-	**-**	-	**149**	23	**9**	1
Rating-based approach	**870**	684	**28**	128	**0**	3	**0**	0	**870**	687	**28**	128
≤ 10%	182	213	1	1	-	-	-	-	182	213	1	1
> 10% ≤ 20%	36	65	-	1	-	-	-	-	36	65	0	1
> 20% ≤ 50%	358	264	12	8	2	2	0	0	358	266	12	8
> 50% ≤ 100%	116	9	9	1	-	-	-	-	116	9	9	1
> 100% ≤ 250%	0	0	0	0	-	-	-	-	0	0	0	0
> 250% ≤ 650%	16	0	6	0	-	-	-	-	16	0	0	0
> 650% ≤ 1,250%	161	134	-	117	0	0	0	0	161	134	106	118
Supervisory Formula Method	**-**	315	**-**	13	**-**	-	**-**	-	**-**	315	**-**	13
Internal Assessment Approach	**3,010**	3,192	**106**	111	**-**	-	**-**	-	**3,010**	3,192	**106**	111
Capital deduction	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-
Total	**5,959**	6,094	**195**	484	**0**	3	**0**	0	**5,959**	6,097	**195**	484

	Trading book															
€ million	Securitizations				Re-securitizations				Total				Total amount			
Regulatory approach	Exposures		Capital requirement		Exposures		Capital requirement		Exposures		Capital requirement		Exposures		Capital requirement	
Risk-weight band	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017
Standardized Approach	**311**	315	**5**	5	**-**	-	**-**	-	**311**	315	**5**	5	**2,240**	2,195	**57**	236
20%	299	305	5	5	-	-	-	-	299	305	5	5	1,523	1,231	24	20
40%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50%	13	10	1	0	-	-	-	-	13	10	0	0	441	597	18	24
100%	-	-	-	-	-	-	-	-	-	-	-	-	108	143	9	11
225%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
350%	-	-	-	-	-	-	-	-	-	-	-	-	23	62	6	17
650%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,250%	-	-	-	-	-	-	-	-	-	-	-	-	146	163	-	163
Standardized Approach, look-through	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**-**	-	**149**	23	**9**	1
Rating-based approach	**170**	145	**2**	1	**4**	4	**0**	0	**170**	149	**2**	2	**1,040**	836	**31**	129
≤ 10%	127	89	1	1	-	-	-	-	127	89	1	1	309	302	2	1
> 10% ≤ 20%	30	51	0	1	-	-	-	-	30	51	0	1	66	116	1	2
> 20% ≤ 50%	-	5	0	0	4	4	0	0	-	9	-	0	358	275	12	8
> 50% ≤ 100%	13	-	1	-	-	-	-	-	13	-	1	-	129	9	10	1
> 100% ≤ 250%	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
> 250% ≤ 650%	-	-	-	-	-	-	-	-	-	-	-	-	16	0	6	0

> 650% ≤ 1,250%	-	-	-	-	-	-	-	-	-	-	-	-	161	134	-	118
Supervisory Formula Method	-	-	-	-	-	-	-	-	-	-	-	-	-	315	-	13
Internal Assessment Approach	-	-	-	-	-	-	-	-	-	-	-	-	3,010	3,192	106	111
Capital deduction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**481**	**461**	**7**	**7**	**0**	**4**	**0**	**0**	**481**	**465**	**7**	**7**	**6,440**	**6,561**	**202**	**491**

7.5.6 Securitization exposures and deductions from own funds

(ARTICLE 449 SENTENCE 1 LETTER N (V) AND M CRR)

Fig. 79 shows the securitization exposures to be deducted from own funds in accordance with article 36 (1) letter k (ii) CRR or to be attributed with a securitization risk weight of 1,250 percent in determining regulatory own funds. The figures shown are the exposure carrying amounts. Market risk exposures in the trading book are factored into the table as net interest-rate exposures.

The securitization exposures with a risk weight of 1,250 percent rose compared with December 31, 2017 due to exchange-rate fluctuations and portfolio changes.

FIG. 79 – DEDUCTIONS FROM OWN FUNDS AND SECURITIZATION EXPOSURES WITH A RISK WEIGHT OF 1,250 PERCENT BY ASSET CLASS

€ million **Asset class**	**Banking book** **Dec. 31, 2018**	 Dec. 31, 2017	**Trading book** **Dec. 31, 2018**	 Dec. 31, 2017	**Total** **Dec. 31, 2018**	 Dec. 31, 2017
Exposure reported on the balance sheet						
Receivables from home loans	145	163	-	-	145	163
Receivables from loans on wholly or partially commercial real estate	20	41	-	-	20	41
Receivables from corporate loans	-	0	-	-	-	0
Lease receivables originated or purchased	-	-	-	-	-	-
Receivables from vehicle finance (excluding leases)	-	-	-	-	-	-
Receivables from CDOs and ABSs	-	-	-	-	-	-
Re-securitizations	0	0	-	-	0	0
Other exposure reported on the balance sheet	-	-	-	-	-	-
Receivables from special-purpose entities and other credit enhancements reported on the balance sheet	84	7	-	-	84	7
Total exposure reported on the balance sheet	**249**	**211**	**-**	**-**	**249**	**211**
Exposure not reported on the balance sheet						
Liquidity facilities	58	85	-	-	58	85
Derivatives (e.g. for hedging purposes)	-	-	-	-	-	-
Exposure specific to synthetic transactions	-	-	-	-	-	-
Re-securitizations	-	-	-	-	-	-
Other exposure not reported on the balance sheet	-	1	-	-	-	1
Total exposure not reported on the balance sheet	**58**	**86**	**-**	**-**	**58**	**86**
Sum total	**307**	**297**	**-**	**-**	**307**	**297**

7.5.7 Re-securitization exposures and collateralization amounts

(ARTICLE 449 SENTENCE 1 LETTERS O (II) AND M CRR)

Fig. 80 discloses the retained or purchased re-securitization exposures before and after offsetting of any collateralization or insurance, together with the extent of collateral provided by guarantors, broken down by guarantor credit rating. Again, the figures shown are the exposure carrying amounts. Market risk exposures in the trading book are factored into the table as net interest-rate exposures.

The level of re-securitizations fell significantly compared with December 31, 2017 due to redemptions/sales.

FIG. 80 – RE-SECURITIZATION EXPOSURES AND COLLATERALIZATION AMOUNTS

	Banking book		Trading book		Total	
€ million	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017
Re-securitizations before collateralization	0	3	-	4	-	7
Collateralized by guarantee	-	-	-	-	-	-
of which: guarantor rated AAA to A	-	-	-	-	-	-
Guarantor rated below A	-	-	-	-	-	-
Other collateral	-	-	-	-	-	-
Re-securitizations after collateralization	0	3	-	4	-	7

7.5.8 Planned securitizations

(ARTICLE 449 SENTENCE 1 LETTER N (III) CRR)

As at December 31, 2018, there were no plans for any securitizations.

8 Market risk

Market risk is defined in section 2.3.2, fig. 7 (page 71) of the opportunity and risk report.

8.1 Market risk management

(ARTICLE 435 (1) CRR)

The principles and objectives of market risk management and the methods used to manage risk are presented in sections 10.1, 10.2, and 10.6 (pages 130 to 132 and 136) of the opportunity and risk report. The structure and organization of the market risk management function are described in section 10.3.1 (page 132) of the opportunity and risk report. Information on the scope and nature of the market risk measurement systems are provided in sections 10.3.2, 10.4.1, 10.4.3, and 10.5 (pages 132, 132 to 133, 133 to 134, and 135 to 136) of the opportunity and risk report. Sections 10.4.2 to 10.4.5 and 10.5 (pages 133 to 136) of the opportunity and risk report set out the strategies for hedging and mitigating market risk and strategies and processes for monitoring the ongoing effectiveness of the measures taken to hedge market risk.

8.2 Required qualitative disclosures on market risk

(ARTICLE 445 AND ARTICLE 455 CRR IN CONJUNCTION WITH ARTICLE 435 (1) LETTERS A, B, AND D AND ARTICLE 448 CRR)

For regulatory purposes, DZ BANK is classed as a trading book institution. It conducts trading activities as part of its role as the central institution in the cooperative financial network and – on this basis – as a corporate bank for customers outside the cooperative financial network.

In line with the requirements in articles 102 to 104 CRR, DZ BANK has defined clear rules on the delimitation and the running and management of the trading book. The trading book is defined using criteria relating to the intention to trade and generate returns, maturities, tradability, the ability to mitigate risk, and the characteristics of the financial instruments. A clear decision-making path for the assignment of an exposure to either the trading book or the banking book is also mandatory.

When a transaction is entered into, its purpose must be documented in a verifiable manner by recognizing it in a specific portfolio – trading book or banking book – so that it is clearly assigned. Compliance with the assignment rules is regularly monitored within a defined process. The assignment to the trading book or banking book can only be changed subsequently in accordance with defined rules as part of a reallocation process.

The handling of risk in the trading book is documented in DZ BANK's trading strategy. The rules for running and managing the trading book, the definition of the trading book, and the trading strategy are reviewed and, if necessary, updated at least once a year.

DZ BANK generally manages market risk on a decentralized, portfolio basis. The traders responsible for managing a portfolio bear responsibility for its risk and performance.

Exposures in the trading book are, where available, measured daily using liquid market prices available in active markets (mark-to-market). These exposures are mainly liquid securities (bonds and equities) and exchange-traded derivatives. If there are no liquid market prices available, the exposures are measured with customary valuation models using predominantly observable market data (mark-to-model). Calibration of the valuation models on the basis of observable market data ensures that measurement reflects the market. The extent of unobservable market parameters that influence value is always kept as small as possible in the measurement. Generally, unobservable market parameters are derived from similar instruments or data that is not observable on a daily basis. As a rule, they are included in the calculation of gains and losses with an adjustment to the instrument's measurement that is appropriate to the degree of imprecision in the measurement. A description of the valuation methods and measurement adjustments can be found in the notes to the financial statements in DZ BANK's Annual Report, part E 'Financial instruments and fair value disclosures' in the 'Fair value measurements within Levels 2 and 3' section. Pursuant to articles 34 and 105 CRR and Delegated Regulation (EU) No. 2016/101, DZ BANK calculates regulatory write-downs for all exposures recognized at fair value in accordance with the core approach and deducts them from common equity Tier 1 capital. Measurement is based on the methods and models used to measure fair value under commercial law; measurement uncertainties relating to market prices, market parameters, and model selection are reflected by taking the 90 percent quantile into account. Additional write-downs for operational risk, future administrative expenses, and exposure concentrations are recognized in accordance with the prescribed methodology and deducted from Tier 1 capital.

8.3 Market risk under the Standardized Approach

(ARTICLE 445 CRR)

Fig. 81 contains the disclosures on the capital requirements for market risk according to article 92 (3) letters b and c CRR under the Standardized Approach. The capital requirement for specific interest-rate risk relating to securitization exposures pursuant to article 445 sentence 2 CRR is also disclosed here. As at December 31, 2018, the proportion of market risk-weighted assets subject to the Standardized Approach was 25.48 percent (June 30, 2018: 23.53 percent).

FIG. 81 – EU MR1 – MARKET RISK UNDER THE STANDARDIZED APPROACH

		Dec. 31, 2018		Jun. 30, 2018	
		a	b	a	b
	€ million	RWAs	Capital requirements	RWAs	Capital requirements
	Outright products				
1	Interest-rate risk (general and specific)	149	12	119	9
2	Equity risk (general and specific)	0	0	0	0
3	Currency risk	2,063	165	1,481	119
4	Commodity risk	15	1	16	1
5	**Options**				
6	Simplified approach	0	0	0	0
7	Delta-plus method	-	-	-	-
8	Scenario approach	-	-	-	-
9	**Securitization (specific risk)**	94	7	64	5
10	**Total**	**2,320**	**186**	**1,680**	**134**

Market risk under the Standardized Approach was €640 million higher than at December 31, 2017. This increase was primarily due to BSH's currency risk being included for the first time. The dominant risk categories are currency risk and interest-rate risk.

8.4 Internal market risk model

8.4.1 Qualitative information on the internal market risk model

(ARTICLE 455 SENTENCE 1 LETTERS A (I) AND B CRR)

The model approved by BaFin for calculating the regulatory capital requirements for general and specific market risk pursuant to the CRR is used for all portfolios of DZ BANK.

DZ BANK's internal model approved by BaFin for calculating the regulatory capital requirements for general and specific market risk pursuant to the CRR is used to calculate **value-at-risk** and **stressed value-at-risk** (crisis risk amount) on a daily basis with a unilateral confidence level of 99.00 percent over a one-year observation period and a holding period of 10 trading days. A historical simulation is used to generate market data scenarios.

DESCRIPTION OF THE CRISIS SCENARIOS USED, PURSUANT TO ARTICLE 455 SENTENCE 1 LETTER A (III) CRR

Risks arising from extreme market situations are primarily recorded using **stress tests**. The crisis scenarios underlying the stress tests for market risk and market liquidity risk include the simulation of significant fluctuations in risk factors and serve to highlight potential losses not generally recognized in the value-at-risk approach. Stress tests are based on extreme market fluctuations that have actually occurred in the past together with crisis scenarios that – regardless of market data history – are considered to be relevant. The crisis scenarios used in this case are constantly reviewed and updated to ensure they are appropriate. Reverse stress tests are also used to identify scenarios that could pose a potential threat to the institution.

QUALITATIVE INFORMATION ABOUT STRESS TESTS AND ABOUT WHICH PORTFOLIOS UNDERGO STRESS TESTS PURSUANT TO ARTICLE 435 SENTENCE 1 LETTER A CRR

Risks arising from extreme market situations are primarily recorded using stress tests. The crisis scenarios underlying the stress tests for market risk and market liquidity risk include the simulation of significant fluctuations in risk factors and serve to highlight potential losses not generally recognized in the value-at-risk approach. Extreme market fluctuations that have actually occurred in the past as a result of crisis events (e.g. September 9, 2011, Lehman insolvency, Iceland's default) are used for historical stress test scenarios; crisis scenarios are also used in which individual risk factor groups are exposed to strong hypothetical fluctuation, regardless of market data history. All portfolios of DZ BANK are remeasured in full in respect of all scenarios, taking account of any relevant changes in the risk factors. The crisis scenarios used in this case are constantly reviewed and updated to ensure they are appropriate. Reverse stress tests are also used to identify scenarios that could pose a potential threat to the institution. Changes in the risk factors are determined that would generate losses above a previously defined threshold in the event of a DZ BANK portfolio being remeasured in full.

Additional default and migration risk (incremental risk charge)
(ARTICLE 455 SENTENCE 1 LETTER A (II) CRR)

Since December 2011, DZ BANK has been using an internal risk model approved by the supervisory authority to determine the capital requirements related to the additional default and migration risk in the trading book (incremental risk charge, IRC). In this model, sudden market changes arising from rating migrations or default by an issuer are specifically factored into the regulatory risk calculation. Potential losses from migrations and defaults are measured on the basis of a one-sided prediction interval with a confidence level of 99.90 percent and a prediction horizon of one year. A factor-based portfolio model is used. Calculations assume a constant risk position over the prediction horizon.

Measurement undertaken independently of the trading function, and model validation
(ARTICLE 455 SENTENCE 1 LETTERS A (IV) AND G CRR)

Independently of the trading function, exposures are measured daily using current market parameters. To this end, the market data is largely collected by Risk Controlling itself and the **measurement methods and models** are developed largely independently of the trading units and validated entirely independently. An independent price verification process takes place where market parameters are not used independently of the trading function. Any discrepancies identified through comparison with data from external suppliers of market data are recognized as a valuation reserve.

The internal market risk model is subject to continuous operational review as part of standard processes. The review is carried out by market risk control using analyses of the value-at-risk and evaluations of the backtesting and stress test results.

In addition, the internal market risk model is audited regularly by internal audit during annual audits. Refinements to the model are reported monthly to the Board of Managing Directors of DZ BANK.

An enhanced review of the model (appropriateness test) is carried out at least once a year. It includes a comprehensive analysis of time series, parameterization, stress test scenarios, processes, and a review of the time period for calculating the stressed value-at-risk. As part of the annual appropriateness test, statistical tests are carried out on the predictive quality of the value-at-risk model and procedural aspects are taken into account, such as delivery times and the quality of the value-at-risk figure.

Market risk model validation consists of five key components: daily risk analysis, daily backtesting, monthly validation, risk self-assessment, and the annual appropriateness test.

Validation governance stipulates that the results of the daily risk analysis and backtesting are used to compile a monthly validation report, with additional analysis and validation as required, and communicated to the Board of Managing Directors.

The annual appropriateness test also includes an assessment of the processes connected with the preparation of key risk indicators, analysis of the stress tests implemented, statistical tests to check the predictive quality of the risk model, and portfolio-level examination of anomalies (if they have not already been noted in the monthly reports).

The risk self-assessment is carried out once a year, or whenever required, with the aim of creating a standard, structured list of known failings in the market risk model, setting logical validation priorities, and defining and monitoring improvement measures.

Required disclosures on the use of VaR models and sVaR models
(ARTICLE 455 SENTENCE 1 LETTERS A (I), (III), (IV) AND B CRR)

Within the DZ BANK banking group, only DZ BANK has a **market risk model** that has been approved by the supervisory authority. The other entities use the **Standardized Approach**.

Portfolio and market data is updated each trading day. Risk is measured using a historical simulation for a 250-day, equally weighted review period. In the context of risk measurement, financial instruments are mostly remeasured in full.

The **VaR model** used for regulatory purposes is also used for internal management, largely using the same methods and processes. The only differences in the VaR model used for internal management are as follows:

- The holding period used is shorter (1 day, 99 percent quantile).
- All asset classes are taken into account, including in the banking book.
- Separate equity event risk is ignored.
- Differences may arise in relation to add-ons or buffers for risks that are not contained in the model.

Risk factor changes are directly derived from 10-day changes observed in the past.

An integrated view of the general and specific risk factors is taken in the historical scenarios.
Risk factors are generally varied on a relative basis unless it is acceptable to assume negative values. That is why all interest-rate and spread risk factors, in particular, are varied on an absolute basis.

The **sVaR model** uses the same methods and processes as the VaR model. Only the historical market data from the stress period is fed into the sVaR model. The stress period chosen was August 25, 2008 to August 7, 2009 because, in the entire historical period since October 2007, this gives the biggest value for the 99 percent quantile for DZ BANK's current portfolio. The stress period is reviewed in the first quarter of each year using a complete historical simulation from October 2007 to the review date in question.

Required disclosures on the use of an IRC model for determining the capital requirement
(ARTICLE 455 SENTENCE 1 LETTER A (II) (III), AND (IV) CRR)

To determine the additional default and migration risk (IRC), a portfolio model is used in which credit rating changes are determined depending on systematic risk factors and using credit rating transition matrices. The credit rating transition matrices, the factor weightings, and the correlations between the systematic risk factors are derived from detailed data supplied by the major rating agencies on migrations and defaults and using established procedures. A constant risk position up to the prediction horizon of one year is assumed, i.e. no individual liquidity horizon is required. The modeling covers DZ BANK's entire trading book, although securitizations and the CTP are explicitly excluded. The risk measure is the gain and loss distribution of the value-at-risk generated by the model with a confidence level of 99.9 percent.

An extensive program of stress testing is regularly conducted for the model. The stress tests include, but are not limited to, analysis of concentration risk, the correlation parameters, and credit rating transition matrices as well as macroeconomic scenarios and their impact on additional default and migration risk.

An annual appropriateness test is conducted on the model for determining the additional default and migration risk. The main aspects covered by this test are as follows:

– Adequacy of the model design and numerical procedures used
– Influence of single borrower concentrations and systematic risk concentrations
– Appropriateness of the correlation assumptions, the credit rating transition matrices, the LGD rates, and the modeling of recovery risk
– Analysis of the stress tests implemented
– Quality of the processes relating to risk reporting
– Appropriateness of the model documentation and compliance with the regulatory requirements.

Required disclosures on the use of internal models for correlation activities for determining the capital requirement
(ARTICLE 455 SENTENCE 1 LETTER A (II) CRR)

The DZ BANK banking group does not use internal models for correlation activities for determining the capital requirement.

8.4.2 Quantitative information on the internal market risk model

(ARTICLE 455 SENTENCE 1 LETTER E CRR)

The capital requirement for market risk at DZ BANK is determined using the internal market risk model described in section 8.3.1. This is based on a historical simulation with a holding period of 10 trading days and an observation period of one year; the following risk factor classes are examined for all subportfolios of DZ BANK: interest rates, spreads, equities, foreign currencies, and commodities.

Fig. 82 shows the components of the capital requirement under the internal models approach for market risk.

As at the reporting date, the proportion of market risk-weighted assets covered by the internal model was 74.51 percent (June 30, 2018: 76.47 percent). The change in the RWAs compared with June 30, 2018 was €1,325 million. There was an increase in the average of the daily VaR and the daily stressed VaR (sVaR) on each of the preceding 60 business days, with the latter playing the biggest part in this rise.

FIG. 82 – EU MR2-A – MARKET RISK UNDER THE INTERNAL MODELS APPROACH (IMA)

		Dec. 31, 2018		Jun. 30, 2018	
		a	b	a	b
€ million		RWAs	Capital requirements	RWAs	Capital requirements
1	**VaR (higher of values 1a) and 1b))**	**1,009**	**81**	745	60
(a)	Previous day's VaR (article 365 (1) CRR (VaR t-1))		20		19
(b)	Average of the daily VaR (article 365 (1) CRR) on each of the preceding 60 business days (VaRavg) x multiplication factor (mc) in accordance with article 366 CRR		81		60
2	**sVaR (higher of values 2a) and 2b))**	**4,809**	**385**	3,516	281
(a)	Latest SVaR (article 365 (2) CRR (sVaR t-1))		128		95
(b)	Average of the daily sVaR (article 365 (2) CRR) on each of the preceding 60 business days (sVaRavg) x multiplication factor (ms) in accordance with article 366 CRR		385		281
3	**IRC (higher of values a) and b))**	**966**	**77**	1,197	96
(a)	Most recent IRC value (additional default and migration risks calculated in accordance with articles 370 and 371 CRR)		71		96
(b)	Average of the IRC number over the preceding 12 weeks		77		74
4	**Internal model for correlation trading activities (higher of values a), b), and c))**	**-**	**-**	-	-
(a)	Most recent risk number for the correlation trading portfolio (article 377 CRR)		-		-
(b)	Average of the risk number for the correlation trading portfolio over the preceding 12 weeks		-		-
(c)	8% of the capital requirements in the Standardized		-		-

	Approach on the most recent risk number for the correlation trading portfolio (article 338 (4) CRR)				
5	**Other**	-	-	-	-
6	**Total**	6,783	543	5,458	437

Fig. 83 is a flow statement designed to explain variations in the RWAs for market risk, which are based on internal models (e.g. VaR, sVaR) and have to be determined in accordance with Part 3 Title IV Chapter 5 CRR (IMA).

The increase in the RWAs (column f) of €677 million (column f, row 2) compared with September 30, 2018 was largely due to the change in the sVaR (column b) during the period under review. The sVaR rose sharply, particularly in November, and remained at this heightened level until the end of 2018. This increase was predominantly due to changes to the exposures.

FIG. 83 – EU MR2-B – RWA FLOW STATEMENTS OF MARKET RISK EXPOSURES UNDER THE IMA

		a	b	c	d	e	f	g
€ million		VaR	sVaR	IRC	Internal model for correlation trading activities	Other	Total risk-weighted assets (RWAs)	Total capital requirements
1	**Total RWAs as at the end of the previous quarter**	**844**	**3,999**	**968**	**-**	**-**	**5,811**	**465**
1(a)	Regulatory adjustment	-657	-3,117	-	-	-	-3,774	-302
1(b)	RWAs as at the end of the previous quarter (end of the day)	188	882	968	-	-	2,038	163
2	**Movement in risk levels**	**66**	**693**	**-82**	**-**	**-**	**677**	**54**
3	Model updates/changes	-	-	-	-	-	-	-
4	Methodology and policy	-	-	-	-	-	-	-
5	**Acquisitions and disposals**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
6	Foreign exchange movements	-1	23	-	-	-	22	2
7	Other	-	-	-	-	-	-	-
8(a)	RWAs as at the end of the reporting period (end of the day)	253	1,598	886	-	-	2,737	219
8(b)	Regulatory adjustment	755	3,211	80	-	-	4,046	324
8	**Total RWAs as at the end of the reporting period**	**1,009**	**4,809**	**966**	**-**	**-**	**6,783**	**543**

Further quantitative disclosures
(ARTICLE 455 SENTENCE 1 LETTERS D, G, AND F CRR)

The value-at-risk for portfolios in the trading book, for which the capital requirement is determined using the internal modeling approach in accordance with section 363 et seq. CRR, and the potential stressed value-at-risk are disclosed in Fig. 84. It therefore shows the change in the market risk figures for the trading book portfolios.

This table also shows the extent of the additional default and migration risk measured in relation to the total trading book and in relation to the relevant subportfolios as specified in articles 372 to 376 CRR. As was the case as at June 30, 2018, this calculation is based on the assumption of a constant exposure over a risk horizon of one year. This disclosure is pursuant to article 455 sentence 1 letter f CRR.

FIG. 84 – EU MR3 – IMA VALUES FOR TRADING PORTFOLIOS

		Dec. 31, 2018	Jun. 30, 2018
€ million		a	a
VaR (10 days, 99%)			
1	Maximum value	25	15
2	Average value	11	9
3	Minimum value	5	5
4	Period end	17	13
sVaR (10 days, 99%)			
1	Maximum value	121	102
2	Average value	68	65
3	Minimum value	38	38
4	Period end	117	67
IRC (99%)			
1	Maximum value	96	96
2	Average value	77	77
3	Minimum value	61	61
4	Period end	71	95
Internal model for correlation trading activities			
1	Maximum value	-	-
2	Average value	-	-
3	Minimum value	-	-
4	Period end	-	-

The value-at-risk (10 days, 99 percent) increased from €13 million to €17 million over the second half of the year. This rise was mainly caused by new relevant scenarios within the historical simulation in November 2018. The stressed value-at-risk (10 days, 99 percent) advanced from €67 million to €117 million over the same period. The incremental risk charge (1 year, 99.9 percent) fell from €95 million to €71 million. Both of these movements were predominantly due to changes to the exposures.

In accordance with article 455 (1) letter a CRR, the VaR and sVaR are allocated to interest-rate, currency, equity, commodity, and credit spread risk as shown below.

FIG. 85 – IMA VALUES FOR EACH SUBPORTFOLIO AS AT DECEMBER 31, 2018

	Total VaR		Interest-rate VaR		Currency VaR		Equity VaR		Commodity VaR		Credit spread VaR	
€ million	Dec. 31, 2018	Jun. 30, 2018	Dec. 31, 2018	Jun. 30, 2018	Dec. 31, 2018	Jun. 30, 2018	Dec. 31, 2018	Jun. 30, 2018	Dec. 31, 2018	Jun. 30, 2018	Dec. 31, 2018	Jun. 30, 2018
VaR (10 days, 99%)												
1 Maximum value	25	15	6	6	9	8	5	4	2	1	25	25
2 Average value	11	9	4	5	6	5	2	2	1	1	13	9
3 Minimum value	5	5	2	5	3	3	1	1	0	0	2	2
4 Period end	17	13	3	4	4	7	3	2	0	1	17	22
sVaR (10 days, 99%)												
1 Maximum value	121	102	61	45	34	32	41	41	9	7	83	83
2 Average value	68	65	31	25	20	17	13	14	3	3	69	71
3 Minimum value	38	38	12	12	4	4	3	3	1	1	54	55
4 Period end	117	67	53	28	14	29	12	6	1	4	72	82

The spread VaR reported as at June 30, 2018 had been considerably higher than the total VaR. This fairly unusual situation has since disappeared again owing to the changed scenario in the historical simulation. Market risk is particularly influenced by credit spread risk. The interest-rate, currency, equity, and commodity risk categories also have an impact, but to a lesser extent. The VaR, the stressed VaR (sVaR), and the incremental risk charge (IRC) are factored into the calculation of the capital requirement. The disclosures on backtesting pursuant to article 455 sentence 1 letter g CRR are shown in Fig. 86. Fig. 87 shows the comparative figures as at June 30, 2018.

Fig. 86 – EU MR4 – COMPARISON OF VAR ESTIMATES FOR MARKET RISK IN THE TRADING BOOK AND CURRENCY RISK AND COMMODITY RISK IN THE BANKING BOOK UNDER THE INTERNAL MODELING APPROACH AND HYPOTHETICAL CHANGES IN FAIR VALUE WITH GAINS/LOSSES AT DZ BANK AS AT DECEMBER 31, 2018

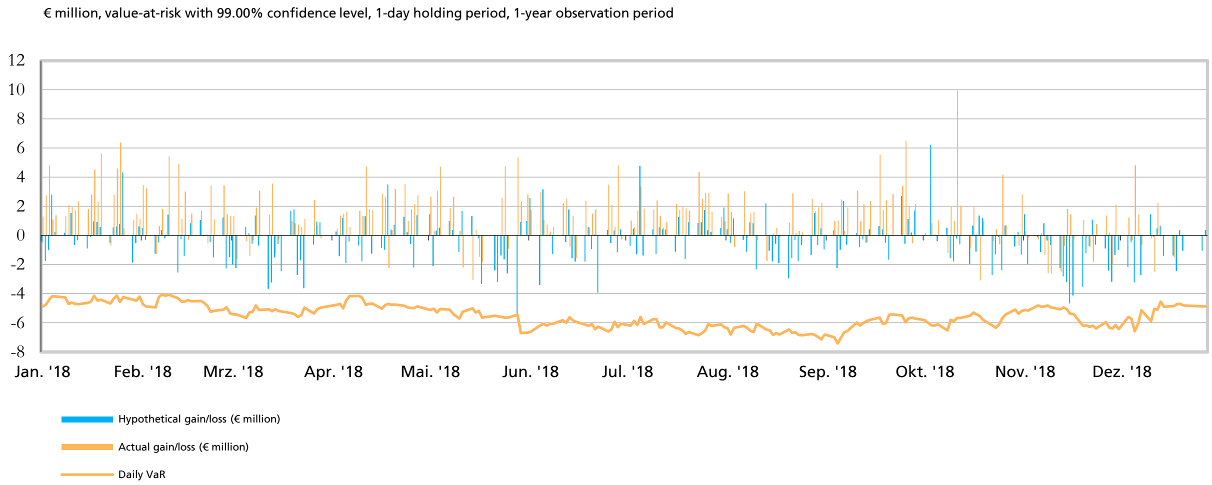
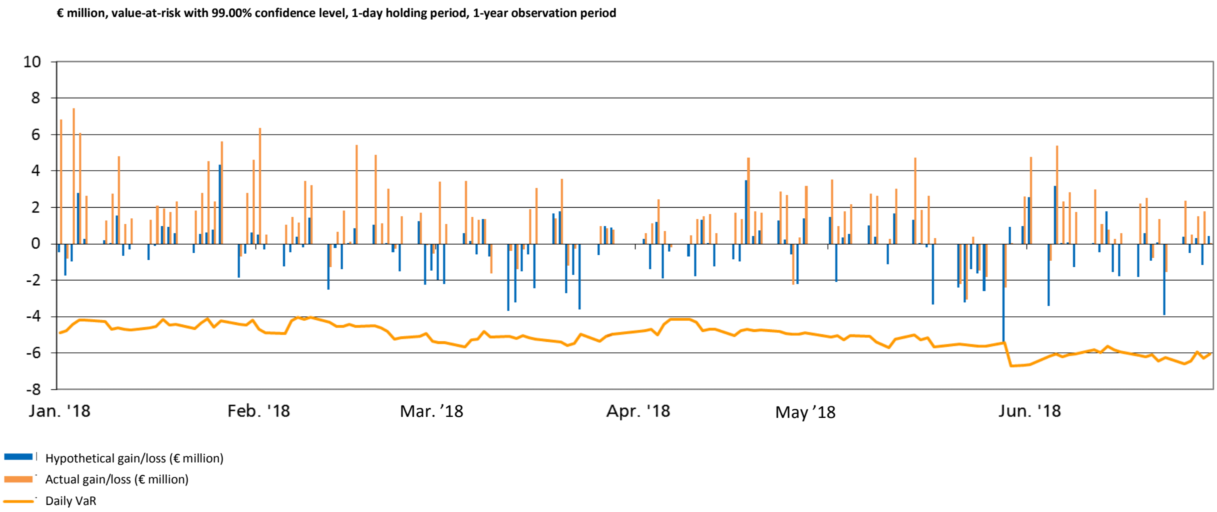


FIG. 87 – EU MR4 – COMPARISON OF VAR ESTIMATES FOR MARKET RISK IN THE TRADING BOOK AND CURRENCY RISK AND COMMODITY RISK IN THE BANKING BOOK UNDER THE INTERNAL MODELING APPROACH AND HYPOTHETICAL CHANGES IN FAIR VALUE WITH GAINS/LOSSES AT DZ BANK AS AT JUNE 30, 2018



The hypothetical and actual changes in fair value, in which all reserves are also included, did not exceed the forecast risk value at any time.

8.5 Interest-rate risk on exposures not included in the trading book

(ARTICLE 448 SENTENCE 1 LETTERS A AND B CRR, BAFIN CIRCULAR 11/2011)

At DZ BANK, interest-rate risk in the banking book mainly arises in the cover pool, from loans eligible as cover assets, from funding and money market business, from unsecured issuance activity, the unsecured funding business, the lending business, in the liquidity pool, in the investment book, from the ABS exposures, and from the management of the Tier 1 and Tier 2 capital of DZ BANK and the banking group.

DZ BANK does not use any approaches for modeling customer behavior – particularly assumptions about early repayment of loans and behavior relating to open-ended deposits – with an impact on interest-rate risk.

DZ BANK consciously takes on these risks, calculates them daily, and takes them into account in its risk-bearing capacity.

When calculating interest-rate risk, the DZ BANK banking group distinguishes between trading portfolios and non-trading portfolios. Interest-rate risk is measured as part of an integrated process. Specific information on the calculation of interest-rate exposure in the trading book and banking book in conjunction with article 448 sentence 1 letter a CRR, including the type of interest-rate risk, key assumptions made, and frequency of risk measurement, is disclosed in section 10.4 (pages 132 to 135) of the opportunity and risk report.

Article 448 sentence 1 letter b CRR requires disclosure of the interest-rate exposure in the banking book. DZ BANK calculates this exposure as a value-at-risk figure at banking group level as part of its internal management of market risk.

The DZ BANK banking group's interest-rate risk in the banking book and trading book as determined using the method specified by senior management is disclosed in the opportunity and risk report (see section 10.7, pages 136 and 137).

From a regulatory perspective, the impact of interest-rate shocks on the economic value of the banking book is simulated on a quarterly basis. The supervisory authority has set the changes in interest rates to be used at plus 200 basis points (rising interest rates) and minus 200 basis points (falling interest rates), both being a parallel shift of the interest-rate curve. The new floor pursuant to the Guidelines on the management of interest-rate risk arising from non-trading book activities (EBA/GL/2018/02) dated July 19, 2018 was applied as at the reporting date. This involved setting a floor of minus 1 percent for the overnight interest rate in the minus 200 basis points scenario (parallel shift). The floor will rise by 5 basis points per year for maturities of up to 20 years. For maturities of more than 20 years, a 0 percent floor applies (previously, a general floor of 0 percent was used). If the basic interest-rate curve is already below the floor, the interest rate of the basic interest-rate curve is used in the simulation (no shift).

At the end of 2018, a potential loss of €160 million was calculated for the plus 200 basis points scenario (potential gain of €252 million at the end of 2017) and a potential gain of €202 million was calculated for the minus 200 basis points scenario (potential loss of €269 million at the end of 2017). These figures include the DZ BANK banking group's exposures. Fig. 88 below shows the changes in present values broken down by main currency.

FIG. 88 – INTEREST-RATE RISK IN THE BANKING BOOK

Interest-rate shock on trade date				
Gain and loss (€ million)	**Fall in interest rates (– 200bp)**		**Rise in interest rates (+ 200bp)**	
Currency	**Dec. 31, 2018**	Dec. 31, 2017	**Dec. 31, 2018**	Dec. 31, 2017
EUR	**160**	-301	**-110**	258
USD	**64**	53	**-54**	-41
GBP	**-42**	-42	**28**	60
CHF	**18**	19	**-29**	-24
Other	**1**	2	**5**	-1
Total	**202**	**-269**	**-160**	**252**

Some of the entities in the DZ BANK banking group use behavior-based models to measure interest-rate risk. They help to accurately reflect the optionalities in traditional lending business and in home savings deposits business. Examples of these include options for drawing down loans or credit lines, termination options, and special repayment options and other options. Behavior-based models are mainly used in the BSH and TeamBank management units. Contractual and statutory termination rights are generally taken into account in the modeling of loans. A holding period of one day is assumed for open-ended deposits in DZ BANK's market risk model, while BSH uses behavior-based modeling in the context of collective simulation for home savings deposits.

9 Operational risk

(ARTICLE 435 (1) AND ARTICLE 446 CRR)

Operational risk is defined in section 3.1, fig. 7 and fig. 8 (pages 72 to 74) of the opportunity and risk report.

The principles for the management of operational risk and the strategies and processes in respect of operational risk management (article 435 (1) CRR) are presented in section 14.2 (page 141) of the opportunity and risk report. Information on the structure and organization of the risk management function is provided in section 14.3 (page 142), while the scope and nature of the risk measurement systems are described in sections 14.3, 14.4.1, and 14.4.3 (pages 142 and 143) of the opportunity and risk report. Sections 14.4.3 and 14.4.4 (page 143) of the opportunity and risk report outline the strategies for hedging and mitigating operational risk as well as details of the strategies and processes for monitoring the ongoing effectiveness of the measures taken to hedge operational risk.

For the purposes of determining regulatory capital requirements, the potential loss arising from operational risk was primarily estimated at DZ BANK using the Standardized Approach in accordance with article 317 CRR. As at December 31, 2018, the banking group's capital requirements for operational risk amounted to €850 million (September 30, 2018: €850 million).

Due to its definition, the 'gross income' indicator used in this approach enables only very limited risk-sensitive management of operational risk. By contrast, the operational-risk instruments 'internal and external loss data' and 'scenario-based risk self-assessments' used in the economic capital model show historical and future components of operational risk and, in conjunction with a risk-sensitive capital allocation, enable the economic measurement and management of operational risk.

In respect of the economic capital requirements, a statistical model is used for the management units that satisfies the criteria for an Advanced Measurement Approach (AMA). The results from this portfolio model, combined with the materiality limits for collation of loss data, scenario-based risk self-assessments, and risk indicators, are used to manage operational risk.

10 Reputational risk

(ARTICLE 435 (1) CRR)

Reputational risk is defined in section 3.1, fig. 7 (page 72) of the opportunity and risk report.

The principles for the management of reputational risk and the strategies and processes in respect of reputational risk management (article 435 (1) CRR) are presented in sections 13.2 and 13.4 (page 141) of the opportunity and risk report. The structure and organization of the reputational risk management function are described in section 13.2 (page 141) of the opportunity and risk report. Details of the scope and nature of the reputational risk measurement systems, the strategies for hedging and mitigating reputational risk, and the monitoring thereof can be found in section 13.3 (page 141) of the opportunity and risk report.

11 Risk on long-term equity investments not included in the trading book

11.1 Management of risks attaching to long-term equity investments

(ARTICLE 435 (1) CRR)

The objectives and principles and the strategies and methods underlying the management of risks attaching to long-term equity investments held in the banking book are described in section 9 (pages 129 to 130) of the opportunity and risk report. In section 9.1 (page 129) of the opportunity and risk report, equity investment risk is defined as the risk of losses arising from negative changes in the fair value of the portion of the long-term equity investments portfolio for which the risks are not included in other types of risk.

Equity investment risk arises primarily at DZ BANK, BSH, and DVB.

11.2 Accounting policies applied to long-term equity investments

(ARTICLE 447 (1) LETTER A CRR)

The long-term equity investments and investments in affiliated companies that fall within the scope of IFRS 9 and are deemed to be equity instruments pursuant to IAS 32 are recognized at fair value.

In this context, the general but irrevocable option set out in IFRS 9.5.7.5 is exercised, which means that fluctuations in fair value and impairment are recognized in other comprehensive income in the FVOCI reserve. Long-term equity investments and investments in affiliated companies that are deemed to be debt instruments pursuant to IFRS 32 are recognized and measured at fair value through profit or loss.

The fair value of investments is measured at the end of each month. The relevant closing share price at the reporting date is used to measure the fair value of publicly traded long-term equity investments.

Investments in associates and joint ventures that are accounted for using the equity method are initially recognized at cost and subsequently measured in accordance with the rules of IAS 28.

The enterprise value of long-term equity investments that are not publicly traded is determined by discounting their future financial surpluses as at the measurement date. The figure used to determine the discount rate is the return on a risk-free capital market investment. A risk premium is added to this base interest rate to reflect the greater uncertainty about the level of future financial surpluses associated with an investment in shares of the company being measured compared with an investment in a risk-free interest-bearing security. The relevant beta factor (multiplier that expresses company-specific and industry-specific risk in relation to general market risk) is individually determined using an appropriate benchmarking method based on listed peer companies.

The enterprise values of companies at which a transaction has recently taken place are validated on the basis of the transaction price. If, rather than pursuing any (direct) financial objectives, the company in question focuses on providing services or promoting the public good (for example in the case of guarantee banks), the net asset value of this company as a going concern should be calculated instead. Alternatively, the value of the pro-rata equity available can be used. Real-estate finance companies are subjected to a property-related measurement.

11.3 Long-term equity investment exposures held in the banking book

(ARTICLE 447 SENTENCE 1 LETTERS B TO E CRR)

The equity investment risk of exposures disclosed in Fig. 89 distinguishes the carrying amounts under commercial law from the current market value of these exposures. The recognition of unrealized gains and losses on long-term equity investments in the DZ BANK banking group's own funds is shown in Fig. 90.

The regulatory report on investments held in the banking book covers conventional investments as well as securities, derivatives on investment exposures, and investment funds. The DZ BANK banking group recognizes the investment funds held in its banking book using the transparency method and breaks them down into the primary exposure classes of the individual investment fund units. These exposures are therefore included in the Standardized Approach to credit risk and IRBA tables rather than the equity investment risk tables. The equity exposures in the investment funds are classified with a risk weight of 100 percent under the

Standardized Approach to credit risk (see Fig. 43; under the IRB approach, they fall into the long-term equity investments exposure class (see Fig. 50 and Fig. 52)).

Fig. 89 shows the long-term equity investments in the banking book that are risk-weighted (and consequently not consolidated, either in full or on a pro-rata basis) or are subject to a capital deduction. These are broken down by groups of equity exposures and various carrying amounts. The classification of investments is based on the financial nature of the equity exposure concerned. The carrying amount is the carrying amount determined in accordance with IFRS. The exposures shown as 'traded equity investments' are those that are listed on a stock exchange. The market value is defined as the cash settlement price of the investment at the reporting date.

FIG. 89 – MEASUREMENT OF EQUITY EXPOSURES

€ million	IFRS carrying amount		Fair value		Market value	
Category of equity exposure	**Dec. 31, 2018**	Dec. 31, 2017	**Dec. 31, 2018**	Dec. 31, 2017	**Dec. 31, 2018**	Dec. 31, 2017
Investments in credit institutions	91	57	84	54	-	0
of which: exchange traded		0		0	-	0
not exchange traded but part of a diversified portfolio	91	57	84	54	-	-
Other	0	0	0	0	-	-
Investments in finance companies	408	331	196	217	0	-
of which: exchange traded	0	-	0	-	0	-
not exchange traded but part of a diversified portfolio	408	61	196	34	-	-
Other	0	270	0	183		
Investments in insurance companies	5,499	5,662	3,033	3,033	-	-
of which: exchange traded		-		-	-	-
not exchange traded but part of a diversified portfolio	5,495	5,658	3,029	3,029	-	-
Other	4	4	4	4	-	-
Investment funds held as investments in banking book	8	8	8	8	-	-
of which: exchange traded		-		-	-	-
not exchange traded but part of a diversified portfolio	7	7	7	7	-	-
Other	0	0	0	0	-	-
Investments in corporates	160	101	142	87	0	-
of which: exchange traded	0	-	0	-	0	-
not exchange traded but part of a diversified portfolio	132	51	123	36	-	-
Other	20	51	20	51	-	-
Total	**6,166**	6,159	**3,463**	3,398	**0**	0

Fig. 90 shows the realized and unrealized gains and losses arising from the long-term equity investments held in the banking book in accordance with IFRS. The table only includes equity investments that are risk-weighted and, consequently, are not fully or proportionately consolidated or are subject to a capital deduction. The capital requirement related to equity exposures is included in Fig. 22. Consequently, no separate disclosure is provided.

FIG. 90 – REALIZED AND UNREALIZED GAINS AND LOSSES ON EQUITY EXPOSURES IN ACCORDANCE WITH IFRS

		Unrealized gains and losses on equity exposures	
€ million	Realized gains and losses on disposals	Total	of which: amounts recognized in Tier 1 capital
Dec. 31, 2018	**154**	**2,703**	**-**
Dec. 31, 2017	48[1]	2,761[1]	-

1 Prior-year value restated.

12 Macroprudential regulatory measures

12.1 Countercyclical capital buffer

(ARTICLE 440 CRR)

In accordance with Delegated Regulation (EU) No. 2015/1555, information about compliance with the prescribed countercyclical capital buffer has had to be disclosed since December 31, 2016.

BaFin specifies the capital buffer rate for Germany, taking account of any recommendations made by the Ausschuss für Finanzstabilität [Financial Stability Committee]. BaFin did not consider it necessary to increase Germany's countercyclical capital buffer rate for 2018, which therefore remained unchanged year on year at 0 percent.

The institution-specific countercyclical capital buffer provides an additional capital buffer consisting of common equity Tier 1 capital that is used to contain excessive growth in lending. It can be drawn on in times of crisis and is designed to stop banks limiting their lending too much. Since March 31, 2016, the capital buffer has had to be determined at the end of each quarter for each banking group individually. In accordance with section 10d (2) KWG, the banking-group-specific buffer rate is the weighted average of the ratios for the countercyclical capital buffers that apply in the following regions: Germany, other countries in the European Economic Area (EEA), and in non-EEA countries as well as European and non-European countries, territories, and legal jurisdictions belonging to them in which the banking group's significant exposures defined in accordance with section 36 SolvV are located. Fig. 92 shows the geographical distribution of the relevant credit risk exposures.

Fig. 91 shows the level of the banking-group-specific countercyclical capital buffer and the requirement under the transitional guidance.

For the calculation of the institution-specific countercyclical capital buffer as at December 31, 2018, a country-specific buffer rate of more than 0 percent was stipulated for the following eight countries by their supervisory authority:

- Hong Kong: 2.50 percent
- Norway: 2.00 percent
- Sweden: 2.00 percent
- Czech Republic: 1.00 percent
- Iceland: 1.25 percent
- Slovakia: 1.25 percent
- United Kingdom: 1.00 percent
- Lithuania: 0.50 percent.

The calculation for all other countries was based on a country-specific buffer rate of 0 percent. As at December 31, 2018, the institution-specific buffer rate, taking account of the applicable transitional provision pursuant to section 64r KWG, amounted to 0.045 percent (December 31, 2017: 0.021 percent taking account of the transitional provision). The capital requirement for the countercyclical capital buffer, calculated as the product of the institution-specific buffer rate and the total relevant exposures, came to approximately €60 million (December 31, 2017: approximately €27 million).

FIG. 91 – LEVEL OF THE INSTITUTION-SPECIFIC COUNTERCYCLICAL BUFFER

Amount of the institution-specific countercyclical capital buffer

€ million		**Dec. 31, 2018**	Dec. 31, 2017
10	Total exposure	132,152	131,567
020	Institution-specific countercyclical capital buffer rate (as a percentage of total exposure)	0.045	0.021
030	Institution-specific countercyclical capital buffer requirement	60	27

FIG. 92 – GEOGRAPHICAL DISTRIBUTION OF THE CREDIT EXPOSURES RELEVANT TO THE CALCULATION OF THE COUNTERCYCLICAL CAPITAL BUFFER

In column 120 of this table, the dash ' - ' means either 'no figure available' or 'capital buffer rate of 0 percent'.

	General credit risk exposures		General credit risk exposures		Securitization exposures		Capital requirements						
	Exposure (CRSA)	Exposure (IRB)	Total long and short positions in the trading book	Value of the exposure in the trading book (internal models)	Exposure (CRSA)	Exposure (IRB)	of which: general credit risk exposures	of which: exposures in the trading book	of which: securitization exposures	Total	Weighting of capital requirements	Rate of the countercyclical capital buffer as at Dec. 31, 2018 (%)	Rate of the countercyclical capital buffer as at Dec. 31, 2017 (%)
€ million	010	020	030	040	050	060	070	080	090	100	110	120	120
010 Breakdown by country													
Germany	11,074	61,606	37	284	345	1,935	3,901	29	81	4,118	0	-	-
Egypt	0	13	-	-	-	-	0	-	-	0	0.00	-	-
Ethiopia	1	36	-	-	-	-	0	-	-	0	0.00	-	-
Albania	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Andorra	0	0	-	-	-	-	0	-	-	0	0.00	-	-
Angola	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Argentina	7	-	-	-	-	-	0	-	-	0	0.00	-	-
Azerbaijan	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Australia	31	620	-	-	20	-	24	-	0	25	0.00	-	-
Bahamas	0	95	-	-	-	-	1	-	-	1	0.00	-	-
Bahrain	2	33	-	-	-	-	1	-	-	1	0.00	-	-
Bangladesh	3	-	-	-	-	-	0	-	-	0	0.00	-	-
Belgium	111	242	-	-	-	-	12	-	-	12	0.00	-	-
Bermuda	0	718	-	-	-	-	4	-	-	4	0.00	-	-
Bolivia	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Botswana	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Brazil	4	94	-	-	-	-	7	-	-	7	0.00	-	-
British Virgin Islands	4	238	-	-	-	-	1	-	-	1	0.00	-	-
Bulgaria	0	7	-	-	-	-	1	-	-	1	0.00	-	-
Burkina Faso	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Burundi	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Cayman Islands	33	806	-	-	1	5	8	-	-	8	0.00	-	-
Chile	59	73	-	-	-	-	5	-	-	5	0.00	-	-
China	60	360	-	-	-	-	4	-	-	4	0.00	-	-
Costa Rica	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Denmark	47	289	-	-	-	-	16	-	-	16	0.00	-	-
Dominican Republic	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Ecuador	-	-	-	-	-	-	0	-	-	0	0.00	-	-
Côte d'Ivoire	0	-	-	-	-	-	0	-	-	0	0.00	-	-
El Salvador	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Eritrea	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Estonia	2	-	-	-	-	-	0	-	-	0	0.00	-	-
Faroe Islands	0	10	-	-	-	-	0	-	-	0	-	-	-
Finland	65	64	-	-	43	-	7	-	1	8	0.00	-	-
France	255	1,192	6	-	87	37	47	0	2	50	0.01	-	-
Gabon	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Georgia	-	-	-	-	-	-	-	-	-	0	0.00	-	-
Ghana	0	7	-	-	-	-	1	-	-	1	0.00	-	-
Gibraltar	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Greece	4	89	-	-	-	-	0	-	-	0	0.00	-	-
United Kingdom	443	1,625	121	-	397	102	64	2	15	81	0.01	0.01	-
Guatemala	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Guernsey	12	39	-	-	-	-	2	-	-	2	0.00	-	-
Honduras	0	-	-	-	-	-	0	-	-	0	0.00	-	-

	General credit risk exposures		General credit risk exposures		Securitization exposures		Capital requirements						
	Exposure (CRSA)	Exposure (IRB)	Total long and short positions in the trading book	Value of the exposure in the trading book (internal models)	Exposure (CRSA)	Exposure (IRB)	of which: general credit risk exposures	of which: exposures in the trading book	of which: securitization exposures	Total	Weighting of capital requirements	Rate of the countercyclical capital buffer as at Dec. 31, 2018 (%)	Rate of the countercyclical capital buffer as at Dec. 31, 2017 (%)
€ million	010	020	030	040	050	060	070	080	090	100	110	120	120
Hong Kong	40	458	-	-	-	-	11	0	-	11	0.00	-	0.025
India	56	537	-	-	-	-	8	-	-	8	0.00	-	-
Indonesia	99	21	-	-	-	-	2	-	-	2	0.00	-	-
Iraq	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Iran	0	3	-	-	-	-	0	-	-	0	0.00	-	-
Ireland	123	1,770	129	-	7	16	31	2	0	34	0.01	-	-
Iceland	-	-	-	2	-	-	-	0	-	0	0.00	0.0125	0.0125
Isle of Man	0	200	-	-	-	-	1	-	-	1	0.00	-	-
Israel	1	80	-	-	-	-	2	-	-	2	0.00	-	-
Italy	76	144	8	-	53	8	14	0	2	16	0.00	-	-
Jamaica	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Japan	22	579	-	-	-	-	4	-	-	4	0.00	-	-
Jersey	6	165	-	-	-	-	5	-	-	5	0.01	-	-
Jordan	0	51	-	-	-	-	1	-	-	1	0.00	-	-
Cameroon	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Canada	160	498	-	-	-	-	18	-	-	18	0.00	-	-
Kazakhstan	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Qatar	14	100	-	-	-	-	6	-	-	6	0.00	-	-
Kenya	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Colombia	1	-	-	-	-	-	0	-	-	0	0.00	-	-
Croatia	0	0	-	-	-	-	0	-	-	0	0.00	-	-
Cuba	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Kuwait	-	37	-	-	-	-	0	-	-	0	0.00	-	-
Latvia	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Lebanon	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Liberia	0	1,496	-	-	-	-	9	-	-	9	0.00	-	-
Liechtenstein	21	7	-	-	-	-	2	-	-	2	0.00	-	-
Luxembourg	1,079	3,505	104	-	-	-	184	6	-	190	0.03	-	-
Malaysia	2	30	-	-	-	-	0	-	-	0	0.00	-	-
Malta	1	465	-	-	-	-	7	-	-	7	0.00	-	-
Morocco	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Marshall Islands	29	2,880	-	-	-	-	13	-	-	13	0.00	-	-
Mauritius	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Macedonia	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Mexico	18	87	-	-	-	-	6	-	-	6	0.00	-	-
Mongolia	0	0	-	-	-	-	0	-	-	0	0.00	-	-
Myanmar	-	4	-	-	-	-	0	-	-	0	0.00	-	-
Namibia	1	-	-	-	-	-	0	-	-	0	0.00	-	-
New Zealand	51	26	-	-	-	-	2	-	-	2	0.00	-	-
Netherlands	797	1,832	128	-	306	153	132	2	9	143	0.02	-	-
Netherlands Antilles	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Niger	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Nigeria	0	32	-	-	-	-	4	-	-	4	0.00	-	-
Norway	19	1,085	-	1	-	-	15	0	-	15	0.00	0.020	0.020
Oman	0	26	-	-	-	-	2	-	-	2	0.00	-	-
Austria	138	760	2	-	-	-	34	-	0	34	0.01	-	-
Pakistan	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Panama	24	390	-	-	-	-	3	-	-	3	0.00	-	-
Paraguay	8	-	-	-	-	-	0	-	-	0	0.00	-	-
Peru	1	21	-	-	-	-	1	-	-	1	0.00	-	-

	General credit risk exposures		General credit risk exposures		Securitization exposures		Capital requirements						
	Exposure (CRSA)	Exposure (IRB)	Total long and short positions in the trading book	Value of the exposure in the trading book (internal models)	Exposure (CRSA)	Exposure (IRB)	of which: general credit risk exposures	of which: exposures in the trading book	of which: securitization exposures	Total	Weighting of capital requirements	Rate of the countercyclical capital buffer as at Dec. 31, 2018 (%)	Rate of the countercyclical capital buffer as at Dec. 31, 2017 (%)
€ million	010	020	030	040	050	060	070	080	090	100	110	120	120
Philippines	0	97	-	-	-	-	1	-	-	1	0.00	-	-
Poland	9	252	-	-	-	-	24	-	-	24	0.00	-	-
Portugal	69	40	-	-	94	-	7	-	4	12	0.00	-	-
Romania	50	-	-	-	-	-	4	-	-	4	0.00	-	-
Russia	1	225	-	-	-	-	1	-	-	1	0.00	-	-
Zambia	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Saudi Arabia	2	92	-	-	-	-	4	-	-	4	0.00	-	-
Sweden	16	368	-	7	-	-	11	1	-	12	0.00	-	0.020
Switzerland	143	879	-	-	-	18	42	-	-	42	0.01	-	-
Senegal	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Singapore	26	1,255	-	-	-	-	25	-	-	25	0.00	-	-
Slovenia	0	2	-	-	-	-	0	-	-	0	0.00	-	-
Slovakia	-	-	-	-	-	-	-	-	-	-	0.00	0.005	0.012
Spain	160	218	2	-	510	-	14	0	13	28	0.00	-	-
Sri Lanka	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Saint Lucia	-	-	-	-	-	-	-	-	-	-	0.00	-	-
South Africa	1	-	-	-	-	-	0	-	-	0	0.00	-	-
South Korea	7	133	-	-	-	-	1	-	-	1	0.00	-	-
Tajikistan	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Taiwan	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Thailand	1	56	-	-	-	-	1	-	-	1	0.00	-	-
Togo	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Czech Republic	2	32	-	1,636	-	-	1	131	-	132	0.02	0.010	0.005
Tunisia	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Turkey	69	390	-	-	-	-	5	-	-	5	0.00	-	-
Trinidad and Tobago	-	-	-	-	-	-	-	-	-	-	0.00	-	-
Ukraine	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Hungary	0	47	-	-	-	-	4	-	-	4	0.00	-	-
Uruguay	0	-	-	-	-	-	0	-	-	0	0.00	-	-
USA	463	4,224	-	-	375	1,607	142	-	74	215	0.04	-	-
Venezuela	0	-	-	-	-	-	0	-	-	0	0.00	-	-
United Arab Emirates	10	108	-	-	-	-	5	-	-	5	0.00	-	-
Vietnam	66	131	-	-	-	-	3	-	-	3	0.00	-	-
Belarus	0	-	-	-	-	-	0	-	-	0	0.00	-	-
Cyprus	18	94	-	-	-	-	3	-	-	3	0.00	-	-
Other countries	1,320	7,306	-	-	-	-	421	-	-	421	0.00	-	-
020 Total	**17,440**	**101,489**	**536**	**1,930**	**2,238**	**3,881**	**5,343**	**173**	**203**	**5,828**	**1.00**	**0.0650**	**0.0875**

12.2 Indicators of global systemic importance

(ARTICLE 441 CRR)

The DZ BANK banking group's total exposure measure within the meaning of article 429 (4) CRR exceeds €200.0 billion. In accordance with section 10f (4) KWG, DZ BANK is therefore obliged to conduct a quantitative analysis each year of the indicators for determining global systemic importance on the basis of the technical standard EBA/ITS/2016/01 and to disclose the resulting values.

In a notice dated December 11, 2017, BaFin confirmed following its annual review pursuant to section 10g (2) KWG that DZ BANK continues to be classified as an 'other systemically important institution' (O-SII). Fig. 93 below shows the key figures for determining global systemic importance. They are disclosed on DZ BANK's website in the Investor Relations section under Reports/Reports 2018.

FIG. 93 – KEY FIGURES FOR GLOBAL SYSTEMIC IMPORTANCE

Indicator	**Key figure**
Size	Total exposure
Interconnectedness	Intra-financial system assets
	Intra-financial system liabilities
	Securities outstanding
Substitutability/financial institution infrastructure	Payments activity (financial year)
	Assets under custody
	Underwritten transactions (financial year)
Complexity	Notional amount of OTC derivatives
	Trading and available-for-sale securities
	Level 3 assets
Cross-jurisdictional activity	Cross-jurisdictional claims
	Cross-jurisdictional liabilities

13 Leverage ratio

13.1 Leverage pursuant to the CRR framework

(ARTICLE 451 (1) LETTERS A, B, C, D, AND E CRR)

The **leverage ratio** is the ratio of the banking group's Tier 1 capital to its total exposure – comprising on-balance-sheet and off-balance-sheet asset items (including derivatives) – and thus represents a risk-neutral capital ratio. In contrast to risk-based capital requirements, the individual exposures are not given a credit-rating-related risk weight but are generally included in the total exposure without being weighted. A low leverage ratio therefore indicates a high level of debt in relation to Tier 1 capital. The purpose of the leverage ratio is to prevent the build-up of unsustainable leverage in the banking industry.

Disclosure of the leverage ratio is based on the provisions of Implementing Regulation (EU) No. 2016/200 dated February 15, 2016 and is carried out at consolidated level. In accordance with article 499 (1) letter b CRR, the capital measure is based on Tier 1 capital. The total exposure measure is calculated in accordance with article 429 et seq. CRR (as amended by Delegated Regulation (EU) No. 2015/62, which came into force on January 17, 2015).

The DZ BANK banking group's leverage ratio pursuant to the CRR transitional guidance was 4.49 percent as at December 31, 2018 (June 30, 2018: 4.40 percent). Applying the CRR in full, the ratio was 4.27 percent (June 30, 2018: 4.18 percent).

Fig. 94 sets out the components and level of the leverage ratio, both applying the CRR transitional guidance (phase-in) and applying the CRR in full.

FIG. 94 – LEVERAGE RATIO ACCORDING TO THE CRR TRANSITIONAL GUIDANCE AND AFTER FULL APPLICATION OF THE CRR

	Leverage ratio according to CRR transitional guidance		Leverage ratio after full application of the CRR	
	Dec. 31, 2018	Jun. 30, 2018	**Dec. 31, 2018**	Jun. 30, 2018
Regulatory Tier 1 capital (€ million)	19,852	20,266	18,866	19,280
Total exposure measure (€ million)	441,667	460,817	441,667	460,817
Leverage ratio as at the balance sheet date (%)	4.49	4.40	4.27	4.18

Fig. 95 shows the reconciliation of the total assets of the DZ BANK Group to the leverage ratio total exposure measure of the DZ BANK banking group.

FIG. 95 – LRSUM – SUMMARY RECONCILIATION OF ASSETS ON THE BALANCE SHEET TO THE LEVERAGE RATIO TOTAL EXPOSURE MEASURE

Summary reconciliation of total assets and total exposure measure

		Applicable amounts	
€ million		Dec. 31, 2018	Jun. 30, 2018
1	Total assets as per published financial statements	518,733	538,234
2	Adjustment for entities that are consolidated for accounting purposes but are outside the scope of regulatory consolidation	-93,434	-93,841
3	Adjustment for trust assets recognized on the balance sheet pursuant to the applicable accounting framework but excluded from the leverage ratio total exposure measure in accordance with article 429 (13) of Regulation (EU) No. 575/2013	-	-
4	Adjustments for derivatives	-7,165	-6,964
5	Adjustments for securities financing transactions (SFTs)	556	233
6	Adjustment for off-balance-sheet items (i.e. conversion to credit equivalent amounts of off-balance-sheet exposures)	26,464	27,832
EU-6a	Adjustment for intragroup exposures excluded from the leverage ratio total exposure measure in accordance with article 429 (7) of Regulation (EU) No. 575/2013	-	-
EU-6b	Adjustment for exposures excluded from the leverage ratio total exposure measure in accordance with article 429 (14) of Regulation (EU) No. 575/2013	-	-
7	Other adjustments	-3,488	-4,677
8	**Leverage ratio total exposure measure**	**441,667**	**460,817**

Fig. 96 shows individual components of the total exposure measure, Tier 1 capital, and the DZ BANK banking group's resulting leverage ratio as at December 31, 2018, applying the CRR transitional guidance.

FIG. 96 – LRCOM – LEVERAGE RATIO COMMON DISCLOSURE

Leverage ratio exposures

		Applicable amounts	
€ million		Dec. 31, 2018	Jun. 30, 2018
On-balance-sheet exposures (excluding derivatives and SFTs)			
1	On-balance-sheet items (excluding derivatives, SFTs, and trust assets but including collateral)	395,988	410,895
2	Asset amounts deducted in determining Tier 1 capital	-950	-792
3	Total on-balance-sheet exposures (excluding derivatives, SFTs, and trust assets) (sum of lines 1 and 2)	395,038	410,103
Derivative exposures			
4	Replacement cost associated with all derivatives transactions (i.e. net of eligible cash variation margin)	6,366	6,732
5	Add-on amounts for PFE associated with all derivatives transactions (mark-to-market method)	9,689	10,646
EU-5a	Exposure determined under Original Exposure Method	-	-
6	Gross-up for derivatives collateral provided where deducted from the balance sheet assets pursuant to the applicable accounting framework	-	-
7	Deductions of receivables assets for cash variation margin provided in derivatives transactions	-5,527	-5,413
8	Exempted CCP leg of client-cleared SFT exposure	-1,160	-1,126
9	Adjusted effective notional amount of written credit derivatives	14,808	15,478
10	Adjusted effective notional offsets and add-on deductions for written credit derivatives	-11,225	-11,350
11	Total derivatives exposures (sum of lines 4 to 10)	12,952	14,967
SFT exposures			
12	Gross SFT assets (with no recognition of netting), after adjusting for sales accounting transactions	10,241	11,810
13	Netted amounts of cash payables and cash receivables of gross SFT assets	-	-
14	Counterparty credit risk exposure for SFT assets	556	233
EU-14a	Derogation for SFTs: Counterparty credit risk exposure in accordance with articles 429b (4) and 222 of Regulation (EU) No. 575/2013	-	-
15	Agent transaction exposures	-	-
EU-15a	Exempted CCP leg of client-cleared SFT exposure	-	-
16	Total securities financing transaction exposures (sum of lines 12 to 15a)	10,797	12,043
Other off-balance-sheet exposures			
17	Off-balance-sheet exposures at gross notional amount	65,711	66,296
18	Adjustments for conversion to credit equivalent amounts	-42,830	-42,592
19	Other off-balance-sheet exposures (sum of lines 17 and 18)	22,881	23,705
EU-	Intragroup exposures (solo basis) exempted in accordance with article 429 (7) of Regulation (EU)	-	-

Leverage ratio exposures

€ million		Applicable amounts Dec. 31, 2018	Jun. 30, 2018
19a	No. 575/2013 (on and off balance sheet)		
EU-19b	Exempted exposures in accordance with article 429 (14) of Regulation (EU) No. 575/2013 (on and off balance sheet)	-	-
Capital and total exposure measure			
20	Tier 1 capital	19,852	20,266
21	Leverage ratio total exposure measure (sum of lines 3, 11, 16, 19, EU-19a, and EU-19b)	441,667	460,817
Leverage ratio			
22	Leverage ratio according to CRR transitional guidance (%)	4.49	4.40
Choice of transitional guidance and amount of derecognized trust items			
EU-23	Choice of transitional guidance for the definition of the capital measure	Transitional guidance	
EU-24	Amount of derecognized trust assets in accordance with article 429 (13) of Regulation (EU) No. 575/2013		-

Applying the CRR transitional guidance, the DZ BANK banking group's leverage ratio rose by 0.09 percentage points to 4.49 percent as at the reporting date. This was mainly because the total exposure measure decreased by €19,150 million to €441,667 million (June 30, 2018: €460,817 million), whereas Tier 1 capital went down by €441 million to €19,852 million (June 30, 2018: €20,266 million).

The decrease in the total exposure measure of the DZ BANK banking group over the course of 2018 was mainly due to the following effects. On-balance-sheet exposures – particularly in the governments and central banks exposure class – decreased in the course of normal business operations (especially at DZ BANK) and there was a reduction in securities financing transactions and in derivative transactions. Details of the main drivers of the change in Tier 1 capital can be found in section 5.2 of this report.

Fig. 97 provides an alternative breakdown by regulatory category of the exposures reported on the balance sheet.

FIG. 97 – LRSPL – BREAKDOWN OF ON-BALANCE-SHEET EXPOSURES (EXCLUDING DERIVATIVES, SFTS AND EXEMPTED EXPOSURES)

Leverage ratio exposures

		Applicable amounts	
€ million		Dec. 31, 2018	Jun. 30, 2018
EU-1	Total on-balance-sheet exposures (excluding derivatives, SFTs, and exempted exposures)	390,100	405,139
EU-2	of which: Trading book exposures	12,769	13,119
EU-3	Banking book exposures, of which:	377,331	392,020
EU-4	Covered bonds	8,292	8,103
EU-5	Exposures treated as sovereigns	100,931	121,807
EU-6	Exposures to regional governments, multilateral development banks, international organizations, and public-sector entities not treated as sovereigns	2,173	1,387
EU-7	Institutions	84,243	82,827
EU-8	Secured by mortgages on immovable property	78,371	76,245
EU-9	Retail exposures	19,584	19,400
EU-10	Corporates	64,057	62,201
EU-11	Exposures in default	2,584	2,999
EU-12	Other exposures (e.g. long-term equity investments, securitizations, and other non-credit-obligation assets)	17,096	17,050

13.2 Description of the process for monitoring the risk of excessive leverage

(ARTICLE 451 SENTENCE 1 LETTER D CRR)

In the strategic planning process, the Board of Managing Directors sets out the bank's overall strategy and the allocation of resources for the individual management units. The risk of excessive leverage is taken into consideration by reflecting the leverage ratio in the planning and management process pursuant to section 6b KWG in conjunction with article 429 CRR. This involves monitoring compliance with internally defined thresholds on a quarterly basis. Within these guidelines, the Treasury and Capital Committee operates with the aim of optimizing the overall portfolio over the course of the year. Detailed plan-versus-actual analysis is carried out for all relevant management units on the basis of the bank's internal target to determine where the actual resource situation has deviated from the original projection. This process also highlights the factors driving these deviations. The latest changes to the leverage ratio and details of its influencing factors are reported on as part of DZ BANK's internal management reporting, which is an integral element of the bank's internal planning and management process. In its management role, the Treasury and Capital Committee also identifies the action required and instigates mitigation steps or optimization measures. In this capacity, the Treasury and Capital Committee makes decisions directly, issues recommendations or, if necessary, submits proposals on specific management actions to the Board of Managing Directors for adoption of a resolution.

13.3 Other factors influencing the leverage ratio

(ARTICLE 451 SENTENCE 1 LETTER E CRR)

The balance sheet assets listed below represent a material proportion of the leverage ratio total exposure measure. It is currently expected that these exposures will no longer be included in the calculation from the second quarter of 2021 onward due to the revision of the CRR. The currently available, final draft of CRR II contains corresponding exemptions. These exposures are explained in more detail below.

Pass-through development loans

As they are passed through various institutions, development loans are weighted more than once in Germany in the context of the leverage ratio. This involvement of different institutions (including central institutions) is essential in multilevel banking systems, not only for reasons of efficiency but also to ensure that development funds are provided throughout the country. Multiple counting of one transaction – as currently happens – obviously conflicts with the government's desire to provide development support, such as for renewable energies. Both trust loans and pass-through loans merely constitute transactions that are redirected to the primary institutions of a financial network, which disburse the development loans to end customers. An exemption would change the leverage ratio as shown in Fig. 98.

FIG. 98 – CHANGE TO THE LEVERAGE RATIO IF PASS-THROUGH DEVELOPMENT LOANS ARE EXCLUDED

Leverage ratio of the DZ BANK banking group	Application of transitional guidance	Full application of CRR

%	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017
In accordance with current legislation	4.49	4.64	4.27	4.38
If pass-through development loans are excluded	5.09	5.24	4.83	4.94
Change in the leverage ratio	0.60	0.60	0.56	0.56

Exposures within the cooperative financial network

In the interest of consistency between risk-based capital requirements and the leverage ratio, exposures within the cooperative financial network that are exempt from inclusion in risk-based capital requirements pursuant to article 113 (7) CRR should also be omitted from the leverage ratio. An exception would raise the leverage ratio – both applying the transitional guidance and applying the CRR in full – as shown in Fig. 99 below.

FIG. 99 – CHANGE TO THE LEVERAGE RATIO IF CREDIT RISK EXPOSURES WITHIN THE COOPERATIVE FINANCIAL NETWORK ARE EXCLUDED

Leverage ratio of the DZ BANK banking group	Application of transitional guidance		Full application of CRR	
%	Dec. 31, 2018	Dec. 31, 2017	Dec. 31, 2018	Dec. 31, 2017
In accordance with current legislation	4.49	4.64	4.27	4.38
If exposures within the cooperative financial network are excluded	5.52	5.68	5.25	5.36
Change in the leverage ratio	1.03	1.04	0.98	0.98

The effects of the pass-through development loans and the exposures within the cooperative financial network are broadly the same, because a very high proportion of the loans and advances in the pass-through development lending business are due from the Volksbanken Raiffeisenbanken cooperative financial network. The combined effect of the two items would be identical to the amounts shown in Fig. 99.

14 Asset encumbrance

(ARTICLE 443 CRR)

According to the regulatory disclosure requirements in article 443 CRR in conjunction with Delegated Regulation (EU) No. 2017/2295 dated December 13, 2017, which is based on EBA/GL/2014/03 and replaced the requirements therein when it came into effect, information on encumbered and unencumbered assets (asset encumbrance) has to be disclosed. These disclosure requirements are defined in more detail and expanded in Delegated Regulation (EU) No. 2017/2295. The following disclosure of asset encumbrance is based on the requirements in this Delegated Regulation.

The encumbered and unencumbered assets are disclosed for the companies consolidated for regulatory purposes pursuant to article 18 CRR.

However, the disclosure of the quality of the encumbered and unencumbered assets ((E)HQLA) is based on the scope of consolidation used for liquidity purposes pursuant to article 18 (1) CRR. The differences between the scopes of consolidation are set out in section 3 of this report.

For the purposes of the DZ BANK banking group's reporting and disclosure, the carrying amounts of encumbered and unencumbered assets are calculated according to the provisions of International Financial Reporting Standards (IFRS). There are no significant differences between the calculation methods applied to the encumbered assets for the asset encumbrance reporting and to the assets presented in accordance with IFRS in the notes to the financial statements in the Annual Report that have been pledged or transferred.

Accordingly, assets that have been pledged as collateral or are the subject of any agreement to collateralize or credit enhance any on-balance-sheet or off-balance-sheet transaction must be treated as encumbered. In addition to the disclosures in the notes to the consolidated financial statements in the Annual Report, the DZ BANK banking group's cover pools held in trust and the derivative receivables in netting master agreements, for which there are equivalent derivative liabilities, are included as encumbered assets in the asset encumbrance reporting.

FINREP validation also takes place as part of asset encumbrance reporting. This ensures that the totals of the unencumbered and encumbered assets in the asset encumbrance reporting match those of the assets in the FINREP reporting.

The following disclosures are based on the DZ BANK banking group's asset encumbrance reporting in 2018. The carrying amounts and fair values of the encumbered and unencumbered assets are disclosed. The fair value of the (repledged) collateral received is disclosed. For each line item, the median values at the end of each of the four past quarters are presented (reporting dates in 2018: March 31, June 30, September 30, and December 31). The totals are calculated from the median values at the end of the four past quarters in the asset encumbrance reporting. Consequently, the totals disclosed may vary from the totals calculated from the individual values.

The DZ BANK banking group's asset encumbrance ratio for 2018 was 38.83 percent. This is the ratio of the median values shown for the totals of the encumbered assets recognized on the balance sheet plus collateral received and re-used to the median values for the total assets plus collateral received.

FIG. 100 – ASSET ENCUMBRANCE AS AT DECEMBER 31, 2018

€ million	Carrying amount of encumbered assets		Fair value of encumbered assets		Carrying amount of unencumbered assets		Fair value of unencumbered assets	
		of which: notionally eligible as EHQLAs and HQLAs		of which: notionally eligible as EHQLAs and HQLAs		of which: EHQLAs and HQLAs		of which: EHQLAs and HQLAs
	010	030	040	050	060	080	090	100
010 Assets of the reporting institution	164,810	14,216			266,618	83,453		
030 Equity instruments	223	-			2,655	-		
040 Debt securities	17,574	13,925	18,094	14,332	39,353	26,826	39,877	26,097
050 of which: covered bonds	1,231	781	1,265	790	6,640	5,377	6,499	5,328
060 of which: asset-backed securities	-	-	-	-	2,055	-	1,964	-
070 of which: issued by general governments	12,252	11,584	12,846	12,022	14,774	14,950	15,177	14,615
080 of which: issued by financial corporations	4,655	1,829	4,811	1,873	20,704	9,958	20,530	9,747
090 of which: issued by non-financial corporations	806	445	826	445	3,777	1,856	3,796	1,842
120 Other assets	147,316	252			224,248	57,252		
121 of which: loans that can be terminated on demand	6,008	252			61,309	57,179		
122 of which: loans and advances other than loans that can be terminated on demand	129,801	-			143,499	-		

FIG. 101 – ASSET ENCUMBRANCE AS AT DECEMBER 31, 2017

		010	040	060	090
		Carrying amount of encumbered assets	Fair value of encumbered assets	Carrying amount of unencumbered assets	Fair value of unencumbered assets
€ million		Dec. 31, 2017			
010	Assets of the reporting institution	168,112		263,905	
030	Equity instruments	123		2,639	
040	Debt securities	19,966	20,133	47,704	47,630
050	of which: covered bonds	1,654	1,604	6,858	6,918
060	of which: asset-backed securities	269	268	1,732	1,744
070	of which: issued by general governments	12,497	12,513	20,778	20,922
080	of which: issued by financial corporations	6,910	6,955	22,562	22,423
090	of which: issued by non-financial corporations	656	689	4,207	4,095
120	Other assets	148,101		214,067	
121	of which: loans that can be terminated on demand	6,968		46,510	
122	of which: loans and advances other than loans that can be terminated on demand	126,506		144,748	

FIG. 102 – COLLATERAL RECEIVED

€ million	Fair value of encumbered collateral received or own debt securities issued		Fair value of collateral received or own debt securities issued available for encumbrance		Fair value of encumbered collateral received or own debt securities issued	Fair value of collateral received or own debt securities issued available for encumbrance
		of which: notionally eligible as EHQLAs and HQLAs		of which: EHQLAs and HQLAs		
	Dec. 31, 2018				Dec. 31, 2017	
	010	030	040	060	010	040
130 Collateral received by the reporting institution	**9,930**	**9,470**	**8,680**	**4,219**	**12,746**	**8,811**
140 Loans that can be terminated on demand	-	-	-	-	-	359
150 Equity instruments	18	-	1,752	-	44	1,538
160 Debt securities	9,903	9,470	6,677	4,219	12,721	6,752
170 of which: covered bonds	303	239	1,840	1,462	580	1,062
180 of which: asset-backed securities	-	-	-	-	-	-
190 of which: issued by general governments	7,607	7,498	2,384	1,937	7,272	3,563
200 of which: issued by financial corporations	1,989	1,740	4,490	2,404	4,342	3,110
210 of which: issued by non-financial corporations	110	85	205	106	943	143
220 Loans and advances other than loans that can be terminated on demand	-	-	-	-	-	-
230 Other collateral received	-	-	12	-	-	60
240 Own debt securities issued other than own covered bonds or asset-backed securities	-	-	**9,038**	-	-	**10,041**
241 Own covered bonds and asset-backed securities issued and not yet pledged			**1,104**	-		**1,879**
250 Total assets, collateral received, and own debt securities issued	**175,644**	**23,721**			**181,300**	

The total of encumbered assets and collateral received (particularly bonds) decreased and unencumbered assets increased (particularly other assets) because there was a reduction in encumbered assets. This was also reflected in the asset encumbrance ratio, which fell from 39.87 percent as at December 31, 2017 to 38.83 percent as at the reporting date.

FIG. 103 – SOURCES OF ENCUMBRANCE

		Matching liabilities, contingent liabilities, or securities lent	Assets, collateral received, and own debt securities issued other than covered bonds and ABSs encumbered	Matching liabilities, contingent liabilities, or securities lent	Assets, collateral received, and own debt securities issued other than covered bonds and ABSs encumbered
		Dec. 31, 2018		Dec. 31, 2017	
		010	030	010	030
010	**Carrying amount of selected financial liabilities**	**148,287**	**162,010**	153,399	166,256
011	of which: derivatives	15,333	18,306	20,909	23,935
012	of which: deposits	109,561	115,671	106,527	111,063
012a	of which: sale and repurchase agreements	11,416	11,911	12,409	12,774
012b	of which: collateralized deposits excluding repurchase agreements	98,145	103,004	95,920	100,648
013	of which: bonds issued	23,912	28,185	22,895	27,754

The business model's influence on the degree of encumbrance and the importance of encumbrance to the DZ BANK banking group's funding model are explained below. The DZ BANK banking group's main sources of encumbrance result from the following business activities:

– DZ BANK, DZ HYP, and DVB obtain some of their funding by issuing covered bonds. The corresponding cover pools of these institutions led to encumbrance of €73,659 million in 2018. The average weighted overcollateralization ratio for the DZ BANK banking group's cover pools was 36.24 percent in 2018. This overcollateralization comprised the excess cover required by law, the excess covered required by the rating agencies, and the voluntary excess cover; it contributed €19,594 million to the aforementioned total encumbrance.

– The entities in the DZ BANK banking group hold covered bonds issued by other group entities, for which there is a corresponding cover pool volume of €7,270 million. From a consolidated group perspective, these assets do not result in asset encumbrance.

– After the cover pools, development lending business with cooperative banks and end customers represents the second biggest factor in the DZ BANK banking group's encumbrance ratio, with pass-through loan receivables of €56,007 million assigned to development banks. This volume of encumbrance is mainly attributable to business at DZ BANK and DZ HYP.

– Securities lending transactions and funding via sale and repurchase agreements are further major sources of encumbrance for the DZ BANK banking group and predominantly result from transactions of DZ BANK, DZ PRIVATBANK, and DZ HYP.

– Both unsecured derivative transactions with netting master agreements (International Swaps and Derivatives Association (ISDA) and Deutscher Rahmenvertrag (DRV) [German Master Agreement]) and derivative transactions backed by collateral agreements (Credit Support Annex to the ISDA Master Agreement and Collateralization Annex to the German Master Agreement for Financial Futures) are considered to be encumbrances.

– The longer-term funding of DZ BANK and DZ HYP in the form of open-market operations via central banks results in additional encumbrance of assets-side business.

There are also assets that are encumbered because they are pledged to entities in the DZ BANK banking group. In particular, they arise from sale and repurchase agreements, derivative transactions backed by collateral agreements, and covered bonds held within the group. The main reason for conducting these transactions is the centralized provision of funding to the individual subsidiaries by DZ BANK (group funding). All transactions between entities in the DZ BANK banking group are recognized on a consolidated basis at group level.

The DZ BANK banking group's own securitizations (asset-backed securities, ABSs) were not relevant to the entities consolidated for regulatory purposes in 2018 and therefore do not represent a source of encumbrance for the purpose of asset encumbrance reporting.

The majority of the DZ BANK banking group's encumbered assets are denominated in euros. There are also encumbered assets denominated in US dollars, which is also deemed a significant currency for the DZ BANK banking group. The encumbered assets denominated in US dollars mainly result from the issuance of covered bonds and from derivatives business. The volume of encumbered assets denominated in US dollars stood at €2,143 million as at December 31, 2018. US-dollar-denominated collateral received and re-used amounted to €79 million. The sources of encumbrance denominated in US dollars came to €1,435 million.

The majority of the unencumbered securities in the portfolios of the DZ BANK banking group are eligible for central bank borrowing and are available in the normal course of business as collateral for potential encumbrance. The unencumbered other assets line item includes assets such as property, plant and equipment, long-term equity investments and investments in other entities, intangible assets, deferred tax assets, and unencumbered derivatives that are not available in the normal course of business for potential encumbrance.

Within the total encumbered loans and advances, the volume of encumbered mortgages amounted to €43,794 million in 2018. Encumbrance predominantly results from the issuance of covered bonds by DZ BANK and DZ HYP.

15 Remuneration policy

15.1 General disclosures

(ARTICLE 450 CRR)

Pursuant to section 16 of the German Regulation Governing Remuneration at Institutions (InstitutsVergV, new version dated July 25, 2017), DZ BANK is required to disclose information about its remuneration policy and practices. As an (EU) parent institution, DZ BANK must disclose information at consolidated level. As an institution subject to the CRR, DZ BANK is subject to the disclosure requirements specified by article 450 CRR in conjunction with section 16 InstitutsVergV.

Pursuant to article 450 CRR, DZ BANK must disclose certain qualitative and quantitative information for categories of employees whose activities have a material impact on its risk profile (risk takers).
In 2018, DZ BANK and the subordinated management units BSH, DZ HYP, DVB, DZ PRIVATBANK, and TeamBank identified the employees whose activities have a material impact on the risk profile. Risk takers were identified based on Commission Delegated Regulation (EU) No. 604/2014 of March 4, 2014 supplementing CRD IV with regard to regulatory technical standards with respect to qualitative and appropriate quantitative criteria to identify categories of staff whose professional activities have a material impact on an institution's risk profile.
This risk report contains detailed information on remuneration in the DZ BANK banking group for the 2018 financial year. The information disclosed in this report is subject to the principle of materiality pursuant to article 432 CRR. Information that is protected by law or is confidential is not to be disclosed.

The quantitative information pursuant to article 450 (1) letters g to j CRR is published after all bonus payments have been calculated. The information disclosed for 2018 pursuant to article 450 CRR for the DZ BANK banking group will therefore be updated in a separate report in the second quarter. This report disclosing the remuneration policy can be found on DZ BANK's website in the Investor Relations section under Reports.

15.2 Remuneration governance in the DZ BANK banking group

15.2.1 Remuneration strategy of the DZ BANK banking group

Section 27 InstitutsVergV dated December 16, 2013, in the version that came into force on August 4, 2017, requires the senior management of the parent company to define a banking group-wide **remuneration strategy**. The Board of Managing Directors of DZ BANK must define a remuneration strategy both for DZ BANK and for the entities in the DZ BANK banking group that implements the requirements of the InstitutsVergV in the banking group.

The remuneration strategy sets out uniform rules for managing remuneration that apply to the remuneration systems of the entities in the DZ BANK banking group. On the basis of this framework, each subordinated entity is obliged to document its subgroup's compliance with the agreed principles and to present this for inspection by DZ BANK.

Decentralized decision-making powers are one of the features of the balanced management approach taken within the DZ BANK banking group. Systematic coordination between all entities in the DZ BANK Group is necessary to ensure compliance with the InstitutsVergV. Company-law provisions and local rules – especially in relation to the independence of the institutions – are also taken into account.

The remuneration system is reviewed and, if necessary, amended at least once a year. There were no material changes to the remuneration system during the year under review.

15.2.2 Remuneration structure

The remuneration of employees in the DZ BANK banking group comprises fixed remuneration and, as a rule, variable remuneration. The level of fixed remuneration is determined by the importance of the employee's role, market conditions, and the employee's personal qualities. The level of variable remuneration reflects the employee's personal performance and, depending on the remuneration system, the entity's success, and the success of the division in which the employee works.

Measures are in place to ensure that variable remuneration does not exceed fixed remuneration at the entities in the DZ BANK banking group. In some cases, variable remuneration has been capped at well below fixed remuneration. The variable remuneration of employees in control units may not exceed 50 percent of their fixed remuneration.

For DVB, a resolution adopted by the Annual General Meeting in 2014 capped the variable remuneration for a strictly limited group of employees at 200 percent of their fixed remuneration.

Variable remuneration is guaranteed for no more than the first twelve months after an employee has joined the DZ BANK banking group.

15.2.3 Remuneration decision-making processes

Various committees and functions in the DZ BANK Group are involved in designing and monitoring the remuneration systems.

The design and implementation of the remuneration system for the Boards of Managing Directors in the DZ BANK Group are decided upon by the Supervisory Board of the entity in question. The Supervisory Boards also check that the employee remuneration systems are appropriate.

Each Supervisory Board is assisted in its work by its Remuneration Control Committee, in particular with regard to the appropriate design and monitoring of the remuneration strategies and their conformity with the business and risk strategies, remuneration strategy, and corporate culture of the DZ BANK banking group.

Each Board of Managing Directors decides on the design and implementation of the employee remuneration systems. The individual members of the Boards of Managing Directors contribute to the implementation of and compliance with the InstitutsVergV in the DZ BANK banking group through their membership of the Supervisory Boards of the subsidiaries.

In each entity, a remuneration officer assists the Remuneration Control Committee and Supervisory Board with their monitoring activities and is involved in deployment of the remuneration systems, the development of new systems, and the refinement of existing systems on a regular basis.

In each entity, the HR division carries out HR-related preparations for the design of the remuneration systems and the decisions of the Board of Managing Directors, which it also puts into practice. As part of their leadership and management role, managers deploy the performance management and remuneration tools provided to them.

The **control units** as defined by section 2 (11) InstitutsVergV are involved in the design and monitoring of the remuneration systems on an ongoing basis. Each entity in the DZ BANK banking group has defined the control units in its institution.

At DZ BANK, the following divisions are defined as the control units: Group Human Resources, Credit/Credit Special (back office), Group Risk Controlling, Group Audit, and Compliance. At BSH, it is the Human Resources, Internal Audit, Financial and Risk Controlling, and Compliance divisions. DVB has defined its control units as follows: all Credit and Research units, Group Audit, Group Compliance Office, Group Controlling, Group Risk Management, Group Human Resources, and Transaction and Loan Services. DZ HYP defines the following divisions as control units: Internal Audit, Risk Controlling, Compliance, and Human Resources. At DZ PRIVATBANK, it is the Risk Controlling, Internal Audit/Data Protection/Information Security, Legal/Compliance/Anti-Money Laundering, and Human Resources divisions.

15.2.4 Remuneration Control Committee

The **Remuneration Control Committee** (RCC) checks that the remuneration systems for members of the Board of Managing Directors and for employees are designed appropriately. In particular, it checks that remuneration is designed appropriately for the heads of the risk control and compliance functions and for those employees who have a material influence on the institution's overall risk profile. The RCC also assists the Supervisory Board with checking that the remuneration systems for the entity's employees are designed appropriately and it evaluates the impact of the remuneration systems on the management of risk, capital, and liquidity.

The RCC prepares the Supervisory Board's resolutions on the remuneration of the members of the Board of Managing Directors, taking particular account of the impact of the resolutions on the entity's risks and risk management. It also considers the long-term interests of shareholders, investors, and other stakeholders as well as the wider public interest.

The RCC helps the Supervisory Board to check that the internal control divisions and all other relevant divisions are duly involved in designing the remuneration systems.

The Supervisory Board's RCC, in cooperation with the remuneration officer, verifies that the remuneration systems are appropriate.

In 2018, the RCC at DZ BANK held three meetings. The Supervisory Board was notified of the findings. The RCC is made up of members of the Supervisory Board. DZ BANK's RCC comprises a chairman, deputy chairman, and four other members.

The RCC at BSH held one face-to-face meeting and circulated one written resolution to each member for adoption in writing in 2018. BSH's RCC comprises a chairman and five other members.

The RCC at DVB met four times in 2018. It comprises a chairman, deputy chairman, and one other member.

The RCC at WL BANK held one meeting in 2018 before the merger with DG HYP. It comprised a chairman, deputy chairman, and two other members. The RCC at DG HYP held two meetings before the merger. DG HYP's RCC comprised a chairman and three other members, as is also the case in the successor institution DZ HYP. The RCC at DZ HYP held two further meetings after the merger.

At DZ PRIVATBANK, the role of the RCC is performed by the Chairman's Committee. In the reporting year, the Chairman's Committee held four meetings, with RCC matters being discussed at three of them. The Chairman's Committee at DZ PRIVATBANK comprises a chairman, deputy chairman, and two other members.

15.2.5 Remuneration officer

In accordance with the requirements of section 23 InstitutsVergV, a **remuneration officer** has been appointed by the Board of Managing Directors in all entities in the DZ BANK banking group that are deemed major pursuant to section 17 InstitutsVergV.

The main tasks of these remuneration officers include the ongoing verification and monitoring of the appropriateness of the remuneration systems, regular and close coordination with the chairman of the Remuneration Control Committee, and preparation of an annual remuneration control report. To this end, they work closely with the other control and monitoring functions.

15.2.6 Relevant stakeholders

When it comes to defining remuneration policy, the **relevant stakeholders** are the owners and the central employees' council. The owners are represented on the Supervisory Board by the shareholders elected by the Annual General Meeting. This ensures that the owners are involved in the design of the remuneration systems and receive information about employee remuneration annually. The central employees' council is involved in the design of the remuneration systems within the framework of the rights of participation that exist under the German Works Council Constitution Act (BetrVG).

15.2.7 External consultancy

In 2018, all entities in the DZ BANK banking group that are deemed major pursuant to section 17 InstitutsVergV engaged external consultants to examine how the remuneration of the Board of Managing Directors compared with the market standard.

At DZ BANK, external consultants were also involved in implementing individual requirements arising from the InstitutsVergV (version dated August 4, 2017). An external law firm was engaged to negotiate the agreement of a harmonized company agreement for non-collectively-negotiated (NCN) remuneration.

BSH did not engage any other external consultants regarding remuneration matters.

DVB worked with two external law firms on implementing individual InstitutsVergV requirements.

Similarly to DZ BANK, DZ HYP brought in external support for the legal and other aspects of implementing individual requirements arising from the InstitutsVergV. These requirements are also currently arising in connection with the planned harmonization of the remuneration systems at DZ HYP.

DZ PRIVATBANK also engaged an external consultancy to deal with unresolved questions regarding the implementation of individual InstitutsVergV requirements.

15.2.8 Appropriateness of the remuneration systems

According to section 12 InstitutsVergV, DZ BANK must review the **appropriateness of the remuneration systems** at least once a year. The related internal audit reports, the audit report from the auditor of the annual financial statements, and the remuneration officer's remuneration control report have to be used as the basis for this review. DZ BANK's Board of Managing Directors confirmed the appropriateness of the remuneration systems in a written resolution adopted in October 2018.

The last audit report from the auditor of the annual financial statements for 2018 found that DZ BANK's remuneration systems and their focus on the institution's long-term performance were appropriate and transparent. The ratio of variable to fixed remuneration was deemed appropriate. The report confirmed that DZ BANK's remuneration systems, including the remuneration strategy, supported the achievement of the institution's strategic objectives. The remuneration parameters are aligned with the business strategy and risk strategy.

The internal audit function conducted its 2018 audit of the remuneration systems in the fourth quarter of 2018 / first quarter of 2019. The bank will rectify any deficiencies identified during the audit in a timely manner. Measures taken to rectify such deficiencies will be documented.

The 2018 remuneration control reports of the remuneration officer for the DZ BANK banking group also found that the remuneration systems were designed appropriately.

The internal audit function reviewed the remuneration systems at BSH in autumn 2018. The auditor found that the remuneration systems were aligned with BSH's strategy, comply with statutory and regulatory requirements, and have been designed appropriately. In 2018, the auditor of the annual financial statements also reviewed BSH's remuneration systems. No deficiencies were identified.

The report from the auditor of DVB's annual financial statements for 2018 and the remuneration control report of the remuneration officers found that the remuneration systems were designed appropriately. The internal audit function conducted its 2018 audit of the remuneration systems in the second/third quarter of 2018, concluding that the remuneration systems were appropriate. Only two borderline deficiencies were identified and have since been rectified.

DZ HYP's predecessor institutions had differing remuneration systems, which will be harmonized in 2019. The appropriateness of the remuneration system at the Hamburg office (formerly DG HYP) was confirmed in the context of the regulatory control mechanisms. At the Münster office (formerly WL BANK), appropriateness was last confirmed in the report from the auditor of the annual financial statements for 2017. The auditor of the annual financial statements confirmed the appropriateness of the remuneration systems for 2018. The remuneration systems were also included in an audit by the Group Audit division in the fourth quarter of 2018. Suitable measures were defined in respect of the audit's findings and are being implemented in a timely manner. In view of the merger, a remuneration control report for 2018 was not produced in the Münster office.

At DZ PRIVATBANK, the appropriateness of the remuneration systems was verified by the institution's remuneration officer in preparation for the annual remuneration control report to the Supervisory Board. This examination found that DZ PRIVATBANK's updated remuneration systems complied with the revised requirements of the InstitutsVergV in the version of August 2017. The obligation to ensure rapid implementation of the requirements in policies and contractual arrangements was fulfilled in 2018. The remuneration systems were also included in an audit by the Group Audit division in the fourth quarter of 2018. Suitable measures were defined in respect of the audit's findings and are being implemented in a timely manner.

15.3 Design of the remuneration systems at DZ BANK

DZ BANK's remuneration systems are aimed at providing appropriate rewards and additional performance incentives in the form of fixed salaries and, in the case of employees in the NCN wage sector, an additional variable remuneration component. The idea is that good performance should pay off.

The remuneration systems for employees in the collectively-negotiated (CN) wage sector were standardized in 2018. Consequently, variable remuneration for such employees was abolished. The negotiations with the central employees' council on the harmonization of remuneration for employees in the NCN wage sector were concluded on November 21, 2018. The outcome was that adjustments necessary for compliance with regulatory requirements were made using the system of the (pre-merger) DZ BANK as the basis (e.g. introduction of a clawback for risk takers). The lower limit for the individual performance factor (IPF) was raised from 0.5 to 0.8. The company agreement defined how the employees of the former WGZ BANK were to be transferred to the standardized remuneration system. Employees in the previous remuneration system of DZ BANK were transferred with retrospective effect from January 1, 2018. Employees in the remuneration system of the former WGZ BANK are being transferred with effect from January 1, 2019. The variable remuneration for 2018 will still be calculated in accordance with the rules in place for that period. Only adjustments necessary for compliance with regulatory requirements (e.g. deferral arrangements for risk takers) apply to these employees with retrospective effect from January 1, 2018.

This report contains a description of the remuneration model for employees in the CN wage sector (see section 15.3.1), followed by the remuneration systems for employees in the NCN wage sector. There are differences between the NCN remuneration in the previous system at DZ BANK (see section 15.3.2.1), the remuneration of risk takers below the level of head of division (see section 15.3.2.2), the remuneration system for heads of division (see section 15.3.2.3), and the system for employees in the NCN wage sector of the former WGZ BANK (see section 15.3.2.4). The remuneration systems for the foreign branches are presented in section 15.3.2.5. Section 15.3.3 contains a description of the remuneration system for members of the Board of Managing Directors and section 15.3.4 describes the remuneration of the members of the Supervisory Board.

The variable remuneration of employees in the NCN wage sector is governed by employment contracts and company agreements. Employees' individual performance is one of the factors used to determine the level of the variable component. Other factors are the results of their division and the overall results of DZ BANK. This not only recognizes employees' high level of dedication but also ensures that they share in DZ BANK's future success.

15.3.1 Remuneration system for employees in the collectively-negotiated wage sector

The **remuneration system for employees in the CN wage sector** generally applies to any employee in the CN wage sector who is in an active employment relationship at any of DZ BANK's offices in Germany. The remuneration for such employees is governed by a company agreement.

Remuneration structure

The annual salary of employees in the CN wage sector consists of the following:

- Twelve monthly salaries (plus any CN or NCN allowances)
- Bonus equal to one month's salary in April
- Bonus equal to one month's salary in November.

Monthly salary and bonuses

The monthly salary is determined by the applicable salary bracket (1 to 9) and the number of years worked. It is paid twelve times a year. The monthly salary may also include CN or NCN allowances.

The level of the bonuses in April and November is determined by the monthly salary in the month of payment according to the CN remuneration table.

Abolition of variable remuneration in 2018

As part of the harmonization of the remuneration systems, variable remuneration for employees in the CN wage sector was abolished in 2018. Upon transfer to the new remuneration system, the employees were compensated for the element of possible variable remuneration that they had previously achieved in practice. To this end, the average variable components paid over the past ten years, if in excess of one month's salary, were granted as a non-pensionable allowance.

15.3.2 Remuneration system for employees in the non-collectively-negotiated wage sector

Once CN remuneration had been harmonized, the remuneration systems for the employees in the NCN wage sector were also harmonized. The new remuneration system essentially corresponds to the previous remuneration system at DZ BANK. Employees of the former WGZ BANK were transferred to this new system.

The adjustments necessary under the InstitutsVergV (e.g. a longer deferral period for high earners' variable remuneration and the introduction of clawback arrangements) were taken into account.

15.3.2.1 Remuneration system for employees in the non-collectively-negotiated wage sector

The remuneration system for employees in the NCN wage sector is governed by a company agreement and applies to all such employees at DZ BANK in Germany (excluding senior managers).

In addition to the fixed salary paid as twelve monthly salaries, the remuneration structure for employees in the NCN wage sector includes a contractually agreed performance- and results-based remuneration component (bonus) and a process for rating role importance (responsibility levels).

There are also non-financial remuneration components that are designed to promote staff loyalty, such as a subsidy for childcare costs.

System of responsibility levels

Each role at DZ BANK that is not covered by a CN pay agreement is rated according to knowledge/ability, problem-solving, responsibility, and strategic importance and then assigned to one of five responsibility levels. The percentage share represented by the target bonus and the lower and upper limits for the employee's remuneration depend on the responsibility level to which his or her role is assigned. The upper limits for variable remuneration are derived from the contractually agreed target bonuses and the upper limits for the bonus factors. Reflecting the market situation, DZ BANK may define special markets (e.g. the capital markets) for specific divisions, departments, groups, or roles. In these special markets, the target bonus may be agreed as a larger percentage share relative to the fixed salary. Under no circumstances may variable remuneration exceed fixed remuneration. The salary bands for each responsibility level are reviewed annually and adjusted if necessary. The adjustments are based on the bank's market position and financial performance as well as on the wider economic situation.

The following terms are used with regard to the NCN remuneration system at DZ BANK:

Fixed salary:
The contractually agreed basic salary and any existing special allowances

Target bonus:
Amount agreed by the employee and his or her manager that provides the basis of calculation for the bonus

Reference salary:
Fixed salary plus target bonus

Fixed allowance:
The fixed allowance is derived from the lower limits of the bonus factors (AG factor of 0.8, divisional factor of 0.8, IPF of 0.8). When deducted from the target bonus, it equates to 51.2 percent of the target bonus (0.8 x 0.8 x 0.8 = 0.512). This share of the target bonus is fixed and is paid monthly with the fixed salary.

Fixed remuneration:
Total of fixed salary plus fixed allowance

Bonus factors:
The AG factor and divisional factors reflect the results of the bank/group and divisions. The IPF indicates the employee's rate of target achievement.

Bonus:
Variable remuneration component calculated from the performance factors and the target bonus less the fixed allowance

Target agreement and target achievement

The basis for a transparent and clearly documented performance appraisal, and thus for determination of the IPF, is a target agreement process that is applied throughout the bank. 'Management by objectives' is the target agreement system used at DZ BANK and constitutes a key element of the variable remuneration system. The employee and his or her manager together agree on three to five specific, challenging, and measurable individual targets by March 1 of the respective year. These targets are given weighting factors and deadlines.

When calculating the bonus, the aim is to both recognize employees' high level of dedication and enable them to share in the success of their division and of DZ BANK as a company. That is why the bonus is determined using further performance factors in addition to the divisional and entity factors.
The IPF ranges from 0.8 to 1.8 and is set on the basis of the employee's personal target achievement during the annual performance review with his or her manager. The divisional factor ranges from 0.8 to 1.2 and is set by the responsible member of the Board of Managing Directors in consultation with the rest of the Board of Managing Directors on the basis of the head of division's suggestion and the division's results. The AG factor also ranges from 0.8 to 1.2 and is set by the Board of Managing Directors on the basis of the bank's and group's results.

The breadth of the IPF range enables employees to have a direct influence on their bonus.

Calculation of the variable component

The IPF is set during the annual performance review by no later than March 1 of the following year on the basis of target achievement. The divisional factor and AG factor are determined by no later than March 31 of the following year. The following formula is used to calculate the bonus:

Variable remuneration = target bonus x IPF x divisional factor x AG factor less fixed allowance (51.2 percent of the target bonus)

The variable remuneration (less the fixed allowance) is paid with the April salary in the year following the year to which it applies. The fixed salary and the fixed allowance are paid in twelve equal monthly installments.

15.3.2.2 Remuneration system for risk takers below the level of head of division

As in previous years, risk takers were identified for 2018 on the basis of Commission Delegated Regulation (EU) No. 604/2014 of March 4, 2014 supplementing CRD IV with regard to regulatory technical standards with respect to qualitative and appropriate quantitative criteria to identify categories of staff whose professional activities have a material impact on an institution's risk profile. These define binding qualitative and quantitative criteria that must be used to identify risk takers.

Using these criteria, a total of 227 risk takers were identified at DZ BANK for the reporting period and an additional 112 risk takers in the DZ BANK banking group. The remuneration structure and, in particular, the bonus calculation for all employees below the level of head of division who have been identified as risk takers are governed by the remuneration system for employees in the NCN wage sector (see section 15.3.2.1).

In accordance with the provisions of the InstitutsVergV, some of a risk taker's variable remuneration is deferred and subject to a retention period if the variable remuneration exceeds €50 thousand. Of the total variable remuneration, 30 percent of the calculated bonus amount is paid to the employee with the April salary. A further 30 percent is subject to a retention period of one calendar year. The other 40 percent of the calculated bonus is deferred over a period of three calendar years. This sum is split into three pro-rata deferrals (each amounting to a third of the 40 percent). 50 percent of the deferral is subject to a retention period. During the retention periods, the variable remuneration is pegged to DZ BANK's long-term performance. The change in the value of the shares is used to measure long-term performance. The deferred variable remuneration decreases if there is an adverse change in the value of the shares.

Above a certain bonus amount, 40 percent of the variable remuneration is paid to the employee and 60 percent is deferred and subject to retention periods.

Negative contributions to profits from an employee are also taken into account.

If the contribution to profits of an employee, his or her division, or DZ BANK falls short of the agreed targets, the employee's variable remuneration is reduced. In these cases, the IPF, divisional factor, or AG factor is set at a lower level. If all factors are set at 0.8, the variable remuneration is cancelled. Before it becomes vested, deferred variable remuneration can be reduced or cancelled if the bonus factors that were originally set no longer appear appropriate when reviewed (backtesting).

Variable remuneration is forfeited in full if the risk taker has played a significant part in, or was responsible for, conduct that led to substantial losses or material regulatory sanctions for the institution, or if the risk taker was in serious (grossly negligent or intentional) breach of relevant external or internal rules regarding suitability and conduct. If, in exercising his or her role, the risk taker exhibits conduct that is immoral or in breach of duty, the IPF is reduced. The IPF can be lowered to zero in individual cases where a reduction of the IPF to 0.8 appears insufficient in view of the significance of the conduct that is immoral or in breach of duty. It is not possible to compensate for conduct that is immoral or in breach of duty by making a positive contribution to profits. Conduct that is immoral or in breach of duty must always lead to a reduction in the employee's variable remuneration. In cases where the variable remuneration is forfeited in full, the bank is also entitled to claw back any variable remuneration already paid to the risk taker.

15.3.2.3 Remuneration system for heads of division
All heads of division at DZ BANK are senior managers and have been identified as risk takers. Because they are senior managers, they are not covered by the company agreement. It was thus possible to implement remuneration systems for the heads of division without adhering to codetermination processes.

Each head of division's variable remuneration is based on the achievement of group, entity, divisional, and individual targets. Achievement of the group and entity targets may account for no more than 40 percent of the maximum bonus amount, and achievement of the divisional and individual targets for no more than 30 percent respectively. In accordance with the requirements of the InstitutsVergV, some of a head of division's variable remuneration is deferred and subject to a retention period. Of the variable remuneration, 60 percent of the bonus amount is pegged to DZ BANK's long-term performance for up to five years. Both the deferred portion and 50 percent of the non-deferred variable remuneration are subject to a retention period of one year. The change in the value of the shares is used to measure long-term performance. Negative contributions to profits are taken into account when the variable remuneration is determined. In accordance with section 20 (6) InstitutsVergV, variable remuneration can be clawed back in particularly serious cases.

Negative contributions to profits are determined using a list of criteria in the following categories:

- Personal conduct
- Significant deterioration in DZ BANK's financial situation during the deferral period
- Missed targets that are ascertained only subsequently.

15.3.2.4 Remuneration system for employees in the non-collectively-negotiated wage sector of the former WGZ BANK
The remuneration of employees in the NCN wage sector comprises 12 monthly salaries, two bonuses in April and November, a results-based bonus, and a discretionary bonus.

The results-based bonus can amount to a maximum of 1.5 x the monthly salary and is oriented to the average entity factor for the past three years.

The Board of Managing Directors decides whether the discretionary bonus will be paid after the financial year has ended. The remuneration of risk takers is paid in accordance with deferral and retention periods where their variable remuneration exceeds €50 thousand. 80 percent of the variable remuneration is deferred. Negative contributions to profits are taken into account when the variable remuneration is determined. It is set in the same way as in the remuneration system for risk takers at DZ BANK below the level of head of division.

15.3.2.5 Remuneration systems for foreign branches
At DZ BANK's offices outside Germany, various variable components that differ from the systems used in Germany are paid along with a fixed salary in accordance with local custom and additional benefits.

The heads of the foreign branches were identified as risk takers for the reporting year. The remuneration system described above for heads of division is also used for the heads of the four foreign branches.

The individual bonus amounts for employees at the offices outside Germany are calculated on the basis of the local systems.

FIG. 104 – OVERVIEW OF CURRENT BONUS ARRANGEMENTS IN THE FOREIGN BRANCHES

New York	For Group Treasury: target bonus system; calculated in the same way as in the German system on the basis of individual performance and the results of the division and bank For all other divisions: discretionary bonus payment; proposed bonuses reflect not only individual performance but also the bonuses paid in the market, seniority, and area of work (risk unit, business unit, or support unit)
London	For Group Treasury: target bonus system; calculated in the same way as in the German system on the basis of individual performance and the results of the division and bank For all other divisions: discretionary bonus payment; proposed bonuses reflect the following criteria: Local market conditions Internal and external salary comparisons Results of the bank Results of the branch Results of the department/group Individual target achievement
Singapore	For Group Treasury and for capital markets divisions: target bonus system; calculated in the same way as in the German system on the basis of individual performance and the results of the division and bank For all other divisions: discretionary bonus payment; proposed bonuses reflect not only individual performance but also the bonuses paid in the market
Hong Kong	For Group Treasury and for capital markets divisions: target bonus system; calculated in the same way as in the German system on the basis of individual performance and the results of the division and bank For all other divisions: discretionary bonus payment; proposed bonuses reflect not only individual performance but also the bonuses paid in the market

15.3.3 Remuneration system for members of the Board of Managing Directors

As well as a fixed salary, the remuneration system for the members of the Board of Managing Directors includes variable remuneration (bonus) that makes up no more than 20 percent of the total salary. The variable remuneration of the Board of Managing Directors is set with reference to a maximum achievable bonus. Quantitative and qualitative targets derived from the corporate strategy in the form of group, bank, area of board responsibility, and individual targets are used to determine the bonus level. The basis of measurement for the bonus covers a period of several years. The maximum bonus is set in the event of full achievement of each individual target. Only 20 percent of the bonus achieved is paid immediately in the following year after the annual financial statements have been adopted and the bonus has been set by the Supervisory Board. Payment of the remaining 80 percent of the bonus set for the previous year is spread out over a period of up to six years in total, taking into account deferral and retention periods. All amounts earmarked for deferred payment are linked to the long-term performance of DZ BANK because they are pegged to the value of its shares. Negative contributions to profits are taken into account when setting bonuses and pro-rata deferrals, which may cause the variable remuneration to be reduced or cancelled. Variable remuneration is not vested during the deferral and retention periods. For a period of seven years after the initial payment, all bonus installments that are already subject to a retention period or have already been paid can be clawed back if the member of the Board of Management has played a significant part in, or was responsible for, conduct that led to substantial losses or material regulatory sanctions for the institution, or if the member was in serious breach of relevant external or internal rules regarding suitability and conduct. The Supervisory Board of DZ BANK is responsible for determining the remuneration system for the members of the Board of Managing Directors.

Negative contributions to profits are determined using a list of criteria in the following categories:

- Personal conduct
- Significant deterioration in DZ BANK's financial situation during the deferral period
- Missed targets that are ascertained only subsequently.

15.3.4 Remuneration system for members of the Supervisory Board

The Annual General Meeting of DZ BANK approved the adjustment of the remuneration and attendance fees for its Supervisory Board with effect from June 1, 2018. Each member of the Supervisory Board receives fixed annual remuneration, the level of which varies depending on whether they are a chairperson, a deputy chairperson, or member of a committee. The members of the Supervisory Board committees also receive an attendance fee for each committee meeting that they attend. There is no variable remuneration.

15.3.5 Determination of the total amount of variable remuneration at DZ BANK

In accordance with section 7 InstitutsVergV, the total amount of variable remuneration at DZ BANK and in the DZ BANK banking group is determined in such a way that takes due regard of risk-bearing capacity, multi-year capital planning, and financial performance and, moreover, ensures that the adequacy of own funds and liquidity along with the combined capital buffer requirements pursuant to section 10i KWG are permanently maintained or restored.

A detailed process has been adopted for this process and the various documents required have been submitted to the relevant decision-making bodies (Board of Managing Directors, Remuneration Control Committee, and Supervisory Board) for approval.

The performance-based variable remuneration is set at individual level in accordance with the company agreements concerning the remuneration systems or, where these agreements do not apply, on the basis of individual contracts.

15.4 Remuneration systems of the management units regarded as major pursuant to section 17 InstitutsVergV

15.4.1 Relevant subsidiaries according to section 27 in conjunction with section 16 InstitutsVergV

DZ BANK, BSH, DZ HYP (until July 26, 2018: DG HYP and WL BANK), DVB, and DZ PRIVATBANK are major institutions according to section 17 InstitutsVergV. They must fulfill the disclosure requirements pursuant to section 16 (1) InstitutsVergV.

The following basic principles apply to them in the context of the remuneration strategy of the DZ BANK banking group. Under the current business model of DZ BANK and the DZ BANK Group, earnings are broadly diversified across various customer groups and products. This is thanks to the combination of different customer groups (retail customers, corporate customers, institutional customers), a broad customer base (around 900 cooperative banks and their approximately 30 million customers), a nationwide branch network (approximately 11,000 branches), and a comprehensive range of services (including asset management, retail and private banking, insurance, real estate finance/home savings, corporate banking, capital markets business). The overarching concept of a network-oriented central institution/financial services group shapes the actions and core business of the DZ BANK Group and is thus a central pillar of the remuneration strategy as well.

Remuneration is one of the DZ BANK Group's key HR management tools. The aims of the DZ BANK Group's remuneration structure are to

- give each employee an incentive to contribute personally to the sustainable implementation of the strategic objectives of the DZ BANK Group and the individual divisions on the basis of targets that are derived from the corporate strategy and cascaded down through the organization.
- reward performance without encouraging employees to take unwanted risks.
- attract talented employees, motivate them, and encourage them to remain in the DZ BANK Group.

To achieve these aims, the DZ BANK Group pays not only a fixed salary but also variable remuneration.

The variable salary component is reasonable in relation to the fixed remuneration and must not exceed the fixed remuneration. Regular performance reviews with their manager ensure that employees know where they are in terms of achieving their targets.

Depending on local custom, the DZ BANK Group offers additional non-cash benefits besides the salary payments. The DZ BANK Group is committed to the principles of sustainable, incentivizing, and risk-oriented remuneration. The remuneration systems also take account of statutory and regulatory requirements.

The remuneration systems of DZ BANK's subordinated entities that are deemed major pursuant to section 17 InstitutsVergV are described below.

15.4.2 Remuneration systems at BSH

Remuneration system for employees in the non-collectively-negotiated wage sector

The remuneration of employees in the NCN wage sector comprises a pensionable basic salary plus a fixed remuneration component (not pensionable) and a target achievement bonus. The level of remuneration is oriented to external benchmarks that are collated for BSH regularly. Variable remuneration – at 100 percent target achievement – may not make up more than 25 percent of the total remuneration.
The target achievement bonus is determined as follows:
Amount paid as a target achievement bonus = target achievement x (target achievement bonus + fixed remuneration)/100 – fixed remuneration

Risk takers

For 2018, the following were defined as risk takers: the members of the Board of Managing Directors of BSH (managing directors of BSH), the managing directors of Schwäbisch Hall Kreditservice GmbH (SHK), Schwäbisch Hall, the managing directors of Fundamenta-Lakáskassza, Budapest, and selected managers at BSH and SHK. The remuneration systems for the managing directors of BSH and Fundamenta-Lakáskassza and the remuneration systems of the other risk takers are described below.
Target achievement ranges from 0 percent to 120 percent and is based entirely on entity targets.

Remuneration of risk takers below the level of managing director

The remuneration of risk takers at BSH and SHK comprises a pensionable basic salary, a fixed non-pensionable remuneration component, and a target achievement bonus. Variable remuneration – at 100 percent target achievement – is not more than 25 percent of the total remuneration.

Target achievement ranges from 0 percent to 120 percent. Target achievement, which is used to determine the level of variable remuneration, is broken down as follows: 80 percent entity targets, 10 percent targets for the organizational unit, and 10 percent individual targets. The breakdown for the managing directors of SHK is the same as for the members of the Board of Managing Directors of BSH. However, target achievement for the SHK managing directors ranges from 0 percent to 120 percent. All targets have only a one-year basis of measurement. The entity targets relate to key metrics in the business and risk strategy.

The parameters factored into the remuneration are also management-related key performance indicators (KPIs) that are important to a building society. By taking return on risk-adjusted capital, profit before taxes, and administrative expenses into account, the remuneration is linked to earnings figures, key risk indicators, and the liquidity situation.

Because the target system, which reflects the change in enterprise value, is combined with the deferral and retention of some of the remuneration, the remuneration is also linked to the entity's long-term performance.

Where the currently applicable exemption threshold of €50,000 is exceeded, the arrangements regarding deferrals, retention periods, and malus criteria are the same as in the system for the managing directors. The Board of Managing Directors is responsible for determining the remuneration system for risk takers below the level of the Board of Managing Directors. The control units (Human Resources, Internal Audit, Financial and Risk Controlling, Compliance) and the remuneration officer were involved in designing the remuneration systems.

Remuneration of managing directors

The remuneration of the BSH Board of Managing Directors consists of a basic salary, a non-pensionable basic salary, and a bonus. Variable remuneration – at 100 percent target achievement – is not more than 25 percent of the total remuneration.

Target achievement ranges from 0 percent to 150 percent. Target achievement, which is used to determine the level of variable remuneration, is broken down as follows: 70 percent entity targets, 10 percent HR targets, and 20 percent individual targets, factoring in the contribution to profits of the Managing Director's area of responsibility. The entity targets, HR targets, and individual targets are measured over a period of several years and include the main targets in the corporate strategy. The parameters factored into the remuneration are management-related KPIs that are important to a building society.

20 percent of the bonus is paid immediately in the following year and 20 percent after a one-year retention period. 60 percent of the bonus is deferred over a period of up to five years, with each payment made after a subsequent retention period of one year. All amounts earmarked for deferred payment are pegged to the change in the notional share price of the building society.

Negative contributions to profits are taken into account when setting bonuses and pro-rata deferrals and at the end of the retention period, which may cause the variable remuneration to be reduced or not be paid. Variable remuneration is not vested during the deferral period. The Supervisory Board is responsible for determining the remuneration system for the members of the Board of Managing Directors.

The remuneration systems were designed in consultation with DZ BANK; the legal affairs division was involved in drafting the employment contracts for the members of the Board of Managing Directors. The Remuneration Control Committee of the Supervisory Board monitors the appropriateness of the remuneration systems.

15.4.3 Remuneration systems at DZ HYP

The remuneration systems of the individual companies are described below.

15.4.3.1 Hamburg office

Remuneration system for employees in the non-collectively-negotiated wage sector

The employees in the NCN wage sector receive 12 monthly salaries plus variable remuneration that is based on the 'Principles of variable remuneration' company agreement.

Each December, these employees also receive half of a gross monthly salary as a bonus. The aforementioned company agreement on variable remuneration distinguishes between employees in the NCN wage sector 'with' a target bonus and those 'without' a target bonus. Managers, employees with quantitative sales targets, and risk takers are eligible for a target bonus. The target bonus equates to a maximum of three gross monthly salaries. Each year, target agreements are reached with the employees eligible for a target bonus. These agreements set out qualitative and quantitative criteria as well as divisional and individual targets. The level of variable remuneration paid depends on the individual's performance and target achievement, on the success of his or her division, and the entity's results (measured on the basis of return on equity (ROE), the cost/income ratio (CIR) and, since 2015, RWAs. The variable remuneration of employees without a target bonus amounts to a maximum of 1.5 x the gross monthly salary. Employees with a target bonus can receive a maximum of 1.5 x the contractually agreed target bonus as variable remuneration. The variable remuneration may account for a maximum of 27 percent of the total annual remuneration. The Board of Managing Directors is responsible for determining the remuneration system for employees in the NCN wage sector.

Remuneration system for risk takers below the level of head of division

Risk takers below the level of head of division receive twelve and a half monthly salaries plus a variable remuneration component that is based on a company agreement setting out the principles of variable remuneration.
The variable remuneration for risk takers below the level of head of division is set by the Board of Managing Directors on the basis of the head of division's suggestion with reference to a contractually agreed target bonus. The level of the contractually agreed target bonus is limited to a maximum of three gross monthly salaries.

Quantitative and qualitative targets derived from the corporate strategy in the form of overall bank, divisional, and individual targets are used to determine the actual bonus level. Target achievement, and thus the variable remuneration, depends on the entity's success (derived from ROE, CIR, and RWAs; target/actual comparison = success of the bank), on the contribution made by the division, and on the individual target achievement of the employee. New divisional and individual targets are agreed upon and set during a target agreement meeting each year between the employee and head of division. In the ideal scenario, the variable remuneration to be paid to employees eligible for a target bonus equates to 1.5 x the contractually agreed target bonus, which means that the variable remuneration may account for a maximum of 27 percent of the total annual remuneration.

The variable remuneration for a particular year is paid in April of the following year. If the variable remuneration amounts to €50 thousand or more, the same arrangements as for the heads of divisions apply with regard to retention, entitlement requirements, and payment requirements.

Remuneration system for risk takers at the level of head of division

The heads of division receive twelve monthly salaries plus a variable remuneration component. Individual contractual agreements on variable remuneration were reached with the heads of division in 2014. They take into account the requirements of the InstitutsVergV, particularly those regarding retention, entitlement requirements, and payment requirements, and came into force in 2015.

The Board of Managing Directors sets the variable remuneration for the heads of division with reference to a contractually agreed target bonus. During the employee's annual performance review, quantitative and qualitative targets are derived from the corporate strategy in the form of overall bank, divisional, and individual targets; target achievement is also ascertained in these meetings and used to determine the actual bonus level. Target achievement, which is calculated on the basis of ROE, CIR, and RWAs, ranges from 0 percent to 130 percent for overall bank targets and from 0 percent to 150 percent for divisional and individual targets. The overall bank targets are given a 40 percent weighting and the divisional and individual targets 60 percent, which means that the variable remuneration may account for a maximum of 142 percent of the target bonus. The variable remuneration for a particular year is paid in April of the following year. If the variable remuneration amounts to €50 thousand or more, some of it is paid immediately, some is deferred, and some is subject to a retention period. Under this arrangement, 20 percent of the variable remuneration is paid immediately in April of the following year. The other 80 percent of the calculated bonus is deferred over a period of up to four years. Of this deferred amount, 50 percent is pegged to long-term performance, which is calculated on the basis of modified operating profit. Negative contributions to profits are taken into account when setting bonuses and pro-rata deferrals. The criteria for determining negative contributions to profits are derived from the company agreement dated December 4, 2014, to which reference is made in employment contracts. This may cause the variable remuneration to be reduced or cancelled. Variable remuneration is not vested during the deferral and retention periods.

Remuneration system for members of the Board of Managing Directors

The members of the Board of Managing Directors receive twelve monthly salaries plus a variable remuneration component that is based on individual contractual arrangements. The requirements of the relevant version of the InstitutsVergV have been taken into account.
The variable remuneration of the members of the Board of Managing Directors is set by the Supervisory Board and measured with reference to a maximum achievable bonus.

Quantitative and qualitative targets derived from the corporate strategy in the form of group, bank, area of board responsibility, and individual targets are used to determine the bonus level. The basis of measurement for the bonus covers a period of several years. The maximum bonus is set in the event of full achievement of each individual target. Only 20 percent of the bonus achieved is paid immediately in the following year after the annual financial statements have been adopted and the bonus has been set by the Supervisory Board. Payment of the remaining 80 percent of the bonus set for the previous year is spread out over a period of up to six years in total, taking into account deferral and retention periods. All amounts earmarked for deferred payment are linked to the long-term performance of DZ HYP because they are pegged to the value of its shares. Negative contributions to profits are taken into account when setting bonuses and pro-rata deferrals, which may cause the variable remuneration to be reduced or cancelled. Variable remuneration is not vested during the deferral and retention periods. For a period of seven years after the initial payment, all bonus installments that are already subject to a retention period or have already been paid can be clawed back if the member of the Board of Management has played a significant part in, or was responsible for, conduct that led to substantial losses or material regulatory sanctions for the institution, or if the member was in serious breach of relevant external or internal rules regarding suitability and conduct.

15.4.3.2 Münster office

Remuneration system for employees in the non-collectively-negotiated wage sector

Employees in the NCN wage sector receive 12 monthly salaries. For 2018, they may also receive – for the last time – discretionary variable remuneration in recognition of outstanding performance. The discretionary variable remuneration was last paid at WL BANK on the basis of company-specific arrangements that no longer apply at DZ HYP.

In 2019, a new company agreement setting out the principles of variable remuneration will be negotiated. The aim is to harmonize the remuneration systems within DZ HYP on the basis of the remuneration systems used at the Hamburg office.

The system at WL BANK provided for variable remuneration only when the financial performance and regulatory requirements allowed, and taking the interests of shareholders into consideration. The main criterion for variable remuneration was operating profit under IFRS, because this was the main KPI used to manage WL BANK. The Board of Managing Directors decided whether the discretionary variable remuneration would be paid and, if so, in what amount. There is no entitlement to a discretionary bonus or a minimum amount. The payment per person was less than €50,000 and was limited to 50 percent of the total annual salary. For risk takers in control units, the limit was 30 percent.

Applying any malus factors, it was also possible to reduce the discretionary variable remuneration to zero, i.e. to cancel it entirely. The malus factors applied in cases such as breach of rules designed to protect customers or other serious derelictions of duty, failure to comply with regulatory requirements regarding Tier 1 capital, liquidity adequacy, or risk-bearing capacity, a decrease in enterprise value to below a certain threshold, the absence of profit transfer, the reversal of statutory reserves for covering losses, or a significant deterioration in operating profit under IFRS.

As a result of the merger, success is no longer measured on the basis of operating profit under IFRS. Some of the malus factors can no longer be applied either. Instead, the KPIs relevant to measurement of overall bank success at DZ HYP that are set out in the Hamburg office’s ‘Principles of variable remuneration’ company agreement – ROE, CIR, and RWAs – are being used for the Münster office for 2018 in accordance with the principle of subsidiarity. The same applies to the malus factors. The success of the bank has an influence on the available budget volume. Distribution is based on defined criteria.

Remuneration system for risk takers

The remuneration of risk takers does not differ from that of employees in the NCN wage sector. However, risk takers enter into quantitative and/or qualitative target agreements that, along with other factors, are reflected in the measurement and payment of the discretionary variable remuneration.

A subsidiarity approach is also being taken for 2018 until a company agreement has been reached for the Münster office. Individual contractual agreements are also being reached with risk takers at the level of head of division in 2019. They take into account the requirements of the InstitutsVergV, particularly those regarding retention, entitlement requirements, and payment requirements in respect of variable remuneration.

Remuneration system for members of the Board of Managing Directors

The individual contractual arrangements for the members of the Board of Managing Directors at the Münster office are the same as for those at the Hamburg office.

15.4.4 Remuneration systems at DVB

Remuneration system for employees in the non-collectively-negotiated wage sector

Employees covered by this remuneration system receive a fixed salary paid in regular installments plus a contractually agreed performance- and results-based remuneration component (target bonus).

The fixed salary installments vary depending on location and local custom.
The variable remuneration component can be tailored to the individual on the basis of a target bonus agreement. The target bonus is set by the Board of Managing Directors and the HR division and is oriented to external benchmarks that are collated regularly.

The proportion of target income (basic salary + target bonus) accounted for by variable remuneration is kept to a level at which the employee does not become financially dependent on it. The fixed component has an even higher weighting in the control units.

The bonus calculation reflects not only entity and divisional targets but also individual performance. Employees' individual targets do not consist of just financial metrics. They also include non-financial factors, such as process-oriented targets, involvement in projects, and conduct. The individual targets can be given different weightings and, like the entity and divisional targets, are documented in writing.

These target levels can vary in terms of weighting. They are currently weighted as follows:

- Bank: 30 percent
- Division, department, team: 35 percent
- Individual: 35 percent.

The performance factors at bank, divisional, and departmental level are determined on the basis of management reporting. The individual factor and any qualitative departmental and team targets are calculated on the basis of target achievement during the annual performance review.

Target achievement is calculated independently for each level. The individual results are aggregated and then multiplied by the target bonus to give the payment amount.

The Board of Managing Directors has a number of options at its disposal for adjusting the formula-based bonus calculation in the event of exceptional circumstances and/or performance or if achievements have not yet been reflected in the targets.

- Adjustment of target achievement at group level using a modifier of plus or minus 20 percentage points (prerequisite: unforeseeable events outside the bank's sphere of influence)
- Granting of an additional discretionary bonus pool at departmental or team level
- Granting of a discretionary bonus to individual employees
- Adjustments due to personal misconduct.

Remuneration system for risk takers (below the level of head of division)

The remuneration system for risk takers is the same as the remuneration system for employees in the NCN wage sector.
However, the bonus is paid as follows in accordance with the InstitutsVergV:
The risk taker becomes entitled immediately (in the following year) to 40 percent of the achieved bonus, once it has been set by the Board of Managing Directors (immediate bonus). Only 50 percent of this amount is paid immediately; the remaining 50 percent is subject to a one-year retention period.

60 percent of the achieved bonus is deferred (deferred bonus) and allocated in 5 tranches (each equating to 12 percent) over a period of 5 years. 50 percent of each tranche is subject to a further retention period of one year.

After each deferral period and after the individual tranche's additional retention period, the risk taker becomes entitled to payment of the particular bonus installment.

During the retention periods, the earmarked amounts are pegged to the change in enterprise value.

Negative contributions to profits are taken into account when setting bonuses and pro-rata deferrals.

Each deferred bonus tranche undergoes a malus process before payment, which involves reviewing the relevant risk situation and financial performance, compliance with internal policies (e.g. compliance policies, lending policies), and personal conduct. However, the malus process cannot increase an individual deferred bonus tranche; it can merely reduce or cancel it.

In the event of serious misconduct on the part of an employee, the Board of Managing Directors will initiate a clawback process, leading to the variable remuneration being forfeited in full (not only outstanding installments but also installments already paid).

The DVB Board of Managing Directors is responsible for determining the remuneration system.

Remuneration system for heads of division (below the level of the Board of Managing Directors)

The remuneration system for heads of division is the same as the remuneration system for risk takers below the level of head of division.

Remuneration system for the Board of Managing Directors

In addition to a fixed salary, the remuneration system for the Board of Managing Directors includes a variable remuneration component (bonus).
The variable remuneration of the Board of Managing Directors is set with reference to a maximum achievable bonus. Quantitative and qualitative targets derived from the corporate strategy and strategic planning are used to determine the bonus. Targets are set at group, bank, divisional, and individual level and are all measured over a period of several years. The maximum bonus is set in the event of full achievement of each individual target.

The member of the Board of Managing Directors becomes entitled immediately (in the following year) to 40 percent of the achieved bonus, once it has been set by the Supervisory Board (immediate bonus). Only 50 percent of this amount is paid immediately; the remaining 50 percent is subject to a one-year retention period.

60 percent of the achieved bonus is deferred (deferred bonus) and allocated in 5 tranches (each equating to 12 percent) over a period of 5 years. After the deferral period, 50 percent of each tranche is subject to a further retention period of one year.

After each deferral period and after the individual tranche's additional retention period, the member of the Board of Managing Directors becomes entitled to payment of the particular bonus installment.

During the retention periods, the earmarked amounts are pegged to the change in DVB's enterprise value.

Negative contributions to profits are taken into account when setting bonuses and pro-rata deferrals, which may cause the variable remuneration to be reduced or cancelled. Variable remuneration is not vested during the deferral period.

Each deferred bonus tranche undergoes a malus process before payment, which involves reviewing the relevant risk situation and financial performance, compliance with internal policies (e.g. compliance policies, lending policies), and personal conduct. However, the malus process cannot increase an individual deferred bonus tranche; it can merely reduce or cancel it. For a period of two years after the end of its deferral period, a bonus installment already paid can be clawed back, and the entitlement to bonus payments can be cancelled if the member of the Board of Management has played a significant part in, or was responsible for, conduct that led to substantial losses or material regulatory sanctions for the institution, or if the member was in serious breach of relevant external or internal rules regarding suitability and conduct.

The full DVB Supervisory Board is responsible for determining the remuneration system for the members of the Board of Managing Directors. Since 2014, the appropriateness of the remuneration systems has been ensured, primarily by the Remuneration Control Committee of the Supervisory Board.

15.4.5 Remuneration systems at DZ PRIVATBANK

At DZ PRIVATBANK, the remuneration of employees in the CN wage sector is governed by the prevailing collective pay agreement. There is also a remuneration system for employees in the NCN wage sector and a remuneration system for risk takers. The Supervisory Board of DZ PRIVATBANK decides on the remuneration of the members of the Board of Managing Directors of DZ PRIVATBANK on the basis of individual contractual arrangements.

The remuneration systems generally apply at all locations while taking country-specific aspects into consideration, for example provisions in a collective pay agreement.

A new collective pay agreement for employees in the financial sector was signed in Luxembourg during the reporting year. It expires in 2020. Among other things, the new agreement includes a new scheme in which the job profiles are assigned to one of four pay brackets (previously six). Assignment is based on 5 categorization criteria, each of which is divided into 4 levels. As well as a 13th salary at the end of the year, employees in the CN wage sector receive a loyalty bonus linked to their length of service that is paid in June. It ranges from 20 percent to 85 percent of the basic monthly salary and is capped at a maximum amount. All employees covered by the collective pay agreement will be assigned to the new salary brackets with effect from January 1, 2020.

Remuneration system for employees in the non-collectively-negotiated wage sector

The Board of Managing Directors is responsible for determining the remuneration system for employees in the NCN wage sector.
In accordance with the provisions of the InstitutsVergV, the remuneration system for employees in the NCN wage sector includes a ban on hedging, rules on the 1:1 ratio of fixed to variable remuneration, an explicit ban on guaranteed bonuses, and specific rules on remuneration arrangements for employees in control units.

The remuneration system for employees in the NCN wage sector includes not only a fixed salary paid in the form of 12, 12.5, or 13 monthly salaries (depending on the arrangements at the local office) but also a performance- and results-based remuneration component (reference bonus).

System of responsibility levels
Each role at DZ PRIVATBANK that is not covered by a CN pay agreement is rated according to knowledge/ability, problem-solving, responsibility, and strategic importance and then assigned to one of four responsibility levels. The percentage share represented by the reference bonus and the lower and upper limits for the employee's remuneration depend on the responsibility level to which his or her role is assigned. This share ranges from 5 percent to a maximum of 40 percent of the annual fixed salary. The remuneration of employees in control units is more oriented toward annual fixed salary. Their possible reference bonus therefore ranges from 5 percent to a maximum of 20 percent of the annual fixed salary. The total variable remuneration of employees in control departments must not exceed 1/3 of their total annual remuneration.

Calculation of the variable component
The following formula is used to calculate the variable component as part of the annual bonus process:

Bonus = (reference bonus x IPF x segment factor x location factor)
When calculating the bonus, the aim is to both recognize employees' high level of dedication and enable them to actively share in the success of their segment and of DZ PRIVATBANK as a company. That is why the bonus is determined using further performance factors in addition to the segment and overall bank targets. The level of these factors is as follows:

- Individual performance factor: 0.5 to 1.8
- Segment factor: 0.8 to 1.2
- Location factor: 0.8 to 1.2.

The Board of Managing Directors sets the segment factors and the location factor. The bank can set an individual performance factor and the location factor in a particular country (so that it differs from the location factor in other countries) at zero, if required under local regulatory and statutory provisions. This ensures that it is possible to cancel an employee's bonus. The segment factors for the variable remuneration of employees in control units are not based on the same remuneration parameters as for the employees in the segments overseen by the control units.

Remuneration system for risk takers (maximum bonus scheme)

The Board of Managing Directors is responsible for determining the remuneration system for risk takers. The remuneration system for risk takers is fundamentally derived from the remuneration system for employees in the NCN wage sector.

The remuneration system for risk takers also includes a ban on hedging, rules on the 1:1 ratio of fixed to variable remuneration, an explicit ban on guaranteed bonuses, and specific rules on remuneration arrangements for employees in control units.
As is the case in the remuneration system for all employees in the NCN wage sector, risk takers are assigned to salary brackets. They are generally assigned to responsibility levels 1 and 2. This is because the categorization is based on Commission Delegated Regulation (EU) No. 604/2014 of March 4, 2014 supplementing CRD IV with regard to regulatory technical standards with respect to qualitative and appropriate quantitative criteria to identify categories of staff whose professional activities have a material impact on an institution's risk profile. In the remuneration system for risk takers, variable remuneration is designed as a maximum bonus scheme. The target agreement system includes quantitative and qualitative targets. The quantitative targets are derived from the operational planning of DZ PRIVATBANK (e.g. IFRS profit before taxes, CIR) and of the relevant segment. There are also additional individual quantitative and qualitative targets. 60 percent of the targets are measured over a period of 3 years; the other targets are measured over a one-year period. Because the maximum bonus scheme is based on aggregation, target achievement for the individual targets ranges from 0 percent to 180 percent, whereas overall target achievement is limited to 100 percent of the maximum bonus. If target achievement for a particular target is below 50 percent, the share of the bonus for this target is zero percent. Deferral and retention rules have also been established for risk takers whose bonus exceeds €50 thousand. If the variable remuneration exceeds this threshold, 20 percent of the bonus achieved is paid immediately in the following year. Payment of the remaining 80 percent of the bonus set for the previous year is spread out over a period of at least four years, taking into account deferral and retention periods for risk takers below the level of head of segment. For employees at the level of the Board of Managing Directors at subsidiaries of DZ PRIVATBANK and for managers below the Board of Managing Directors at DZ PRIVATBANK (heads of segment, risk takers required to report directly to the Board of Managing Directors, and defined high earners) whose bonus exceeds the threshold of €50 thousand, the deferral period is at least 6 years (including retention periods). The deferred bonus is split into three or five pro-rata deferrals (each amounting to 1/3 or 1/5 of the 60 percent). All amounts earmarked for deferred payment are linked to the long-term performance of DZ PRIVATBANK because they are pegged to the value of its shares. Negative contributions to profits are taken into account when setting bonuses and pro-rata deferrals, which may cause the variable remuneration to be cancelled or clawed back in a period lasting no more than two years after payment of the final deferred installment. Variable remuneration is not vested during the deferral and retention periods.

Remuneration system of the Board of Managing Directors

The Supervisory Board of DZ PRIVATBANK is responsible for determining the remuneration system for the members of the Board of Managing Directors. The remuneration of the Board of Managing Directors is set on the basis of individual contractual arrangements. As well as a pensionable fixed salary, the remuneration includes a bonus and contributions to an occupational pension.
Depending on target achievement, the bonus for the Board of Managing Directors of DZ PRIVATBANK ranges from 0 percent to a maximum of 150 percent of the reference bonus. Quantitative and qualitative targets derived from the corporate strategy in the form of group, bank, area of board responsibility, and individual targets are used to determine the bonus level. All targets for the Board of Managing Directors have a historical multi-year measurement period of three years. Only 20 percent of the bonus achieved is paid immediately in the following year after the annual financial statements have been adopted and the bonus has been set by the Supervisory Board. Another 20 percent is subject to a retention period of one calendar year and depends on the long-term changes in the enterprise value of DZ PRIVATBANK. 60 percent of the bonus set by the Supervisory Board for the previous financial year is deferred over a period of five calendar years. To this end, the deferred bonus is divided into five equal installments. They are paid after taking into account deferral and retention periods. All amounts earmarked for deferred payment are linked to the long-term performance of DZ PRIVATBANK because they are pegged to the change in its enterprise value. Negative contributions to profits are taken into account when setting bonuses and pro-rata deferrals by means of backtesting, which may cause the variable remuneration to be reduced or cancelled. Variable remuneration is not vested during the deferral and retention periods. For a period of two years after the end of its deferral period, a bonus installment already paid can be clawed back, and the entitlement to bonus payments can be cancelled if the member of the Board of Management has played a significant part in, or was responsible for, conduct that led to substantial losses or material regulatory sanctions for the institution, or if the member was in serious breach of relevant external or internal rules regarding suitability and conduct.

16 Annexes

Annex 1: Geographical breakdown of exposures

Fig. 105 – ANNEX 2: SUPPLEMENT TO FIG. 29 – EU CRB-C – GEOGRAPHICAL BREAKDOWN OF EXPOSURES IN DETAIL

		a	b	c	d	e	f	g
€ million		Germany	Other industrialized countries	France	Netherlands	United Kingdom	Luxembourg	Austria
1	Central governments and central banks	152	7,105	-	48	-	-	169
2	Institutions	9,478	16,668	2,623	924	4,882	310	478
3	Corporates	72,317	21,753	1,174	1,790	1,788	3,582	842
3a	of which: specialized lending	20,090	6,589	352	676	522	2,966	140
3b	of which: SMEs	8,926	17	0	1	0	1	8
4	Retail business	71,013	381	43	44	17	26	62
4a	Exposures secured by mortgages on immovable property	57,095	278	36	40	10	24	54
	of which: SMEs	-	-	-	-	-	-	-
	of which: non-SMEs	57,095	278	36	40	10	24	54
4b	Qualified revolving	-	-	-	-	-	-	-
4c	Other retail business	13,919	102	6	4	7	2	8
	of which: SMEs	1	102	-	-	-	-	-
	of which: non-SMEs	13,918	-	6	4	7	2	8
5	Equity exposures	3,363	95	0	-	-	8	0
	Other non-credit-obligation assets	1,059	8	-	-	-	8	-
6	**Total amount under IRB approach**	**157,384**	**46,010**	**3,840**	**2,806**	**6,687**	**3,934**	**1,551**
7	Central governments and central banks	42,667	7,677	730	0	125	2,180	946
8	Regional governments or local authorities	29,806	3,120	31	-	-	-	36
9	Public-sector entities	8,082	820	113	-	-	-	-
10	Multilateral development banks	-	28	-	-	-	15	-
11	International organizations	-	0	-	-	-	-	-
12	Institutions	94,240	211	-	14	11	25	9
13	Corporates	10,614	3,590	122	903	624	564	216
13a	of which: SMEs	2,191	25	0	6	1	4	2
14	Retail business	7,480	927	2	1	0	1	917
14a	of which: SMEs	1,880	3	0	0	0	-	3
15	Secured by mortgages on immovable property	3,518	274	-	38	7	148	17
15a	of which: SMEs	2,528	179	-	25	6	93	17
16	Exposures in default	129	42	21	0	0	0	4
17	Exposures associated with particularly high risk	547	60	-	-	-	10	-
18	Covered bonds	298	154	-	-	26	20	-
19	Exposures to institutions and corporates with a short-term credit assessment	-	0	-	-	-	-	0
20	CIUs	297	2,128	454	168	163	199	58
21	Equity exposures	73	0	-	-	-	0	0
22	Other items	54	31	-	-	-	13	-
23	**Total amount under Standardized Approach**	**197,803**	**19,063**	**1,473**	**1,124**	**956**	**3,175**	**2,203**
24	**Total as at Dec. 31, 2018**	**355,187**	**65,072**	**5,313**	**3,930**	**7,643**	**7,109**	**3,755**
25	Total as at Dec. 31, 2017	344,585	65,562	5,756	4,104	7,830	4,656	3,681

€ million		Italy	Switzerland	United States	Other countries	Advanced economies	Malta	Czech Republic
1	Central governments and central banks	-	5,077	1,766	45	707	-	488
2	Institutions	154	1,545	1,176	4,575	695	-	71
3	Corporates	114	1,043	4,472	6,949	2,661	453	29
3a	of which: specialized lending	-	119	585	1,229	134	54	-
3b	of which: SMEs	-	3	1	4	1	-	1
4	Retail business	4	129	18	37	2,126	1	2,115
4a	Exposures secured by mortgages on immovable property	4	64	17	29	1,586	1	1,575
	of which: SMEs	-	-	-	-	-	-	-
-	of which: non-SMEs	4	64	17	29	1,586	1	1,575
4b	Qualified revolving	-	-	-	-	-	-	-
4c	Other retail business	0	66	2	9	540	0	540
	of which: SMEs	-	-	-	-	-	-	-
	of which: non-SMEs	0	66	2	9	540	0	540
5	Equity exposures	30	2	54	1	0	-	-
	Other non-credit-obligation assets	0	-	-	-	13	-	13
6	**Total amount under IRB approach**	**302**	**7,797**	**7,487**	**11,606**	**6,201**	**454**	**2,716**
7	Central governments and central banks	2,285	194	-	1,217	366	-	-
8	Regional governments or local authorities	390	331	235	2,097	-	-	-
9	Public-sector entities	-	-	-	706	0	-	-
10	Multilateral development banks	-	-	13	-	-	-	-
11	International organizations	-	-	0	-	-	-	-
12	Institutions	0	39	45	64	79	-	8
13	Corporates	45	121	289	704	149	1	11
13a	of which: SMEs	2	5	5	-	43	-	-
14	Retail business	0	3	2	1	670	-	0
14a	of which: SMEs	-	-	0	-	3	-	-
15	Secured by mortgages on immovable property	0	37	-	25	47	-	-
15a	of which: SMEs	-	37	-	1	2	-	-
16	Exposures in default	0	0	16	0	23	-	0
17	Exposures associated with particularly high risk	-	50	-	-	-	-	-
18	Covered bonds	-	64	-	45	44	-	-
19	Exposures to institutions and corporates with a short-term credit assessment	-	-	-	-	-	-	-
20	CIUs	35	54	201	658	5	0	1
21	Equity exposures	-	-	-	0	6	-	-
22	Other items	-	19	-	0	14	-	-
23	**Total amount under Standardized Approach**	**2,756**	**913**	**801**	**5,518**	**1,402**	**1**	**20**
24	**Total**	**3,058**	**8,710**	**8,288**	**17,124**	**7,603**	**455**	**2,736**
25	Total as at Dec. 31, 2017		8,675	7,559	23,300	7,631	483	2,732

€ million		Singapore	Korea	Hong Kong	Other countries	Slovakia	Emerging markets	Turkey
1	Central governments and central banks	192	17	1	9	-	1,384	25
2	Institutions	67	450	53	53	-	2,914	428
3	Corporates	1,338	133	438	270	-	8,506	412
3a	of which: specialized lending	80	-	-	-	-	606	125
3b	of which: SMEs	-	-	-	0	-	2	-
4	Retail business	2	0	0	7	0	21	0
4a	Exposures secured by mortgages on immovable property	2	-	0	7	-	19	0
	of which: SMEs	-	-	-	-	-	-	-
	of which: non-SMEs	2	-	0	7	-	19	0
4b	Qualified revolving	-	-	-	-	-	-	-
4c	Other retail business	0	0	0	0	0	2	0
	of which: SMEs	-	-	-	-	-	-	-
	of which: non-SMEs	0	0	0	0	-	2	0
5	Equity exposures	-	-	-	0	-	61	-
	Other non-credit-obligation assets	-	-	-	-	-	-	-
6	**Total amount under IRB approach**	**1,599**	**600**	**493**	**339**	**0**	**12,886**	**865**
7	Central governments and central banks	94	0	-	24	249	841	-
8	Regional governments or local authorities	-	-	-	-	-	2	1
9	Public-sector entities	-	-	-	-	0	-	-
10	Multilateral development banks	-	-	-	-	-	-	-
11	International organizations	-	-	-	-	-	-	-
12	Institutions	-	-	53	0	17	29	-
13	Corporates	66	7	55	8	-	705	99
13a	of which: SMEs	8	-	31	4	-	6	2
14	Retail business	0	-	3	0	667	401	0
14a	of which: SMEs	0	-	3	-	-	-	-
15	Secured by mortgages on immovable property	-	-	0	2	45	1,485	-
15a	of which: SMEs	-	-	-	2	-	-	-
16	Exposures in default	3	-	-	0	20	39	-
17	Exposures associated with particularly high risk	-	-	-	-	-	-	-
18	Covered bonds	-	-	-	-	44	-	-
19	Exposures to institutions and corporates with a short-term credit assessment	-	-	-	-	-	-	-
20	CIUs	2	0	1	0	-	115	1
21	Equity exposures	6	-	-	-	-	0	-
22	Other items	-	-	-	-	14	20	-
23	**Total amount under Standardized Approach**	**171**	**7**	**113**	**34**	**1,055**	**3,637**	**101**
24	**Total**	**1,771**	**607**	**606**	**373**	**1,055**	**16,523**	**966**
25	Total as at Dec. 31, 2017	1,684	576	642	491	1,023	15,701	965

	€ million	Hungary	India	Liberia	Bermuda	China	Marshall Islands	Other countries
1	Central governments and central banks	32	-	-	-	-	-	1,326
2	Institutions	0	126	3	-	443	-	1,914
3	Corporates	33	526	1,467	659	410	2,797	2,203
3a	of which: specialized lending	32		-	-	-	28	421
3b	of which: SMEs	-		-	-	-	-	2
4	Retail business	1	0	-	-	3	-	17
4a	Exposures secured by mortgages on immovable property	0	0	-	-	3	-	15
	of which: SMEs	-		-	-	-	-	-
	of which: non-SMEs	0	0	-	-	3	-	15
4b	Qualified revolving	-		-	-	-	-	-
4c	Other retail business	0		-	-	0	-	2
	of which: SMEs	-		-	-	-	-	-
	of which: non-SMEs	0		-	-	0	-	2
5	Equity exposures	-		-	-	-	-	61
	Other non-credit-obligation assets	-		-	-	-	-	-
6	**Total amount under IRB approach**	**66**	**652**	**1,470**	**659**	**856**	**2,797**	**5,522**
7	Central governments and central banks	415		-	-	116	-	310
8	Regional governments or local authorities	1		-	-	-	-	0
9	Public-sector entities	-		-	-	-	-	-
10	Multilateral development banks	-		-	-	-	-	-
11	International organizations	-		-	-	-	-	-
12	Institutions	7		-	-	8	-	14
13	Corporates	27	63	0	0	97	29	390
13a	of which: SMEs	-	1	-	-	2	-	1
14	Retail business	297		-	-	103	-	1
14a	of which: SMEs	-		-	-	-	-	-
15	Secured by mortgages on immovable property	956	-	-	-	529	-	-
15a	of which: SMEs	-		-	-	-	-	-
16	Exposures in default	15	-	0	-	1	0	23
17	Exposures associated with particularly high risk	-		-	-	-	-	-
18	Covered bonds	-		-	-	-	-	-
19	Exposures to institutions and corporates with a short-term credit assessment	-		-	-	-	-	-
20	CIUs	0	0	-	0	21	-	93
21	Equity exposures	-		-	-	-	-	0
22	Other items	8	-	-	-	11	-	-
23	**Total amount under Standardized Approach**	**1,727**	**64**	**0**	**0**	**885**	**29**	**831**
24	**Total**	**1,793**	**715**	**1,470**	**659**	**1,741**	**2,826**	**6,353**
25	Total as at Dec. 31, 2017	1,679		1,328	823	1,607	3,764	5,536

€ million		Supranational organizations	Other European institutions, governing bodies, and organizations	European Investment Bank	European Financial Stability Facility	European Broadcasting Union	Other countries	Not allocated to a geographical area
1	Central governments and central banks	455	-	406	-	-	-	-
2	Institutions	-	-	-	-	-	-	-
3	Corporates	-	-	-	-	-	-	-
3a	of which: specialized lending	-	-	-	-	-	-	-
3b	of which: SMEs	-	-	-	-	-	-	-
4	Retail business	-	-	-	-	-	-	-
4a	Exposures secured by mortgages on immovable property	-	-	-	-	-	-	-
	of which: SMEs	-	-	-	-	-	-	-
	of which: non-SMEs	-	-	-	-	-	-	-
4b	Qualified revolving	-	-	-	-	-	-	-
4c	Other retail business	-	-	-	-	-	-	-
	of which: SMEs	-	-	-	-	-	-	-
	of which: non-SMEs	-	-	-	-	-	-	-
5	Equity exposures	-	-	-	-	-	-	-
	Other non-credit-obligation assets	-	-	-	-	-	880	-
6	**Total amount under IRB approach**	**455**	**-**	**406**	**-**	**-**	**880**	**-**
7	Central governments and central banks	-	-	-	-	-	13	-
8	Regional governments or local authorities	-	-	-	-	-	7	-
9	Public-sector entities	-	-	-	-	-	-	-
10	Multilateral development banks	387	-	326	-	-	-	-
11	International organizations	585	390	-	43	-	-	-
12	Institutions	-	-	-	-	-	0	-
13	Corporates	-	-	-	-	-	211	-
13a	of which: SMEs	-	-	-	-	-	-	-
14	Retail business	-	-	-	-	-	-	-
14a	of which: SMEs	-	-	-	-	-	-	-
15	Secured by mortgages on immovable property	-	-	-	-	-	-	-
15a	of which: SMEs	-	-	-	-	-	-	-
16	Exposures in default	-	-	-	-	-	-	-
17	Exposures associated with particularly high risk	-	-	-	-	-	-	-
18	Covered bonds	-	-	-	-	-	-	-
19	Exposures to institutions and corporates with a short-term credit assessment	-	-	-	-	-	-	-
20	CIUs	0	0	-	-	-	0	-
21	Equity exposures	-	-	-	-	-	-	-
22	Other items	5	-	-	5	-	69	-
23	**Total amount under Standardized Approach**	**977**	**390**	**326**	**48**	**-**	**301**	**-**
24	**Total**	**1,432**	**390**	**732**	**48**	**-**	**1,181**	**-**
25	Total as at Dec. 31, 2017	1,804	467	837	249	-	216	1,096

Annex 2: Materiality threshold for tables EU CRBC and EU CR1-C

The materiality threshold is used as follows for Fig. 29 (EU CRB-C) and Fig. 35 (EU CR1-C).

The individual countries are assigned to regions in accordance with the disclosures in the opportunity and risk report. Within a region, the countries whose net exposure makes up at least 5 percent of the total exposure are shown individually. All other countries in that region are aggregated under 'Other'. In 2018, Italy, India, and the European Broadcasting Union became material, whereas the European Stability Mechanism ceased to be material.

Region	Country	Share of total exposure (%)
Other industrialized countries	France	8
	United Kingdom	18
	Italy	5
	Luxembourg	8
	Netherlands	6
	Austria	5
	Switzerland	13
	United States	13
	Other countries	25
Advanced economies	Hong Kong	10
	Korea	8
	Malta	5
	Singapore	22
	Slovakia	13
	Czech Republic	34
	Other countries	6
Emerging markets	Bermuda	5
	China	10
	India	6
	Liberia	9
	Marshall Islands	21
	Turkey	6
	Hungary	12
	Other countries	30
Supranational organizations	Other European institutions, governing bodies, and organizations	27
	European Financial Stability Facility	13
	European Investment Bank	40
	European Broadcasting Union	7
	Other	12

17 Overview of quantitative and qualitative requirements pursuant to the CRR, EBA/GL/2016/11, and other sources

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
		CRR EBA/GL/2016/11 paragraph 4.2 section A	Overview of quantitative and qualitative requirements pursuant to the CRR and EBA/GL/2016/11	x	Flexible	x	x	x	Section 17	
Article 431 (3)		CRR	Scope of disclosure requirements – disclosure policy	x	Flexible	-	-	x	Section 1.2	
Article 432	Inclusion of entities in the DZ BANK banking group in quantitative regulatory disclosures	CRR EBA/GL/2014/14	Non-material, proprietary, or confidential information	x	Flexible	x	x	x	Section 3.1	
Article 433		CRR EBA/GL/2014/14	Frequency of disclosure	x	Flexible	x	x	x	Section 1.2	
Article 434		CRR EBA/GL/2014/14	Means of disclosure	x	Flexible	x	x	x	Section 1.1	
Article 435 (1)	EU OVA, EU CRA, EU CCRA, EU MRA, and EU LIA	CRR EBA/GL/2016/11 paragraph 4.3 sections A and B	– Institution's risk management approach – General qualitative information about credit risk, counterparty credit risk, and market risk	x	Flexible	-	-	x	Sections 1.2, 2.1, 8.1, 8.2, 9, 10, 11.1	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
Article 435 (2) letter a	Number of executive or supervisory directorships held by members of the management body	CRR EBA/GL/2016/11 paragraph 57 EBA/GL/2017/12	Number of executive or supervisory directorships held by members of the management body	x	Flexible	-	-	x	Section 2.2.1	
Article 435 (2) letter b		CRR EBA/GL/2016/11 paragraph 58 EBA/GL/2017/12	Recruitment policy for the selection of members of the management body and their actual knowledge, skills and expertise	x	Flexible	-	-	x	Section 2.2.2	
Article 435 (2) letter c		CRR EBA/GL/2016/11 paragraph 59 EBA/GL/2017/12	Diversity policy for selecting members of the management body, its objectives, relevant targets and achievement of targets	x	Flexible	-	-	x	Section 2.2.3	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 435 (2) letter d		CRR	Disclosures regarding the formation of a risk committee and the number of times it has met	x	Flexible	-	-	x	Section 2.3	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
Article 435 (2) letter e	EU OVA	CRR EBA/GL/2016/11 paragraphs 49 and 60 EBA/GL/2017/12	Information flow to the Supervisory Board	x	Flexible	-	-	x	Section 2.4	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
Article 436 sentence 1 letter a		CRR	Name of the institution to which the requirements of the CRR apply	x	Flexible	-	-	x	Section 1.1	
Article 436 sentence 1 letter b	EU LIA, EU LI1, EU LI2, and EU LI3	CRR EBA/GL/2016/11 paragraph 4.4	– Consolidation matrix – differences in the scopes of consolidation (entity by entity), – Differences between accounting and regulatory scopes of consolidation and – Reconciliation of financial statements categories to regulatory risk categories, – Sources of differences between regulatory exposure amounts and carrying amounts on the balance sheet and – Explanation of the differences between the carrying amounts for accounting purposes and the regulatory exposures.	x	Flexible	-	-	x	Sections 3.1, 3.2, 3.3	
Article 436 sentence 1 letter c		CRR	Current or foreseen material practical or legal impediment to the prompt transfer of own funds or repayment of liabilities among the parent company and its subsidiaries	Not relevant	Flexible	-	-	x	Section 3.1	
Article 436 sentence 1 letter d		CRR	Aggregate amount by which actual own funds are less than required in all subsidiaries not included in the consolidation, and the name or names of such subsidiaries	Not relevant	Flexible	-	-	x	-	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 436 sentence 1 letter e		CRR	Use of the waiver	x	Flexible	-	-	x	Sections 3.1, 5.2.4	
Article 437 (1) letter a	Reconciliation of equity reported on the balance sheet with regulatory own funds	CRR Implementing Regulation (EU) No. 1423/2013, Annex II	Full reconciliation of own funds items to the financial statements	x	Flexible	-	x	x	Section 5.2.2	
Article 437 (1) letter b	Main features of capital instruments	CRR Implementing Regulation (EU) No. 1423/2013, Annex I	Description of the main features of the common equity Tier 1, additional Tier 1, and Tier 2 instruments issued by institutions	x	Fixed	-	x	x	Section 5.2.1	DZ BANK's website in the Investor Relations section under Bondholder Information, subsection Capital Instruments
Article 437 (1) letter c		CRR	Full terms and conditions of capital instruments	x	Flexible	-	x	x	Section 5.2.1	DZ BANK's website in the Investor Relations section under Bondholder Information, subsection Capital Instruments
Article 437 (1) letters d and e	Structure of own funds	CRR Implementing Regulation (EU) No. 1423/2013, Annex IV	Disclosure of the nature and amounts of specific elements of own funds	x	Fixed	x	x	x	Section 5.2.1	
Article 437 (1) letter f		CRR	Explanation of the basis on which capital ratios are calculated, if determined on a basis other than that laid down in the CRR	Not relevant	Flexible	-	x	x	-	
Article 438 sentence 1 letter a		CRR	Qualitative disclosure requirements regarding the approach to assessing the adequacy of internal capital	x	Flexible	-	-	x	Section 5.1	
Article 438 sentence 1 letter b		CRR	The result of the institution's internal capital adequacy assessment process, if requested by the relevant competent authority	x	Flexible	-	-	x	Section 5.2.5	
Article 438 sentence 1 letters c to f	EU OV1 and capital requirements	CRR EBA/GL/2016/11 paragraph 69	Overview of risk-weighted assets (RWAs) and capital requirements	x	Fixed	x	x	x	Section 5.2.3	
Article 438 sentence 1 letter d	EU CR8	CRR EBA/GL/2016/11 paragraph 109	RWA flow statement for credit risk under the IRB approach	x	Fixed	x	x	x	Sections 5.2.3, 6.6.2.4	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 438 sentence 1 letters c to d and article 49 (5)	EU INS1	CRR EBA/GL/2016/11 paragraph 71	Non-deducted participations in insurance undertakings	x	Fixed	-	x	x	Section 5.2.3	
Article 438 sentence 2	EU CR10	CRR EBA/GL/2016/11 paragraph 70	IRB (specialized lending and long-term equity investments)	x	Flexible	-	x	x	Section 5.2.3	
Article 439 sentence 1 letters a to d	EU CCRA	CRR EBA/GL/2016/11 paragraph 53	Qualitative disclosure requirements regarding counterparty credit risk	x	Flexible	-	-	x	Section 6.7.1	Opportunity and risk report
Article 439 sentence 1 letters e, f, and i	EU CCR1, EU CCR2, EU CCR8, EU CCR5-A, EU CCR5-B	CRR EBA/GL/2016/11 paragraphs 114, 115, 116, 120, 122	– Analysis of counterparty credit risk by approach; – Capital requirement for adjustment of the credit valuation; – Exposures to central counterparties; – Impact of netting and collateral held on exposure values; – Composition of collateral for exposures subject to counterparty credit risk	x	Fixed & flexible	-	x	x	Sections 1.2, 6.7.1, 6.7.4.1, 6.7.4.2	
Article 439 sentence 1 letters g to h	EU CCR6	CRR EBA/GL/2016/11 paragraph 123	Exposures secured by credit derivatives	x	Flexible	-	x	x	Section 6.7.4.3	
Article 440		CRR Delegated Regulation (EU) No. 2015/1555	Countercyclical capital buffer	x	Flexible	-	-	x	Section 12.1	
Article 441		CRR Implementing Regulation (EU) No. 2016/818	Indicators of global systemic importance	x	Flexible	-	-	x	Section 12.2	DZ BANK's website in the Investor Relations section under Reports
Article 442 sentence 1 letters a and b	EU CRB-A	CRR EBA/GL/2016/11 paragraph 76	Additional disclosure related to the credit quality of assets	x	Flexible	-	-	x	Section 6.2.1	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
Article 442 sentence 1 letter c	EU CRB-B	CRR EBA/GL/2016/11 paragraph 77	Total and average net amount of exposures	x	Flexible	-	-	x	Section 6.2.2.1	
Article 442 sentence 1 letter d	EU CRB-C	CRR EBA/GL/2016/11 paragraph 78	Geographical breakdown of exposures	x	Flexible	-	-	x	Section 6.2.2.2	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 442 sentence 1 letter e	EU CRB-D	CRR EBA/GL/2016/11 paragraph 81	Concentration of exposures by industry or counterparty type	x	Flexible	-	-	x	Section 6.2.2.3	
Article 442 sentence 1 letter f	EU CRB-E (only on-balance-sheet exposures) and CRB-E (on-balance-sheet exposures, off-balance-sheet exposures, and SFTs)	CRR EBA/GL/2016/11 paragraph 83	Residual maturity of exposures	x	Flexible	-	-	x	Section 6.2.2.4	
Article 442 sentence 1 letters g and h	EU CR1-A	CRR EBA/GL/2016/11 paragraph 88	Credit quality of exposures by exposure class and instrument	x	Fixed	-	x	x	Section 6.2.2.5	
Article 442 sentence 1 letter g	EU CR1-B	CRR EBA/GL/2016/11 paragraph 89	Credit quality of exposures by industry or counterparty type	x	Fixed	-	x	x	Section 6.2.2.6	
Article 442 sentence 1 letter h	EU CR1-C	CRR EBA/GL/2016/11 paragraph 89	Credit quality of exposures by geography	x	Fixed	-	x	x	Section 6.2.2.7	
Article 442 sentence 1 letters g and h	EU CR1-D	CRR EBA/GL/2016/11 paragraph 89	Maturity structure of past-due exposures	x	Fixed	-	x	x	Section 6.2.2.8	
Article 442 sentence 1 letters g and i	EU CR1-E	CRR EBA/GL/2016/11 paragraph 90	Non-performing and forborne exposures	x	Flexible	-	x	x	Section 6.2.2.9	
Article 442 sentence 1 letter i and sentence 2	EU CR2-A and EU CR2-B	CRR EBA/GL/2016/11 paragraph 92	Changes in the stock of general and specific credit risk adjustments and changes in the stock of defaulted and impaired loans and debt securities	x	Fixed	-	x	x	Section 6.2.2.10	
Article 443	Disclosure template A – encumbered and unencumbered assets Disclosure template B – collateral received Disclosure template C – sources of encumbrance Disclosure template D – accompanying narrative information	CRR Delegated Regulation (EU) No. 2017/2295	Asset encumbrance	x	Fixed	-	-	x	Section 14	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 444 sentence 1 letters a to d	EU CRD	CRR EBA/GL/2016/11 paragraph 97	Qualitative disclosure requirements regarding institutions' use of external credit ratings under the Standardized Approach to credit risk	x	Flexible	-	-	x	Sections 6.5.1, 6.5.1.1	
Article 444 sentence 1 letter e	EU CR5, EU CCR3, and CRSA exposures before credit risk mitigation by rating category	CRR EBA/GL/2016/11 paragraphs 100 and 117	Standardized Approach exposures before and after credit risk mitigation by rating category	x	Fixed	-	x	x	Sections 6.5.2, 6.5.2.2, 6.7.2	
Article 445	EU MR1	CRR EBA/GL/2016/11 paragraph 127	Market risk under the Standardized Approach	x	Fixed	-	x	x	Sections 8.2 and 8.3	
Article 446		CRR	Operational risk	x	Fixed	-	x	x	Section 9	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
Article 447 sentence 1 letter a		CRR	Accounting policies applied to long-term equity investments	x	Flexible	-	-	x	Section 11.2	
Article 447 sentence 1 letters b and c	Measurement of equity exposures	CRR	Disclosure of equity investment risk: carrying amounts under commercial law and current market value	x	Flexible	-	-	x	Section 11.3	
Article 447 sentence 1 letters d and e	Realized and unrealized gains and losses on equity exposures in accordance with IFRS	CRR	Inclusion of unrealized gains and losses on long-term equity investments in own funds	x	Flexible	-	-	x	Section 11.3	
Article 448 sentence 1 letter a		CRR BaFin Circular 11/2011	Nature of interest-rate risk, key assumptions made, and frequency of risk measurement	x	Flexible	-	-	x	Section 8.5	
Article 448 sentence 1 letter b	Interest-rate risk in the banking book	CRR BaFin Circular 11/2011	Interest-rate risk in the banking book	x	Flexible	-	-	x	Section 8.5	
Article 449 sentence 1 letters a, d, e, and i	Securitization exposures as originator and sponsor	CRR	Scope, objectives, and risks of securitization	x	Flexible	-	-	x	Section 7.1	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 449 sentence 1 letters b, c, f, and g		CRR	Risk management in respect of securitizations	x	Flexible	-	-	x	Section 7.2	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
Article 449 sentence 1 letter h		CRR	Procedure for determining risk-weighted exposures	x	Flexible	-	-	x	Section 7.4.1	
Article 449 sentence 1 letter j (i), (ii), (iii), (iv), (v), and (vi)		CRR	Accounting policies applied to securitizations	x	Flexible	-	-	x	Section 7.3	
Article 449 sentence 1 letter l		CRR	Internal ratings	x	Flexible	-	-	x	Section 7.4.3	
Article 449 sentence 1 letter k	Reconciliation of external and internal ABS ratings	CRR	External ratings	x	Flexible	-	-	x	Section 7.4.2	
Article 449 sentence 1 letter m		CRR	Explanation of significant changes to any of the quantitative disclosures in letters n to q since the last reporting period	x	Flexible	-	-	x	Section 7.5	
Article 449 sentence 1 letters n (i) and q	Total amount of securitizations with DZ BANK banking group as originator and sponsor	CRR	Total amount of asset securitizations	x	Flexible	-	-	x	Section 7.5.1	
Article 449 sentence 1 letters n (iii), (vi) and r		CRR	Total amount of planned securitizations; securitizations during the reporting period	x	Flexible	-	-	x	Sections 7.5.1, 7.5.3, 7.5.8	
Article 449 sentence 1 n (ii)	Retained, purchased or off-balance-sheet securitization exposures	CRR	Retained, purchased or off-balance-sheet securitization exposures	x	Flexible	-	-	x	Section 7.5.4	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 449 sentence 1 n (iv)		CRR	For securitized facilities subject to early amortization treatment, the aggregate drawn exposures attributed to the originator's and investor's interests respectively, the aggregate capital requirements incurred by the institution against the originator's interest and the aggregate capital requirements incurred by the institution against the investor's shares of drawn balances and undrawn lines	Not relevant	Flexible	-	-	x	Section 1.2	
Article 449 sentence 1 letter o (i)	EU OV1 and exposures and capital requirements for retained or purchased securitizations	CRR EBA/GL/2016/11 paragraph 69	Exposures and capital requirements for retained or purchased securitizations broken down by the approach used to calculate the capital requirement	x	Fixed	x	x	x	Section 5.2.3	
Article 449 sentence 1 letter n (v)	Deductions from own funds and securitization exposures with a risk weight of 1,250 percent by asset class	CRR	Securitization exposures and deductions from own funds	x	Flexible	-	-	x	Section 7.5.6	
Article 449 sentence 1 letter o (ii)	Re-securitization exposures and collateralization amounts	CRR	Re-securitization exposures and collateralization amounts	x	Flexible	-	-	x	Section 7.5.7	
Article 449 sentence 1 letter p	Impaired securitizations, securitizations in arrears, and losses realized during the reporting period	CRR	Impaired securitizations, securitizations in arrears, and losses realized during the reporting period	x	Flexible	-	-	x	Section 7.5.2	
Article 450		CRR EBA/GL/2015/22	Remuneration policy	x	Flexible	-	-	x	Section 15	DZ BANK's website in the Investor Relations section under Reports, 'Remuneration policy disclosures'

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 451 (1) letter a	Summary reconciliation of assets on the balance sheet to the leverage ratio total exposure measure	CRR Implementing Regulation (EU) No. 2016/200, Annex I (LRSum)	Reconciliation of the total assets of the DZ BANK Group to the leverage ratio total exposure measure	x	Fixed	-	x	x	Section 13.1	
Article 451 (1) letter a	Leverage ratio according to the CRR transitional guidance and after full application of the CRR	CRR	Components for calculating the leverage ratio in accordance with the CRR transitional guidance and after application of the CRR in full	x	Flexible	x	x	x	Section 13.1	
Article 451 (1) letter b	Leverage ratio common disclosure	CRR Implementing Regulation (EU) No. 2016/200, Annex I (LRCom)	Individual components of the total exposure measure, Tier 1 capital, and the resulting leverage ratio	x	Fixed	-	x	x	Section 13.1	
Article 451 (1) letter c	Breakdown of on-balance-sheet exposures (excluding derivatives, SFTs and exempted exposures)	CRR Implementing Regulation (EU) No. 2016/200, Annex I (LRSpl)	Breakdown by regulatory category of the exposures reported on the balance sheet	x	Fixed	-	x	x	Section 13.1	
Article 451 (1) letters d and e	Change to the leverage ratio: – If pass-through development loans are excluded – If exposures within the cooperative financial network are excluded – If the exclusions in the tables above are applied cumulatively	CRR Implementing Regulation (EU) No. 2016/200, Annex I (LRQua)	Description of the processes for monitoring the risk of excessive leverage and factors influencing the leverage ratio during the reporting period	x	Flexible	x	x	x	Sections 13.2, 13.3	
Article 452 sentence 1 letters a, b, and c	EU CRE and distribution of the exposure classes and their percentage of coverage under the Standardized Approach to credit risk, FIRB approach, and AIRB approach (share of total EAD)	CRR EBA/GL/2016/11 paragraph 103	Qualitative disclosure requirements regarding IRB models	x	Flexible	-	-	x	Sections 6.3.1, 6.6.1.1, 6.6.1.2, 6.6.1.3, 6.6.1.4, 6.6.1.5, 6.6.1.6	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 452 sentence 1 letters d, e, f, and g	EU CR6 and EU CCR4	CRR EBA/GL/2016/11 paragraphs 107 and 118	IRB approach – credit risk exposures by exposure class and PD range and counterparty credit risk exposures by portfolio and PD scale	x	Fixed	-	x	x	Sections 6.6.2.1, 6.6.2.2, 6.6.2.3	
Article 452 sentence 1 letter g	Year-on-year change in the actual losses in the total credit portfolio under the IRB approach by exposure class	CRR	Year-on-year change in the actual losses in the total credit portfolio under the IRB approach by exposure class	x	Flexible	-	-	x	Section 6.6.2.5	
Article 452 sentence 1 letter h		CRR	Description of the factors that impacted on the loss experience in the preceding period	x	Flexible	-	-	x	Section 6.6.2.5	
Article 452 sentence 1 letter i	EU CR9 and comparison of loss estimates and actual losses in non-defaulting exposure classes under the IRB approach	CRR EBA/GL/2016/11 paragraph 111	IRB approach – backtesting of the probability of default (PD) per exposure class Comparison of loss estimates and actual losses in non-defaulting exposure classes under the IRB approach	x	Flexible	-	-	x	Section 6.6.2.6	
Article 452 sentence 1 letter j (ii)	Average PD by country and exposure class under the foundation IRB approach	CRR	Average risk parameters by country of domicile of borrowing entity and exposure class under the foundation IRB approach	x	Flexible	-	-	x	Section 6.6.2.7	
Article 452 sentence 1 letter j (i)	Average PD and LGD by country and exposure class under the advanced IRB approach	CRR	Average risk parameters by country of domicile of borrowing entity and exposure class under the advanced IRB approach	x	Flexible	-	-	x	Section 6.6.2.7	
Article 453 sentence 1 letters a to e	EU CRC	CRR EBA/GL/2016/11 paragraph 93	Qualitative disclosure requirements regarding credit risk mitigation techniques	x	Flexible	-	-	x	Section 6.3.1	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
Article 453 sentence 1 letters f and g	EU CR3 and EU CR4	CRR EBA/GL/2016/11 paragraphs 94 and 99	Credit risk mitigation techniques – overview; Standardized Approach – credit risk exposure and credit risk mitigation effects	x	Fixed	-	x	x	Section 6.3.2	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Article 453 sentence 1 letter g	EU CR7	CRR EBA/GL/2016/11 paragraph 108	IRB approach – effect on the RWAs of credit derivatives used as credit risk mitigation techniques	x	Fixed	-	x	x	Section 6.6.2.3	
Article 454		CRR	Use of Advanced Measurement Approaches for operational risk	Not relevant	Flexible	-	-	x	Section 1.2	
Article 455 sentence 1 letters a and b	EU MRB	CRR EBA/GL/2016/11 paragraphs 54 and 66	Qualitative disclosure requirements for institutions using the IMA	x	Flexible	-	-	x	Sections 8.4.1, 8.4.2	
Article 455 sentence 1 letter c	EU MRA and EU LIA	CRR EBA/GL/2016/11 paragraphs 54 and 66	EU MR2-A – Market risk under the internal models approach	x	Fixed	-	x	x	Section 8.2	
Article 455 sentence 1 letter e	EU MR2 A	CRR EBA/GL/2016/11 paragraph 129	EU MR2-A – Market risk under the internal models approach	x	Fixed	-	x	x	Section 8.4.2	
Article 455 sentence 1 letter e	EU MR2 B	CRR EBA/GL/2016/11 paragraph 129	EU MR2-B – RWA flow statements of market risk exposures under the IMA	x	Fixed	x	x	x	Section 8.4.2	
Article 455 sentence 1 letter d	EU MR3	CRR EBA/GL/2016/11 paragraph 130	EU MR3 – IMA values for trading portfolios	x	Fixed	-	x	x	Section 8.4.2	
Article 455 sentence 1 letter f	IMA values for each subportfolio	CRR	Additional default and migration risk measured in relation to the total trading book and in relation to the relevant subportfolios	x	Flexible	-	-	x	Section 8.4.2	
Article 455 sentence 1 letter g	EU MR4	CRR EBA/GL/2016/11 paragraph 132	EU MR4 – Comparison of VaR estimates with gains/losses	x	Flexible	-	x	x	Section 8.4.2	
LCR in conjunction with article 435 (1)	EU LIQA	CRR EBA/GL/2017/01	Qualitative information on the LCR	x	Flexible	-	-	x	Section 4.3	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
LCR in conjunction with article 435 (1)	EU LIQ1 and liquidity coverage ratio of the banking group	CRR EBA/GL/2017/01	Levels and components of the LCR of the banking group	x	Fixed	x	x	x	Section 4.2	
Section 26a		KWG	Legal basis	x	Flexible	-	-	x	Sections 1.1, 1.2	DZ BANK's website in the Investor Relations section under Reports
-	Capital ratios	-	Capital ratios	x	Flexible	x	x	x	Section 5.2.4	

Legal basis	Table name	Source	Description	Relevance	Format	Disclosure frequency			Reference to the regulatory risk report	Reference
						Quarterly	Half-yearly	Annually		
Pillar I and pillar II requirements		Pillar I and pillar II requirements	Regulatory minimum requirements	x	Flexible	x	x	x	Section 5.2.5	
Section 35		German Bank Recovery and Resolution Act (SAG)	Legal basis	x	Flexible	-	-	x	Section 1.1	Combined opportunity and risk report ('opportunity and risk report') contained in the DZ BANK Annual Report
Sections 17 and 18		German Supervision of Financial Conglomerates Act (FKAG) and Delegated Regulation (EU) No. 342/2014	Financial conglomerate solvency	x	Flexible	-	-	x	Section 5.2.6	

18 List of figures

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