# VI Combined opportunity and risk report

# **1 Disclosure principles**

In its capacity as the parent company in the DZ BANK Group, DZ BANK is publishing this opportunity and risk report in order to meet the transparency requirements for opportunities and risks applicable to the DZ BANK Group as specified in sections 114 and 117 of the German Securities Trading Act (WpHG) and section 315 of the German Commercial Code (HGB) in conjunction with German Accounting Standard (GAS) 20. Furthermore, the opportunity and risk report meets the transparency requirements regarding opportunities and risks applicable to DZ BANK as a separate entity that are specified in section 289 HGB in accordance with GAS 20.

This report also implements the applicable international risk reporting requirements, specifically those set out in the following legal standards:

- International Accounting Standard (IAS)
   1.134–136 (capital)
- International Financial Reporting Standard (IFRS) 7.31–42 (nature and extent of risks arising from financial instruments)
- **IFRS 4.38–39A** (nature and extent of risks arising from insurance contracts).

This does not include the legal standards below, because the required disclosures are not used to manage risk. In these instances, the disclosures are included in the notes to the consolidated financial statements ('notes'):

- Accounting-related credit disclosures in accordance with IFRS 7.35F(a)-36(b): note 85
- Maturity analysis in respect of financial assets and financial liabilities in accordance with IFRS 7.39(a) and (b): note 86
- Maturity analysis in respect of financial assets and financial liabilities in accordance with IFRS 4.39(d)(i): note 86

 Claims rate trend for direct non-life insurance business and for the inward reinsurance business in accordance with IFRS 4.39(c)(iii): note 42.

The requirements set out in IFRS 7 are generally limited to financial instruments, shifting the focus of reporting to credit risk, equity investment risk, market risk, and liquidity risk. In contrast, the DZ BANK Group takes a holistic view of all these risks when using risk management tools and when assessing the risk position. As a consequence, the groupwide risk management system not only covers risks that arise specifically in connection with financial instruments, but also all other relevant types of risk. This integrated approach is reflected in the opportunity and risk report.

The opportunity and risk report also includes information in compliance with those recommended risk-related disclosures that have been issued by the **Financial Stability Board** (FSB), the **European Banking Authority** (EBA), and the **European Securities and Markets Authority** (ESMA) that are intended to improve the usefulness of the disclosures in the decision-making process.

The quantitative disclosures in this opportunity and risk report are based on information that is presented to the Board of Managing Directors and used for internal management purposes (known as the **management approach**). This is designed to ensure the usefulness of the disclosures in the decisionmaking process.

The opportunity and risk report of the DZ BANK Group includes disclosures relating to **DZ BANK**. It is therefore a **combined opportunity and risk report** in accordance with section 315 (5) HGB in conjunction with GAS 20.22. A separate opportunity and risk report is not prepared for DZ BANK. Unless stated otherwise, the disclosures relating to the DZ BANK Group and the Bank sector also apply to DZ BANK.

Detailed information on individual **management units** is only provided in the opportunity and risk report if the units are of material significance to opportunity and risk management, potential opportunities, risk factors or the risk position, and if the situation in the subsidiaries differs substantially from the overall descriptions applicable to the DZ BANK Group. However, management units are always specifically mentioned where this is necessary to explain the amount, structure, and management of the risks in the DZ BANK Group, and the changes in these risks.

The disclosure of **non-financial risks in accordance with section 315c HGB in conjunction with section 289c HGB** is included in a separate nonfinancial statement within this Annual Report. The statement analyzes the negative consequences of the activities of the entities in the DZ BANK Group on economic units and persons outside the DZ BANK Group. The concept of risk in section 315c HGB therefore fundamentally differs from the standard concept of risk as defined in Basel Pillar 2, which is concerned with risks that affect the entities in the DZ BANK Group themselves. The risks as defined in Basel Pillar 2 are disclosed in this opportunity and risk report.

The DZ BANK Group and DZ BANK treat reputational risk and operational risk as non-financial risks subject to regulatory standards. Details on the management of these risks are included in sections 13 and 19 (Reputational risk) and in sections 14 and 20 (Operational risk).

# DZ BANK Group

# 2 Summary

# 2.1 Material changes

# 2.1.1 Risk factors

As part of the annual appropriateness test relating to risk disclosure in the DZ BANK Group, the following risk factors that had been included in the 2018 opportunity and risk report were removed because they were found to be not material.

- Commercial-law environment
- UK exit from the EU (Brexit)
- Instability in Turkey
- Catalonian independence.

The risk factor relating to the capital requirement for market risk was assigned to the risk factor Basel IV. 2.1.2 ECB guides to the ILAAP and ICAAP Since the start of 2019, the DZ BANK Group has applied the guides to the internal liquidity adequacy assessment process (ILAAP) and the internal capital adequacy assessment process (ICAAP) that were published by the ECB as part of the Single Supervisory Mechanism (SSM) in November 2018. In accordance with these guides, the DZ BANK Group manages both its liquidity adequacy and its capital adequacy from an economic perspective and from a normative internal perspective. This includes integration of the economic and normative internal perspectives within the ILAAP and within the ICAAP as well as integration between the ICAAP and the ILAAP.

Management of **liquidity adequacy** from an **economic perspective** is closely based on the method that was used until 2018. In this approach, a purely internal view is used to manage liquidity adequacy. This supports the aim of ensuring that all material risks in the DZ BANK Group and at DZ BANK affecting liquidity are covered by full liquidity adequacy. An internally specified management buffer is also held. The **normative internal perspective** is based on the liquidity ratios required under Pillar 1. Its objective is to assess the DZ BANK banking group's ability to comply with regulatory minimum requirements (plus an internally specified management buffer).

The aim of the ICAAP is to ensure that, from two complementary perspectives (the economic and the normative internal perspectives), **capital resources are adequate** for an institution to be able to continue operating. Both perspectives are equally valid management approaches. They are integrated mainly on the basis of the risk inventory check, which the management uses to determine and specify the main risks in the DZ BANK Group.

The economic perspective is purely an internal perspective for managing capital adequacy with the aim of ensuring that all of the DZ BANK Group's material capital risks are fully backed by capital plus an internally specified management buffer. According to the ICAAP guide, the economic perspective is based on the assumption of an institution's continuity. Consequently, a notable change is that subordinated liabilities have not been included in the calculation of the DZ BANK Group's available internal capital since the beginning of 2019. The new method therefore means that the level of economic capital adequacy is significantly lower than under the previous method. The assessment of current economic capital adequacy is supplemented by **stress tests** that analyze economic losses in scenarios covering all types of risk and in scenarios for specific risk types.

# The normative internal perspective is based on

the capital ratios in Pillar 1. Its objective is to ensure that the DZ BANK financial conglomerate and the DZ BANK banking group comply with regulatory minimum capital requirements (plus an internally specified management buffer), both in the current circumstances and in forward-looking scenarios. The normative internal perspective comprises three management dimensions: monitoring of actual regulatory KPIs, capital planning, and adverse stress tests.

# 2.1.3 Central market risk model

Also since the beginning of 2019, the aggregate risk capital requirement for market risk in the Bank sector has been determined centrally at DZ BANK, taking into account concentration and diversification effects. The procedures for determining market risk at sector level previously used locally in the management units have thus been superseded.

2.2 Opportunity and risk management system

#### 2.2.1 Fundamental features

The DZ BANK Group and DZ BANK define opportunities as unexpected positive variances from the forecast financial performance. **Risks** result from adverse developments affecting financial position or financial performance, and essentially comprise the risk of an unexpected future liquidity shortfall or unexpected future losses. A distinction is made between liquidity and capital. Risks that materialize can affect both of these resources.

The management of opportunities in the DZ BANK Group and at DZ BANK is integrated into the annual strategic planning process. Strategic planning is designed to enable the group to identify and analyze market discontinuities based on different macroeconomic scenarios, trends, and changes in the markets, and forms the basis for evaluating opportunities. Opportunities that the management units identify as adding value are fed into the relevant business strategies.

**Reports** on future business development opportunities are based on the business strategies. As part of the general communication of the business strategies, employees are kept up to date about potential opportunities that have been identified.

The management of opportunities and risks forms an integral part of the groupwide strategic planning process. The risk management system is based on the risk appetite statement – the fundamental document for determining risk appetite in the DZ BANK Group – and the specific details of this appetite embodied in **risk strategies**, which are consistent with the business strategies and have been approved by the Board of Managing Directors. The **risk appetite statement** contains risk policy guidelines and risk strategy requirements applicable throughout the group. It also sets out quantitative requirements reflecting the risk appetite specified by the Board of Managing Directors.

**Management and control tools** are used in all areas of risk. These tools are subject to continual further development and refinement. The methods used for measuring risk are integrated into the risk management system. Risk model calculations are used to manage the DZ BANK Group, DZ BANK, and the other management units.

DZ BANK and its subsidiaries have a **risk management system** that covers all material risks and is updated on an ongoing basis in line with changes to the business and regulatory environment. The organizational arrangements, methods, and IT systems that have been implemented – especially the limit system based on risk-bearing capacity, stress testing of all material risk types, and internal reporting – are designed to enable the DZ BANK Group and DZ BANK to identify material risks at an early stage and initiate the necessary control measures. This particularly applies to **risks that could affect the group's survival as a going concern**.

The tools used for the purposes of risk management are also designed to enable the DZ BANK Group to respond appropriately to **significant market movements**. Possible changes in risk factors, such as a deterioration in credit ratings or the widening of credit spreads on securities, are reflected in adjusted risk parameters in the mark-to-model measurement of credit risk and market risk. Conservative crisis scenarios for short-term and medium-term liquidity are intended to ensure that liquidity risk management also takes adequate account of market crises. The risk management system is more detailed than the system for the **management of opportunities** because risk management is subject to comprehensive statutory requirements and is also of critical importance to the continued existence of DZ BANK and the DZ BANK Group as going concerns. The management of opportunities and risks is an integral part of the strategic planning process.

#### 2.2.2 KPIs

Risks affecting liquidity and capital 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). The aim of **risk capital management** is to ensure the availability of capital resources that are commensurate with the risks assumed (capital adequacy).

The key risk management figures used in the DZ BANK Group are the minimum liquidity surplus and the liquidity coverage ratio (LCR) in respect of **liquidity**, economic capital adequacy, the coverage ratio for the financial conglomerate, and the regulatory capital ratios in respect of **capital**, plus the leverage ratio and the minimum requirement for own funds and eligible liabilities (MREL).

The **minimum liquidity surplus**, which reflects economic liquidity adequacy, and **economic capital adequacy** are calculated using the methods developed by DZ BANK. Disclosures on the method used to calculate these key figures can be found in sections 6.2.5 and 7.2.1. Information on the relationship between these figures and the balance sheet can be found in sections 6.2.6 and 7.2.1. The other KPIs mentioned above are calculated in accordance with the methods stipulated by the supervisory authorities. The minimum liquidity surplus and economic capital adequacy cannot be reconciled directly to individual line items in the consolidated financial statements because they are forward-looking considerations. Although these key figures are based on the consolidated financial statements, a number of other factors are used in their calculation. The disclosure of these figures in the opportunity and risk report is in accordance with the financial reporting standards to be applied in external risk reporting.

### 2.2.3 Management units

All DZ BANK Group entities are integrated into the groupwide opportunity and risk management system. DZ BANK and its main subsidiaries – also referred to as management units – form the core of the financial services group. The DZ BANK Group largely comprises the regulatory DZ BANK banking group and R+V.

The insurance business operated at R+V differs in material respects from the other businesses of the DZ BANK Group. For example, actuarial risk is subject to factors that are different from those affecting risks typically assumed in banking business. Furthermore, policyholders have a share in any gains or losses from investments in connection with life insurance, as specified in statutory requirements, and this must be appropriately taken into account in the measurement of risk. Not least, the supervisory authorities also treat banking business and insurance business differently and this is reflected in differing regulatory regimes for banks and insurance companies.

Because of these circumstances, two sectors – Bank sector and Insurance sector – have been created within the DZ BANK Group for the purposes of risk management. The management units are assigned to these sectors as follows:

# Bank sector:

- DZ BANK
- BSH
- DVB
- DZ HYP
- DZ PRIVATBANK
- TeamBank
- UMH
- VR Smart Finanz

### Insurance sector:

- R+V.

The management units represent the operating segments of the DZ BANK Group. From a risk perspective, the 'DZ BANK' management unit equates to the central institution and corporate bank operating segment and the holding function.

**DZ HYP** has applied the **waiver** pursuant to section 2a (1), (2), and (5) of the German Banking Act (KWG) in conjunction with article 7 (1) of the Capital Requirements Regulation (CRR), under which – provided certain conditions are met – the regulatory supervision at individual bank level may be replaced by supervision of the entire banking group.

The management units are deemed to be material in terms of their contribution to the DZ BANK Group's aggregate risk and are therefore directly incorporated into the group's risk management system. The other subsidiaries and investee entities are included in the system indirectly as part of equity investment risk.

The management units' subsidiaries and investees are also included in the DZ BANK Group's risk management system – indirectly via the majorityowned entities – with due regard to the minimum standards applicable throughout the group.

Risk is managed groupwide on a consolidated basis. Risks arising in the subsidiaries therefore impact the risk-bearing capacity of DZ BANK as the group parent. **2.3 Potential opportunities and risk factors** The DZ BANK Group and DZ BANK have the benefit of significant **potential opportunities** from the strategic focus on the cooperative banks and from increasing digitalization, especially in the payments processing business. In addition, the funding opportunities in money and capital markets derived from the credit ratings enjoyed by DZ BANK and its subsidiaries enable the entities in the DZ BANK Group to pursue a wider range of business options.

The DZ BANK Group and DZ BANK are exposed to risk factors that could have an adverse impact on liquidity adequacy and capital adequacy. For example, the **regulatory framework** for the banking industry remains characterized by ever tighter regulatory requirements. These developments particularly have an impact on business risk.

# The DZ BANK Group and DZ BANK are also exposed to the following **macroeconomic risk** factors:

- Low interest rates
- Global trade disputes
- Economic divergence in the eurozone
- Challenging shipping and offshore markets
- Climate change.

A potential **rating downgrade** for DZ BANK or its subsidiaries represents a further risk factor across all risk types for the DZ BANK Group and DZ BANK.

**Risk factors specific to each type of risk** also determine the extent of risk exposure in the DZ BANK Group and at DZ BANK. Detailed disclosures in this regard are provided in sections 8 to 20, in each case under the header 'Specific risk factors'.

# 2.4 Risk

# 2.4.1 Features of managed risks

The main **features of the directly managed risks** and their significance for the operating segments in the Bank and Insurance sectors are shown in Fig. 5 and Fig. 6. The risks shown correspond to the outcome of the risk inventory check carried out for 2019 and reflect the risks that are material to the DZ BANK Group and DZ BANK.

To ensure that the presentation of the disclosures remains clear, the risk management system disclosures included in the opportunity and risk report are limited to the main material entities in the group (indicated in Fig. 5 by a dot on a dark gray background). This selection is based on a materiality assessment, which takes into account the contribution of each management unit to the DZ BANK Group's overall risk for each type of risk. However, the figures presented in the opportunity and risk report cover all the management units included in the internal reporting system (indicated additionally in Fig. 5 by a dot on a light gray background).

The following risks have been identified as not material:

- Funding risk (Bank sector)
- Strategic risk (Bank sector and Insurance sector).

#### FIG. 5 – RISKS AND OPERATING SEGMENTS IN THE BANK SECTOR<sup>1</sup>

Risk

	Risk type	Definition	Specific risk factors
	RISK NOT COVERED BY CAPITAL Liquidity risk	Risk that cash and cash equivalents will not be available in sufficient amounts to ensure that payment obligations can be met (insolvency risk)	<ul> <li>Withdrawal of funding</li> <li>Greater collateral requirements</li> <li>Changes in the fair value of financial instruments</li> <li>Exercise of drawing rights</li> <li>Exercise of termination rights</li> <li>Conclusion of new business to uphold reputation</li> <li>Repurchase of products to uphold reputation</li> <li>Increased liquidity requirement for intraday payments</li> <li>Restrictions on currency-related liquidity generation via currency swaps</li> </ul>
	RISK COVERED BY CAPITAL		
	<b>Credit risk</b> – Traditional credit risk – Issuer risk – Replacement risk	Risk of losses arising from the default of counterparties (borrowers, issuers, other counterparties) and from the migration of the credit ratings of these counterparties	<ul> <li>Increase in the concentration of volume in counterparties, industries, or countries</li> <li>Accumulation of exposures with longer terms to maturity</li> </ul>
	Equity investment risk	Risk of losses arising from negative changes in the fair value of that portion of the long-term equity investments portfolio for which the risks are not included in other types of risk	Increased requirement for the recognition of impairment losses on the carrying amounts of investments – as a result of impaired carrying amounts – as a result of a lack of information in the case of non-controlling interests
ıancial risks	Market risk – Interest-rate risk – Equity risk – Fund price risk – Currency risk – Commodity risk – Spread risk and migration risk – Asset-management risk – Market liquidity risk	<ul> <li>Risk of losses that could arise from adverse changes in market prices or in the parameters that influence prices (market risk in the narrow sense of the term)</li> <li>Risk of losses that could arise from adverse changes in market liquidity (market liquidity risk)</li> </ul>	<ul> <li>Widening of credit spreads on government and corporate bonds</li> <li>Shortages of market liquidity</li> </ul>
Fin	Technical risk of a home savings and loan company <sup>2</sup> – New business risk – Collective risk	<ul> <li>Risk of a negative impact from possible variances compared with the planned new business volume (new business risk)</li> <li>Risk of a negative impact that could arise from variances between the actual and forecast performance of the collective building society operations caused by significant long-term changes in customer behavior unrelated to changes in interest rates (collective risk)</li> </ul>	<ul> <li>Decline in new business</li> <li>Changed customer behavior (unrelated to changes in interest rates)</li> </ul>
	Business risk	Risk of losses arising from earnings volatility for a given business strategy and not covered by other types of risk	<ul> <li>Costs of regulation</li> <li>Competition based on pricing and terms</li> <li>Greater competition in capital markets business</li> <li>New competitors in transaction banking</li> </ul>
	Reputational risk <sup>3</sup>	Risk of losses from events that damage confidence, mainly among customers (including the cooperative banks), shareholders, employees, the labor market, the general public, and the supervisory authorities, in the entities in the Bank sector or in the products and services that they offer	– Decrease in new and existing business – Backing of stakeholders is no longer guaranteed
Non-financial risks	Operational risk	Risk of losses from human behavior, technological failure, weaknesses in process or project management, or external events	HR risk: - Business interruption caused by strikes - Insufficient availability of employees and skills IT risk: Malfunctions or breakdowns in data processing systems Outsourcing risk: Disruptions to outsourced processes and services Legal risk: Adverse changes in the legal environment Tax risk: - Adverse changes in the tax framework - Adverse changes in the interpretation by tax authorities of the existing tax framework - Adverse changes in non-tax rules - Retrospective tax liabilities Compliance risk: Violations of legal provisions Risks in connection with the (consolidated) financial reporting process: deficiencies in external financial reporting

1 Apart from migration risk on traditional loans, which are covered by the capital buffer.
 2 Including business risk and reputational risk of BSH.
 3 The Bank sector's reputational risk is contained in the risk capital requirement for business risk. BSH's reputational risk, which is covered mainly by the technical risk of a home savings and loan company, is not included here.

Risks		Operating segments (management units)							
Risk management KPIs disclosed		DZ BANK	BSH	DVB	DZ HYP	DZ PRIVAT BANK	TeamBank	НМИ	VR Smart Finanz
<ul> <li>Liquid securities</li> <li>Unsecured short-term and medium-term funding</li> <li>Minimum liquidity surplus</li> <li>LCR</li> </ul>	Section 6.2.6 Section 6.2.6 Section 6.2.7 Section 6.3.3	•	•	•	•	•	•		•
– Lending volume – Risk capital requirement	Sections 8.6, 8.7, and 8.8 Section 8.10	•	•	•	•	•	•		•
– Carrying amounts of investments – Risk capital requirement	Section 9.5	•	•	•	•		•	•	•
– Value-at-risk – Risk capital requirement	Section 10.7.1 Section 10.7.2	•	•	•	•	•	•	•	•
Risk capital requirement	Section 11.5		•						
Risk capital requirement	Section 12.4	•	•	•	•	•	•	•	•
		•	•	•	•	•	•	•	•
– Loss events and losses – Risk capital requirement	Section 14.12 Section 14.13	•	•	•	•	•	•	•	•

Management unit disclosures in the opportunity and risk report:

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#### FIG. 6 - RISKS IN THE INSURANCE OPERATING SEGMENT AND SECTOR

	Risk type	Definition	Specific risk factors	Risk management KPIs disclosed			
	RISK COVERED BY CAPITAL PURS	UANT TO SOLVENCY II					
ncial risks	Actuarial risk – Life actuarial risk – Health actuarial risk – Non-life actuarial risk	<ul> <li>Life actuarial risk: Risk arising from the assumption of life insurance obligations in relation to the risks covered and the processes used in the conduct of this business</li> <li>Health actuarial risk: Risk arising from the assumption of health and casualty insurance obligations in relation to the risks covered and the processes used in the conduct of this business</li> <li>Non-life actuarial risk: Risk arising from the assumption of non-life insurance obligations in relation to the risks covered and the processes used in the conduct of this business</li> </ul>	<ul> <li>Life actuarial risk: Adverse change in the calculation assumptions for life insurance over the lifetime of the contract</li> <li>Health actuarial risk: Higher drawdown of benefits by health insurance policyholders</li> <li>Non-life actuarial risk: Unexpected rise in claims incurred</li> </ul>	- Claims rate trend in non- life insurance - Overall solvency requirement	Section 16.6 Section 16.7		
Finar	Market risk – Interest-rate risk – Spread risk – Equity risk – Currency risk – Real-estate risk – Concentration risk	Risk arising from fluctuation in the level or volatility of market prices of financial instruments that have an impact on the value of the assets and liabilities of the entity	<ul> <li>Rise in interest rates or widening of credit spreads</li> <li>Deterioration of the financial circumstances of issuers or debtors</li> </ul>	<ul> <li>Lending volume</li> <li>Overall solvency requirement</li> </ul>	Section 17.4 Section 17.5		
	Counterparty default risk	Risk of possible losses due to unexpected default or deterioration in the credit standing of counterparties or debtors of insurance or reinsurance companies over the subsequent 12 months	Deterioration of counterparties' financial circumstances	<ul> <li>Lending volume</li> <li>Overall solvency requirement</li> </ul>	Section 17.4 Section 18.4		
	Reputational risk <sup>1</sup>	Risk of losses that could arise from possible damage to the reputation of R+V or of the entire industry as a result of a negative perception among the general public	<ul> <li>Decrease in new and existing business</li> <li>Backing of stakeholders is no longer guaranteed</li> </ul>				
Non-financial risks	Operational risk	Risk of loss arising from inadequate or failed internal processes, personnel, or systems, or from external events (including legal risk)	HR risk: Insufficient availability of employees and skills IT risk: Malfunctions or breakdowns in data processing systems Legal risk: Adverse changes in the legal environment Tax risk: – Adverse changes in the tax framework – Changes in the interpretation by tax authorities of the existing tax framework – Retrospective tax liabilities	Overall solvency requirement	Section 20.7		
	RISK COVERED BY CAPITAL PURS	UANT TO SOLVENCY I					
	Risks from entities in other financial sectors	The entities in other financial sectors mainly consist of pension funds and occupational pension schemes	Generally corresponding to the risk factors for risks backed by capital pursuant to Solvency II	Overall solvency requirement	Section 21		

1 The Insurance sector's reputational risk is included in the overall solvency requirement for life actuarial risk (lapse risk).

#### 2.4.2 Risk profile

The DZ BANK Group's **business model** and the associated business models used by the management units (see section I.1 of the (group) management report) shape the risk profile of the group. The main risks associated with the business models of the management units are shown in Fig. 5 and Fig. 6. The businesses operated by the DZ BANK Group and DZ BANK that have a significant impact on the risk profile are described under 'Business background and risk strategy' within the sections of the opportunity and risk report covering the different risk types.

The values for the **risk-related KPIs** presented in Fig. 7 reflect the liquidity risks and the risks backed by

capital assumed by the DZ BANK Group and DZ BANK. They illustrate the **risk profile** of the DZ BANK Group. The values for these KPIs are compared against the (internal) threshold values specified by the Board of Managing Directors of DZ BANK with due regard to the business and risk strategies – also referred to below as **risk appetite** – and against the (external) minimum targets laid down by the supervisory authorities.

The interaction between the risk profile and risk appetite is explained in section 6 in connection with liquidity adequacy, and in section 7 in connection with capital adequacy.

#### FIG. 7 – RISK-RELATED KPIS

			Internal minimu	im threshold		
	Measured figure		value	e <sup>1</sup>	External minin	num target
-	Dec. 31, 2019	Dec. 31, 2018	2019	2018	2019	2018
LIQUIDITY ADEQUACY						
DZ BANK Group (economic perspective)						
Economic liquidity adequacy (€ billion) <sup>2</sup>	12.5	12.0	4.0	4.0	0.0	0.0
DZ BANK banking group						
Liquidity coverage ratio (%)	144.6	141.4	110.0	110.0	100.0	100.0
CAPITAL ADEQUACY						
DZ BANK Group (economic perspective)						
Economic capital adequacy (%) <sup>3</sup>	159.3	170.3	120.0	120.0	100.0	100.0
DZ BANK financial conglomerate						
(normative internal perspective)						
Coverage ratio for the financial conglomerate (%) <sup>+ 3</sup>	171.9	174.0	120.0	120.0	100.0	100.0
DZ BANK banking group (normative internal perspective)						
Common equity Tier 1 capital ratio (%) <sup>56</sup>	14.4	13.7	11.5	11.0	9.8	8.8
Tier 1 capital ratio (%) <sup>5 6</sup>	15.9	14.3	13.0	12.5	11.3	10.3
Total capital ratio (%) <sup>5 6</sup>	17.9	16.8	15.0	14.5	13.3	12.3
Leverage ratio (%) <sup>5</sup>	4.9	4.3	3.5	3.5		
MREL ratio (%) <sup>7</sup>	11.4	14.4	8.5		8.2	8.2

1 As specified by the Board of Managing Directors.

2 The measured value relates to the stress scenario with the lowest minimum liquidity surplus. The internal threshold value relates to the observation threshold. 3 The internal threshold value is the amber threshold in the traffic light system for managing and monitoring economic capital adequacy. The value originally measured as at December 31, 2018 was 167.8 percent and has been adjusted due to the scheduled recalculation of the overall solvency requirement for the Insurance sector. 4 Figure measured as at December 31, 2019: Preliminary coverage ratio. Figure measured as at December 31, 2018: Final coverage ratio.

5 Measured values based on full application of the CRR.

6 The external minimum targets are the binding regulatory minimum capital reguirements. Details on the minimum capital reguirements can be found in section 7.3.3.

7 Measured value as at September 30, 2019 rather than as at December 31, 2019.



The DZ BANK Group met the internal threshold values and external minimum targets on every measurement date/every reporting date in 2019. The solvency of DZ BANK or its subsidiaries was never in jeopardy on any risk measurement date during the reporting period. By holding liquidity reserves, the DZ BANK Group and DZ BANK are able to protect their liquidity against any potential crisis-related threats. They also complied with regulatory requirements for liquidity adequacy on every reporting date.

In addition, the DZ BANK Group remained within its economic risk-bearing capacity in 2019 and also complied with regulatory requirements for capital adequacy on every reporting date.

# **3 Fundamental principles of managing** opportunities and risks

3.1 Regulatory framework for risk management The conglomerate-wide risk management system takes into account the statutory requirements specified in section 25 (1) of the German Supervision of Financial Conglomerates Act (FKAG) in conjunction with section 25a KWG and the German Minimum

Requirements for Risk Management for Banks and Financial Services Institutions (MaRisk BA). In respect of risk management for the relevant management units, the DZ BANK Group also observes the requirements specified in sections 26 and 27 of the German Act on the Supervision of Insurance Undertakings (VAG) and section 28 of the German Capital Investment Code (KAGB) in conjunction with the German Minimum Requirements for Risk Management for Investment Management Companies (KAMaRisk).

When DZ BANK designed the risk management system of the DZ BANK Group and DZ BANK, it followed the guidance provided by the EBA and the European Insurance and Occupational Pensions Authority (EIOPA), together with the pronouncements of the Basel Committee on Banking Supervision (BCBS) and the Financial Stability Board (FSB) on risk management issues.

In the year under review, DZ BANK updated its recovery plan in accordance with the requirements specified by banking supervisors. The recovery plan is based on the requirements specified in the German Bank Recovery and Resolution Act (SAG) and in

other legal sources, especially Commission Delegated Regulation (EU) No. 2016/1075, which implements various EBA guidelines and also includes specific national stipulations. The German Minimum Requirements for the Design of Recovery Plans (MaSan) contains further relevant provisions. An updated recovery plan was prepared during the reporting year and submitted to the ECB.

In accordance with article 7 (2) of Regulation (EU) No. 806/2014, the Single Resolution Board (SRB) is the European regulator responsible under the Single Resolution Mechanism (SRM) for the preparation of resolution plans and for all decisions in connection with the resolution of all institutions that are under the direct supervision of the ECB. A group resolution plan is drawn up for institutions that are subject to supervision at consolidated level. The SRB works closely with the national resolution authorities (in 2019 in Germany, this was the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) [German Federal Financial Supervisory Authority]). The resolution plan is aimed at ensuring the resolvability of the banking group. In accordance with section 42 (1) SAG, the resolution authority (BaFin) can demand that the institution provide it with comprehensive assistance in connection with drawing up and updating the resolution plan. For this reason, as in prior years, DZ BANK once again in 2019 supported the ongoing preparation of the resolution plan for the DZ BANK Group. It supplied the resolution authority with numerous analyses related to DZ BANK and completed standardized questionnaires.

### 3.2 Risk culture

The risk culture at DZ BANK is shaped by the high degree of responsibility assumed by the cooperative financial network for its members and for society. At DZ BANK, activities involving risk are based on the values of drive, integrity, and trust. The priority is on compliance with strategic and associated operating requirements when dealing with risk. The risk culture is reflected in the existing risk management processes and methods and in the conduct of employees.

The following principles apply in respect of employee conduct:

- Leadership culture: The management must set out clear expectations regarding the handling of risk and lead by example.
- Risk appetite: Employees must understand their roles and their part in the risk management system; they must assume responsibility for their decisions.

- Communications: Internal communications must be open and consensus-based. Alternative opinions must be respected and employees encouraged to analyze risk transparently.
- Employees and expertise: Employees must bear responsibility for conscious handling of risk. They must use the available expertise and undertake continuing professional development in a changing environment.
- Change management: Employees must learn from past experience and ensure the business model is sustainable by managing change proactively.

The key features of the risk culture are documented in a framework, which is available to all employees of DZ BANK.

#### 3.3 Risk strategies

The exploitation of business opportunities and the systematic, controlled assumption of risk in relation to target returns form an integral part of corporate control in the DZ BANK Group and at DZ BANK. The activities resulting from the business model require the ability to identify, measure, assess, manage, monitor, and communicate opportunities and risks. The need to hold appropriate reserves of cash and to cover risks with adequate capital is also recognized as an essential prerequisite for the operation of the business and is of fundamental importance.

In all their activities, the DZ BANK Group and DZ BANK therefore observe a risk culture in which they only take on risk to the extent necessary to achieve their business objectives – taking account of the guiding principle of a 'network-oriented central institution and financial services group' – and to the extent that they have an adequate understanding of, and expertise in, measuring and managing the risk. The focus is on all material risks from the perspectives of capital/income and liquidity and on avoiding the aggressive assumption of risk.

In order to implement this principle, the Board of Managing Directors of DZ BANK has drawn up risk strategies for each of the material risks using the business strategies as a basis. The risk strategies each encompass the main risk-bearing business activities, the objectives of risk management (including the requirements for accepting or preventing risk), and the action to be taken to attain the objectives. The risk strategies are each valid for one calendar year. The annual updating of the risk strategies is integrated with the strategic planning process and is carried out by the Group Risk Controlling, Credit, Credit Services, and Strategy & Group Development divisions in consultation with other relevant divisions at DZ BANK and the subsidiaries concerned.

The risk strategies are described in the following sections covering the individual risk types.

# 3.4 Risk appetite

The entities in the DZ BANK Group define risk appetite as the nature and extent of the risks that will be accepted at group level or by the management units when implementing their business models. Risk appetite equates to the term 'risk tolerance' used by the supervisory authorities in a disclosure context.

The risk appetite statement formulates risk policy principles on risk tolerance in the DZ BANK Group. The principles are overarching statements that are consistent with the business model and the risk strategies. The qualitative principles are supplemented by quantitative key figures, for which threshold values are set internally. These key figures constitute the DZ BANK Group's risk-oriented KPIs. The values for the KPIs and the internal threshold values are shown in Fig. 7. The monthly overall risk report is used to monitor the internal threshold values.

Disclosures on the business model and the business strategies can be found in section I.1 (Business model and strategic focus) of the (group) management report.

3.5 Opportunity and risk-oriented corporate governance

# 3.5.1 Governance structure

The **risk management system** in the DZ BANK Group and at DZ BANK builds on the risk strategies adopted by the Board of Managing Directors of DZ BANK. It is based on three lines of defense that are interlinked and well established in the monitoring and control environment. Fig. 8 shows the governance structure for risk management.

The **three-lines-of-defense model** clarifies the understanding of risk management within the DZ BANK Group and sets out the roles and responsibilities.

The interaction between the three functional areas, or lines of defense, is intended to provide the basis for effective groupwide risk management. The tasks of the individual lines of defense are as follows:

**First line of defense**: Day-to-day assumption and management of risk; related reporting to the Board of Managing Directors

# Second line of defense:

- Establishment and enhancement of a framework for risk management
- Monitoring of compliance with the framework in the first line of defense
- Related reporting to the Supervisory Board and Board of Managing Directors
- Second vote in credit decisions as defined in MaRisk
- Structuring and monitoring of compliance, data protection, and corporate security

# Third line of defense:

- Process-independent examination and assessment of risk management and control processes in the first and second lines of defense.
- Reporting to the Board of Managing Directors, Supervisory Board, and Audit Committee

Independent auditors, together with banking and insurance supervisory authorities, form the **external control functions** and these functions regularly hold discussions with all three lines of defense. The supervisory authorities can specify key points to be covered by independent auditors in their audits of financial statements. The auditors report to the supervisory authorities on the findings of their audits of financial statements and special audits.

The role of the opportunity and risk management **committees** in the corporate governance structure is presented in section I.2.2.3 (Corporate management committees), which can be found in the 'DZ BANK Group fundamentals' chapter of the (group) management report.

# 3.5.2 Risk management

Risk management refers to the operational implementation of the risk strategies in the riskbearing business units based on standards applicable throughout the group.

The management units make conscious decisions on whether to assume or avoid risks. They must observe guidelines and risk limits specified by the head office.



FIG. 8 – GOVERNANCE STRUCTURE OF RISK MANAGEMENT IN THE DZ BANK GROUP AND AT DZ BANK (SCHEMATIC DIAGRAM)

The divisions responsible for risk management in the first line of defense are separated in terms of both organization and function from the divisions in the second and third lines of defense.

# 3.5.3 Risk control

Central Risk Controlling at DZ BANK is responsible for identifying, measuring, and assessing risk in the DZ BANK Group. This role includes early detection, full recording of data (to the extent that this is possible), and internal monitoring for all material risks. Risk Controlling also reports risks to the Supervisory Board, the Board of Managing Directors, and the management units.

Risk Controlling at DZ BANK lays down the fundamental requirements for the risk measurement methods to be used throughout the group and coordinates implementation with the risk control units in the other management units. The aim of this structure is to ensure that the management of risk capital is consistent throughout the group. In cooperation with the other management units, Risk Controlling at DZ BANK establishes a groupwide risk reporting system covering all material types of risk based on specified minimum standards using methods agreed between the management units.

Both at DZ BANK and in the other management units, Risk Controlling is responsible for the transparency of risks assumed and aims to ensure that all risk measurement methods used are up to date. The risk control units in the management units also monitor compliance with the entity-related limits that have been set based on the risk capital allocated by DZ BANK. Risk Controlling at DZ BANK is also responsible for risk reporting at group level.

# 3.5.4 Credit back-office division

The Credit divisions of the entities in the Bank sector form the back office within the meaning of MaRisk. They are responsible for aspects of identifying, measuring, monitoring, and managing credit risk. These aspects include analyzing the risk (including ratings), approving or rejecting a credit decision with the back office's 'second vote', ensuring compliance with the credit risk strategy, and identifying and appropriately assessing the risks from loans to members of the governing bodies. The responsibilities of the back office also comprise the ongoing monitoring of loan exposures, including identifying and processing non-performing exposures and deciding on measures to be implemented if limits are exceeded, as well as the management of loan collateral. In the case of exposure that are relevant for management, the exposure throughout the group is taken into account and appropriate management guidance is given to the management units.

The Credit back-office division also specifies credit standards, processes, and procedures for the lending business and monitors compliance in a number of ways, notably through the comply-or-explain approach. In addition, the Credit divisions are responsible for supervising and updating the group credit risk reporting system, which complements the risk control reporting system.

# 3.5.5 Compliance

The Board of Managing Directors of DZ BANK and the Boards of Managing Directors of the other management units are responsible for compliance with legal provisions and requirements and for the principles and measures implemented for this purpose. To fulfill these duties, the Boards of Managing Directors generally appoint an independent compliance function.

The main tasks of the compliance function are to identify, manage, and mitigate compliance risk in order to protect customers, DZ BANK, the other entities in the DZ BANK Group, and their employees against breaches of legal provisions and requirements. The compliance function is also responsible for monitoring compliance with the legal provisions and requirements. Other tasks of the compliance function are to keep senior management up to date with new regulatory requirements and to advise the departments on implementing new provisions and requirements.

In accordance with the requirements of the Supervisory Review and Evaluation Process for Basel Pillar 2 (SREP), a single compliance framework must be established for the main entities in the DZ BANK Group. This framework must lay down rules on cooperation between the individual compliance functions and set out their authority and responsibilities.

The DZ BANK Group's compliance framework comprises the compliance policy. The policy includes requirements for establishing and organizing the compliance functions and details of their duties. It is supplemented by compliance standards, which specify how to implement these requirements at an operational level.

If individual requirements in the compliance standards cannot be fulfilled by a management unit, for example because they conflict with local rules or special legal requirements, the affected management unit must provide an explanation.

The DZ BANK Group's compliance framework is reviewed annually to check that it is up to date.

# 3.5.6 Data protection

The entities in the DZ BANK Group have introduced suitable precautions aimed at ensuring that they comply with data protection provisions relating to customers, business partners, and employees. This has involved, in particular, creating the function of data protection officer and issuing standard data protection principles. In addition, employees regularly receive updates on the currently applicable data protection provisions.

In the management units, independent data protection officers report to the relevant Board of Managing Directors. At the invitation of DZ BANK's data protection officer, the data protection officers in the management units meet at least once a year to share information on current data protection issues and discuss potential joint data protection activities.

### 3.5.7 Corporate security

DZ BANK and the other management units take into account the relevant regulatory requirements in the following areas of corporate security:

- Information security
- Business continuity management
- Outsourcing management.

In some management units, these areas of activity are not assigned to corporate security from an organizational perspective. The regulatory requirements are implemented in all of the group's subsidiaries by means of written specifications and compliance is monitored by DZ BANK. Information security

The DZ BANK Group understands information security to be the operational security of processes, IT applications, and IT infrastructures.

DZ BANK has implemented an information security management system (ISMS). The rules that it contains, along with the methodological framework that it provides, are based on the ISO/IEC 27001:2013 standard. The ISMS is designed to ensure the confidentiality, integrity, availability, and authenticity of data and the media on which data is stored (IT applications, IT systems, and infrastructure components). The governance model implemented defines the methods, processes, roles, responsibilities, authority, and reporting channels that are necessary to achieve the strategic objectives and carry out the tasks of information security at operational level. It also provides an operational framework for the consistent quantitative and qualitative evaluation and management of information security risk, which forms part of operational risk.

# Business continuity management

At DZ BANK, business continuity management provides structures and methodologies that will enable time-critical business processes to be maintained should an emergency arise (dealing with emergencies). Measures to prevent such emergencies are also developed and implemented (preventing emergencies). In this way, DZ BANK aims to ensure that it can maintain its operations in the event of emergencies, even though the level of activity may have to be reduced. This applies particularly if there are situations in which whole groups of individuals or significant parts of the buildings or IT infrastructure are affected.

At DZ BANK, time-critical business processes are identified by the head-office team for business continuity management using business impact analyses and protected by business continuity planning. DZ BANK's business continuity management system has been certified in accordance with the ISO 22301 2012 standard.

#### Outsourcing management

At DZ BANK, the central outsourcing management unit acts as the central point of contact for all issues relating to the management of external procurement. This includes outsourcing and management-relevant external procurement (external procurement of IT services and other purchases from third parties). The Central Outsourcing Management (COM) unit is responsible for developing, introducing, and monitoring the framework specifications as well as for appropriately implementing the statutory requirements in respect of regulated external procurement at DZ BANK.

The framework specifications for outsourcing management include general requirements for the management units in the Bank sector to ensure that the management of outsourcing is largely standardized throughout the DZ BANK Group. The Insurance sector is subject to separate regulatory requirements that are described in internal guidance issued by R+V.

Further disclosures on outsourcing risk can be found in section 14.7.

# 3.5.8 Control functions

#### Internal audit

The **internal audit** departments of DZ BANK and all the main subsidiaries are responsible for non-processspecific control and monitoring tasks. They carry out systematic, regular risk-based audits focusing on compliance with statutory and regulatory requirements. The internal audit departments also review and assess risk management and the internal control system to ensure that they are fully operational and effective, and that processing is properly carried out. In addition, they monitor the action taken in response to audit findings to ensure that identified problems have been rectified.

The internal audit departments at DZ BANK and the other management units report to the chief executive officer or other senior managers of the unit concerned.

DZ BANK's internal audit department is responsible for internal audit tasks at group level. These tasks include, in particular, the coordination of audits involving multiple entities, the implementation of which lies within the remit of the individual internal audit departments in the management units concerned, and the evaluation of individual management unit audit reports of relevance to the group as a whole. Cooperation between internal audit departments in the DZ BANK Group is governed by a separate set of rules and arrangements.

#### Supervisory Board

The Board of Managing Directors reports to the Supervisory Board of DZ BANK four times a year about the risk situation, the risk strategies, and the status and further development of the risk management system of the DZ BANK Group and DZ BANK. The Board of Managing Directors also provides the Supervisory Board with reports about significant loan and investment exposures and the associated risks, again four times a year. The Supervisory Board discusses these issues with the Board of Managing Directors, advises it, and monitors its management activities. The Supervisory Board is involved in decisions of fundamental importance.

The Supervisory Board has set up a Risk Committee, which addresses issues related to overall risk appetite and risk strategy. The chairman of the Risk Committee reports to the full Supervisory Board four times a year on the material findings of the committee's work.

At least quarterly, the Board of Managing Directors makes the centrally produced risk reports available to the members of the Risk Committee and the other members of the Supervisory Board. The chairman of the Risk Committee informs the full Supervisory Board about the main content of these reports no later than at its next meeting.

# External control functions

Independent **auditors** carry out audits pursuant to section 29 (1) sentence 2 no. 2a KWG in conjunction with section 25a (1) sentence 3 KWG in relation to the risk management system, including the internal control functions, of the entities in the Bank sector. For the Insurance sector, verification of the Solvency II balance sheet is carried out pursuant to section 35 (2) VAG and an audit of the early-warning system for risk, including the internal monitoring system of R+V, is carried out pursuant to section 35 (3) VAG in conjunction with section 317 (4) HGB and section 91 (2) of the German Stock Corporation Act (AktG).

# The **banking and insurance supervisory authorities** also conduct audits focusing on risk.

### 3.5.9 General internal control system

The objective of DZ BANK's internal control system and the corresponding control systems in other management units is to ensure the effectiveness and efficiency of the risk management activities within the DZ BANK Group and at DZ BANK by means of basic principles, action plans, and procedures.

Organizational structures and controls built into work processes serve to ensure that the monitoring of risk management activity is integrated into processes. IT systems are systematically protected by authoritydependent management of authorizations and by technical security measures, the aim of which is to prevent unauthorized access both within and outside management units.

# 3.5.10 Internal control system for the (consolidated) financial reporting process

# Objective and responsibilities

DZ BANK is subject to a requirement to prepare consolidated financial statements and a group management report as well as separate financial statements and a management report. The primary objective of external (consolidated) financial reporting in the DZ BANK Group and at DZ BANK is to provide decision-useful information for the users of the reports. This includes all activities to ensure that (consolidated) financial reporting is properly prepared and that material violations of accounting standards – which could result in the provision of inaccurate information to users or in mismanagement of the group – are avoided with a sufficient degree of certainty.

In order to limit operational risk in this area of activity, DZ BANK and its subsidiaries have set up internal control systems for the (consolidated) financial reporting process as an integral component of the control systems put in place for the general risk management process. In this context, the activities of employees, the implemented controls, the technologies used, and the design of work processes are structured to ensure that the objectives associated with (consolidated) financial reporting are achieved.

Overall responsibility for (consolidated) financial reporting lies in the first instance with Group Finance and Group Risk Controlling at DZ BANK, with all the consolidated entities in the DZ BANK Group responsible for preparing and monitoring the quantitative and qualitative information required for the consolidated financial statements.

#### Instructions and rules

The methods to be applied within the DZ BANK Group in the preparation of the consolidated financial statements are set out in writing in a group manual. The methods to be applied within DZ BANK in the preparation of the separate financial statements are documented in a written set of procedural rules. Both of these internal documents are updated on an ongoing basis. The basis for external 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 in risk disclosure in the DZ BANK Group and at DZ BANK. The instructions and rules are audited to assess whether they remain appropriate and are amended in line with changes to internal and external requirements.

#### Resources and methods

The processes set up at DZ BANK and its subsidiaries aim to facilitate (using suitable IT systems) efficient risk management in respect of financial reporting, based on the guidelines set by the Finance working group and taking into account the rules in the risk manual and the policy on risk disclosure.

The group's financial reporting process is decentralized. Responsibility for preparing and checking the quantitative and qualitative information required for the consolidated financial statements lies with the organizational units used for this purpose in the entities of the DZ BANK Group. The Group Finance and Group Risk Controlling divisions at DZ BANK implement the relevant controls and checks in respect of data quality and compliance with the DZ BANK Group rules. Guidelines for the management units' risk control departments on data quality management and the internal control system set out the standards for ensuring the quality of data in the process for managing economic capital adequacy.

The organizational units post the accounting entries for individual transactions. The consolidation processes are carried out by DZ BANK's Group Finance division and by the accounting departments of each entity in the DZ BANK Group. The purpose of this structure is to ensure that all accounting entries and consolidation processes are properly documented and checked.

Financial reporting, including consolidated financial reporting, is chiefly the responsibility of employees of DZ BANK and the other organizational units used for this purpose in the entities of the DZ BANK Group. If required, external experts are brought in for certain accounting-related calculations as part of the financial reporting process, such as determining the defined benefit obligation and valuing collateral.

Consolidated financial reporting is based on mandatory workflow plans agreed between DZ BANK's Group Finance division and the individual accounting departments of the organizational units within the DZ BANK Group. These plans set out the procedures for collating and generating the quantitative and qualitative information required for the preparation of statutory company reports and which are necessary for the internal management of the operating units within the DZ BANK Group.

Generally accepted valuation methods are used in the preparation of the consolidated financial statements and group management report, and the separate financial statements and the management report. These methods are regularly reviewed to ensure they remain appropriate.

In order to ensure the efficiency of the (consolidated) financial reporting system, the processing of the underlying data is extensively automated using IT systems. Control mechanisms are in place with the aim of ensuring the quality of processing and are one of the elements used to limit operational risk. (Consolidated) accounting input and output data undergoes automated and manual checks.

Business continuity plans have also been put in place. These plans are intended to ensure the availability of HR and technical resources required for the (consolidated) accounting and financial reporting processes.

### Information technology

The IT systems used for (consolidated) financial reporting have to satisfy the applicable security requirements in terms of confidentiality, integrity, availability, and authenticity. Automated controls are used to ensure that the processed (consolidated) accounting data is handled properly and securely in accordance with the relevant requirements. The controls in IT-supported (consolidated) accounting processes include, in particular, validation procedures to ensure consistent issue of authorizations, verification of master data modifications, logical access controls, and change management validation procedures in connection with developing, implementing, or modifying IT applications.

The IT infrastructure required for the use of electronic (consolidated) accounting systems is subject to the security controls implemented on the basis of the general security principles for data processing at DZ BANK and in the other entities of the DZ BANK Group. The information technology used for consolidated accounting purposes is equipped with the functionality to enable it to handle the journal entries in individual organizational units as well as the consolidation transactions carried out by DZ BANK's group accounting department and by the accounting departments in the subgroups.

IT-supported (consolidated) accounting processes are audited as an integral part of the internal audits carried out by the internal audit departments at DZ BANK and the other entities in the DZ BANK Group.

#### Ensuring and improving effectiveness

The processes used are reviewed to ensure they remain appropriate and fit for purpose; they are adapted in line with new products, circumstances, or changes in statutory requirements. To guarantee and increase the quality of (consolidated) accounting at DZ BANK and the other entities in the DZ BANK Group, the employees charged with responsibility for financial reporting receive needs-based training in the legal requirements and the IT systems used. When statutory changes are implemented, external advisors and auditors are brought in to provide quality assurance for financial reporting. At regular intervals, the internal audit department audits the internal control system related to the process for (consolidated) financial reporting.

### 3.6 Risk management tools

### 3.6.1 Accounting basis

### Accounting basis for risk measurement

The transaction data that is used to prepare the DZ BANK consolidated financial statements forms the basis for the measurement of risk throughout the group. The same applies to the separate financial statements of DZ BANK. A wide range of other factors are also taken into account in the calculation of risk. These factors are explained in more detail during the course of this opportunity and risk report.

The line items in the consolidated financial statements significant to risk measurement are shown in Fig. 9. The information presented is also applicable to the measurement of risk for the separate financial statements of DZ BANK and the measurement of its risk, which does not include the technical risk of a home savings and loan company or the risks incurred by the Insurance sector. The sections below provide a further explanation of the link between individual types of risk and the consolidated financial statements.

A further breakdown of the line items in the consolidated financial statements used to determine **credit risk** is given in section 8.7.1. The investments used for the purposes of measuring **equity investment risk** are the following items reported in note 56 of the notes to the consolidated financial statements: shares and other shareholdings, investments in subsidiaries, investments in associates, and investments in joint ventures.

In the Bank sector, the measurement of financial instruments both for the purposes of determining market risk and for financial reporting purposes is based on financial market data provided centrally. Discrepancies in carrying amounts arise from the differing treatment of impairment amounts in the market risk calculation and in the accounting figures. Differences also arise because the market risk calculation measures bonds on the basis of credit spreads using available market data whereas the accounting treatment uses liquid bond prices. If no liquid prices are available for bonds, issuer and credit spreads are also used to measure bonds for accounting purposes. With the exception of these differences, the disclosures relating to market risk reflect the fair values of the assets and liabilities concerned.

The measurement for the **technical risk of a home savings and loan company** is based on the loans and advances to banks and customers (home savings loans) and also the home savings deposits (deposits from banks and customers) described in notes 64 and 65 of the notes to the consolidated financial statements.

Insurance liabilities, as reported in the financial statements, are a key value for determining all types of **actuarial risk**. The line item Investments held by insurance companies is also used to determine all types of **market risk** and **counterparty default risk**. The line item Other assets is included in the computation of actuarial risk and counterparty default risk.

**Operational risk, business risk,** and **reputational risk** are measured independently of the balance sheet items reported in the consolidated financial statements.

The calculation of **liquidity risk** is derived from future cash flows, which in general terms are determined

#### FIG. 9 – RISK-BEARING LINE ITEMS IN THE CONSOLIDATED FINANCIAL STATEMENTS<sup>1</sup>

		BANK SECTOR								INSURANCE SECTOR													
		Cr	redit ri	isk	sk Market risk 7					Actuarial risk Market risk													
							n risk					Port assigr	folio ment <sup>a</sup>	savings an									×
Cons	olidated financial statements	Traditional credit risk	Issuer risk	Replacement risk	Equity investment risk	Interest-rate risk	Spread risk and migration	Equity risk	Currency risk	Fund price risk	Asset management risk	Trading portfolios	Non-trading portfolios	Technical risk of a home company	Life	Health	Non-life	Interest-rate risk	Spread risk	Equity risk	Currency risk	Real-estate risk	Counterparty default ris
	Loans and advances to banks			•		•					-	•	•	•									
	Loans and advances to customers	•		_		•	•		•			•	•	•									
ets	Derivatives used for hedging (positive fair values)			•		٠	٠	•	٠	٠		•	•										
ng ass	Financial assets held for trading		•	•		•	٠	•	٠	٠		•											
beari	Investments		٠	٠	٠	٠	٠	٠	٠	٠			٠										
Risk-	Investments held by insurance companies																	٠	٠	٠	٠	•	•
	Other assets														٠	٠	٠						٠
	Financial guarantee contracts and loan commitments	٠				٠			٠				•										
	Deposits from banks					٠	٠		٠			•	•	•									
ities	Deposits from customers					٠	٠		٠			•	•	٠									
liabil	Debt certificates issued including bonds					٠	•	٠	٠	٠		•	٠										
k-bearing	Derivatives used for hedging (negative fair values)			٠		٠	•	•	٠	٠	•	•	•										
Ris	Financial liabilities held for trading			•		٠	•	•	٠	٠		•											
	Insurance liabilities														•	٠	٠	•					

1 As liquidity risk is determined on the basis of all line items in the consolidated financial statements, the details for liquidity risk are not provided here for reasons of clarity. 2 Disclosures for the banking business.

# from all of the balance sheet items in the consolidated financial statements.

#### Accounting basis for risk coverage

The link between available liquidity reserves, which are used to determine economic liquidity adequacy, and the consolidated balance sheet is described in section 6.2.6.

The link between available internal capital, which is used to determine economic capital adequacy, and the consolidated balance sheet is covered in section 7.2.1.

3.6.2 Measurement of risk and risk concentrations

### Framework

Risk management in the DZ BANK Group is based on a **resource-oriented perspective of liquidity and capital**. The group uses this approach to implement the regulatory requirements for the internal liquidity adequacy assessment process (ILAAP) and the internal capital adequacy assessment process (ICAAP). A distinction is also made between **economic and regulatory liquidity adequacy and between economic and regulatory capital adequacy**. The impact of each risk type on both economic capital and economic liquidity is taken into consideration. The effect and materiality of the various types of risk may vary, depending on the resource in question.

#### Economic liquidity adequacy

To ascertain the DZ BANK Group's economic liquidity adequacy, the minimum surplus cash that would be available if various scenarios were to materialize within the following year is determined as part of the **measurement of liquidity risk**.

**Concentrations** of liquidity risk can occur primarily due to the accumulation of outgoing payments at particular times of the day or on particular days (concentrations of maturities), the distribution of funding across particular currencies, markets, products, and liquidity providers (concentrations of funding sources), and the distribution of liquidity reserves across particular currencies, ratings, and issuers (concentrations of reserves). There is no capital requirement in connection with liquidity risk.

Liquidity risk at R+V (Insurance sector) is not material at DZ BANK Group level. This is because liquidity is typically tied up in liabilities with maturities of 5 years or more in insurance business.

#### Economic capital adequacy

In the **Bank sector, economic capital** (risk capital requirement) is calculated for credit risk, equity investment risk, market risk, the technical risk of a home savings and loan company, operational risk, and business risk in order to ascertain economic capital adequacy. This risk capital requirement is generally calculated as value-at-risk with a holding period of 1 year and a unilateral confidence level of 99.90 percent.

The capital requirement for the individual risk types is aggregated into the total risk capital requirement for the Bank sector taking into account various diversification effects. The diversified risk capital requirement reflects the interdependency of individual types of risk. The risks relating to the Bank and Insurance sectors are aggregated, disregarding diversification effects between the sectors.

In the **Insurance sector**, risk measurement is based on the method specified in Solvency II with the aim of determining value-at-risk, which is the measure of **economic capital**. The value-at-risk for the change in economic own funds is determined with a confidence level of 99.5 percent over a period of one year.

The DZ BANK Group holds a **capital buffer** as a component of aggregate risk to allow for a possible lack of precision in the measurement of the risks backed by capital.

Based on an analysis of portfolios, the management of **risk concentrations** aims to identify potential downside risks that may arise from the accumulation of individual risks and, if necessary, to take corrective action. A distinction is made between risk concentrations that occur within a risk type (intra-risk concentrations) and concentrations that arise as a result of the interaction between different types of risk (inter-risk concentrations). Inter-risk concentrations are implicitly taken into account when determining correlation matrices for the purposes of inter-risk aggregation. They are mainly managed by using quantitative stress test approaches and qualitative analyses, which aim to provide a holistic view across all types of risk.

### 3.6.3 Stress tests

In addition to the risk measurements, the effects of extreme but plausible events are also analyzed. Stress tests of this kind are used to establish whether the DZ BANK Group can sustain its business models, even under extreme economic conditions. Stress tests are carried out in respect of liquidity, economic riskbearing capacity, and regulatory capital ratios.

# 3.6.4 Limitation principles

The DZ BANK Group has implemented a system of limits to ensure that it retains an adequate level of liquidity and maintains its risk-bearing capacity.

A system of limits and pre-set threshold values aims to ensure that the **liquidity surplus** at the level of the DZ BANK Group does not become a shortfall and therefore that an adequate level of liquidity is guaranteed.

In the case of **risks backed by capital**, the limits take the form of risk limits or volume limits, depending on the type of business and type of risk. Whereas risk limits in all types of risk restrict exposure measured with an economic model, volume limits are applied additionally in transactions involving counterparties. Risk management is also supported by limits for relevant key performance indicators. Specific amendments to risk positions based on an adjustment of the volume and risk structure in the underlying transactions are intended to ensure that the measured exposure does not exceed the approved volume and risk limits. Risks that are incurred are compared with the limits allocated to them and monitored using a traffic light system.

3.6.5 Hedging objectives and hedging transactions Hedging activities can be undertaken where appropriate in order to transfer liquidity risk, credit risk, market risk (Bank sector), market risk (Insurance sector), actuarial risk, and operational risk to the greatest possible extent to third parties outside the DZ BANK Group. All hedging activities are conducted within the strategic rules specified in writing and applicable throughout the group. Derivatives and other instruments are used to hedge credit risk and market risk. If the hedging of risk in connection with financial instruments gives rise to **accounting mismatches** between the hedged item and the derivative hedging instrument used, the DZ BANK Group designates the hedging transaction as a hedge in accordance with the hedge accounting requirements of IFRS 9 in order to eliminate or reduce such mismatches. The DZ BANK Group continues to account for portfolio hedges in application of the rules under IAS 39. Hedge accounting in the DZ BANK Group encompasses the hedging of interest-rate risk and currency risk. It therefore affects market risk in both the Bank and Insurance sectors. Hedging information is disclosed in note 84 of the notes to the consolidated financial statements.

DZ BANK has not recognized any hedges on the balance sheet in accordance with section 254 HGB.

3.6.6 Risk reporting and risk manual

The quarterly overall risk report includes the risks throughout the group identified by DZ BANK. Together with the adverse stress tests report, which is also compiled on a quarterly basis, the report on recovery indicators, which is prepared quarterly, and the reverse stress tests report, which is produced annually, the overall risk report is the main channel through which risks incurred by the DZ BANK Group, DZ BANK, and the other management units are communicated to the Supervisory Board, the Board of Managing Directors, and the Group Risk and Finance Committee. Since the beginning of 2019, economic and regulatory key risk indicators have also been made available to the Board of Managing Directors in a monthly overall risk report, which is intended to ensure that the Board is informed promptly about the overall risk situation. In addition, the Board of Managing Directors and the Supervisory Board's Risk Committee receive portfolio and exposure-related management information in the quarterly credit risk report for the DZ BANK Group. Furthermore, the Board of Managing Directors receives monthly information on liquidity risk in the DZ BANK Group, DZ BANK, and the other management units.

To complement the above, DZ BANK and the main subsidiaries have further reporting systems for all relevant types of risk. Depending on the degree of materiality in the risk exposures concerned, these systems aim to ensure that decision-makers and supervisory bodies receive transparent information at each measurement date on the risk profile of the management units for which they are responsible. The **risk manual**, which is available to all employees of the management units, sets out the general parameters for identifying, measuring, assessing, managing, monitoring, and communicating risks. These general parameters are intended to ensure that risk management is properly carried out in the DZ BANK Group. The manual forms the basis for a shared understanding of the minimum standards for risk management throughout the group.

The main subsidiaries also have their own risk manuals covering special aspects of risk related specifically to these management units. R+V has Solvency II guidelines.

3.6.7 Risk inventory and appropriateness test Every year, DZ BANK draws up a **risk inventory**, the objective of which is to identify the types of risk that are relevant for the DZ BANK Group and assess the materiality of these risk types. According to need, a risk inventory check may also be carried out at other times in order to identify any material changes in the risk profile during the course of the year. A materiality analysis is carried out for those types of risk that could arise in connection with the operating activities of the entities in the DZ BANK Group. The next step is to assess the extent to which there are concentrations of risk types classified as material in the Bank sector, the Insurance sector, and across sectors.

DZ BANK also conducts an annual **appropriateness test**, both for itself and at DZ BANK Group level. The appropriateness test may also be carried out at other times in response to specific events. The objective is to review the latest groupwide specifications for the analysis of risk-bearing capacity. In addition, the appropriateness test includes a number of other tests to assess whether the risk measurement methods used for all types of risk classified as material are in fact fit for purpose. The appropriateness test found that risk measurement in the DZ BANK Group is generally appropriate, although potential improvements to some aspects of risk measurement were identified.

The risk inventory check and appropriateness test are coordinated in terms of content and timing. All management units in the DZ BANK Group are included in both processes. The findings of the risk inventory and the appropriateness test are incorporated into the risk management process. Risk inventory checks and appropriateness tests are generally conducted in a similar way for the main subsidiaries.

# **4** Opportunities

4.1 Management of opportunities

The management of opportunities in the DZ BANK Group and at DZ BANK is integrated into the annual **strategic planning process**. Strategic planning enables the group to identify and analyze market discontinuities based on different macroeconomic scenarios, trends, and changes in the markets, and forms the basis for evaluating opportunities. Identified opportunities are taken into account in the business strategies.

Details about the strategic planning process are presented in section I.2.4 of the (group) management report.

**Reports** on future business development opportunities are based on the outcome of the business strategies. As part of the general communication of the business strategies, employees are kept up to date about potential opportunities that have been identified.

# 4.2 Potential opportunities

# 4.2.1 Corporate strategy

DZ BANK's core functions as a central institution, corporate bank, and holding company mean that it focuses closely on the local cooperative banks, which are its customers and owners. DZ BANK's **focus on the cooperative banks** is vital in view of the need to manage scarce resources and to meet new regulatory requirements. By focusing more closely on the Volksbanken Raiffeisenbanken cooperative financial network, DZ BANK's aim is to exploit the potential of its core activities more fully, particularly with regard to retail banking and SME business.

The principle of a 'network-oriented central institution/financial services group' also means that business activities are concentrated on the business areas covered by the cooperative banks and on strengthening the position of the local cooperative banks in their markets. To this end, the DZ BANK Group, in its role as financial services provider, supplies decentralized products, platforms, and services. In 2018, DZ BANK launched **'Verbund First 4.0'**, a strategic program designed to ensure the organization's resilience for the future. The associated potential opportunities are presented in section I.1 (Business model and strategic focus) of the (group) management report.

The core activities referred to above are supplemented by **complementary activities** using existing products, platforms, and services, for which DZ BANK acts as a corporate bank vis-à-vis third parties. These activities do not compete directly with those of the cooperative banks.

The **Outlook** in chapter V of the (group) management report describes expected developments in the market and business environment together with the business strategies and their implications for the financial performance forecast for 2020. The expected developments in the market and business environment are crucial factors in the **strategic positioning** and the resulting opportunities for increasing earnings and cutting costs.

4.2.2 Digitalization and new competitors The process of **digitalization** has been surging ahead in virtually every area of life, evidenced by the widespread growth in the use of internet-based services and high-tech end devices. This trend is encouraging the intermediation of **new competitors** at the interface between customers and banking services. For example, it is evident that non-banks are increasingly gaining a foothold in the payments processing segment.

At the same time, the advancing digitalization across all areas of life and the associated changes in customer behavior are opening up opportunities in relation to day-to-day banking business, especially payments processing. For example, increased use of mobile devices in payments processing means that particularly Germany – where paying in cash has generally continued to be more common than in other countries - is now seeing cash transactions being substituted with cashless payments. Payments through online cash register functions are climbing steadily, making it more important to have payment processes that are suitable for omnichannel use. Overall, the acceleration in the use of financial management applications means that business processes and payment processes are becoming increasingly merged.

The entities in the DZ BANK Group responded to these developments a while ago by increasing the new products and services that they offer. Examples include the launch of paydirekt, a cross-bank e-commerce payment system, the implementation of contactless credit card payments using a smartphone at point of sale, and the introduction of standardized and stronger authentication procedures. The expansion of applications aimed at simplifying liquidity management and billing, together with greater use of a range of special benefits, facilitates more integration of banking business into customer value chains. DZ BANK's participation in the SEPA instant payments system also opens up opportunities for developing new solutions.

Based on this range of initiatives, the DZ BANK Group is forging ahead with the replacement of cash and increasingly tying in additional payment-related services with accounts. DZ BANK is thus sharing in the accelerating trend toward electronic payment transactions with the objective of increasing its earnings.

Furthermore, new technologies and developments – such as blockchain and digital currencies – are being identified as potential opportunities, tested by the Transaction Banking business line, and assessed as to whether they are viable for use in the cooperative financial network.

# 4.2.3 Credit ratings

The credit ratings of DZ BANK and its subsidiaries are critical in determining the funding opportunities available on money and capital markets. The relatively high ratings compared with other entities in the market open up potential opportunities for the entities in the DZ BANK Group.

DZ BANK is awarded credit ratings by the three largest rating agencies, Standard & Poor's, Moody's, and Fitch Ratings. Individual subsidiaries of DZ BANK are also given their own ratings. In view of the high degree of cohesion within the cooperative financial network, Fitch Ratings and Standard & Poor's issue a network rating, for the purposes of which the cooperative financial institutions are analyzed on a consolidated basis. The criteria used by the agencies include factors such as strategy, risk assessment, transparency, and solidarity within the cooperative financial network in addition to business performance and collaboration.

During the year under review, the rating agencies reviewed the credit ratings issued for DZ BANK. In September, Standard & Poor's confirmed its ratings for DZ BANK, but set the outlook for the long-term ratings to negative. The reason behind this was a change in the assessment of the German banking market, which was reflected in an adverse trend in the Banking Industry Country Risk Assessment (BICRA) on which the ratings are based. The BICRA is relevant to the anchor rating, which is used as the starting point for individual bank ratings. According to Standard & Poor's, the reason for this was the deterioration in the economic environment for German banks in view of the persistently low interest rates, challenging competitive and profitability conditions, and the economic slowdown in Germany.

In October, **Moody's** confirmed the ratings for DZ BANK, but nevertheless likewise set the outlook for the long-term ratings to negative because of changes in its view of the economic conditions surrounding the German banking market and an associated change in the outlook for the industry. The reasons given by Moody's for the downgrade were an increasingly challenging environment in terms of the profitability of German banks, a persistently high cost base, downward pressure on income because of the low interest rates, and flagging economic growth.

In the reporting year, **Fitch Ratings** confirmed its prior-year ratings for DZ BANK.

Fig. 10 provides an overview of DZ BANK's credit ratings.

As at December 31, 2019, the long-term credit rating for the **cooperative financial network** issued by Standard & Poor's and Fitch Ratings remained unchanged at AA. In September, the rating issued by Standard & Poor's was given a negative outlook, reflecting the change in the rating for DZ BANK. Again, the reasons were a change in the assessment of the German banking market, combined with a modified BICRA.

#### FIG. 10 - DZ BANK RATINGS

	Standard	& Poor's	Моо	dy's	Fitch		
	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	
Issuer rating	AA-	AA-	Aa1	Aa1	AA-	AA-	
Covered bonds (DZ BANK BRIEFE)	AA+	AA+	Aaa	Aaa	-	-	
Long-term rating for deposits	-	-	Aa1	Aa1	AA-	AA-	
Long-term counterparty risk assessment/ derivative counterparty rating	-	-	Aa1	Aa1	AA-	AA-	
Long-term rating for unsecured, 'preferred' bonds	AA-	AA-	Aa1	Aa1	AA-	AA-	
Long-term rating for unsecured, 'non-preferred' bonds	A+	A+	A1	A1	AA-	AA-	
Short-term rating	A-1+	A-1+	P-1	P-1	F1+	F1+	

# **5 General risk factors**

The DZ BANK Group and DZ BANK are subject to a range of risk factors that apply generally to the German and European banking industry as a whole. These are regulatory and macroeconomic risk factors that have an impact on liquidity and capital adequacy. The factors can be classified under business risk but are addressed separately here because of their key importance.

# 5.1 Regulatory risk factors

The term 'regulation' refers to all the different types of governmental intervention in the organization and activities of the DZ BANK Group, DZ BANK, and its subsidiaries. In the context of regulatory risk factors, the term generally encompasses standards from the perspectives of prudential supervision, commercial law, capital markets law, stock corporation law, and tax law.

DZ BANK and its subsidiaries are exposed to the following risks as a result of changes to the regulatory frameworks, including increasing regulation of the financial services industry in countries in which they operate. Amendments to existing legislation and regulations for banking and financial services may lead to higher capital requirements or adversely impact the earnings of DZ BANK and its subsidiaries. These risks could have a detrimental impact on the business of the entities in the DZ BANK Group.

### 5.1.1 Basel IV

In the next 5 years, DZ BANK and its subsidiaries subject to banking supervision must implement the European rules and regulations (CRR II and III) amended as a result of the international regulatory reforms in Basel IV. This represents a huge challenge for the DZ BANK banking group. The first elements of the Basel IV reforms have already been introduced in the form of CRR II and will have to be applied by the entities in the DZ BANK banking group from the 2020 or 2021 financial years. Legislators intend to introduce the outstanding changes as part of CRR III.

The objective of the new regulations is to limit the use of internal models for determining regulatory capital adequacy and apply a higher degree of standardization to ensure that banks use uniform, comparable processes throughout the industry. One of the main aspects of the reforms is that they provide for a comprehensive revision of the procedures used to determine credit risk exposures. As part of its reporting system, DZ BANK makes considerable use of models approved by the supervisory authorities for determining credit risk with the application of the internal ratings-based approach (IRB approach).

Following the implementation of Basel IV, the current benefits for the affected entities in the DZ BANK banking group from using internal models could diminish because capital adequacy would be based to a greater extent on the revised standardized approaches. A core component of this revision is the introduction of an output floor for the amount of risk-weighted assets determined with internal models. This output floor would restrict the benefit from using internal models to 72.5 percent of the risk-weighted assets computed using the standardized approaches. This rule is expected to be introduced in stages from January 1, 2022, finally coming into force in full on January 1, 2027.

The capital requirements for market risk and operational risk are also affected by the output floor in addition to those for credit risk. DZ BANK uses internal models and will thus have to introduce the new market risk standardized approach so that it can then comply with the mandatory requirement to report its capital requirement for market risk in the trading book to the supervisory authorities in parallel to its calculations using the internal model. Implementation of the new rules entails extensive and time-consuming changes to the calculation of the capital requirement for market risk in the trading book at DZ BANK.

The planned new regulations could lead to a substantial rise in risk-weighted assets and capital requirements as well as to a fall in the capital ratios for the DZ BANK banking group and DZ BANK. There is a risk that DZ BANK would not be able to obtain the necessary additional own funds (or would only be able to obtain them at a higher cost) or would have to reduce its riskweighted assets. This could limit the flexibility enjoyed by DZ BANK in the operation of its business.

5.1.2 Switch in interest-rate benchmarks To implement Regulation (EU) No. 2016/1011 (Benchmarks Regulation) and to respond to international market developments, the German and European financial industry is currently pressing ahead with the replacement of the present interest-rate benchmarks (some of which do not comply with the EU Benchmarks Regulation) with (virtually) risk-free interest-rate benchmarks.

The reformed interest-rate benchmarks and the new risk-free interest-rate benchmarks are provided by central banks or administrators. Such administrators must be entered in the benchmarks register maintained by ESMA. This means that Euribor and – until its scheduled discontinuation at the end of 2021 – EONIA can continue to be used. In the case of Libor rates, which are already compliant with the EU benchmark requirements, the banks involved are expected to continue supplying the necessary data only up to the end of 2021. In these circumstances, market participants are assuming that Libor rates will no longer be published going forward.

The main reformed interest-rate benchmarks of significance for the entities in the DZ BANK Group are Euribor, EONIA, and Libor; the new risk-free interest-rate benchmarks of significance are €STR, SOFR, SONIA, and SARON. Assets and liabilities of entities in the DZ BANK Group in national and international interbank and customer business are linked to these interest-rate benchmarks. There is a lack of clarity about numerous aspects of the switch in interest-rate benchmarks in the transition phase, particularly concerning new market practices and the

establishment of the interest-rate benchmarks in the markets.

The transition period for critical benchmarks has been extended by 2 years until December 31, 2021. If the changeover is not completed on time, there is a risk that the ability of the entities in the DZ BANK Group to handle the transactions concerned may be constrained. The transactions affected are, for example, the issuance of floating-rate securities referencing a Libor rate or interest-rate derivatives. In addition to the acquisition of new business, the calculation and billing of interest payments in connection with securities already issued by entities in the DZ BANK Group and the valuation of these securities could be adversely affected. This could give rise to business risks (such as a withdrawal from profitable areas of business), legal risks (such as compensation claims), and reputational risks for the entities in the DZ BANK Group.

# 5.2 Macroeconomic risk factors

### 5.2.1 Low interest rates

If there is a long period of low interest rates, the DZ BANK Group could face the risk of lower earnings, including lower earnings from BSH's extensive **building society operations**. When interest rates are very low, home savings loans lose their appeal for customers, while high-interest home savings deposits become more attractive. Consequently, interest income on home savings loans would fall and the interest cost for home savings deposits would rise. Furthermore, available liquidity could only be invested at low rates of return, an additional factor depressing earnings.

Because of the long period of low interest rates, the challenge faced by the DZ BANK Group's asset management activities, brought together under UMH, is to ensure that the guarantee commitments given to customers in respect of individual products can actually be met from the investment instruments in those products. This particularly affects the pension products and the guarantee fund product group. The pension products mainly consist of UniProfiRente, a retirement pension solution certified and subsidized by the German government. The amounts paid in during the contributory phase and the contributions received from the government are guaranteed to be available to the investor at the pension start date. The pension is then paid out under a payment plan with a subsequent life annuity. Guarantee funds are products for which

UMH guarantees that a minimum percentage of capital is preserved, depending on the precise product specification. If UMH is unable to draw some of the management fees, or has to inject fresh capital, so that it can meet its guarantee commitments, this could have a substantial detrimental impact on the financial performance of the DZ BANK Group.

The entire insurance industry is affected by the low interest rates in the capital markets. These low interest rates are having a particular effect on the **business** model of the personal insurance companies at R+V. Further details can be found in section 17.3.4.

A long period of low interest rates also increases the risk of **incorrect valuations** in financial and real estate markets in which the entities in the DZ BANK Group operate.

The developments described above affect market risk in the Bank sector, business risk in the Bank sector, and market risk in the Insurance sector.

# 5.2.2 Global trade disputes

If the United States were to further ramp up its protectionist action and Europe and China were to respond with retaliatory measures, the consequence could be escalation of the **trade disputes** that would have a huge negative impact on global trade as a whole. This would adversely affect the global economy and hit the heavily export-dependent German economy particularly hard.

DZ BANK, DZ HYP, and VR Smart Finanz grant a substantial number and volume of loans to German businesses. There is thus a risk that a deterioration in the credit quality of German businesses could lead to a greater credit risk and, if individual entities default, higher impairment losses in the Bank sector. Other potential consequences include a widening of credit spreads and a fall in the market liquidity of government and corporate bonds, which could cause a rise in market risk in both the Bank sector and the Insurance sector. This mainly affects DZ BANK, DZ HYP, and BSH in the Bank sector and R+V in the Insurance sector because these entities hold considerable portfolios of securities from German and European issuers.

There is also a risk that fair value losses on corporate bonds could have a temporary or permanent adverse impact on capital. 5.2.3 Economic divergence in the eurozone DZ BANK, DZ HYP, and R+V hold significant investments in Italian and Spanish bonds. In addition, DZ BANK and DZ HYP have substantial investments in Portuguese bonds. DZ BANK has only entered into a small volume of derivatives and money market business with Italian and Spanish counterparties. Furthermore, DZ BANK operates a negligible volume of trading and lending business with short- and medium-term maturities involving counterparties in Italy, Spain, and Portugal; this business consists of trade finance and letters of credit.

The economies of Italy and Spain continue to be characterized by **government debt levels that are high** in relation to gross domestic product and are still proving difficult to bring down. Consequently, these countries remain vulnerable to fluctuation in investors' risk assessments.

In Italy, the coalition between the populist right-wing Lega and the likewise populist, but left wing, Five Star Movement collapsed at the beginning of September 2019. The new coalition between the Five Star Movement and the Social Democrats is expected to abandon the policy of confrontation with the EU. The areas of difficulty are the high level of government debt and the chronically weak growth in the Italian economy. If there are no lasting solutions to these problems, there could be perpetual concerns about whether the government debt could be sustained and/or refinanced. This could prejudice the ability of the country to obtain funding in international capital markets. As a result of the economic developments in Italy, the funding of Italian banks via the capital markets is becoming increasingly difficult. Moreover, the financial performance of these banks is hampered by continued high additions to loan provisions and by losses relating to the elimination of non-performing loans.

Since January 2020, the Socialist Workers' Party and the alternative left-wing Unidas Podemos alliance have been partners in a coalition forming a minority government in Spain. The direction of the government's fiscal policy is subject to significant uncertainty. Problem areas are the high level of government debt and weak growth in the Spanish economy, combined with a persistently high rate of unemployment. The tensions in Catalonia could give rise to further risks for the economy. This could prejudice the ability of the country and its banks to obtain funding in international capital markets. **Portugal's** financial strength is weakened by its significant government indebtedness. The banking sector harbors further risks to financial stability. Even after capitalization, the banks are still carrying substantial portfolios of non-performing loans, although these are declining. To add to this, the earnings prospects for the sector are weak because of the current low level of interest rates. The Portuguese financial market is highly susceptible to volatility in investor confidence, but the country's ability to respond to negative shocks with fiscal policy measures is limited because of the high level of public debt.

In the last few years, the **ECB's expansionary monetary policy** and particularly its bond-buying program largely prevented the structural problems in some EMU member countries from being reflected in the capital markets. For Italy, Spain, and Portugal, there is a risk that this situation could change if the asset purchase program were to be brought to an end. Highly indebted countries could find it considerably more difficult to arrange funding through capital markets.

The developments described above could cause a deterioration in the credit standing of the countries concerned and of the businesses based in those countries, which would lead to heightened credit risk in the Bank sector. Other potential consequences of the sovereign debt crisis include a widening of credit spreads and a fall in the market liquidity of government and corporate bonds, which could cause a rise in market risk in both the Bank sector and the Insurance sector. There is also a risk that fair value losses on government and corporate bonds could have a temporary or permanent adverse impact on capital. If individual counterparties - for example, southern eurozone periphery countries - were to become insolvent, this would give rise to a requirement for additional impairment losses in the entities of the DZ BANK Group in respect of the financial instruments purchased from these countries.

5.2.4 Challenging shipping and offshore markets In the Bank sector, the shipping finance business is mainly operated by DVB and, to a lesser degree, by DZ BANK. DVB also has offshore finance in its credit portfolio, consisting of various financing arrangements with broad links to the shipping sector. The portfolio includes finance for drilling platforms, drill ships, offshore construction ships, and supply ships for oil platforms. In the shipping finance business, an oversupply of tonnage continues to have a detrimental impact on asset values and customer credit quality in some cases. To add to the problems, the low price of oil is adversely affecting global offshore oil production, leading to lower demand for supply ships and other floating offshore equipment. The market values of the financed assets are subject to significant fluctuation because of market volatility. These trends could lead to increased credit risk and to a higher level of impairment losses in the Bank sector.

# 5.2.5 Climate change

The DZ BANK Group is exposed to medium- and long-term risks resulting from climate change. These risks comprise both physical risks, such as more occurrences of natural disasters and flooded buildings, and transition risks, which can arise particularly as a result of legislative initiatives and changes in consumer behavior.

Physical climate risks affect the lending business of the entities in the DZ BANK Group. They can give rise to credit risk if, for example, the recoverability of collateral for loan exposures is adversely impacted by climate events. In addition, as a result of transition effects such as the transformation to a carbon-neutral economy, there is a risk in the lending business that the profitability of corporate finance borrowers (mainly at DZ BANK) and of real estate finance borrowers (mainly at BSH and DZ HYP) could be decreased. These effects could lead to a deterioration of the borrowers' credit quality and thus to higher impairment losses. In the Insurance sector of the DZ BANK Group, non-life actuarial risk (premium and reserve risk, catastrophe risk) at R+V is the main type of risk that could be significantly affected by physical climate risk. Specifically, in any one year, the actual impact from the size and frequency of losses could exceed the forecast impact. In both the Bank sector and the Insurance sector, physical climate risk could also give rise to operational risk from the nonavailability of buildings or IT systems, or from weather or environmental events.

If climate risks are relevant because of the business model, they are implicitly backed with capital within the risk types referred to above. If the specified risks were to materialize, DZ BANK would have to fall back on the capital concerned. Furthermore, negative effects on the reputation of individual entities in the DZ BANK Group or on the DZ BANK Group as a whole cannot be ruled out.

# 5.3 Rating downgrades

DZ BANK's credit rating and the credit ratings of its subsidiaries are an important element in any comparison with competitor banks. A downgrade or even just the possibility of a downgrade in the rating for DZ BANK or one of its subsidiaries could have a detrimental effect on the relationship with customers and on the sale of products and services at all entities in the DZ BANK Group.

If DZ BANK's credit rating or the network rating for the cooperative financial network were to be downgraded, this would have a negative impact on DZ BANK's costs of raising equity and borrowing. In the event of a rating downgrade, new liabilities could also arise, or liabilities dependent on the maintenance of a specific credit rating could become due for immediate payment.

Furthermore, if a rating downgrade were to occur, the DZ BANK Group or DZ BANK could face a situation in which it had to furnish additional collateral in connection with rating-linked collateral agreements for derivatives (regulated by a credit support annex to an appropriate master agreement for financial futures) or in which it was no longer considered a suitable counterparty for derivative transactions at all.

In 2019, the credit ratings for DZ BANK issued by rating agencies Standard & Poor's and Moody's were given a negative outlook. The reasons were the deteriorating economic conditions for German banks, partly because of the low interest rates and the accompanying decline in profitability. It is not possible to predict with any degree of certainty whether the negative outlook will actually result in a rating downgrade for DZ BANK. Its rating would probably be downgraded simultaneously with those of other German banks.

If the credit rating for DZ BANK or one of its subsidiaries were to fall out of the range covered by the top four rating categories (investment-grade ratings, disregarding rating subcategories), the operating business of DZ BANK or the subsidiaries concerned could be adversely affected. This could also lead to an increase in the liquidity requirement in relation to derivatives and to a rise in funding costs. There would be an additional risk that these negative effects could spread to the other entities in the DZ BANK Group.

# 6 Liquidity adequacy

# 6.1 Principles

The management of liquidity adequacy is an integral component of business management in the DZ BANK Group and at DZ BANK. Liquidity adequacy is defined as the holding of sufficient liquidity reserves in relation to the risks arising from future payment obligations. It is considered from both an economic and a regulatory perspective. Whereas the economic perspective implements the requirements of MaRisk BA, the regulatory perspective applies the requirements from the CRR and the German national requirements for the implementation of Capital Requirements Directive IV in the KWG.

Economic liquidity adequacy is managed on the basis of the internal liquidity risk model, which takes account of the impact on liquidity of other risks when measuring liquidity risk. The DZ BANK Group fulfills the regulatory liquidity adequacy requirements by managing economic liquidity adequacy.

# 6.2 Economic perspective

Owing to the close ties between management of economic liquidity adequacy at DZ BANK and that of the DZ BANK Group, the information below on economic liquidity adequacy also applies to DZ BANK. Liquidity risk is a key aspect of economic liquidity adequacy.

# 6.2.1 Risk definition

Liquidity risk is the risk that cash and cash equivalents will not be available in sufficient amounts to ensure that payment obligations can be met. It is therefore defined as insolvency risk. Liquidity risk is significantly influenced by the risks that are backed by capital and those that are not backed by capital. In particular, reputational risk is relevant to liquidity risk.

# 6.2.2 Business background and risk strategy

# Business background

The activities of DZ BANK and the management units BSH, DVB, DZ HYP, DZ PRIVATBANK, TeamBank, and VR Smart Finanz are relevant to the level of liquidity risk in the DZ BANK Group.

# Risk strategy

A key component of the liquidity risk strategy is the process of specifying and monitoring the risk appetite for liquidity risk. The liquidity risk strategy aims to establish a binding basis for implementing these requirements at operational level.

The entities in the DZ BANK Group operate on the principle that the assumption of liquidity risk is only permitted if it is considered together with the associated opportunities and complies with the **risk appetite** specified by the Board of Managing Directors. Solvency must be ensured, even in times of serious crisis. Risk appetite is expressed in the form of crisis scenarios, and stress tests must demonstrate that there is adequate cover for these scenarios. The crisis scenarios also take into account the specific MaRisk BA requirements for the structure of stress scenarios at capital-market-oriented banks.

However, further extreme scenarios are not covered by the risk appetite. The risks arising in this regard are accepted and therefore not taken into account in the management of risk. Examples of such scenarios are a run on the bank, i.e. an extensive withdrawal of customer deposits as a result of damage to the reputation of the banking system, or a situation in which all non-collateralized funding sources on money markets completely dry up over the long term, also encompassing transactions with those corporate customers, institutional customers, and customer banks that have close ties to the entities in the DZ BANK Group. On the other hand, the risk of a short-term and complete loss, or the risk of a mediumterm and substantial loss, of unsecured funding from institutional investors is not accepted and this risk is the subject of relevant stress scenarios.

Liquidity reserves in the form of liquid securities are held by the entities so that they can remain solvent, even in the event of a crisis. Potential sources of funding in the secured and unsecured money markets are safeguarded by maintaining a broadly diversified national and international customer base. The local cooperative banks also provide a significant source of funding.

DZ BANK aims to ensure that the liquidity risk strategy is consistent with the **business strategies**. To this end, the liquidity risk strategy is reviewed at least once a year with due regard to the business strategies and adjusted as necessary.

### 6.2.3 Specific risk factors

The following factors, alone or in combination with each other, could lead to an increase in liquidity risk, adversely affect financial position and, in an extreme case, cause the insolvency of DZ BANK:

- Funding is withdrawn but cash nevertheless still flows out when legally due.
- Derivatives result in greater collateral requirements that involve cash outflows.
- Changes in the fair value of financial instruments mean that less liquidity can be generated.
- Cash is paid out earlier than expected because drawing rights are exercised.
- Cash outflows are earlier than expected or cash inflows later than expected because termination rights are exercised.
- New business is entered into to safeguard the reputation of the DZ BANK Group, resulting in cash outflows.
- Products are repurchased to safeguard the reputation of the DZ BANK Group, resulting in cash outflows.
- The liquidity requirement to ensure intraday payment obligations can be satisfied is greater than expected.
- There has been a negative impact on opportunities for generating currency-related liquidity through currency swaps.

# 6.2.4 Organization, responsibility, and risk reporting

# Organization and responsibility

The strategic guidelines for the management of liquidity risk by the entities in the DZ BANK Group are established by the **Group Risk and Finance Committee**. At the level of DZ BANK, this is the responsibility of the **Treasury and Capital Committee**.

Liquidity risk control in the DZ BANK Group is coordinated by the Group Risk Management working group and carried out in Risk Controlling at DZ BANK independently of the units that are responsible for liquidity risk management. The risk data calculated by the subsidiaries on the basis of intra-group guidelines is aggregated to provide a group perspective.

### Risk reporting

Liquidity up to 1 year and structural liquidity of 1 year or more are reported on a daily basis to the **members of the Board of Managing Directors** of DZ BANK responsible for Group Treasury and Group Risk Controlling. The **Board of Managing Directors** receives a monthly report on liquidity risk. The DZ BANK **Group Treasury** division and the units in the subsidiaries responsible for the management of liquidity risk also receive detailed daily information showing the contribution from each individual position to the aggregate position.

The DZ BANK **Group Treasury** division also has read-only access to the IT system used for measuring liquidity risk on a day-to-day basis and has set up its own analysis functionality within the system.

The Group Risk and Finance Committee receives a quarterly report on the liquidity risk of the DZ BANK Group and the individual management units, including DZ BANK.

The entities in the DZ BANK Group have their own corresponding reporting procedures that help to manage and monitor liquidity risk at individual entity level.

Group Treasury is informed on a daily basis of the largest providers of liquidity to DZ BANK in the unsecured money markets. This is reported to the **Treasury and Capital Committee** and the **Board of Managing Directors** on a monthly basis. The reports make a distinction between customers and banks and relate to DZ BANK in Frankfurt and to each foreign branch. These reports ensure that any possible concentration risk as regards sources of liquidity can be clearly identified at an early stage.

### 6.2.5 Risk management

#### Measurement of liquidity risk

DZ BANK uses an **internal risk model** to determine liquidity risk over a time horizon of 1 year. The same model is used to determine liquidity risk at the level of the DZ BANK Group. All entities in the DZ BANK Group with a significant impact on liquidity risk are integrated into the model, which is used to simulate one risk scenario and four stress scenarios a day.

A minimum liquidity surplus figure is calculated for each scenario. This figure quantifies the minimum surplus cash that would be available if the scenario were to materialize suddenly within the next 12 months. To carry out this calculation, cumulative cash flow (forward cash exposure) is compared against available liquidity reserves (counterbalancing capacity) on a day-by-day basis. The minimum liquidity surplus expresses economic liquidity adequacy. Forward cash exposure includes both expected and unexpected payments. The **counterbalancing capacity** includes balances on nostro accounts, liquid securities, and unsecured funding capacity with customers, banks, and institutional investors. By including the counterbalancing capacity, the calculation of the minimum liquidity surplus already takes into account the effect on liquidity of the measures that could be implemented to generate liquidity in each scenario. These measures include collateralized funding of securities in the repo market.

**Stress tests** are conducted for the forward cash exposure and for the counterbalancing capacity using the following four scenarios with defined limits: 'downgrading', 'corporate crisis', 'market crisis', and 'combination crisis'. The stress scenarios look at sources of crises in both the market and the institution itself. A combination of market-specific and institutionspecific sources is also taken into consideration. In crisis scenarios with institution-specific causes, such as a deterioration in the institution's reputation, it is assumed for example that it will be very difficult to obtain unsecured funding from customers, banks, and institutional investors in the 1-year forecast period. The simulated event in each stress scenario represents a serious deterioration in conditions.

The stress scenario with the lowest minimum liquidity surplus is deemed to be the squeeze scenario. Economic liquidity adequacy is determined as the amount of the minimum liquidity surplus in the squeeze scenario.

In addition to the existing stress scenarios with defined limits, **foreign currency stress tests** simulate what would happen if the currency swap market also defaulted. The currencies in the major locations are examined (US dollar, pound sterling, Swiss franc, Hong Kong dollar, Singapore dollar). The currency limits relate only to the critical first month.

Further stress scenarios in addition to the scenarios with defined limits are analyzed, and a **reverse stress test** is carried out and reported on a monthly basis. The reverse stress test shows which stress events (changes in risk factors) could still occur without liquidity falling below the limit in a subsequent liquidity risk measurement and triggering the need for a business model adjustment.

The internal liquidity risk model is constantly revised using an **appropriateness test** and adjusted in line with changes in the market, products, and processes. The appropriateness test is conducted for each entity in the DZ BANK Group and aggregated at group level.

# Management of limits for liquidity risk

Liquidity risk is monitored and managed with the aim of ensuring economic liquidity adequacy at every measurement date. This is based on the minimum liquidity surplus calculated for the four stress scenarios with defined limits. The Board of Managing Directors of DZ BANK has set, at the level of the DZ BANK Group, a limit (€1.0 billion) for liquidity risk and an observation threshold (€4.0 billion) that is higher than the limit. The observation threshold equates to the threshold value for economic liquidity adequacy specified in the risk appetite statement. The observation threshold and limit were unchanged compared with December 31, 2018. The Board of Managing Directors of DZ BANK has also specified a limit for each management unit. The observation threshold and the limits are monitored by the liquidity risk control function at DZ BANK both at group level and also for the management units.

The limit system aims to ensure that the DZ BANK Group remains solvent even in serious stress scenarios. **Emergency liquidity plans** are in place so that the group is able to respond to crisis events rapidly and in a coordinated manner. The emergency plans are revised annually.

# Liquidity risk mitigation

Within liquidity management activities, measures to reduce liquidity risk are initiated by the treasuries of the management units. Active liquidity risk management is made possible by holding a large number of instruments in the form of cash and liquid securities, and by managing the maturity profile of money market and capital market transactions.

# Liquidity transfer pricing system

The DZ BANK Group aims to use liquidity – which is both a resource and a success factor – in line with opportunities and risks. Liquidity costs, benefits, and risks are allocated among the entities in the DZ BANK Group based on the liquidity transfer pricing system using internal prices charged by the units generating liquidity and paid by those consuming liquidity. Care is taken to ensure that the transfer prices are consistent with risk measurement and risk management. Transfer prices are set at DZ BANK for the liquidity costs of all the main products. The transfer pricing system takes into account the maturity period and market liquidity of the products and has a significant impact on risk/return management.

# 6.2.6 Quantitative variables

The available liquid securities and the availability and composition of the sources of funding have a significant influence on the minimum liquidity surplus of the DZ BANK Group and at DZ BANK. These factors are presented below.

#### Liquid securities

Liquid securities form part of the available liquidity reserves, which are referred to as **counterbalancing capacity**. Liquid securities are largely held in the portfolios held by DZ BANK's Capital Markets Trading division or in the portfolios of the treasury units at the subsidiaries of DZ BANK. Only bearer bonds are eligible as liquid securities.

Liquid securities comprise highly liquid securities that are suitable for collateralizing funding in private markets, securities eligible as collateral for central bank loans, and other securities that can be liquidated in the 1-year forecast period that is relevant for liquidity risk.

Securities are only eligible provided they are not pledged as collateral, e.g. for secured funding. Securities that have been borrowed or taken as collateral for derivatives business or in connection with secured funding only become eligible when they are freely transferable. Eligibility is recognized on a daily basis and also takes into account factors such as restrictions on the period in which the securities are freely available.

Fig. 11 shows the liquidity value of the liquid securities that would result from secured funding or if the securities were sold.

#### FIG. 11 - LIQUID SECURITIES

€ billion	Dec. 31, 2019	Dec. 31, 2018
Liquid securities eligible for GC	26.2	22.4
Pooling (ECB Basket)	20.5	25.4
Securities in own portfolio	27.6	22.7
Securities received as collateral	9.4	9.7
Securities provided as collateral	-10.7	-9.0
Liquid securities eligible as collateral		
for central bank loans	16.8	12.3
Securities in own portfolio	17.7	13.4
Securities received as collateral	6.0	4.9
Securities provided as collateral	-6.9	-6.0
Other liquid securities	6.5	6.0
Securities in own portfolio	5.5	5.4
Securities received as collateral	1.2	0.9
Securities provided as collateral	-0.2	-0.2
Total	49.6	41.8
Securities in own portfolio	50.8	41.5
Securities received as collateral	16.6	15.5
Securities provided as collateral	-17.7	-15.3

1 GC = general collateral, ECB Basket = eligible collateral for ECB funding.

As at December 31, 2019, the total liquidity value at the level of the **DZ BANK Group** was €49.6 billion (December 31, 2018: €41.8 billion). The total liquidity value attributable to **DZ BANK** as at December 31, 2019 was €39.0 billion (December 31, 2018: €30.2 billion). The year-on-year rise in the volume of liquid securities as at December 31, 2019 was attributable to expansion in securities portfolios, mainly at DZ BANK.

Consequently, liquid securities represented the largest proportion of the counterbalancing capacity for both the DZ BANK Group and DZ BANK, and made a major contribution to ensuring that they remained solvent in the stress scenarios with defined limits at all times during the relevant forecast period. In the first month, which is a particularly critical period in a crisis, liquid securities were almost exclusively responsible for maintaining solvency in the stress scenarios with defined limits.

#### Funding

The short-term and medium-term funding structure is a determining factor in the level of liquidity risk in the DZ BANK Group and at DZ BANK. The main sources of funding on the unsecured money markets are shown in Fig. 12.

#### FIG. 12 – UNSECURED SHORT-TERM AND MEDIUM-TERM FUNDING

	DZ B banking	ANK g group	DZ BANK			
%	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018		
Local cooperative banks	43	55	45	59		
Other banks, central banks	11	14	11	14		
Corporate customers, institutional customers	12	15	11	14		
Commercial paper (institutional investors)	34	16	33	13		

Changes in the composition of the main sources of funding were attributable to a change in the behavior of customers and investors resulting from money market policy implemented by the ECB.

Further details on funding are provided in the business report (section II.5 (Financial position) of the (group) management report).

### Liquidity maturities

The maturity analysis of contractual cash inflows and cash outflows is set out in note 86 of the notes to the consolidated financial statements. The cash flows in these disclosures are not the same as the expected and unexpected cash flows used for internal management purposes in the DZ BANK Group.

#### 6.2.7 Risk position

Economic liquidity adequacy is assured if none of the four stress scenarios with defined limits exhibit a negative value for the internal key risk indicator 'minimum liquidity surplus'. Fig. 13 shows the results of measuring liquidity risk. The results are based on a daily calculation and comparison of forward cash exposure and counterbalancing capacity. The values reported are the values that occur on the day on which the liquidity surplus calculated over the forecast period of 1 year is at its lowest point.

The liquidity risk value measured for the **DZ BANK Group** as at December 31, 2019 for the stress scenario with defined limits with the lowest minimum liquidity surplus (squeeze scenario) was €12.5 billion (December 31, 2018: €12.0 billion). The minimum liquidity surplus as at December 31, 2019 thus remained roughly at the level of the prior-year reporting date. During the year under review, liquidity at the level of the DZ BANK Group did not, in any of the stress scenarios with defined limits, fall below the observation threshold of €4.0 billion set by the Board

	Forward ca	sh exposure	Counterb capa	palancing acity	Minimum liq	uidity surplus
€ billion	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018
Downgrading	-76.1	-39.3	105.7	61.8	29.6	22.5
Corporate crisis	-74.5	-37.1	88.0	50.1	13.5	13.0
Market crisis	-80.7	-42.5	97.2	58.2	16.4	15.7
Combination crisis	-80.2	-42.1	92.7	54.1	12.5	12.0

#### FIG. 13 - LIQUIDITY UP TO 1 YEAR IN THE STRESS SCENARIOS WITH DEFINED LIMITS: MINIMUM LIQUIDITY SURPLUSES

of Managing Directors as the internal threshold value for 2019. Furthermore, it did not fall below the limit of €1.0 billion or the external minimum target of €0.0 billion on any measurement date in the reporting period. The observation threshold, limit, and external minimum target remained unchanged compared with 2018.

The corresponding liquidity risk value attributable to **DZ BANK** as at December 31, 2019 was €3.0 billion (December 31, 2018: €2.1 billion). The value is derived from the stress scenario with defined limits that has the lowest minimum liquidity surplus (squeeze scenario). The rise in the minimum liquidity surplus at DZ BANK resulted primarily from issuing activities.

The value fell below the limit applicable to DZ BANK from mid-June to mid-November in the reporting period. The temporary drop below the limit was largely attributable to a lower level of issuing activities, which was deliberately scheduled because of an anticipated liquidity inflow in November 2019 from the disposal of DVB's aviation portfolio. Until the completion date of the transaction, the disposal was not reported as a liquidity inflow to DZ BANK in the economic liquidity risk measurement at DVB.

The minimum liquidity surplus as at December 31, 2019 for both the DZ BANK Group and DZ BANK was positive in the stress scenarios with defined limits that were determined on the basis of risk appetite. This is due to the fact that the counterbalancing capacity was above the cumulative cash outflows on each day of the defined forecast period for each scenario, which indicates that the cash outflows assumed to take place in a crisis could be comfortably covered.

# 6.2.8 Possible impact from crystallized liquidity risk

One of the main operating activities of the management units is to make long-term liquidity available to their customers for different maturity periods and in different currencies, for example in the form of loans. The units generally organize their funding to match these transactions that tie up liquidity. Any funding needs that are not covered by the local cooperative banks are met by obtaining additional funding in the money and capital markets, with the deposit base from money market funding reducing the need for long-term funding. When funding matures, it is therefore possible that the replacement funding required to fund transactions with longer maturities has to be obtained at **unfavorable terms and conditions**.

The entities in the DZ BANK Group are also exposed to the risk that the minimum liquidity surplus will fall below the limit. If the minimum liquidity surplus were to fall below the limit for an extended period, the possibility of **reputational damage and a ratings downgrade** could not be ruled out.

Crystallization of liquidity risk causes an unexpected **reduction in the liquidity surplus**, with potential negative consequences for DZ BANK's financial position and enterprise value. If a crisis were to occur in which the circumstances were more serious or the combination of factors were significantly different from those assumed in the stress scenarios, there would be a risk of **insolvency**.

6.3 Normative internal perspective

### 6.3.1 Regulatory framework

Internal liquidity risk management is supplemented by the liquidity coverage ratio (LCR) specified in the Basel III framework, which was transposed into law with the CRR and Commission Delegated Regulation (EU) No. 2015/61, and by the net stable funding ratio (NSFR), which is based on the Basel III framework (BCBS 295).

The **liquidity coverage ratio** has a short-term focus and is intended to ensure that institutions can

withstand a liquidity stress scenario lasting 30 days. This KPI is defined as the ratio of available liquid assets (liquidity buffer) to total net cash outflows in defined stress conditions over the next 30 days. The external minimum target for the LCR specified by the supervisory authorities in 2019 was 100 percent. DZ BANK reports its own LCR and that of the DZ BANK banking group, calculated in accordance with the CRR in conjunction with Commission Delegated Regulation (EU) No. 2015/61, to the supervisory authority on a monthly basis.

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 (assetsside 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 will only become mandatory from the 2021 financial year with the application of CRR II. From this point, it is planned to manage the NSFR within the groupwide liquidity risk management system.

6.3.2 Organization, responsibility, and reporting The liquidity ratios reported for supervisory purposes resulting from the CRR, the Basel III framework, and Commission Delegated Regulation (EU) No. 2015/61 are calculated for DZ BANK by the **Group Finance** division and aggregated at the level of the DZ BANK banking group with the corresponding values for the management units.

Both the **Treasury and Capital Committee** and the **Board of Managing Directors** are notified of the LCR and the NSFR each month.

# 6.3.3 Liquidity coverage ratio

The LCRs for the **DZ BANK banking group** and **DZ BANK** calculated in accordance with Commission Delegated Regulation (EU) No. 2015/61 are shown in Fig. 14.

The increase in the LCR measured for the DZ BANK banking group from 141.4 percent as at December 31, 2018 to 144.6 percent as at December 31, 2019 was largely attributable to higher excess cover at DZ BANK, although some of the gain was offset by countervailing effects in the subsidiaries.

#### FIG. 14 – LIQUIDITY COVERAGE RATIOS AND THEIR COMPONENTS

	DZ B banking	ANK g group	DZ BANK				
	Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,			
	2019	2018	2019	2018			
Total liquidity buffer							
(€ billion)	84.1	78.7	63.4	58.0			
Total net liquidity outflows							
(€ billion)	58.2	55.6	46.1	45.8			
Liquidity coverage ratio (%)	144.6	141.4	137.5	126.7			

The increase in the LCR measured for DZ BANK from 126.7 percent as at December 31, 2018 to 137.5 percent as at December 31, 2019 was attributable to higher excess cover, which was derived from the funding with commercial paper with maturities of more than 30 days. Excess cover in relation to the LCR is the difference between the liquidity buffer and the net liquidity outflows.

In the reporting period, the regulatory minimum requirement for the LCR of 100 percent was exceeded on every reporting date at the level of the DZ BANK banking group and at DZ BANK.

# 7 Capital adequacy

**7.1 Strategy, organization, and responsibility** The management of capital adequacy is an integral component of business management in the DZ BANK Group and at DZ BANK. Capital adequacy is defined as the holding of sufficient capital to cover the risks assumed by the business. It is considered from both an economic and a regulatory perspective. Whereas the economic perspective takes into account the requirements of MaRisk BA, the regulatory perspective applies the requirements from the CRR and the German national requirements for the implementation of CRR IV (KWG and German Solvency Regulation (SolvV)).

DZ BANK and all other management units are included in the groupwide management of capital adequacy. Management of economic capital adequacy on the basis of both internal risk measurement methods and regulatory capital adequacy requirements aims to ensure that the assumption of risk is consistent with the capital resources of the DZ BANK Group, the DZ BANK financial conglomerate, and the DZ BANK banking group at every measurement date and at every reporting date. Regulatory solvency requirements for the DZ BANK financial conglomerate, the DZ BANK banking group, and the R+V Versicherung AG insurance group are observed in economic capital management.

# The Board of Managing Directors of DZ BANK

defines the corporate objectives and the capital requirement in the DZ BANK Group and at DZ BANK in terms of both risks and returns. In managing the risk profile, the Board of Managing Directors strives for an appropriate ratio between risk and available internal capital. DZ BANK is responsible for risk and capital management, and for compliance with capital adequacy at group level.

The management of economic and regulatory capital adequacy is based on internal target values. To avoid any unexpected adverse impact on target values and capital ratios and ensure that any changes in risk are consistent with corporate strategy, groupwide economic limits and risk-weighted assets are planned as limits for the risk capital requirement on an annual basis as part of the strategic planning process. This process results in a requirements budget for the economic and regulatory capital needed by the group. The implementation of any corresponding measures to raise capital is approved by the Treasury and Capital Committee and then coordinated by Group Treasury at DZ BANK. The integration of economic risk capital requirements planning into the strategic planning process aims to ensure that the risk strategy for types of risk covered by capital is closely linked with the business strategies.

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 every reporting date. Monitoring takes place monthly for the DZ BANK financial conglomerate, the DZ BANK banking group and DZ BANK, and at least quarterly for 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.

# 7.2 Economic perspective

Owing to the close ties between the management of economic capital adequacy at DZ BANK and that of the DZ BANK Group, the information below also applies to DZ BANK.

# 7.2.1 Measurement methods

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 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 limits can be adjusted during the year, e.g. if economic conditions change.

**Available internal capital** comprises equity and hidden reserves. It is reviewed on a quarterly basis. The available internal capital is determined as follows:

- The available internal capital from the Bank sector is calculated on the basis of the IFRS data in accordance with regulatory financial reporting. In this process, R+V is not fully consolidated but taken into account using the equity method.
- The available internal capital from the Insurance sector is based on the own funds of the R+V Versicherung AG insurance group in accordance with Solvency II.
- The available internal capital from the two sectors is combined to produce the available internal capital of the DZ BANK Group. During this process, the effects of consolidation between the Bank and Insurance sectors are taken into account, resulting in a reduction in the available internal capital at group level.

The purpose of the **capital buffer** (also referred to below as the capital buffer requirement) is to cover the lack of precision in some areas of risk measurement. This applies to migration risk on traditional loans and the risk arising from defined benefit obligations, for example. The latter, in the form of longevity risk, is one aspect of actuarial risk and is particularly important for the Bank sector. The individual components of the capital buffer are quantified using a method based on scenarios and models with input from experts. A distinction is made between centralized and decentralized capital buffer requirements. Decentralized capital buffer requirements are managed within the limits for the individual risk types, whereas the centralized capital buffer is managed on the basis of a limit covering all sectors and risk types.

# 7.2.2 Traffic light system

Economic capital adequacy is monitored and managed using a traffic light system based on the ratio of available internal capital to aggregate risk (expressed as a percentage).

The switch from green to amber in the traffic light system (**amber threshold**) is set at the internal threshold value for economic capital adequacy specified in the risk appetite statement, which in 2019 was unchanged compared with the previous year at 120 percent. The amber threshold serves as an early warning indicator. The **red threshold**, i.e. the borderline between amber and red in the traffic light system, was set at 110.0 percent in the year under review, again unchanged compared with 2018.

The threshold values for economic capital adequacy are reviewed annually and adjusted if necessary.

# 7.2.3 Risk-bearing capacity

# Retrospective recalculation of the overall solvency requirement

It was necessary to recalculate the overall solvency requirement as at December 31, 2018 owing to scheduled changes to the parameters for the risk measurement procedures and the updating of actuarial assumptions carried out in the second quarter of 2019 for the Insurance sector on the basis of R+V's 2018 consolidated financial statements. The recalculation reflects updated measurements of insurance liabilities based on annual actuarial analyses and updates to parameters in the risk capital calculation. Because of the complexity and the amount of time involved, the parameters are not completely updated in the in-year calculation and an appropriate projection is made.

The recalculation led to changes in the available internal capital, the key risk indicators at the level of the DZ BANK Group, and economic capital adequacy. The figures as at December 31, 2018 given in this opportunity and risk report have been restated accordingly and are not directly comparable with the figures in the 2018 opportunity and risk report.

#### Available internal capital

The DZ BANK Group's **available internal capital** as at December 31, 2019 was measured at €26,968 million. The comparable figure as at December 31, 2018 was €27,954 million. The figure originally measured as at December 31, 2018 and disclosed in the 2018 opportunity and risk report came to €28,562 million. The reduction in available internal capital was largely because capital components were no longer included following implementation of the new requirements in the ECB's ICAAP guide.

The limit derived from the available internal capital amounted to €21,723 million as at December 31, 2019 (December 31, 2018: €24,276 million). The lower limit arose because unneeded sub-limits were relinquished.

As at the reporting date, **aggregate risk** was calculated at €16,932 million. The comparable figure as at December 31, 2018 was €16,418 million. The figure originally measured as at December 31, 2018 and disclosed in the 2018 opportunity and risk report came to €17,025 million. The increase in risk, which was mainly attributable to the Insurance sector, was due to portfolio growth and the level of interest rates. This trend was accompanied by a sharp rise in own funds in the Insurance sector.

### Economic capital adequacy

As at December 31, 2019, the economic capital adequacy ratio for the **DZ BANK Group** was calculated at 159.3 percent. The comparable figure as at December 31, 2018 was 170.3 percent. The figure originally measured as at December 31, 2018 and disclosed in the 2018 opportunity and risk report was 167.8 percent. During the reporting year, the economic capital adequacy ratio was higher than the internal threshold value of 120.0 percent at every measurement date. The reduction in economic capital adequacy compared with the end of 2018 was largely because capital components were no longer included in available internal capital following implementation of the requirements in the ECB's new ICAAP guide.

Fig. 15 provides an overview of the components of economic capital adequacy.

The limits and risk capital requirements including the capital buffer requirements for the **Bank sector**, broken down by risk type, are shown in Fig. 16.
Fig. 17 sets out the limits and overall solvency requirements for the Insurance sector, broken down by risk type, and includes policyholder participation. The definition of the limits and determination of overall solvency requirements take into account the ability to offset deferred taxes against losses (which arises where deferred tax liabilities can be eliminated in the loss scenario). Diversification effects between the risk types are also taken into consideration. Owing to these effects of correlation, the overall solvency requirement and limit for each risk type are not cumulative. The rise in the overall solvency requirement compared with the prior year resulted first and foremost from the trend in interest rates and business growth.

In addition to the figures shown in Fig. 16 and Fig. 17, the aggregate risk includes a centralized capital buffer requirement across all types of risk, which was calculated at €526 million as at December 31, 2019 (December 31, 2018: €301 million). The corresponding limit was €620 million (December 31, 2018: €340 million). This increase was predominantly the result of the specifications in the ECB's new ICAAP guide.

## 7.2.4 Possible impact from crystallized risk covered by capital

If risk covered by capital actually materializes, this has a negative impact on both financial performance and financial position as well as on the enterprise value of the DZ BANK Group and DZ BANK. In the income statement in this situation, the recognized expenses are higher and/or the recognized income is lower than originally expected. This is accompanied by a decrease in the net assets on the balance sheet because assets are unexpectedly lower and/or liabilities are unexpectedly higher. A widening of spreads on fungible financial instruments may also lead to a deterioration in the financial position, which is reflected in other comprehensive income.

If there is a deterioration in financial performance, there is the risk of long-term negative risk-adjusted profitability where the cost of capital cannot then be covered, and economic value added (EVA) becomes negative. If this situation arose, there would no longer be any point in continuing business operations from a business management perspective.





FIG. 16 - LIMITS AND RISK CAPITAL REQUIREMENTS INCLUDING CAPITAL BUFFER REOUIREMENTS IN THE BANK SECTOR

	Lir	nit	Risk o require	capital rement <sup>3</sup>			
€ million	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018			
Credit risk	7,189	8,238	5,484	5,541			
Equity investment risk	1,063	1,341	850	1,091			
Market risk	5,646	6,768	3,860	4,030			
Technical risk of a home savings and loan company <sup>1</sup>	706	667	397	553			
Business risk <sup>2</sup>	1,016	1,118	837	857			
Operational risk	926	1,030	859	804			
Total (after diversification)	15,201	18,236	11,289	11,600			

1 Including business risk and reputational risk of BSH. 2 Apart from that of BSH, reputational risk is contained in the risk capital requirement for business risk

3 Including decentralized capital buffer requirement.

FIG. 17 - LIMITS AND OVERALL SOLVENCY REQUIREMENTS IN THE **INSURANCE SECTOR** 

	Lir	nit	Overall solvency requirement			
€ million	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018		
Life actuarial risk	1,200	1,100	977	921		
Health actuarial risk	410	350	244	234		
Non-life actuarial risk	3,960	3,650	3,597	3,300		
Market risk	3,850	4,350	3,575	3,205		
Counterparty default risk	100	100	90	64		
Operational risk	680	640	644	557		
Risks from entities in other financial sectors	112	145	111	111		
Total (after diversification)	5,902	5,700	5,116	4,517		

Viewed in isolation and assuming there are no other influencing factors, this chain of events would apply particularly in a scenario where the equity holder is simply seeking to maximize profits. In the case of DZ BANK, however, there is another significant factor in that the intention of the equity holders (who in many cases are also customers of DZ BANK and its subsidiaries) in committing equity to DZ BANK is not only to achieve, as far as possible, market-level returns commensurate with the risk involved, but also to utilize the decentralized services that DZ BANK provides as the central institution in the cooperative financial network. The return on capital that forms part of any purely monetary analysis therefore needs to be adjusted in the case of DZ BANK to add the effects of the extra benefits. Given this background, EVA is only of limited use for assessing the advantages of the investment in DZ BANK. Thus, a negative EVA is not necessarily associated with the discontinuation of business activities undertaken by DZ BANK or its subsidiaries.

If risk were to materialize and associated losses be incurred, there would be a risk that the DZ BANK Group would **miss its economic capital adequacy target**. However, this situation could also occur with an increase in risk arising from heightened market volatility or as a consequence of changes in the business structure. In addition, a decrease in available internal capital, for example because its components have expired or are no longer eligible, could mean that the risk capital requirement exceeds the available internal capital. Additional or more stringent regulatory requirements could also have a negative impact on the economic capital adequacy of the DZ BANK Group.

In a situation in which the economic capital adequacy of the DZ BANK Group could not be guaranteed, there would be insufficient capital available to meet the group's own standards with regard to the coverage of risk. This could lead to a **deterioration in the credit ratings** for DZ BANK and its subsidiaries. If there is also insufficient capital to meet the level of protection demanded by the supervisory authority, this authority could initiate action, which in extreme cases could lead to the **resolution** of DZ BANK or its subsidiaries.

## 7.3 Normative internal perspective

## 7.3.1 Principles

The regulatory ratios presented below are used as part of the internal management of the DZ BANK financial conglomerate, the DZ BANK banking group, and DZ BANK. The procedures used to determine these ratios are predominantly those that will be required by the full application of the CRR going forward. 7.3.2 DZ BANK financial conglomerate The FKAG forms the main legal basis for the supervision of the DZ BANK financial conglomerate. The calculation methodology for the coverage ratio is taken from Commission Delegated Regulation (EU) No. 342/2014 in conjunction with article 49 (1) CRR.

The financial conglomerate coverage ratio is the ratio between the total of own funds in the financial conglomerate and the total of solvency requirements for the conglomerate. The resulting ratio must be at least 100 percent. The changes in the **eligible own funds** and the **solvency requirements** are shown in Fig. 18. According to current projections, the requirements will also be satisfied in 2020.

These components gave a preliminary **coverage ratio** of 171.9 percent as at December 31, 2019 (final figure as at December 31, 2018: 174.0 percent), which was in excess of the regulatory minimum requirement (100.0 percent) and the internal threshold value (120.0 percent). According to current projections, the requirements are also expected to be satisfied in 2020.

## 7.3.3 DZ BANK banking group

#### Regulatory framework

The DZ BANK banking group uses the following methods to calculate the regulatory risk-weighted assets in accordance with the CRR:

- Credit risk: Primarily the foundation IRB approach and the IRB approach for the retail business (the regulatory credit risk measurement methods used by DVB are based on the advanced IRB approach)
- Market risk: Predominantly the group's own internal models and, to a minor extent, the Standardized Approaches
- Operational risk: Standardized Approach.





1 December 31, 2019: Preliminary figures; December 31, 2018: Final figures.

Regulatory minimum capital requirements The minimum capital requirements that the DZ BANK banking group had to comply with in 2019 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 SREP conducted for the DZ BANK banking group in 2018, also had to be satisfied. In this process, the banking supervisor specified a mandatory add-on (Pillar 2 requirement) that is factored into the basis of calculation used to determine the threshold for the maximum distributable amount (MDA). Distributions are restricted if capital falls below the MDA threshold.

In addition to this mandatory component, there is a recommended own funds amount under Pillar 2 (Pillar 2 guidance), which likewise is determined from the SREP, but unlike the mandatory component relates only to common equity Tier 1 capital. Failure to comply with the own funds guidance under Pillar 2 does not constitute a breach of regulatory capital requirements. Nevertheless, this figure is relevant as an early warning indicator for capital planning.

The mandatory minimum capital requirements and their components applicable to 2019, 2018, and 2020 are shown in Fig. 19.

FIG. 19 – REGULATORY MINIMUM CAPITAL REQUIREMENTS OF THE DZ BANK BANKING GROUP  $^{\rm 1}$ 

%	2019	2018
Minimum requirement for		
common equity Tier 1 capital	4.50	4.50
Additional Pillar 2 capital		
requirement	1.75	1.75
Capital conservation buffer	2.50	1.88
Countercyclical capital buffer	0.04	0.05
O-SII capital buffer	1.00	0.66
Mandatory minimum requirement		
for common equity Tier 1 capital	9.79	8.84
Minimum requirement for	1 50	1 50
additional Her I capital	1.50	1.50
Mandatory minimum requirement		
for Tier 1 capital	11.29	10.34
Minimum requirement for Tier 2		
capital <sup>2</sup>	2.00	2.00
Mandatory minimum requirement		
for total capital	13.29	12.34

1 The minimum requirement can also be satisfied with common equity Tier 1 capital. 2 The minimum requirement can also be satisfied with common equity Tier 1 capital or

additional Tier 1 capital.

The internal threshold values at the level of the DZ BANK banking group 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. The internal threshold values are shown in Fig. 7 in section 2.4.2.

Applying the CRR in full, the mandatory minimum capital requirements stipulated by the supervisory authorities and the recommended minimum capital requirements were also complied with on every reporting date in 2019. According to current projections, the requirements will also be satisfied in 2020.

BaFin has classified DZ BANK 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 1.0 percent in 2019.

#### Regulatory capital ratios

The regulatory **own funds** of the **DZ BANK banking group** as at December 31, 2019 determined in accordance with full application of the CRR amounted to a total of €25,690 million (December 31, 2018: €22,210 million).

This equates to a **rise in own funds** of €3,480 million compared with the end of 2018, comprising an increase in common equity Tier 1 capital of €2,547 million and in additional Tier 1 capital of €1,401 million. Some of the increase in these capital components was offset by a decrease in Tier 2 capital of €469 million.

In the case of **common equity Tier 1 capital**, net profits eligible for retention had a particularly positive impact. Conversely, a contraction in securitization exposures and the shortfall resulting from the comparison between expected losses and the loss allowances recognized in this regard for IRB approach exposures led to a reduction in common equity Tier 1 capital. The increase in additional Tier 1 capital was attributable to a new issue in this class of capital amounting to €1,401 million.

Tier 2 capital declined from €3,344 million as at December 31, 2018 to €2,875 million as at December 31, 2019, a year-on-year decrease of €469 million. This change was mainly attributable to the reduced level of eligibility under CRR rules for own funds instruments in this capital category in the last 5 years before their maturity date and to the reduced possibilities for including minority interests.

Regulatory **risk-weighted assets** in the DZ BANK banking group went up from €132,152 million as at December 31, 2018 to €143,800 million as at December 31, 2019, a rise of €11,648 million. This increase was primarily due to a greater level of credit risk and a higher amortized carrying amount for R+V.

As at December 31, 2019, the DZ BANK banking group's **common equity Tier 1 capital ratio** was 14.4 percent and therefore higher than the ratio of 13.7 percent at the end of 2018. The **Tier 1 capital ratio** of 15.9 percent calculated as at the reporting date was also up compared with the figure at December 31, 2018. The figure as at December 31, 2019 was 14.3 percent. The **total capital ratio** also went up year on year from 16.8 percent as at December 31, 2018 to 17.9 percent as at the reporting date.

Fig. 20 provides an overview of the DZ BANK banking group's regulatory capital ratios.

The figures below are based on full application of the CRR. The common equity Tier 1 capital ratio for DZ BANK was calculated at 14.5 percent as at December 31, 2019, which was lower than the equivalent figure of 15.4 percent as at December 31, 2018. In contrast, the Tier 1 capital ratio (calculated on the same legal basis) was up, from 16.3 percent as at December 31, 2018 to 16.7 percent as at December 31, 2019. The total capital ratio declined from 19.7 percent as at December 31, 2018 to 19.5 percent as at the reporting date. The fall in the Tier 1 capital ratio and total capital ratio was attributable to the rise of €4,774 million in risk-weighted assets. The increase in the Tier 1 capital ratio was largely attributable to the issuance of new AT1 bonds. DZ BANK exceeded the regulatory minimum capital ratios at every reporting date in 2019.

#### Leverage ratio

The leverage ratio shows the ratio of a bank's Tier 1 capital to its total exposure. In contrast to credit-riskrelated capital requirements for which the assumptions are derived from models, the individual line items in the calculation of the leverage ratio are not given their own risk weighting but are generally included in the total exposure without any weighting at all. The leverage ratios determined for the DZ BANK banking group and DZ BANK with the full application of the CRR are shown in Fig. 21.

In the reporting period, the leverage ratio of the **DZ BANK banking group** determined with **full** application of the **CRR regulations** went up by 0.6 percentage points from 4.3 percent as at December 31, 2018 to 4.9 percent as at December 31, 2019. This increase resulted primarily from the rise in Tier 1 capital of €3.9 billion. In addition, the total exposure as at the reporting date had risen by €25.0 billion year on year. The growth of the total exposure was mainly attributable to the expansion of on-balance-sheet business at DZ BANK.

FIG. 20 – REGULATORY CAPITAL RATIOS OF THE DZ BANK BANKING GROUP WITH FULL APPLICATION OF THE CRR<sup>1</sup>

	Dec. 31, 2019	Dec. 31, 2018
Capital		
Common equity Tier 1 capital (€ million	20,705	18,158
Additional Tier 1 capital (€ million)	2,109	708
Tier 1 capital	22,814	18,866
Total Tier 2 capital (€ million)	2,875	3,344
Own funds	25,690	22,210
Risk-weighted assets		
Credit risk including long-term equity investments (€ million)	124,734	112,425
Market risk (€ million)	8,350	9,104
Operational risk (€ million)	10,716	10,623
Total	143,800	132,152
Capital ratios		
Common equity Tier 1 capital ratio (%)	14.4	13.7
Tier 1 capital ratio (%)	15.9	14.3
Total capital ratio (%)	17.9	16.8

1 The figures as at December 31, 2018 differ from the corresponding figures disclosed in the opportunity and risk report for the first half of 2019 and in the opportunity and risk report for 2018 due to the transition to disclosure based on full application of the CRR and due to regulatory requirements.





The **DZ BANK banking group's** leverage ratio calculated in accordance with the currently applicable **CRR transitional guidance** was 5.0 percent as at December 31, 2019 (December 31, 2018: 4.5 percent).

**DZ BANK's** leverage ratio as at December 31, 2019 was calculated at 3.9 percent (December 31, 2018: 3.8 percent). The leverage ratio was the same whether the CRR was applied in full or with the transitional guidance. The increase was attributable to the rise in Tier 1 capital of €1,216 million. On the other side of the ratio, the total exposure grew by €29.6 billion, which was mainly attributable to expansion of onbalance-sheet business.

Using both calculation methods, the internal **threshold value** of 3.5 percent applicable to the leverage ratio of the DZ BANK banking group was met on every reporting date in 2019. According to current projections, the requirements will also be satisfied in 2020.

From June 2021, both the DZ BANK banking group and DZ BANK will have to comply with a **minimum target** for the leverage ratio of 3 percent, which has been set externally by the banking supervisor.

At the same time, the **calculation of total exposure** will be adjusted as part of the introduction of CRR II. As a consequence, it is anticipated that the leverage ratio for the DZ BANK banking group will increase by approximately 1 percentage point based on full application of the CRR. A significant factor in the forecast increase is that loans and advances within the cooperative network will no longer have to be included, which will lead to a significant reduction in the total exposure measure.

Minimum requirement for own funds and eligible liabilities The BRRD, Regulation (EU) No. 806/2014 establishing a Single Resolution Mechanism, and the transposition of the BRRD into German law in the form of the SAG have created the legal basis at European and national level for a single resolution mechanism for banks and the MREL regulatory ratio.

The MREL is intended to ensure that banks hold a sufficiently large volume of own funds and liabilities that can be 'bailed-in' to make it possible at all times to carry out an orderly resolution. 'Bail-in-able' liabilities are those that provide for creditors to take an interest in losses incurred and recapitalization if a bank gets into financial difficulties, enabling resolution to take place on the basis of the bail-in and other instruments without recourse to government help and without jeopardizing the stability of the financial system.

The MREL ratio is the ratio of the total of own funds and eligible bail-in-able liabilities of the DZ BANK banking group to the total liabilities and own funds of the DZ BANK banking group.

The internal threshold value for the DZ BANK banking group's MREL ratio set by DZ BANK's Board of Managing Directors was 8.5 percent in 2019. In June 2019, BaFin notified DZ BANK that the Single Resolution Board had set an MREL ratio of 8.2 percent for the DZ BANK banking group, which was unchanged compared with the prior-year figure.

The MREL ratio measured for the DZ BANK banking group was 11.4 percent as at September 30, 2019 (December 31, 2018: 14.4 percent). The fall in the ratio compared with the figure as at the prior-year reporting date was attributable to the non-eligibility of existing non-preferred and non-subordinated issues because of their remaining term to maturity and to a significant increase in total assets. The measured MREL ratio was therefore above the internal threshold value and the external minimum target. These requirements were met at every reporting date during the year up to September 30, 2019. It is reasonable to assume that the requirements were also met as at December 31, 2019 and – according to current projections – will be satisfied in 2020.

The MREL ratio disclosed for 2019 relates to September 30, 2019 because the relevant figures for the end of the year were not yet available at the deadline date for the publication of this opportunity and risk report.

7.3.4 R+V Versicherung AG insurance group The regulatory solvency requirements for insurance companies and insurance groups provide a means of evaluating the overall risk position in the R+V Versicherung AG insurance group.

The group's risk-bearing capacity for regulatory purposes is defined as the eligible own funds at group level in relation to the risks arising from operating activities. The changes in the regulatory risk-bearing capacity of the R+V Versicherung AG insurance group as a whole and each of its constituent entities are analyzed at least once a quarter. Fig. 22 shows how the solvency requirements are covered by eligible own funds.

As at December 31, 2019, the preliminary figure for the regulatory risk-bearing capacity of the R+V Versicherung AG insurance group was 152.4 percent (final figure as at December 31, 2018: 177.3 percent).

The recalculation of the overall solvency requirement described in section 7.2.3 also affected the regulatory risk-bearing capacity of the R+V Versicherung AG insurance group and led to retrospective changes in the solvency requirements as at the end of 2018. The figures as at December 31, 2018 given in this opportunity and risk report have been restated accordingly and are not directly comparable with the figures in the 2018 opportunity and risk report.

The project accounting applied in the internal planning shows that the R+V Versicherung AG insurance group's solvency ratio will continue to exceed the minimum statutory requirement as at December 31, 2020.

7.4 Stress tests for types of risk covered by capital

### 7.4.1 Adverse stress tests

Adverse stress tests are used to examine the impact on capital and risk from potential **crisis scenarios** that are exceptional, but plausible, and particularly relevant to the DZ BANK Group's value and risk drivers. The **KPIs** relating to economic and regulatory capital adequacy are analyzed in this context. However, the stress tests also reflect events that go beyond the methods established for calculating capital adequacy. The term 'adverse stress tests' encompasses those stress scenarios that represent negative macroeconomic trends or events from the perspective of the DZ BANK Group. In this context, 'adverse' indicates that the scenarios may be particularly disadvantageous or even harmful.

Adverse stress tests can provide information on whether the level of capital resources – especially the buffer held to cover crisis situations – is also sufficient to cover various types of moderate to serious crisis scenario. The stress test results also facilitate an assessment of the extent to which the analyzed value and risk drivers are material for the DZ BANK Group.



FIG. 22 – REGULATORY CAPITAL ADEQUACY OF THE R+V VERSICHERUNG AG INSURANCE GROUP<sup>1</sup>

1 December 31, 2019: Preliminary figures; December 31, 2018: Final figures.

The adverse stress tests include a number of **scenarios across all risk types** and are generally designed for a 1-year scenario horizon as a minimum. They take into account both macroeconomic scenarios and historical situations that are particularly relevant for the DZ BANK Group's business model and portfolios.

The adverse scenarios are based on macroeconomic factors from both the real economy and financial markets or they consist of specific events that are particularly relevant for the DZ BANK Group but not of a macroeconomic nature; some scenarios combine both macroeconomic and specific events.

The methods used are designed so that the specific features of R+V's business model and its risk and capital management systems are taken into account when determining the results of stress testing in the DZ BANK Group.

For the adverse stress tests, DZ BANK has put in place a system of threshold values as an **earlywarning mechanism**. The threshold values for the scenarios across all risk types are monitored in the ongoing reporting system. These early-warning signals trigger various risk management processes so that there can be an early response to the potential risks highlighted by the stress tests. Control measures potentially available for the crisis scenario in question are also taken into account so that there is a comprehensive, critical evaluation of the stress test results.

The adverse stress tests are carried out quarterly. The results are noted by the **Board of Managing Directors** and by the DZ BANK Supervisory Board's **Risk Committee**.

## 7.4.2 Reverse stress tests

Reverse stress tests complement the adverse stress tests and are used to investigate which of the hypothetical scenarios could conceivably be sufficiently plausible and relevant to jeopardize the ability of the DZ BANK Group to **continue as a going concern**.

Reverse' indicates that the tests are in the opposite direction and distinguishes them from the adverse stress tests. In adverse stress tests, scenarios are defined and the corresponding KPIs determined in order to assess whether there is a sufficient level of capital resources available to cover moderate or serious crisis scenarios. Reverse stress tests, on the other hand, examine which scenarios would have to occur to jeopardize the survival of the bank as a going concern.

In reverse stress tests, the risk particularly to the regulatory KPIs is simulated with scenarios in which it would no longer be feasible to **continue the business model** or in which the business model would prove to be no longer sustainable. In the case of reverse stress tests, the priorities are therefore as follows: firstly, to identify relevant scenario approaches that could have the potential to jeopardize the bank's survival as a going concern, and secondly, to estimate the probability and plausibility of a specific, sufficiently serious scenario of this nature.

The reverse stress tests are carried out annually. The results are noted by the **Board of Managing Directors** and by the DZ BANK Supervisory Board's **Risk Committee**.

7.4.3 Scenario analyses in the risk types In the economic perspective, the quarterly report on adverse stress tests in the DZ BANK Group is supplemented by various scenario analyses in the risk types. These analyses serve as a link between risk drivers and sensitivities, and between potential events and adverse scenarios. The scenario analyses also enhance the risk quantification for each risk type by including an alternative perspective.

In the scenario analyses, specific risk drivers, risk concentrations, or events are examined in detail for each type of risk by simulating economic losses and comparing them against the relevant risk limit.

## Bank sector

## 8 Credit risk

## 8.1 Definition

**Credit risk** is defined as the risk of losses arising from the default of counterparties (borrowers, issuers, other counterparties) and from the migration of the credit ratings of these counterparties.

Credit risk may arise in traditional lending business and also in trading activities. **Traditional lending business** is for the most part commercial lending, including financial guarantee contracts and loan commitments. In the context of credit risk management, **trading activities** refers to capital market products such as securities (in both the banking book and the trading book), promissory notes, derivatives, secured money market business (such as repo transactions), and unsecured money market business.

In **traditional lending business**, credit risk arises mainly in the form of default risk and migration risk. In this context, default risk refers to the risk that a customer may be unable to settle receivables arising from loans or advances made to the customer (including lease receivables) or make overdue payments, or that losses may arise from contingent liabilities or from lines of credit committed to third parties. Migration risk is a sub-risk within traditional credit risk and reflects changes in the fair value of types of exposure subject to credit risk caused by a change in the rating for a borrower (rating migration).

Credit risk in connection with **trading activities** arises in the form of default risk, which can be subdivided into issuer risk, replacement risk, and settlement risk, depending on the type of transaction involved.

**Issuer risk** is the risk of incurring losses from the default of issuers of tradable debt or equity instruments (such as bonds, shares, profit-participation certificates), losses from a default in connection with the underlying instrument in derivatives (for example, credit or equity derivatives), or losses from a default in connection with fund components.

**Replacement risk** on derivatives is the risk of a counterparty defaulting during the term of a trading transaction where entities in the Bank sector can only

enter into an equivalent transaction with another counterparty by incurring an additional expense in the amount of the positive fair value at the time of default.

**Recovery risk** forms part of credit risk and increases the risk capital requirement for traditional credit risk, issuer risk, and replacement risk. Recovery risk arises from uncertainty relating to the recovery rates for collateral received. It also reflects the uncertainty regarding the recovery rate for unsecured receivables and the cure rate following counterparty default.

**Settlement risk** arises when there are two mutually conditional payments and there is no guarantee that when the outgoing payment is made the incoming payment will be received. Settlement risk is the risk of a loss if counterparties do not meet their obligations, counter-performance already having taken place.

Country risk is also included within credit risk. Country risk in the narrower sense of the term refers to conversion, transfer, payment prohibition, or moratorium risk. It is the risk that a foreign government may impose restrictions preventing a debtor in the country concerned from transferring funds to a foreign creditor. This type of risk is taken into account by means of the ratings used in credit risk measurement and specific modeling in the credit portfolio model. It increases the risk capital requirement for traditional credit risk, issuer risk, and replacement risk. In the broader sense of the term, country risk forms part of credit risk. In this case, it refers to the risk arising from exposure to the government itself (sovereign risk) and the risk that the quality of the overall exposure in a country may be impaired as a result of country-specific events.

### 8.2 Specific risk factors

Key values used in determining credit risk include the concentrations of lending volume in terms of counterparties, sectors, countries, and maturities, and the credit quality structure of the credit portfolio. **Significant concentrations of volume** in counterparties, sectors, or countries increase the risk that an accumulation of credit risk will become critical, for example if there are defaults among greater concentrations of counterparties or, in economic crises, defaults in sectors or countries with significant concentrations in the credit portfolio. The term of loan agreements is also a key credit risk factor because the probability of a deterioration in credit rating and therefore of a counterparty default during the term of an agreement generally increases over time. Particularly in the case of an **accumulation of exposures that have longer terms to maturity** and a noninvestment-grade rating, there is a danger that the credit risk will materialize and the recognition of impairment losses will become necessary.

**8.3 Business background and risk strategy** The DZ BANK Group is exposed to considerable credit risk in the Bank sector. The lending business is one of the most important core activities of the entities in the Bank sector. In its role as the central institution, DZ BANK covers the entire range of lending business, either in partnership with the local cooperative banks or in direct business, and provides its customers with financing solutions. Its customers include the local cooperative banks themselves, corporate customers, international companies, and banks and institutions both in Germany and abroad.

Default risk from traditional lending business arises primarily at DZ BANK, BSH, DVB, DZ HYP, and TeamBank. The risk results from the specific transactions in each management unit and therefore has varying characteristics in terms of diversification and size in relation to the volume of business.

Default risk relating to trading transactions arises from issuer risk, particularly in connection with the trading activities and investment business of DZ BANK, BSH, and DZ HYP. Replacement risk arises for the most part at DZ BANK and DZ PRIVATBANK. The entities in the Bank sector pursue a strictly decentralized business policy aimed at promoting the cooperative banks and are bound by the core strategic guiding principle of a 'network-oriented central institution and financial services group'. The business and risk policy for the credit-risk-bearing core businesses in the group is formulated on the basis of risk-bearing capacity. The credit risk strategy therefore forms the basis for credit risk management and reporting across the whole group and ensures that there is a standard approach to credit risk within the group. It takes into account the business models of each of the management units.

Lending throughout the group is predominantly based on the 'VR rating' system, a rating procedure developed by DZ BANK in collaboration with the BVR.

Both DZ BANK and the subsidiaries with a material credit risk seek to maintain a good rating and risk structure in their credit portfolios at all times. In the future, the portfolios will continue to be characterized by a high degree of diversification.

Where required, the Board of Managing Directors of DZ BANK makes decisions during the course of the year to ensure that the rules for the medium-term and long-term credit risk strategy are adjusted in line with changing circumstances and current developments.

The credit risk strategy specifies that the entities in the Bank sector must treat their partners fairly and, as part of the sustainability strategy, not enter into any lending arrangement that could prejudice the reputation of the DZ BANK Group or DZ BANK. A sustainable lending policy developed on the basis of this strategy is applied in the majority of the management units involved in lending.

The entities in the Bank sector are not involved in providing finance for the construction of new coalfired power plants.

8.4 Sustainability review in the lending process In the lending evaluation process, DZ BANK systematically reviews loan applications from relevant sustainability perspectives in order to limit any detrimental impact from its financing activities. All factors relevant to the financing arrangement in question are assessed in relation to environmental and social risks using a sustainability checklist based on the 10 principles of the UN Global Compact and the Equator Principles, the latter forming a global project finance standard for evaluating environmental and social risks. Loans to cooperative banks and to entities in the DZ BANK Group are exempt from the checks, as are exposures that are being restructured. Further exemptions apply to certain product types in the joint credit business with the cooperative banks, to loans under blanket approval agreements, and to exposures that are below the rating threshold.

At DZ BANK, industry-related principles are used in addition to the sustainability checklist when reviewing loan applications from sensitive industries (forestry, commodities mining/extraction, dam construction, fishing, and maritime industries). These principles specify the details to be reviewed with reference to international industry-specific conventions, recognized standards, certification, and optimum production processes. 8.5 Organization, responsibility, and risk reporting

Responsibilities in the lending process have been laid down and are documented in a written set of procedural rules. These responsibilities cover loan applications, approvals, and processing, including periodic credit control with regular analysis of ratings. Decision-making authority levels are specified by the relevant **rules** based on the risk content of lending transactions.

Established **reporting and monitoring processes** help to provide decision-makers with information about changes in the risk structure of credit portfolios and form the basis for managing credit risk.

The **credit risk report** keeps the Board of Managing Directors, the Group Risk and Finance Committee, and the Supervisory Board's Risk Committee informed of the economic capital required to cover credit risk. In addition to providing management with recommendations for action, internal reporting also includes an in-depth analysis of the portfolio structure in regard to risk concentrations based on key risk characteristics such as country, asset class, industry, rating class, and the lending volume to single borrowers. In addition, the reports include details on specific exposures. In the context of the risk limit, the credit value-at-risk is also included in the credit risk report.

### 8.6 Risk management

## 8.6.1 Rating systems

Use and characteristics of the rating systems The generation of internal credit ratings for the counterparties of entities in the Bank sector 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, investment funds, and project finance. 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**.

For internal management purposes, DZ BANK uses further rating systems to assess SMEs (German Mittelstand), countries, asset finance, acquisition financing, agricultural businesses, public-sector entities, not-for-profit organizations, foreign SMEs, and insurance companies.

Most of the other entities in the Bank sector 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.

Development and expansion of rating systems All internal **rating systems** approved by the banking supervisor for solvency reporting were **validated** in 2019. Validation processes at DZ HYP have not yet been completed in full for all rating systems because of merger activities. The revision of the **rating system for project finance** and of the **slotting approach for project finance**, which was completed in 2018, successfully underwent a supervisory review in the first half of 2019, focusing on the slotting approach. It is planned to use the slotting approach from 2020 when determining the regulatory capital requirement.

The new default definition as specified in the EBA's 'Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures' (EBA/GL/2017/16) was implemented in September of the reporting year. The revision of the IRB approach rating systems in accordance with EBA/GL/2017/16 is scheduled for 2020.

The rating system for major corporations is currently being redeveloped and the testing phase is planned to start in 2020. The supervisory review of this rating system is scheduled for 2021.

#### DZ BANK credit rating master scale

The credit rating master scale serves as a groupwide rating benchmark with which to standardize the different rating systems used by the entities in the Bank sector as a result of differences in their business priorities. It thereby provides all management units with a uniform view of counterparties' credit ratings.

Fig. 23 shows 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 Ratings. 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. The ratings for securitization exposures are matched to various different external ratings depending on the asset class and region.

In DZ BANK's master scale, the default bands remain unchanged to ensure comparability over the course of time, whereas some fluctuation in default rates can be seen in external ratings. Therefore, it is not possible to map the internal ratings directly to the ratings used by the rating agencies. Consequently, the scale can only be used as a starting point for comparison between internal and external credit ratings.

#### DZ BANK rating desk

The VR rating systems for banks and countries are also available to DZ BANK subsidiaries and the cooperative banks. Users can enter into a master agreement to access the ratings via an IT application (Rating Desk), which is available throughout the cooperative financial network, in return for the payment of a fee. Any accessed ratings are first validated by the entities in the Bank sector or the cooperative banks before they are included in the user's credit procedures.

#### FIG. 23 - BANK SECTOR: DZ BANK'S VR CREDIT RATING MASTER SCALE AND EXTERNAL CREDIT RATINGS

	5	rnal rating classe	Exte		
Rating		Standard &		Average	Internal rating
category	Fitch	Poor's	Moody's	default probability	class
	AAA to AA	AAA to AA	Aaa to Aa2	0.01%	1A
	AA-	AA-	Aa3	0.02%	1B
				0.03%	1C
ade	A+	A+	A1	0.04%	1D
tgr				0.05%	1E
.ueu	A	A	A2	0.07%	2A
estn	A-	A-	A3	0.10%	2B
Inve	BBB+	BBB+	Baa1	0.15%	2C
	BBB	BBB	Baa2	0.23%	2D
				0.35%	2E
	BBB-	BBB-	Baa3	0.50%	ЗA
	BB+	BB+	Ba1	0.75%	3B
¢,	BB	BB	Ba2	1.10%	3C
rade				1.70%	3D
nt g	BB-	BB-	Ba3	2.60%	ЗE
mer	B+	B+	B1	4.00%	4A
esti	В	В	B2	6.00%	4B
-inv	B-	В-	B3	9.00%	4C
Yon				13.50%	4D
2	CCC+ or	CCC+ or	Caa1 or		
	lower	lower	lower	30.00%	4E
				DPD default	5A
iault				Specific loan loss allowance / internal neutralization of interest / rating-related sale with significant loss / further bank-internal criteria	5B
Dei				Distressed restructuring	5C
				Insolvency	5D
				Direct impairment / workout	5E
				Not rated	NR

## 8.6.2 Lending business pricing

The management units in the Bank sector use the riskadjusted pricing of the financing as a criterion in lending decisions. Adequate standard risk costs and risk-adjusted capital costs are taken into account. The methods used by the management units to manage transactions reflect the particular features of the product or business concerned.

To ensure that lending business remains profitable, standard risk costs are determined in the management of individual transactions in many parts of the **Bank sector**. The purpose of these costs is to cover average expected losses from borrower defaults. The aim is to ensure that the net loss allowances recognized in the financial statements are covered on average over the long term in an actuarial-type approach by the standard risk costs included in the pricing. In addition to standard risk costs, **an imputed economic cost of capital** based on the capital requirement is integrated into **DZ BANK's** contribution margin costing. This enables DZ BANK to obtain a return on the capital tied up that is in line with the risk involved and that covers any unexpected losses arising from the lending business. Pricing also includes an appropriate amount to cover the costs of risk concentration.

## 8.6.3 Credit-portfolio management

Credit portfolio models are used together with valueat-risk methods to quantify unexpected losses that may arise from the credit portfolio for lending and for trading business. Credit value-at-risk reduced by the expected loss describes the risk of unexpected losses arising should a default or migration event occur in the credit portfolio. This calculation is based on one-year default probabilities, taking into account additional transaction-specific features and reflecting the current rating of the borrower. When determining credit value-at-risk, recovery risk is taken into account as the amount by which the actual loss deviates from the expected recovery rate or - in the case of transactions already in default - from the specific loan loss allowances. Existing netting agreements are included in the measurement of trading exposures subject to default risk. The risk capital requirement is determined in the management units on a decentralized basis.

The credit portfolio is managed by restricting the credit value-at-risk to the limit set for credit risk. A traffic light system is used to monitor Bank sector management units' compliance with the limits specified for credit risk.

## 8.6.4 Management of exposure in traditional lending business

Measuring exposure in traditional lending business Individual lending exposures are managed on the basis of an analysis of gross lending exposure. The period taken into account in this case is equivalent to the monitoring cycle of 1 year. Together with risk-related credit-portfolio management, volume-oriented credit risk management is one of the components in the management of risk concentrations in the lending business.

In traditional lending business, the credit exposure or lending volume is generally the same as the nominal value of the total loan book and reflects the maximum volume at risk of default. The credit exposure is a gross value because risk-bearing financial instruments are measured before the application of any credit risk mitigation and before the recognition of any loss allowances.

In building society operations, nominal amounts are used as a basis for measuring the gross lending volume. In addition, loans and advances to customers in building society operations are reduced by the associated deposits. The maximum credit exposure comprises the total lines of credit committed to third parties, or in the case of limit overruns, the higher amounts already drawn.

Limit system for managing exposures in traditional lending business

Limits are set in the relevant entities in the Bank sector for individual borrowers and groups of connected customers. Counterparties are also managed centrally at the level of the Bank sector, depending on the limit level and credit rating.

As a prerequisite for prompt monitoring of limits, suitable **early-warning processes** have been established in the management units that are of material significance for the Bank sector's credit risk. In this context, financial covenants are often incorporated into loan agreements to act as earlywarning indicators for changes in credit standing and as a tool for the proactive risk management of lending exposures.

In addition, processes have been set up in the Bank sector to handle instances in which limits are **exceeded**. Such excess exposures must be approved by the relevant level of authority in the management units concerned and in accordance with applicable internal requirements, and must be reduced if necessary.

Country exposure in the traditional lending business is managed by setting **country limits** for industrialized countries and emerging markets at the Bank sector level.

## 8.6.5 Management of credit exposure in trading transactions

Measuring credit exposure in trading transactions Issuer risk, replacement risk, and settlement risk are exposure-based measurements of the potential loss in trading transactions. These are determined without taking into account the likelihood of a default. In order to determine the credit exposure, securities in the banking book and trading book are predominantly measured at fair value (nominal amounts are used in building society operations), while derivatives are measured at fair value and, in respect of settlement risk, at the cash-flow-based accepted value.

The fair value of a securities exposure is used to determine the **issuer risk**. Risks relating to the underlying instruments in derivative transactions are also included in issuer risk.

At the level of the **Bank sector**, **replacement risk** is generally determined on the basis of fair value, taking into account appropriate add-ons. At **DZ BANK**, which is of particular significance as far as replacement risk is concerned, the risk is determined primarily according to each individual transaction as part of a portfolio simulation. The portfolio simulation models future exposures, taking into account a large number of risk factors. Replacement risk resulting from remaining over-the-counter (OTC) derivatives is calculated on the basis of fair value and the add-ons for individual transactions. The add-ons take into account specific risk factors and residual maturities.

With regard to exchange-traded derivatives, the replacement risk vis-à-vis the customer in customer brokerage business consists of the actual collateral exchanged (the variation margin for the daily settlement of profits and losses, and the initial margin as the collateral to be provided in advance to cover the loss risk), the fair value, and additional collateral requirements. To calculate the replacement risk vis-àvis stock exchanges, additional potential for changes in value or add-ons for individual transactions are also taken into consideration. Where legally enforceable, netting agreements and collateral agreements are used at counterparty level for all derivatives in order to reduce exposure. In the case of repos and securities lending transactions, haircuts are applied instead of add-ons. Unsecured money market transactions are measured at fair value.

As regards **settlement risk**, the risk amount is the expected payment due. Settlement risk is recognized for the specified settlement period. It takes into account the amount and timing of outstanding cash flows for the purposes of managing the risk associated with mutual settlement at some point in the future. These future cash flows are already factored into the replacement risk through the fair value measurement and are therefore included in the risk capital requirement. As a result, settlement risk does not need to be covered with risk capital in addition to that for the other types of credit risk related to trading activities.

Limit system for managing trading exposure

DZ BANK has established an exposure-oriented **limit system** related to credit ratings to limit the default risk arising from trading business. Replacement risk is managed via a structure of limits broken down into maturity bands. Unsecured money market transactions are subject to separate limits. A daily limit is set in order to manage settlement risk. A specific limit for each issuer or, in certain circumstances, a general limit is determined as the basis for managing issuer risk. Covered bonds are subject to separate limits. The main subsidiaries have their own comparable limit systems. The issuer risk in treasury's investment book is restricted by means of portfolio limits in addition to the individual issuer limits.

Exposure in connection with DZ BANK's trading business is measured and monitored using a standard method and a central, IT-supported limit management system to which all relevant trading systems are connected. Furthermore, the trading exposure in the Bank sector is managed on a decentralized basis at management unit level.

As in the traditional lending business, appropriate processes have also been established for the trading business to provide **early warnings and notification of limit overruns**. The member of the Board of Managing Directors responsible for risk monitoring is sent a daily list of significant exceeded trading limits. A monthly report is prepared covering the utilization of replacement and issuer risk in connection with trading activities.

Country exposure in the trading business is managed in the same way as in the traditional lending business by setting **limits for countries** at the Bank sector level.

8.6.6 Management of risk concentrations and correlation risks

### Identifying risk concentrations

In order to highlight concentrations of credit risk, the exposure at portfolio level is categorized by, among other things, asset class, industry sector, country group, term to maturity, size category, and rating. In addition, risks resulting from large exposures to individual single borrower units are closely monitored and managed. The key factor to be considered when determining concentrations of credit risk is the possibility of a simultaneous default by a number of borrowers who share the same characteristics. This is why determining the correlated exposure to loss as a part of the calculation of the risk capital required for credit risk is essential for managing risk concentrations.

Risk concentrations in credit and collateral portfolios In managing the traditional lending business and its trading business, DZ BANK takes into account the correlation between collateral and the borrower pledging the collateral or between the collateral and the counterparty whose replacement risk the collateral is intended to mitigate. If there is a significant positive correlation between the collateral and the borrower or the counterparty pledging the collateral, the collateral is disregarded or accorded a reduced value as collateral. This situation arises, for example, where a guarantor, garnishee, or issuer forms a group of connected clients or a similar economic entity with the borrower or counterparty.

## Wrong-way risk

**General wrong-way risk** can arise as a result of DZ BANK's trading activities. This is defined as the risk of a positive correlation between the default probability of a counterparty and the replacement value (replacement risk exposure) of a (hedging) transaction entered into with this counterparty because of a change in the macroeconomic market factors of the traded underlying instrument (e.g. price changes for exchange rates).

**Specific wrong-way risk** can also occur. This is the risk of a positive correlation between the default probability of a counterparty and the replacement value (replacement risk exposure) of a (hedging) transaction entered into with this counterparty because of an increase in the default probability of the issuer of the traded underlying instrument. This type of risk largely arises in connection with OTC equity and credit derivatives in which the underlying instrument is a (reference) security or (reference) issuer.

The measures described below are used to appropriately monitor these risks and significantly reduce them. As a result, wrong-way risk, in particular, is not material at DZ BANK.

Measures to prevent concentration risk and wrong-way risk In order to prevent unwanted risks that may arise from the concentration or correlation of collateral in the trading business or from general wrong-way risk, DZ BANK has brought into force a collateral policy and its own internal 'minimum requirements for bilateral reverse repo transactions and securities lending transactions'.

These requirements are based on the Credit Support Annex (ISDA Master Agreement) and the Collateralization Annex (German Master Agreement for Financial Futures) and stipulate that, in accordance with the collateral policy, only collateral in the form of cash (mainly in euros or US dollars), investment-grade government bonds, and/or Pfandbriefe can be used for mitigating risks arising from **OTC derivatives**. Exceptions to this rule are permitted, mainly for local cooperative banks, although a very good credit rating (at least 2B on DZ BANK's credit rating master scale) is still required for the relevant securities collateral. The collateral must also be eligible for use as collateral at the ECB.

High-grade collateral is also required for **repo and securities lending transactions** in compliance with DZ BANK's own internal minimum requirements and the generally accepted master agreements, although the range of collateral is somewhat broader here than in the case of OTC derivatives. Furthermore, the 'minimum requirements for bilateral reverse repos and securities lending transactions' exclude prohibited correlations and specify collateral quality depending on the credit rating of the counterparties. The relevant rules are monitored on a daily basis and any infringements of the requirements are reported each month to the Risk Committee.

If material specific wrong-way risk arises in connection with a bilateral OTC trading transaction, it is taken into account when the exposure is calculated.

The Risk Committee receives quarterly reports on relevant wrong-way risk and concentration risk arising in connection with derivatives and securities financing, including any necessary exposure adjustments.

### 8.6.7 Mitigating credit risk

Collateral strategy and secured transactions In accordance with the credit risk strategy, **customer credit quality** forms the main basis for any lending decision; collateral has no bearing on the borrower's credit rating. However, depending on the structure of the transaction, collateral may be of material significance in the assessment of risk in a transaction.

Collateral in line with the level of risk in medium-term or long-term financing arrangements is generally sought. In particular, recoverable collateral equivalent to 50 percent of the finance volume is required for new business with SME customers in rating category 3D or below on the credit rating master scale.

Collateral is used as an appropriate tool for the management of risk in export finance or structured trade finance transactions. In the case of project finance, the financed project itself or the assignment of the rights in the underlying agreements typically serve as collateral. **Secured transactions** in traditional lending business encompass commercial lending including financial guarantee contracts and loan commitments. In order to protect transactions against default risk, traditional collateral is obtained, the decision being made on a case-by-case basis.

### Types of collateral

The entities in the Bank sector use all forms of **traditional loan collateral**. Specifically, these include mortgages on residential and commercial real estate, registered ship and aircraft mortgages, guarantees (including sureties, credit insurance, and letters of comfort), financial security (certain fixed-income securities, shares, and investment fund units), assigned receivables (blanket and individual assignments of trade receivables), and physical collateral.

Privileged mortgages, registered ship and aircraft mortgages, guarantees, and financial collateral are the main sources of collateral recognized for regulatory purposes under the CRR.

In accordance with DZ BANK's collateral policy, only cash, investment-grade government bonds, and/or Pfandbriefe are normally accepted as **collateral for trading transactions** required by the collateral agreements used to mitigate the risk attaching to OTC derivatives. DZ BANK also enters into netting agreements to reduce the credit risk arising in connection with OTC derivatives. The prompt evaluation of collateral within the agreed margining period also helps to limit risk.

In order to reduce the issuer risk attaching to bonds and derivatives, use is made of credit derivatives, comprising credit-linked notes, credit default swaps, and total return swaps. Macro hedges are used dynamically to mitigate spread risk and migration risk as well as risks attaching to underlying assets. In isolated cases, transactions are conducted on a back-to-back basis. For risk management purposes, the protection provided by credit derivatives is set against the reference entity risk, thereby mitigating it. The main protection providers/counterparties in credit derivatives are financial institutions, mostly investment-grade banks in the VR rating classes 1A to 2C.

Management of traditional loan collateral Collateral management is the responsibility mainly of **specialist units**, generally outside the front-office divisions. The core tasks of these units include providing, inspecting, measuring, recording, and managing collateral and providing advice to all divisions in related matters.

To a large extent, standardized contracts are used for the provision of collateral and the associated declarations. Specialist departments are consulted in cases where customized collateral agreements are required. Collateral is managed in separate IT systems.

Collateral **is measured** in accordance with internal guidelines and is usually the responsibility of backoffice units. As a minimum, carrying amounts are normally reviewed annually or on the agreed submission date for documents relevant to measurement of the collateral. Shorter monitoring intervals may be specified for critical lending exposures. Regardless of the specified intervals, collateral is tested for impairment without delay if any indications of impairment become evident.

The workout units are responsible for **recovering collateral**. In the case of non-performing loans, it is possible to depart from the general measurement guidelines and measure collateral on the basis of its likely recoverable value and time of recovery. Contrary to the general collateralization criteria, collateral involved in restructuring exposures can be measured using market values or the estimated liquidation proceeds.

### Collateral management

In addition to **netting agreements** (ISDA Master Agreement and German Master Agreement for Financial Futures), **collateral agreements** (Credit Support Annex to the ISDA Master Agreement and Collateralization Annex to the German Master Agreement for Financial Futures) are entered into as instruments to reduce credit exposure in OTC transactions.

DZ BANK's **collateral policy** regulates the content of collateral agreements and the responsibilities and authorities for implementing the rights and obligations they confer within the bank. This policy specifies contractual parameters, such as the quality of collateral, frequency of transfer, minimum transfer amounts, and thresholds. DZ BANK regularly uses bilateral collateral agreements. Exceptions apply to cover assets and special-purpose entities, as the special legal status of the counterparties means that only unilateral collateral agreements can be usefully enforced, and to supranational or government entities. Any decision not to use a bilateral collateral agreement for counterparties not subject to the European Market Infrastructure Regulation (EMIR) rules must be approved by a person with the relevant authority.

Netting and collateralization generally result in a significant reduction in the exposure from trading business. IT systems are used to measure exposures and collateral. **Margining** is carried out on a daily basis for the vast majority of collateral agreements in accordance with the collateral policy.

Collateral agreements generally include minimum transfer amounts and, in some cases, also **thresholds** that are independent of the credit rating. There are also some agreements with triggers based on the credit rating. In these agreements, for example, the unsecured part of an exposure is reduced in the event of a ratings downgrade or the borrower is required to make additional payments (for example, payments known as 'independent amounts'). Since the EMIR collateral agreement obligation came into force on March 1, 2017, the supervisory authorities have specified these contractual provisions as standard.

EMIR requires the exchange of an initial margin in bilateral OTC derivatives transactions in addition to the variation margin. The **initial margin exchange** will be mandatory for the entities in the Bank sector from September 2020.

#### Central counterparties

EMIR has permanently changed the environment in which banks, insurance companies, and investment funds conduct OTC derivative transactions. Under this regulation, market players must report all exchangetraded and OTC derivatives to central trade repositories and use predefined steps to settle certain standardized OTC derivatives via central counterparties (known as clearing houses). Furthermore, risk mitigation methods have to be used for OTC derivatives that are not settled centrally through a clearing house. This is intended to minimize counterparty risk.

Any market players not exempted from this new clearing obligation must be connected to a central counterparty. The market player concerned may be a direct member of a clearing house or may process its derivative contracts using a bank that is a member of a central counterparty. DZ BANK is a direct member of the London Clearing House, which is Europe's largest clearing house for interest-rate derivatives, and of Eurex Clearing AG. The bank therefore has direct access to central counterparties for derivatives for the purposes of clearing derivative transactions. In the case of credit derivatives, it also has indirect access to the Intercontinental Exchange clearing house via clearing broker Deutsche Bank.

## 8.6.8 Management of non-performing lending exposures

Managing and monitoring non-performing exposures Identified non-performing loans are transferred to the **workout units** at an early stage. By providing intensified loan management for critical exposures and applying tried-and-tested solutions, these special units lay the basis for securing and optimizing nonperforming risk positions.

In its traditional lending business, DZ BANK has a comprehensive range of tools at its disposal for the early identification, close support, and high-quality monitoring of non-performing exposures. The sub-portfolio of non-performing loans is reviewed, updated, and reported on a quarterly basis. The process is also carried out at shorter intervals if required. This process is comprehensively supported by IT systems. Meaningful, prompt internal reporting focused on target groups is a key component of this approach. If necessary, the intensified loan management put in place for individual borrowers is transferred to task forces specially set up for this purpose. The risks in sub-portfolios are monitored and analyzed by means of regular reports.

Where required, similar procedures have been implemented in the main subsidiaries, which adapt them to the characteristics of the risks faced in their particular business.

## Policies and procedures for the recognition of loss allowances

The description required by GAS 20 A1.7(c) of the methods used for recognizing loss allowances is included in note 5 of the notes to the consolidated financial statements.

#### Non-performing loans

The entities in the Bank sector classify a loan as nonperforming if it has been rated between 5A and 5E on the VR credit rating master scale. This corresponds to the definition of default specified by the CRR. Nonperforming loans are also referred to by the abbreviation NPLs.

The following key figures are used to manage nonperforming loans:

- Loss allowance ratio (balance of loss allowances as a proportion of total lending volume)
- Risk cover ratio (balance of loss allowances as a proportion of the volume of non-performing loans)
- NPL ratio (volume of non-performing loans as a proportion of total lending volume).

The management of non-performing loans at DZ BANK is currently being updated in line with the requirements specified in the NPL guidance issued by the ECB.

## 8.7 Lending volume

8.7.1 Reconciliation of lending volume to the consolidated financial statements For the purposes of internal credit risk management in the Bank sector, the lending volume is broken down by credit-risk-bearing instrument - traditional lending, securities business, and derivatives and money market business. This breakdown corresponds to the risk classes required for the external reporting of risks arising from financial instruments. The credit-riskbearing instruments are classified by sector, country group, credit rating, and term to maturity so that volume concentrations can be identified.

Fig. 24 shows a reconciliation of the gross lending volume on which the risk management is based to individual balance sheet items in order to provide a transparent illustration of the link between the consolidated financial statements and risk management.

FIG. 24 - BANK SECTOR: RECONCILIATION OF THE LENDING VOLUME

€ billion				Reconc	iliation						
Lending volume f accounts	or internal mana <u>c</u>	gement	Scope of co	nsolidation	Carrying an measur	nount and ement					
	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	D	ec. 31, 2019	Dec	. 31, 2018	
								81.3		79.2	
								81.3		79.2	
Traditional					4 26.2		-			-	
lending	299.6	289.3	2.3	2.4		20.3	328.1	181.0	312.0	170.3	
business								183.2		172.6	
									-2.2		-2.2
								65.8		62.4	
								66.5		56.6	
Securities	<b>5</b> 7	72.0	0.3	0.3	16 F	16.6	66 F	11.7	56.6	56.6	10.8
business	62.7	75.0	0.5	0.5	-10.5	-10.0	00.5	1.0	50.0	0.7	
								53.8		45.1	
						-15.9	-0.7 0.2 -0.7 19.3		-2.1		
	11.4							0.2		0.9	
business		13.7	-0.1	0.1	-12.0			19.3	-2.1	15.6	
								-1.3		-2.5	
								-18.9		-16.1	
								31.3		24.6	
								16.2		12.4	
Money market		2.0			26.6	21.6	21.2	3.1	24.6	1.9	
business	4.0	5.0	-	-	26.6	<b>5.6</b> 21.6	31.3	1.0	24.6	0.2	
								10.6		9.6	
							-	0.4		0.5	
Total	398.3	378.9	2.5	2.8	24.3	9.4	425.1		391.1		
						Baland	e as at D	ec. 31, 2019	26.8	6.7%	
						Baland	e as at D	ec. 31, 2018	12.2	3.2%	



There are discrepancies between the internal management and external consolidated financial reporting measurements for some products owing to the focus on the risk content of the items. The other main reasons for the discrepancies between the internal management figures and those in the external consolidated financial statements are differences in the scope of consolidation and differences in recognition and measurement methods.

Differences in the **scope of consolidation** result from the fact that, in internal credit risk management, only the entities in the Bank sector that contribute significantly to the aggregate risk of the sector are included.

The discrepancy in the **securities business** is mainly due to the variations in carrying amounts that arise because credit derivatives are offset against the issuer risk attaching to the underlying transaction in the internal management accounts, whereas such derivatives are recognized at their fair value as financial assets or financial liabilities held for trading in the consolidated financial statements.

The differences between the measurements in the derivatives business and those in the money market business arise because of differences in the treatment of offsetting items in internal risk management and in external financial reporting. Offsetting items are actually netted for the purposes of risk management, whereas netting of this nature is not permitted in the consolidated financial statements. In addition, add-ons are attached to the current fair values of derivative positions in the internal management accounts to take account of potential future changes in their fair value. By contrast, the external (consolidated) financial statements focus exclusively on the fair values determined on the valuation date, and, unlike in the internal accounts, collateral must not be recognized for risk mitigation purposes.

Lending volume for the consolidated financial statements	Note
Loans and advances to banks	
of which: loans and advances to banks excluding money market placements	52
of which: loss allowances for loans and advances to banks	61
Loans and advances to customers	
Loans and advances to customers excluding money market placements	53
of which: loss allowances for loans and advances to customers	61
Financial guarantee contracts and loan commitments	89
Bonds and other securities	
of which: financial assets held for trading/bonds excluding money market placements	55
of which: financial assets held for trading/promissory notes, registered bonds, and loans and advances	55
of which: investments/bonds excluding money market placements	56
Derivatives	
of which: derivatives used for hedging (positive fair values)	54
of which: financial assets held for trading/derivatives (positive fair values)	55
of which: derivatives used for hedging (negative fair values)	67
of which: financial liabilities held for trading/derivatives (negative fair values)	68
Money market placements	
of which: loans and advances to banks/money market placements	52
of which: loans and advances to customers/money market placements	53
of which: financial assets held for trading/money market instruments	55
of which: financial assets held for trading/money market placements	55
of which: investments/money market instruments	56

In money market business, further discrepancies arise between the consolidated financial statements and internal risk management due to the method used for the recognition of repo transactions. In contrast to the treatment in the consolidated financial statements, securities provided or received as collateral are offset against the corresponding assets or liabilities for the purposes of the internal analysis.

## 8.7.2 Change in lending volume

The total lending volume of the Bank sector increased by 5 percent overall in the year under review, from €378.9 billion as at December 31, 2018 to €398.3 billion as at December 31, 2019. One of the factors behind this increase was a rise of 4 percent in the lending volume in the traditional lending business, from €289.3 billion as at December 31, 2018 to €299.6 billion as at December 31, 2019. This uptrend was driven mainly by the retail sector. There was also an increase in the volume of the securities business, which advanced by 13 percent, from €73.0 billion as at December 31, 2018 to €82.7 billion as at December 31, 2019; this growth was focused in the financial sector. At €16.0 billion, the lending volume in the derivatives and money market business was down by 4 percent as at December 31, 2019 compared with the figure of €16.7 billion as at December 31, 2018.

At **DZ BANK**, the **total lending volume** rose by 9 percent, from €198.3 billion as at December 31, 2018 to €216.5 billion as at December 31, 2019. This was mainly due to an increase in volume in the traditional lending business, which went up from €146.7 billion as at the prior-year reporting date to €156.5 billion as at December 31, 2019. **Securities business** also saw growth, rising to €45.8 billion as at December 31, 2019 compared with €36.8 billion as at December 31, 2018; this was primarily attributable to higher exposure in financial-sector and public-sector bonds. However, **derivatives and money market business** at DZ BANK declined to €14.3 billion as at December 31, 2019 compared with the December 31, 2018 figure of €14.9 billion.

8.7.3 Sector structure of the credit portfolio Fig. 25 shows the breakdown of the credit portfolio by sector, in which the lending volume is classified according to the industry codes used by Deutsche Bundesbank. This also applies to the other sector breakdowns related to credit risk in this opportunity and risk report.

As at December 31, 2019, a significant proportion (unchanged at 36 percent) of the lending volume in the **Bank sector** continued to be concentrated in the financial sector. 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.

As at December 31, 2019, a significant proportion (59 percent) of **DZ BANK's** lending volume was also concentrated in the financial sector (December 31, 2018: 60 percent). The composition of this customer segment is the same both at DZ BANK and in the Bank sector. Loans and advances to public-sector borrowers rose by  $\notin$ 1.3 billion year on year.

In its role as central institution for the Volksbanken Raiffeisenbanken cooperative financial network, DZ BANK provides funding for the entities in the Bank sector 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, the direct business of DZ BANK and DZ HYP, the real-estate lending business brought together in BSH, and DZ HYP's local authority lending business determine the industry breakdown for the remainder of the portfolio.

## 8.7.4 Geographical structure of the credit portfolio

Fig. 26 shows the geographical distribution of the credit portfolio by country group. The lending volume is assigned to the individual country groups using the International Monetary Fund's breakdown, which is updated annually. This also applies to the other country-group breakdowns related to credit risk in this opportunity and risk report.

As at December 31, 2019, 97 percent of the lending in the **Bank sector** (December 31, 2018: 96 percent) and also 95 percent of the total lending by **DZ BANK** (unchanged on the figure as at December 31, 2018) was concentrated in Germany and other industrialized countries.

#### FIG. 25 - BANK SECTOR: LENDING VOLUME, BY SECTOR

	Traditiona busir	l lending ness	Derivatives and money Securities business market business			Total		
€ billion	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018
Financial sector	100.6	98.3	32.0	25.7	10.2	12.8	142.8	136.8
Public sector	10.7	10.4	38.1	35.9	0.7	0.4	49.5	46.7
Corporates	107.3	114.9	8.5	7.6	4.6	3.0	120.4	125.5
Retail	69.8	57.2	1.5	2.4	-	-	71.4	59.6
Industry conglomerates	10.5	7.8	2.7	1.5	0.5	0.4	13.6	9.7
Other	0.6	0.7	-	-	-	-	0.6	0.7
Total	299.6	289.3	82.7	73.0	16.0	16.6	398.3	378.9

#### FIG. 26 - BANK SECTOR: LENDING VOLUME, BY COUNTRY GROUP

	Traditiona busir	l lending ness	Securities	business	Derivatives and busir	money market ness	Tot	al
€ billion	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018
Germany	269.4	254.3	47.7	43.1	10.7	10.1	327.8	307.4
Other industrialized countries	20.9	23.5	31.0	26.1	4.8	5.5	56.7	55.2
Advanced economies	1.9	2.5	0.8	0.8	0.1	0.1	2.8	3.4
Emerging markets	7.3	9.0	0.9	0.9	0.2	0.2	8.5	10.1
Supranational institutions	-	-	2.3	2.1	0.3	0.6	2.6	2.8
Total	299.6	289.3	82.7	73.0	16.0	16.6	398.3	378.9

## 8.7.5 Residual maturity structure of the credit portfolio

The breakdown of the credit portfolio by residual maturity for the **Bank sector** as at December 31, 2019 presented in Fig. 27 shows that the lending volume had increased by €14.0 billion in the short-term maturity band and by €23.0 billion in the medium-term maturity band compared with the figures as at December 31, 2018. By contrast, the lending volume in the longer-term maturity band contracted by €17.6 billion. The shift between the maturity bands is primarily attributable to updates to the methodology used at DZ BANK as part of its activities to implement the requirements of BCBS 239 (Principles for effective risk data aggregation and risk reporting).

8.7.6 Rating structure of the credit portfolio Fig. 28 shows the Bank sector's consolidated lending volume by rating class according to the VR credit rating master scale.

In the **Bank sector**, the proportion of the total lending volume accounted for by rating classes 1A to 3A (investment grade) as at December 31, 2019 was unchanged year on year at 78 percent. Rating classes 3B to 4E (non-investment grade) represented 21 percent of the total lending volume as at the reporting date, which was also unchanged compared with the end of 2018. The proportion of the total lending volume in the Bank sector accounted for by defaults, represented by rating classes 5A to 5E, was unchanged year on year at 1 percent as at December 31, 2019.

Rating classes 1A to 3A (investment grade) also dominated lending at **DZ BANK**, where they accounted for 87 percent of the total lending volume, which was down slightly compared with a year earlier (December 31, 2018: 88 percent). Rating classes 3B to 4E (non-investment grade) represented 11 percent of the total lending volume as at the reporting date, which equated to an increase of 10 percent compared with the figure as at December 31, 2018. Defaults (rating classes 5A to 5E) accounted for 1 percent of the total lending volume as at December 31, 2019, which was unchanged year on year.

As at December 31, 2019, the **10 counterparties associated with the largest lending volumes** accounted for 6 percent of total lending in the **Bank sector** (December 31, 2018: 7 percent). These borrowers were predominantly in the public sector and had investment-grade ratings. The equivalent proportion for **DZ BANK** was 5 percent (December 31, 2018: 7 percent). In this case, these counterparties largely comprised borrowers from the financial sector (including the cooperative banks) and public sector with investment-grade ratings.

#### FIG. 27 - BANK SECTOR: LENDING VOLUME, BY RESIDUAL MATURITY

	Traditional len	ding business	Securities	business	Derivatives and busi	money market ness	Tot	al
€billion	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018
≤1 year	69.3	53.6	15.3	13.2	7.8	11.6	92.4	78.4
> 1 year to $\leq$ 5 years	73.9	53.2	26.9	26.3	3.2	1.4	104.0	81.0
> 5 years	156.4	182.4	40.5	33.5	5.0	3.6	201.9	219.5
Total	299.6	289.3	82.7	73.0	16.0	16.6	398.3	378.9

#### FIG. 28 - BANK SECTOR: LENDING VOLUME, BY RATING CLASS

		Traditiona busin	l lending less	Securities	business	Derivatives and busin	money market less	Tot	al
€ billion		Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018
	1A	5.0	5.1	32.6	30.8	1.0	1.2	38.6	37.1
	1B	1.8	1.6	2.9	2.8	0.9	2.5	5.6	6.9
	1C	97.4	91.8	10.7	8.2	4.0	3.4	112.1	103.4
ade	1D	7.4	6.8	2.4	2.0	0.4	0.2	10.2	9.0
t gra	1E	11.7	11.5	3.2	2.0	1.5	1.9	16.5	15.4
Ient	2A	10.8	9.9	5.0	5.8	1.0	1.4	16.8	17.1
estm	2B	10.6	11.4	8.4	6.1	1.8	2.1	20.9	19.7
Inve	2C	15.6	14.9	2.4	2.5	1.1	1.0	19.1	18.4
	2D	17.4	17.1	4.2	2.9	0.9	0.7	22.6	20.7
	2E	18.7	17.6	3.7	2.5	1.4	0.8	23.8	20.9
	ЗA	20.2	21.8	4.5	3.8	0.6	0.6	25.4	26.2
	3B	25.1	22.9	0.6	1.4	0.5	0.3	26.3	24.7
e B	3C	21.4	16.3	0.5	0.3	0.1	0.1	22.0	16.7
grae	3D	13.5	15.0	0.2	0.5	0.1	0.1	13.8	15.5
ent	3E	5.9	5.7	0.2	0.2	-	-	6.2	6.0
stme	4A	3.4	2.3	-	-	-	-	3.5	2.3
Save	4B	3.3	5.1	-	-	-	-	3.3	5.1
n-ir	4C	1.7	2.6	-	0.1	-	-	1.8	2.7
Z	4D	0.5	0.6	-	-	-	-	0.5	0.6
	4E	1.7	2.2	-	-	-	-	1.8	2.2
Defa	ult	4.3	4.8	0.1	0.1	-	-	4.5	5.0
Not r	ated	1.9	2.5	0.8	0.8	0.5	0.3	3.2	3.5
Tota		299.6	289.3	82.7	73.0	16.0	16.6	398.3	378.9

## 8.7.7 Collateralized lending volume Fig. 29 shows the breakdown of the collateralized lending volume at overall portfolio level by type of collateral and by risk-bearing instrument.

In the case of **traditional lending business**, lending volume is generally reported as a gross figure before the application of any offsetting agreements, whereas the gross lending volume in the **derivatives and money market business** is shown on a netted basis. In the derivatives and money market business, collateral values are relatively low and are in the form of personal and financial collateral. In the **securities business**, there is generally no further collateralization to supplement the collateral already taken into account. For this reason, securities business is not included in the presentation of the collateralized lending volume. As at December 31, 2019, the total collateral value in the **Bank sector** had risen to €124.3 billion as at December 31, 2019 from €121.5 billion as at December 31, 2018. The collateralization rate was 39.4 percent as at the reporting date (December 31, 2018: 39.7 percent).

In the **traditional lending business**, most of the collateral value (87 percent as at December 31, 2019) continued to be accounted for by charges over physical assets such as land charges, mortgages, and registered ship and aircraft mortgages (December 31, 2018: 85 percent). These types of collateral are particularly important for BSH, DZ HYP, and DVB. In contrast, charges over physical assets are of lesser importance at DZ BANK because DZ BANK bases its lending decisions primarily on borrower credit quality.

	Traditiona busi	al lending ness	Derivatives market	and money business	То	otal
€ billion	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018
Guarantees, indemnities, risk subparticipation	6.5	6.4	0.4	0.3	7.0	6.7
Credit insurance	4.0	3.7	-	-	4.0	3.7
Land charges, mortgages, registered ship and aircraft mortgages	107.4	103.5	-	-	107.4	103.5
Pledged loans and advances, assignments, other pledged assets	3.5	6.0	-		3.5	6.0
Financial collateral	2.2	1.3	0.1	0.1	2.3	1.3
Other collateral	0.1	0.2	-	-	0.1	0.2
Total collateral	123.7	121.1	0.6	0.4	124.3	121.5
Lending volume	299.6	289.3	16.0	16.6	315.6	305.9
Uncollateralized lending volume	175.9	168.2	15.4	16.2	191.3	184.4
Collateralization rate (%)	41.3	41.9	3.7	2.4	39.4	39.7

#### FIG. 29 - BANK SECTOR: COLLATERAL VALUE, BY TYPE OF COLLATERAL

In securities transactions, there is generally no further collateralization to supplement the collateral already taken into account. Equally, in the **derivatives** and money market business, collateral received under collateral agreements is already factored into the calculation of gross lending volume with the result that only a comparatively low level of collateral (personal and financial collateral) is then additionally reported.

At €11.9 billion, **DZ BANK's** total collateral value as at December 31, 2019 was down year on year (December 31, 2018: €12.6 billion). The collateralization rate had declined to 7.0 percent as at the reporting date (December 31, 2018: 7.8 percent).

#### 8.7.8 Securitizations

The following figures are not directly comparable with the corresponding figures in the 2018 annual opportunity and risk report or in the 2019 half-yearly opportunity and risk report because the base data has been adjusted from a fair value analysis to a nominal amount analysis in line with the internal reporting system.

The Bank sector's **asset-backed securities (ABS) portfolio** is predominantly held by DZ BANK and DZ HYP. This portfolio at **Bank sector** level had a nominal amount of  $\in 2,797$  million as at the reporting date (December 31, 2018:  $\in 2,756$  million). The nominal amount for **DZ BANK** was  $\in 2,323$  million as at the reporting date (December 31, 2018:  $\notin 2,196$  million). The highest internal rating class 1A accounted for 57 percent of the nominal amount as at December 31, 2019 (December 31, 2018: 45 percent). This year-on-year improvement largely arose because new investments in the ABS portfolio were focused only on unencumbered high-quality liquid assets (HQLAs) in accordance with the requirements of the credit risk strategy.

The above figures included the **ABS wind-down portfolio** from the period before the financial crisis with a nominal amount of €1,178 million (December 31, 2018: €1,464 million) at **Bank sector** level and €705 million (December 31, 2018: €903 million) in respect of **DZ BANK**. As in the previous year, the volume of the wind-down portfolio contracted during the reporting year, primarily because of regular redemptions.

In addition, **DZ BANK** acts as a **sponsor** in ABCP programs that are funded by issuing money marketlinked ABCP or liquidity lines. The ABCP programs are made available for DZ BANK customers who then securitize their own assets via these companies.

As at December 31, 2019, the securitization exposures arising from **DZ BANK's** activities in which it acts as a sponsor amounted to €1,442 million (December 31, 2018: €1,398 million). The increase in the exposures was due to new business and to fluctuations in the drawdown of liquidity lines.

**8.8 Credit portfolios with increased risk content** The credit portfolios with increased risk content are analyzed separately because of their significance for the risk position. The figures presented here are included in the above analyses of the total lending volume.

## 8.8.1 Loans and advances to borrowers in eurozone periphery countries

As at December 31, 2019, loans and advances to borrowers in the countries directly affected by the **economic divergence in the eurozone** attributable to the **Bank sector** and to **DZ BANK** amounted to €7,505 million (December 31, 2018: €7,355 million) and €2,175 million (December 31, 2018: €2,165 million) respectively.

Fig. 30 shows the borrower structures of the entities in the Bank sector for the eurozone periphery countries by credit-risk-bearing instrument.

8.8.2 Shipping finance and offshore finance

#### **Business background**

Within the DZ BANK Group's Bank sector, the **shipping finance business** is mainly operated by DVB and, to a lesser degree, by DZ BANK. At DVB and DZ BANK, the lending volume associated with shipping finance comprises loans and advances to customers, guarantees and indemnities, irrevocable loan commitments, and derivatives.

**DVB** had decided to implement a run-off strategy in 2019 for its shipping finance business with the aim of scaling back its portfolio in an orderly fashion as the individual finance contracts matured. Key components were the discontinuation of new business and a run-off plan designed to preserve value. Separately from the above, DVB will participate in necessary restructuring measures to improve the collection of outstanding loans and receivables.

DVB also has **offshore finance** business in its credit portfolio. This business consists of various financing arrangements with broad links to the shipping sector. The portfolio includes finance for drilling platforms, drill ships, offshore construction ships, and supply ships for oil platforms. No further new business has been taken on in the business since 2017.

**DZ BANK** offers **shipping finance** as part of its joint credit business with the local cooperative banks. Shipping finance in the narrow sense refers to capital investment in mobile assets involving projects that are separately defined, both legally and in substance, in which the borrower is typically a special-purpose entity whose sole business purpose is the construction and operation of ships. In such arrangements, the debt is serviced from the cash flows generated by the ship. The assessment of the credit risk is therefore based not only on the recoverability of the asset, but also in particular on the capability of the ship to generate earnings.

To reduce risk, finance provided by DZ BANK must normally be secured by a first mortgage on the vessel and the assignment of insurance claims and proceeds. A distinction is made between shipping finance in the narrow sense and finance provided for shipyards and shipping companies. The following disclosures for DZ BANK relate solely to shipping finance in the narrow sense.

	Traditi lending b	ional usiness <sup>1</sup>	Securities	business	Derivatives and busir	money market 1ess	Total		
€million	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	
Portugal	41	62	1,104	1,026	-	-	1,146	1,089	
of which: public sector	-	-	1,030	925	-	-	1,030	925	
of which: non-public sector	41	62	74	101	-	-	116	164	
of which: financial sector	-	1	-	-	-	-	-	1	
Italy	92	148	3,094	2,847	70	70	3,256	3,065	
of which: public sector	-	-	2,856	2,599	-	-	2,856	2,599	
of which: non-public sector	92	148	238	248	70	70	400	465	
of which: financial sector	34	32	68	59	70	70	172	161	
Spain	169	222	2,830	2,850	104	129	3,104	3,201	
of which: public sector	6	13	2,006	1,859	-	-	2,012	1,872	
of which: non-public sector	163	210	824	991	104	129	1,091	1,330	
of which: financial sector	31	28	263	364	99	126	393	518	
Total	302	432	7,029	6,723	174	199	7,505	7,355	
of which: public sector	6	13	5,892	5,383	-	-	5,898	5,396	
of which: non-public sector	296	419	1,137	1,341	174	199	1,607	1,959	
of which: financial sector	66	61	331	423	169	196	566	680	

#### FIG. 30 - BANK SECTOR: LOANS AND ADVANCES TO BORROWERS IN EUROZONE PERIPHERY COUNTRIES

1 Unlike the other presentations of lending volume, traditional lending business in this case includes long-term equity investments.

#### Crisis management

In the shipping finance business, an oversupply of tonnage continued to have a detrimental impact on asset values and customer credit quality. In the offshore business, there was no increase in the demand for vessels, despite the rise in the oil price in the reporting year. The global bulk cargo, container, and tanker markets presented a mixed picture in 2019. Fleet growth was limited because of preparations for an International Maritime Organization regulation due to come into force in 2020 and because of the removal of tanker tonnage for floating storage. In many of the sectors, this helped to offset the weaker market fundamentals.

At **DVB** and **DZ BANK**, shipping finance is deemed to be non-performing if it has been rated between 5A and 5E on the VR credit rating master scale. The two banks aim to secure and optimize the non-performing exposures within their management system for handling problem loans.

Conditions in the **offshore finance** market remained tough in the reporting year and the market is not expected to bounce back significantly in the short term. For this reason, all offshore finance had been moved to the NCA portfolio in 2018.

#### Shipping finance lending volume

As at December 31, 2019, the **Bank sector's** shipping finance portfolio had a total value of €6,334 million (December 31, 2018: €8,692 million). The breakdown of the lending volume between the two management units as at December 31, 2019 was as follows

(corresponding figures as at December 31, 2018 in parentheses):

- DVB: €5,648 million (€8,084 million), of which
  €5,060 million (€6,922 million) is core business not classified as non-performing
- DZ BANK: €686 million (€608 million), of which
  €351 million (€313 million) is business not classified as non-performing.

The lending volume of **DVB** shipping finance exposed to heightened risk (NCA portfolio) consists solely of traditional lending business. It declined from €1,162 million as at December 31, 2018 to €558 million as at December 31, 2019, a year-on-year decrease of 49 percent. This decrease was primarily attributable to early redemptions and (partial) workout of individual large-volume exposures.

The breakdown by country group of DVB's NCA shipping finance portfolio as at December 31, 2019 was as follows (corresponding figures as at December 31, 2018 in parentheses):

- Germany: €96 million (€136 million)
- Other industrialized countries: €348 million (€820 million)
- Advanced economies: €60 million (€150 million)
- Emerging markets: €84 million (€56 million).

As at December 31, 2019, DVB's NCA shipping finance portfolio included 70 financed vessels (December 31, 2018: 135 vessels). The average exposure as at the reporting date was €15 million (December 31, 2018: €26 million) and the largest single exposure was €40 million (December 31, 2018: €115 million).

The largest proportion of the NCA shipping finance portfolio was attributable to the financing of bulk carriers. As at December 31, 2019, this proportion had risen to 51 percent of DVB's total NCA shipping finance volume (December 31, 2018: 40 percent) as a consequence of the disproportionate level of redemptions in other shipping finance segments. The portfolio was almost fully collateralized in compliance with DVB strategy.

At DZ BANK, shipping loans with a value of €335 million were classified as non-performing as at December 31, 2019 (December 31, 2018: €295 million). These exposures consisted almost entirely of traditional lending business, most of which was operated jointly with the local cooperative banks. Broken down by type of ship, DZ BANK's nonperforming portfolio was focused mainly on multifunctional merchant vessels. In terms of carrying capacity, these ships were almost exclusively small- to medium-sized vessels. As in 2018, DZ BANK's shipping finance portfolio in 2019 was mainly concentrated in Germany but broadly diversified by type of vessel, borrower, charterer, and shipping activity.

#### Offshore finance lending volume

As at December 31, 2019, the Bank sector's lending volume in the offshore finance business, which is attributable exclusively to **DVB** and is classified as traditional lending business, amounted to €921 million (December 31, 2018: €1,335 million).

8.9 Volume of non-performing loans The fall in the volume of non-performing loans reported for the **Bank sector** from €5.0 billion as at December 31, 2018 to €4.5 billion as at December 31, 2019 in conjunction with the increase in the total lending volume from €378.9 billion to €398.3 billion caused the NPL ratio to go down year on year to 1.1 percent at the end of 2019 (December 31, 2018: 1.3 percent).

At DZ BANK, there was a rise in the volume of nonperforming loans, which went up from €1.9 billion as at December 31, 2018 to €2.1 billion as at the 2019 balance sheet date. Combined with a rise in the total lending volume from €198.3 billion to €216.5 billion,

this resulted in a higher NPL ratio of 1.0 percent (December 31, 2018: 0.9 percent).

Fig. 31 shows key figures relating to the volume of non-performing loans.

## 8.10 Risk position

The risk capital requirement (including capital buffer requirement) for credit risk is based on a number of factors, including the size of single-borrower exposures, individual ratings, and the industry sector of each exposure.

As at December 31, 2019, the credit value-at-risk including capital buffer requirement in the Bank sector was €5,484 million (December 31, 2018: €5,541 million) with a limit of €7,189 million (December 31, 2018: €8,238 million).

#### FIG. 31 - BANK SECTOR: KEY FIGURES FOR THE VOLUME OF NON-PERFORMING LOANS

	Bank	sector	DZ B	ANK
	Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,
	2019	2018	2019	2018
Total lending volume				
(€ billion)	398.3	378.9	216.5	198.3
Volume of non-performing				
loans (€ billion) <sup>1</sup>	4.5	5.0	2.1	1.9
Balance of loss allowances				
(€ billion)	2.7	2.7	1.2	1.2
Loss allowance ratio (%) <sup>2</sup>	0.7	0.7	0.6	0.6
Coverage ratio (%) <sup>3</sup>	59.3	54.5	59.5	65.2
NPL ratio (%) <sup>4</sup>	1.1	1.3	1.0	0.9

1 Volume of non-performing loans excluding collateral. 2 Balance of loss allowances as a proportion of total lending volume. 3 Balance of loss allowances as a proportion of the volume of non-performing loans. 4 Volume of non-performing loans as a proportion of total lending volume.

The contraction in the credit value-at-risk including capital buffer requirement resulted largely from the reduction in the DVB portfolio.

As at December 31, 2019, the credit value-at-risk including capital buffer requirement at **DZ BANK** was €2,297 million (December 31, 2018: €2,166 million) with a limit of €2,674 million (December 31, 2018: €2,674 million).

The credit values-at-risk including capital buffer requirement for the Bank sector and for DZ BANK were within the applicable limit at every measurement date during 2019.

Fig. 33 shows the credit value-at-risk together with the average probability of default and expected loss. Because of the breakdown by credit-risk-bearing instrument, the risk capital requirement is presented without the capital buffer requirement.

The risk capital required in the **Bank sector** and at **DZ BANK** for credit portfolios exposed to increased credit risk is shown in Fig. 32, again without the capital buffer requirement.

Compared with December 31, 2018, the credit valueat-risk for the Bank sector entities' exposure in the peripheral countries of the eurozone had increased as at December 31, 2019. The credit value-at-risk for the overall shipping finance portfolio in the Bank sector amounted to €132 million as at December 31, 2019 (December 31, 2018: €194 million). These figures consist of the DVB core business and DZ BANK business, in either case not classified as non-performing.

The credit value-at-risk in the Bank sector for shipping finance and offshore finance stemmed primarily from DVB. The decline in the credit value-at-risk for the shipping finance portfolio compared with the end of 2018 arose predominantly because of the scaling back of DVB's NCA portfolio.

FIG. 32 – BANK SECTOR: CREDIT VALUE-AT-RISK<sup>1</sup> FOR CREDIT PORTFOLIOS WITH INCREASED RISK CONTENT

	Bank	sector	DZ BANK			
€ million	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018		
Eurozone periphery countries portfolio	1,288	1,079	21	14		
Shipping finance portfolio <sup>2</sup>	57	98	36	38		
Offshore finance portfolio	73	118				

1 Excluding capital buffer requirement. 2 DVB: NCA portion; DZ BANK: Rating classes 5A–5E on the VR credit rating master scale

Not relevant

FIG. 33 – BANK SECTOR: FACTORS DETERMINING THE CREDIT VALUE-AT-RISK

	Average probability of default (%)					Expected loss (€ million)				Credit value-at-risk <sup>1</sup> (€ million)			
	Bank	sector	DZ BANK		Bank sector		DZ BANK		Bank sector		DZ BANK		
	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	
Traditional lending business	0.5	0.5	0.2	0.2	418	405	138	122	2,493	2,568	1,168	950	
Securities business	0.1	0.2	0.2	0.2	48	49	28	28	1,733	1,511	299	226	
Derivatives and money market business	0.1	0.1	0.2	0.1	11	10	10	9	226	453	148	365	
Total					477	464	176	159	4,452	4,532	1,614	1,541	
Average	0.4	0.4	0.2	0.2									

1 Excluding capital buffer requirement

Not relevant

## 9 Equity investment risk

## 9.1 Definition

Equity investment risk is defined as the risk of losses arising from negative changes in the fair value of that portion of the long-term equity investments portfolio for which the risks are not included in other types of risk.

## 9.2 Specific risk factors

Key factors when determining equity investment risk are the equity investment's industry sector, the location of its registered office, and the nominal amount of the investment. The possibility cannot be ruled out that a future impairment test on the long-term equity investments held by the entities in the Bank sector could lead to a significant reduction in the carrying amounts of these investments reported on the balance sheet. In the case of non-controlling interests, there is also a risk that key information may not be available or cannot be obtained promptly by virtue of the fact that the investment is a minority stake and this could result in a need to recognize impairment losses.

**9.3 Business background, risk strategy, and responsibility** In the Bank sector, equity investment risk arises

primarily at DZ BANK, BSH, and DVB.

The entities in the Bank sector hold long-term equity investments largely for strategic reasons, especially to cover markets, market segments, or parts of the value chain in which they themselves or the cooperative banks are not active. These investments therefore support the sales activities of the cooperative banks or help reduce costs by bundling functions. The investment strategy is continuously aligned with the needs of cooperative financial network policy.

**Risk strategy requirements** must be observed in the management of long-term equity investments. Such management is subject to the principle that equity investment risk (measured as risk capital requirement) may be taken on only if this risk is considered together with the associated opportunities and only if the risk remains below the existing limits.

Decisions on whether to acquire or dispose of **longterm equity investments** are made by the Board of Managing Directors of the entities in the Bank sector in consultation with the relevant committees. At DZ BANK, the Strategy & Group Development division is responsible for **supporting these investments**, whereas at BSH the task falls within the scope of the Central Services/Policy/International division and the Financial Controlling division. At DVB, the investments are the responsibility of the Accounting and Legal Affairs departments.

Equity investment risk is **measured** and **monitored** at Bank sector level by DZ BANK. Details are reported within the DZ BANK Group's overall risk report.

## 9.4 Risk management

The carrying amounts of the long-term equity investments are regularly tested for possible impairment in the last quarter of the financial year. If there are any indications during the course of the year of possible impairment, more frequent impairment tests are also carried out. In the impairment tests, the carrying amounts of the long-term equity investments are compared against the amount that could be realized on the market on the same date.

The risk capital requirement for the vast majority of the long-term equity investments in the **Bank sector** including **DZ BANK** is determined using a Monte Carlo simulation. In this method, portfolio concentrations in sectors and individual counterparties are taken into account by simulating industry-wide and individual investment-related risk factors.

The risk capital requirement is influenced, in particular, by the market values of the long-term equity investments, the volatility of the market values, and the correlations between the market values, with market price fluctuations mainly derived from reference prices listed on an exchange.

At **DVB**, the risk capital requirement for long-term equity investments in the transport sector is determined using an earnings-at-risk approach.

The measurement of equity investment risk takes into account both the equity-accounted investments and the fully consolidated investees. As part of acquisition accounting and during the course of preparing the consolidated financial statements, the investment carrying amounts for consolidated subsidiaries are offset against the relevant share of net assets. Consequently, the investment carrying amounts disclosed in the notes to the consolidated financial statements are considerably lower than the carrying amounts used for determining risk.

### 9.5 Risk position

The carrying amounts of long-term equity investments in the Bank sector relevant for the measurement of equity investment risk amounted to €2,392 million as at December 31, 2019 (December 31, 2018: €2,776 million). As at December 31, 2019, the carrying amounts of the long-term equity investments of **DZ BANK** totaled €1,509 million (December 31, 2018: €1,697 million).

As at the reporting date, the **risk capital requirement including capital buffer requirement** for equity investment risk in the **Bank sector** was measured at €850 million, which was lower than the corresponding figure at the end of 2018 of €1,091 million. The limit was €1,063 million (December 31, 2018: €1,341 million). The limit was not exceeded at any time in 2019. The decline in the risk and the limit was attributable to the disposal of long-term equity investments.

As at December 31, 2019, the **risk capital requirement including capital buffer requirement** for equity investment risk at **DZ BANK** amounted to €503 million (December 31, 2018: €685 million). The limit at December 31, 2019 was €640 million (December 31, 2018: €800 million).

## 10 Market risk

**10.1 Definition** 

Market risk in the Bank sector comprises market risk in the narrow sense of the term, and market liquidity risk.

## Market risk in the narrow sense of the term -

referred to below as market risk – is the risk of losses arising from adverse movements in market prices or in the parameters that influence prices.

Market risk in the Bank sector is broken down into general market risk, spread and migration risk, and asset management risk. General market risk comprises the following components: interest-rate risk, equity risk, fund price risk, currency risk, and commodity risk.

**Market liquidity risk** is the risk of losses arising from adverse changes in market liquidity, for example as a result of a reduction in market depth or of market disruption. Market liquidity risk arises primarily in connection with securities already held in the portfolio as well as funding and money market business.

## **10.2 Specific risk factors**

Interest-rate risk, spread and migration risk, equity risk, fund price risk, currency risk, and assetmanagement risk are caused by changes in the yield curve, credit spreads, exchange rates, and share prices. Credit spreads and market liquidity squeezes are the critical risk factors for the overall market risk in the Bank sector, including DZ BANK.

Spread risk, including migration risk, is the most significant type of market risk for the entities in the Bank sector and DZ BANK. A significant proportion of the spread and migration risk is attributable to securities issued by southern eurozone periphery countries and held by the entities in the Bank sector. **Wider credit spreads** are an indication that markets believe credit quality has deteriorated. If credit spreads were to widen, this would therefore lead to a fall in the fair value of the government and corporate bonds affected.

A **liquidity squeeze throughout the market** could also mean that assets held by the entities in the Bank sector could only be liquidated in markets if they were discounted and that it would only possible to carry out active risk management on a limited basis. There is also a risk that the business activities of the entities in the Bank sector could be adversely impacted as a result of these effects, which could arise particularly in periods when markets are subject to significant stress.

10.3 Business background and risk strategy

### 10.3.1 Business background

The DZ BANK Group is exposed to considerable market risk in the Bank sector. Market risk arises mainly in connection with BSH, DZ HYP, and UMH in addition to DZ BANK. The assumption of market risk by these entities in the Bank sector is primarily attributable to the DZ BANK Group's strategic focus on the cooperative financial network. This strategy means that each entity in the DZ BANK Group specializes in certain types of product with a corresponding impact on the respective entity's risk profile.

Market risk thus arises mainly from DZ BANK's own trading activities and its traditional lending business with non-retail customers, BSH's traditional lending business aimed at financing privately owned real estate, DZ HYP's traditional lending business involving finance for real estate and local authorities, together with its portfolios of securities held to manage liquidity and cover assets, and UMH's own-account investing activities and its guarantee obligations to customers linked to fund-based investment products.

Liabilities and – where present in a group entity – assets related to direct pension commitments are a further source of market risk. Market liquidity risk arises primarily in connection with securities already held in the portfolio as well as funding and money market business.

#### 10.3.2 Risk strategy

The following principles for managing market risk apply to the **Bank sector** and **DZ BANK**:

- Market risk is only taken on to the extent that it is necessary to facilitate attainment of business policy objectives.
- The assumption of market risk is only permitted within the existing limits and only provided that it is considered together with the associated opportunities.
- Statutory restrictions, provisions in the Articles of Association, or other limitations enshrined in the risk strategy that prohibit the assumption of certain types of market risk for individual management units are observed.

DZ BANK and the subsidiaries pursue the following strategies in relation to the individual **types of market risk**:

- Spread and migration risk is assumed.
- Interest-rate risk associated with the original business purpose of the management units is largely eliminated.
- In contrast, interest-rate risk from pension obligations is accepted and included in the calculation of risk-bearing capacity.
- Virtually all currency risk is eliminated.
- Commodity risk is assumed only to a very small degree.

**Market liquidity risk** is consciously assumed following an analysis that takes into account the prevailing market liquidity.

## 10.4 Organization, responsibility, and risk reporting

Market risk in the **Bank sector** is managed on a decentralized basis by the individual management units within the centrally specified limits for the capital requirement for market risk. Each unit bears

responsibility for the risk and performance associated with each portfolio. Responsibility for managing risk within a management unit is normally brought together under a local treasury unit.

One exception is **DZ BANK**, where portfolios are managed at the level of subordinate organizational units (group, department, division). In this case, the relevant traders bear direct responsibility for risk and performance. The organizational units are structured in such a way that the responsibility for the marketing of certain types of product is assigned in each case to a trading division with product responsibility.

Key figures for market risk are reported at **sector level** and for **DZ BANK** to the Group Risk and Finance Committee within the overall risk report for the DZ BANK Group.

## 10.5 Management of market risk

10.5.1 Central market risk measurement

Central market risk measurement in the overall portfolio Various components are used to quantify market risk in the Bank sector from a present value perspective. These components are combined to determine the aggregate risk capital requirement for market risk, taking into account the effects of concentration and diversification. The risks arising in connection with the assets and liabilities associated with direct pension commitments are also factored in. Since the start of 2019, the models have been operated centrally by DZ BANK and are fed with input data provided by the management units on each trading day. Sectorwide standards and rules ensure that the modeling is appropriate.

The **first component** of the measurement approach creates a spread and migration risk model based on a Monte Carlo simulation. It determines the combined spread and migration risk over a longer-term (strategic) horizon of 1 year with a confidence level of 99.9 percent. Whereas spread risk quantifies creditrisk-related losses from financial instruments in a short-term view of value-at-risk, this becomes the combined spread and migration risk in the risk capital requirement over a longer-term perspective. For this reason, migration risk is not shown in the table of values-at-risk in Fig. 35.

The **second component** is a value-at-risk model based on a historical simulation in which the general

market risk is determined from a short-term (operational) perspective over 1 day and with a confidence level of 99.0 percent. The model calculated day by day is based on a historical observation period of 250 trading days and includes a number of risk factors. The most important risk factor groups include money market and swap interest rates, basis and credit spreads, share prices, exchange rates, and commodity prices. The model also includes implied volatility in the risk measurement. Drawing on the results of the valueat-risk measurement, a transformation model scales up the operational key risk indicators (also taking account of stress events) to a strategic perspective in which a 1year holding period and a confidence level of 99.9 percent is assumed.

In the **last step**, the results from the spread and migration risk model and from the transformation model are then combined to give the aggregate risk capital requirement for market risk.

## Central market risk measurement for interest-rate risk in the banking book

For internal sector-wide management purposes, the banking book and trading book are treated in the same way in terms of the models used, key risk indicators, frequency of risk measurement, and main risk measurement parameters. To supplement this risk management approach in which the banking and trading books are analyzed holistically, interest-rate risk in the banking book from a regulatory perspective within the Bank sector and at DZ BANK is managed separately using a present-value approach.

On behalf of the other management units in the Bank sector, DZ BANK also operates a partially centralized model for quantifying periodic interest-rate risk.

Overall, these methods are used to record the impact from changes in interest rates, both from an economic perspective (based on present value) and from the angle of net interest income.

## Concentrations of market risk

Concentrations in the portfolio affected by market risk are identified by classifying the exposure in accordance with the risk factors associated with interest rates, spreads, migration, equities, currencies, and commodities. This incorporates the effects of correlation between these different risk factors, particularly in stress phases. 10.5.2 Decentralized market risk measurement In addition to the models specified in section 10.5.1, the main **management units** operate their own risk models to satisfy ICAAP requirements from the perspective of the individual institution. The results from these models are not used to manage market risk in the Bank sector and therefore do not form part of this opportunity and risk report.

### 10.5.3 Backtesting and stress tests

The central value-at-risk model is subject to **backtesting**, the purpose of which is to verify the predictive quality of the model. Changes in the value of portfolios on each trading day are usually compared against the value-at-risk calculated using risk modeling.

Risks arising from extreme market situations are primarily recorded using **stress tests**. The crisis scenarios underlying the stress tests 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 economically relevant. The crisis scenarios used in this case are regularly reviewed to ensure they are appropriate. The following are deemed to be risk factors: interest-rate risk, spread risk, migration risk, equity risk, and currency risk.

10.5.4 Management of limits for market risk The starting point for limiting market risk is a limit for the capital requirement for market risk in the **Bank sector** specified as part of operational planning. This limit is broken down into an individual limit for the market risk capital requirement in each management unit.

Within **DZ BANK**, this limit is then further subdivided into a system of limits for the divisions, departments, and groups to appropriately reflect the decentralized portfolio responsibility assigned to these units and the nature of the bank from a regulatory perspective as a trading book institution. Limits are monitored on every trading day.

## 10.5.5 Mitigating market risk

The entities in the Bank sector use various approaches to mitigate market risk. For example, some market risk from the assets-side business (such as traditional lending business) or from the liabilities-side business (such as home savings deposits) is offset by suitable countervailing liability or asset transactions (such as own issues or securities). These activities are carried out as part of asset/liability management. In other cases, financial derivatives are used for hedging purposes.

As the measurement of market risk is based on the inclusion of the individual items subject to market risk, there is no need to monitor the economic effectiveness of hedges.

10.5.6 Managing the different types of market risk

Management of spread risk and migration risk Most of the spread and migration risk in the **Bank** sector and at **DZ BANK** arises from non-trading portfolios and is consciously assumed within the established limits in accordance with the associated long-term investment strategy. Hedging instruments are also used in carefully selected trading book portfolios. The central measurement of this risk means that the level of the risk on every trading day is transparent. If there is any indication that the ability of the Bank sector or DZ BANK to bear the spread and migration risk is in jeopardy, Group Treasury at DZ BANK will initiate corrective measures across the sector.

### Management of interest-rate risk

Interest-rate risk arising from operating activities at **DZ BANK** and **DZ HYP** is mitigated primarily by means of hedging using interest-rate derivatives, either on the basis of individual transactions or portfolios.

At **BSH**, an asset/liability management approach based on the maturities of the securities in the investment portfolio is used to manage interest-rate risk arising from the collective building society operations and the traditional lending business, including the interest-rate risk associated with direct pension commitments. Interest-rate derivatives are of minor significance.

**DZ BANK** is notably exposed to significant interestrate risk from direct pension commitments in addition to the interest-rate risk arising from operating activities. This risk is consciously assumed within the existing limits.

Management of equity risk and fund price risk Equity risk and fund price risk from the non-trading portfolios are managed first and foremost by directly changing the underlying exposure. Derivative products are also used within the trading portfolio to keep the type of risk involved within the allocated limits.

Some funds are broken down into their constituent parts for the purposes of measuring the risk. In such cases, the risk is not treated as part of fund price risk, but is managed within the type of market risk determined for the constituent part concerned.

#### Management of asset-management risk

Asset-management risk arises from minimum payment commitments given by **UMH** and/or its subsidiaries for guarantee products. The risks from these guarantee products are managed mainly by using asset allocation.

The launch of new guarantee products is governed by the guidelines for medium-term planning that apply to UMH and takes into account the risk capital required and the available internal capital. Before new products are launched, the risks associated with them are analyzed and assessed. Management mechanisms embedded in the products aim to prevent the value of an individual product from falling below its guaranteed level during its lifetime.

Asset-management risk is reported using a separate internal system and is monitored regularly at individual product level by UMH.

**10.6 Management of market liquidity risk** The calculation of general market risk in the Bank sector and at DZ BANK using the transformation model and the spread and migration risk model takes market liquidity risk into account.

Within the transformation model, stress events are expressly integrated into the analysis when market risk is scaled up from an operating perspective to a strategic perspective. The change in risk factors in these events is based on the assumption that it is not possible to make changes to the exposures in the portfolio of the Bank sector and DZ BANK over a specified period. The spread and migration risk model implicitly factors in phases of diminishing market liquidity via the calibration of the credit spread volatility included in the model. The estimation of volatility based on market data from the recent past also uses a lower limit determined from longer-term data. This prevents any low level of credit spread volatility in a calm market environment with normal liquidity from being transferred directly into the model parameters.

## 10.7 Risk position

#### 10.7.1 Value-at-risk

Since the start of 2019, DZ BANK has been using a central, sector-wide market risk model for the shortterm (operational) management of market risk in the

FIG. 34 – BANK SECTOR: CHANGE IN MARKET RISK BY TRADING DAY<sup>1</sup>

Bank sector and at DZ BANK. Because of this change of management system, the aggregate risk is no longer separated into trading and non-trading portfolios. This has resulted in changes to the chart and table of risk values compared with the presentation in the 2018 opportunity and risk report.

The changes in market risk by trading day for the Bank sector and DZ BANK in 2019 are shown in Fig. 33.

Fig. 35 shows the average, maximum, and minimum values-at-risk measured for the Bank sector and DZ BANK over the reporting year, including a further breakdown by type of market risk.



<sup>1</sup> Value-at-risk with 99.00% confidence level, 1-day holding period, 1-year observation period, based on a central market risk model for the Bank sector. Concentrations and effects of diversification vere taken fully into account when calculating the risk:

€million	Interest-rate risk		Spread risk		Equity	Equity risk <sup>3</sup> Currency risk		Commodity risk		Diversification effect <sup>4</sup>		Total		
	Bank sector	DZ BANK	Bank sector	DZ BANK	Bank sector	DZ BANK	Bank sector	DZ BANK	Bank sector	DZ BANK	Bank sector	DZ BANK	Bank sector	DZ BANK
Dec. 31, 2018	23	7	76	19	7	1	1	2	-	-	-19	-6	88	23
Average	20	11	88	22	6	2	2	3	-	-	-20	-8	96	29
Maximum	30	17	103	25	8	3	5	4	-	-	-37	-11	109	39
Minimum	11	7	73	18	5	1	-	2	-	-	-3	14	86	23
Dec. 31, 2019	11	9	88	21	6	2	4	4	-	-	-21	15	88	27

#### FIG. 35 – BANK SECTOR: CHANGE IN MARKET RISK BY TYPE OF RISK<sup>12</sup>

1 Value-at-risk with 99.00% confidence level, 1-day holding period, 1-year observation period, based on a central market risk model for the Bank sector. Concentrations and effects of diversification

were taken fully into account when calculating the risks. 2 The minimum and maximum amounts for the different subcategories of market risk may stem from different points in time during the reporting period. Consequently, they cannot be

aggregated to produce the minimum or maximum aggregate risk due to the diversification effect.

3 Including funds, if not broken down into constituent parts.
 4 Total effects of diversification between the types of market risk for all consolidated management units

The following value-at-risk figures were measured as at December 31, 2019 for the **interest-rate risk in the banking book for regulatory purposes** (corresponding figures as at December 31, 2018 in parentheses):

- Bank sector: €11 million (€23 million)
- DZ BANK: €8 million (€7 million)

The decline in the interest-rate risk in the Bank sector was attributable to changes in positions at BSH.

## 10.7.2 Risk capital requirement

One of the tools used to quantify market risk from a longer-term (strategic) perspective is a spread and migration risk model. This model determines the combined spread and migration risk with a 1-year horizon and a confidence level of 99.9 percent. A value-at-risk model is also used. It determines the general market risk from a short-term (operational) perspective over 1 day with a confidence level of 99.0 percent. Drawing on the results of the value-atrisk measurement, a transformation model scales up the operational key risk indicators (also taking account of stress events) to a strategic perspective with a 1-year holding period and a confidence level of 99.9 percent. The results from the spread and migration risk model and from the transformation model are then combined to give the aggregate risk capital requirement for market risk. The aggregate risk capital requirement is compared with the related limits every month to ensure there is capacity to bear market risk.

## As at December 31, 2019, the **risk capital** requirement (including capital buffer

requirement) for market risk in the **Bank sector** amounted to €3,860 million (December 31, 2018: €4,030 million with a **limit** of €5,646 million (December 31, 2018: €6,768 million). The decrease in the risk was largely due to the introduction of the central market risk model.

As at December 31, 2019, **DZ BANK's risk capital requirement (including capital buffer requirement)** for market risk amounted to  $\notin$ 1,698 million (December 31, 2018:  $\notin$ 1,150 million) with a **limit** of  $\notin$ 2,220 million (December 31, 2018:  $\notin$ 2,000 million). The increase in the risk was attributable to a change in the reporting methodology. DZ BANK is not exposed to any assetmanagement risk.

Throughout the year under review, the risk capital requirement (including capital buffer requirement)

remained below the relevant limit at the levels of both the Bank sector and DZ BANK.

# 11 Technical risk of a home savings and loan company

## **11.1 Definition**

Technical risk of a home savings and loan company is subdivided into two components: new business risk and collective risk.

**New business risk** is the risk of a negative impact from possible variances compared with the planned new business volume.

**Collective risk** refers to the risk of a negative impact that could arise from variances between the actual and forecast performance of the collective building society operations caused by significant long-term changes in customer behavior unrelated to changes in interest rates. It can be distinguished from interest-rate risk by incorporating a change in customer behavior unrelated to interest rates in the collective simulation. Conversely, only changes in customer behavior induced by changes in interest rates are relevant to interest-rate risk.

## 11.2 Specific risk factors

A variance between the actual and planned new business volume (**new business risk**) could lead to lower deposits from banks and customers over the short to medium term. Over the medium to long term, the lower level of new business could also lead to a decrease in loans and advances to banks and customers.

Variances between the actual and forecast performance of the collective building society business caused by significant long-term changes in customer behavior unrelated to changes in interest rates (**collective risk**) could also lead to lower loans and advances to banks and customers and to lower deposits from banks and customers.

Over the medium to long term, there is a risk that a lower level of new business and change in customer behavior could cause net interest income to taper off.

11.3 Business background, risk strategy, and responsibility

Technical risk of a home savings and loan company arises in the Bank sector in connection with the

business activities of BSH. This risk represents the entity-specific business risk of BSH. A home savings arrangement is a system in which the customer accumulates savings earmarked for a specific purpose. The customer enters into a home savings contract with fixed credit balance and loan interest rates, so that when the savings phase is completed at a later point and a loan is allocated under the contract, he/she can receive a home savings loan at a favorable interest rate. A home savings agreement is therefore a combined asset/liability product with a very long maturity.

Technical risk of a home savings and loan company is closely linked with the BSH business model and cannot therefore be avoided. Against this backdrop, the **risk strategy** aims to prevent an uncontrolled increase in risk.

BSH is **responsible** for managing the technical risk of a home savings and loan company within the Bank sector. This includes measuring the risk and communicating risk information to the risk management committees at BSH and to the Board of Managing Directors and Supervisory Board of BSH. Technical risk of a home savings and loan company forms an integral part of the DZ BANK Group's internal risk reporting system.

### 11.4 Risk management

A special collective simulation, which includes the integrated effects of a (negative) change in customer behavior and a drop in new business, is used to measure the technical risk of a home savings and loan company on a quarterly basis. The results from the collective simulation for the technical risk of a home savings and loan company are fed into a longterm forecast of earnings. The variance between the actual earnings in the risk scenario and the earnings in a base forecast with the same reference date is used as a risk measure. The variance is discounted to produce a present value. The total present value of the variances represents the technical risk of a home savings and loan company and therefore the risk capital requirement for this type of risk. Concentrations of this risk are most likely to arise from new business risks.

In order to determine the technical risk of a home savings and loan company in a **stress scenario**, the stress parameters (customer behavior and new business) are severely impaired. An appropriate collective simulation is then generated on this basis and is analyzed using the same methodology used for the measurement of current risk. Stress tests are carried out quarterly.

The risk is managed in particular through a forwardlooking policy for products and scales of rates and charges, and through appropriate marketing activities and sales management.

## 11.5 Risk position

As at December 31, 2019, the **capital requirement** for the technical risk of a home savings and loan company amounted to €397 million (December 31, 2018: €553 million) with a **limit** of €706 million (December 31, 2018: €667 million). A capital buffer requirement was not calculated for the technical risk of a home savings and loan company as at the reporting date. The decrease in the risk was due to the course of business and the general conditions.

## **12 Business risk**

**12.1 Definition and business background** Business risk denotes the risk of losses arising from earnings volatility for a given business strategy and not covered by other types of risk. In particular, this comprises the risk that, as a result of changes in material circumstances (for example, the regulatory environment, economic conditions, product environment, customer behavior, market competitors) corrective action cannot be taken at an operational level to prevent the losses.

DZ BANK's core functions as a central institution, corporate bank, and holding company mean that it focuses closely on the local cooperative banks, which are its customers and owners. In this context, business risk can arise from corporate banking, retail banking, capital markets business, and transaction banking.

Business risk mainly affects DVB and DZ PRIVATBANK in addition to DZ BANK.

### 12.2 Specific risk factors

Business risk in the Bank sector of the DZ BANK Group is shaped by the following factors:

## Costs of regulation

Over the next few years, the DZ BANK Group is likely to continue to face increased costs, and thus reduced profits, in connection with implementing the requirements resulting from regulatory legislative initiatives (see section 5.1). Competition based on pricing and terms Fiercer competition in retail and corporate banking based on pricing and terms could give rise to margins that are economically unattractive for the entities in the Bank sector or that do not adequately cover the risk arising from the corresponding transactions.

Greater competition in capital markets business DZ BANK's capital markets business is faced with the ongoing challenges presented by low interest rates, accompanied by a fall in market liquidity and historically low risk premiums. In DZ BANK's ownaccount investing activities with the local cooperative banks, there is an evident rise in price sensitivity caused by a contraction in operating profits and increases in the size of the banks resulting from mergers. DZ BANK's customers have the option of conducting transactions in selected financial instruments using electronic trading platforms. For certain products, this is likely to lead to a shift in trading volume to such trading platforms. It is predicted that this will bring about a change in competitor structure, with competition becoming fiercer in the trading of certain financial instruments for customer account, resulting in the risk of a reduction in margins and revenue going forward.

#### New competitors in transaction banking

In transaction banking, the entities in the Bank sector are increasingly finding themselves up against less regulated global competitors, often from outside the banking sector and offering innovative solutions to meet the changes in customer needs. These developments are changing the role played by the management units as product providers and are likely to reduce fee and commission income from the transaction banking activities of the entities in the Bank sector.

**12.3 Organization and risk management** The management of business risk is a primary responsibility of the **Board of Managing Directors of DZ BANK** and is carried out in consultation with the senior management of the main subsidiaries and the heads of the DZ BANK divisions involved. Group management is integrated into a committee structure, headed by the **Group Coordination Committee**. The Strategy & Group Development division supports the Board of Managing Directors as part of its role in supervising the activities of the subsidiaries.

The **Central Advisory Council** plays a key role in providing ideas and advice for the members of the

Group Coordination Committee and the Board of Managing Directors of DZ BANK. The council facilitates in-depth discussion of key strategic issues in the DZ BANK Group. These issues include the fundamental ongoing development of the entities in the DZ BANK Group, strategic planning considerations, and current business performance. The Central Advisory Council also addresses key questions relating to the design of new products and services, and their marketing to cooperative banks and their customers.

The management of business risk is closely linked with the **management of opportunities** and the tools used in the strategic planning process. It is based on setting targets for the subsidiaries involved in active management and for the divisions of DZ BANK.

**Business risk is quantified** using a risk model based on an earnings-at-risk approach. Risk concentrations may arise if business activities are focused on a small number of areas. Concentrations of business risk are limited by using qualitative criteria in strategic management.

To identify regulatory initiatives with a material impact on the DZ BANK Group, DZ BANK, and the other management units, a centralized **regulation management** office has been set up at DZ BANK. This office establishes direct contact with the relevant units at DZ BANK and in the other management units, organizes regular bank-wide and groupwide dialog on identified and new strategic regulatory initiatives, and uses a 'regulatory map' to report to the responsible steering committees, the Board of Managing Directors, and the Supervisory Board of DZ BANK.

#### 12.4 Risk position

As at December 31, 2019, the **Bank sector's risk** capital requirement (including capital buffer requirement) for business risk (including reputational risk) amounted to  $\notin$ 837 million (December 31, 2018:  $\notin$ 857 million). The limit was  $\notin$ 1,016 million as at the reporting date (December 31, 2018:  $\notin$ 1,118 million).

As at December 31, 2019, the economic capital requirement for **DZ BANK** was calculated at €673 million (December 31, 2018: €686 million). The limit as at December 31, 2019 was €770 million (December 31, 2018: €800 million). The limits for the Bank sector and for DZ BANK were not exceeded at any measurement date during 2019.

## **13 Reputational risk**

**13.1 Definition and business background** Reputational risk refers to the risk of losses from events that damage confidence, mainly among customers (including the cooperative banks), shareholders, employees, the labor market, the general public, and the supervisory authorities, in the entities in the Bank sector or in the products and services that they offer. Reputational risk can arise as an independent risk (primary reputational risk) or as an indirect or direct consequence of other types of risk, such as liquidity risk, business risk, and operational risk (secondary reputational risk).

## 13.2 Specific risk factors

If the Bank sector as a whole or the individual management units acquire a negative reputation, there is a risk that existing or potential customers will be unsettled with the result that existing business relationships might be terminated or it might not be possible to carry out planned transactions. There is also a risk that it will no longer be possible to guarantee the backing of stakeholders, such as shareholders and employees, necessary to conduct business operations.

**13.3 Risk strategy and responsibility** Reputational risk is incorporated into the risk strategy by pursuing the following objectives:

- Avoiding loss resulting from reputation-damaging incidents by taking preventive action
- Mitigating reputational risk by taking preventive and responsive action
- Raising awareness of reputational risk within the Bank sector, e.g. by defining the people responsible for risk and establishing a sector-wide reporting system and set of rules for reputational risk.

These objectives are applicable both at the Bank sector level and in the management units. The management units are responsible for complying with the rules and for deciding what suitable preventive and responsive action to take. The reputational risk strategy is based on the business strategies in each management unit and to this end is reviewed at least once a year and adjusted as necessary.

Each management unit is responsible for managing its reputational risk and must comply with the requirements laid down in the set of rules for reputational risk. The principle of **decentralized** responsibility applies equally within all the management units, including DZ BANK. Based on this approach, responsibility for managing reputational risk lies with each division with the involvement of other functions such as communications, marketing, corporate security, and compliance.

#### 13.4 Risk management

Reputational risk in the Bank sector is generally taken into account within business risk and is therefore implicitly included in the measurement of risk and assessment of capital adequacy. At BSH, reputational risk is measured and the capital requirement determined mainly as part of the technical risk of a home savings and loan company. In addition, the risk that obtaining funding may become more difficult as a consequence of reputational damage is specifically taken into account in liquidity risk management.

Crisis communications aimed at mitigating reputational risk are designed to prevent greater damage to the entities in the Bank sector if a critical event occurs. The management units therefore follow a stakeholder-based approach in which reputational risk is identified and evaluated from a qualitative perspective depending on the stakeholder concerned.

## 14 Operational risk

### 14.1 Definition

Operational risk – also referred to below as OpRisk – is defined as the risk of loss from human behavior, technological failure, weaknesses in process or project management, or external events. This closely resembles the regulatory definition. Legal risk is included in this definition.

Operational risk in the Bank sector is broken down into the following components:

- HR risk
- IT risk
- Outsourcing risk
- Legal risk
- Tax risk
- Compliance risk
- Risks in connection with the (consolidated) financial reporting process.

**14.2 Business background and risk strategy** Operational risk can arise in any division of the entities in the Bank sector. DZ BANK as well as DVB, DZ HYP, DZ PRIVATBANK, and UMH are particularly subject to operational risk.

The Bank sector entities aim to manage operational risk efficiently. They apply the following principles:

- Reinforce risk awareness
- Handle operational risk openly and largely without penalties
- Avoid, reduce, transfer, or accept risk as optional courses of action
- Ensure that the impact of decisions on operational risk is taken into account
- Manage operational risk on a decentralized basis but within the limits set out in the framework for operational risk.

14.3 Organization, responsibility, and risk reporting

Each management unit is responsible for managing its operational risk. The principle of **decentralized** responsibility applies equally within all the management units, including DZ BANK.

One of the purposes of the **framework for operational risk** is to harmonize organizational structures throughout the sector. The sector-wide coordinated approach to operational risk is also managed by a **committee** assigned to the Group Risk Management working group and comprising representatives from DZ BANK and its main subsidiaries.

A **DZ BANK** unit responsible for controlling operational risk located within the Group Risk Controlling division develops the management and control methods based on regulatory requirements and business needs applicable to the Bank sector. The unit ensures that operational risk is monitored independently and it is responsible for central reporting.

Corresponding organizational units are also in place at the other main entities in the **Bank sector**. In most of the management units in the **Bank sector**, including **DZ BANK**, specialist divisions with central risk management functions manage some operational risk tasks. As part of their overarching responsibility, these specialist divisions in each entity also perform an advisory and guiding function for the matters within their remit.

Because operational risk can affect all divisions, local operational risk coordinators are located in each division of the main **management units** and they act as interfaces with Central Risk Controlling. This also applies to **DZ BANK**.

Regular **reports** on loss data, risk self-assessments, risk indicators, and risk capital are submitted to the Board of Managing Directors, the Group Risk and Finance Committee, the Risk Committee, and operational management, facilitating effective management of operational risk on a timely basis.

## 14.4 Central risk management

14.4.1 Measurement of operational risk An **economic portfolio model** that takes into account loss data and the results from the risk selfassessments is used to determine the risk capital requirement for operational risk in the Bank sector. The results from the model, combined with the tools used to identify risk, are used to manage operational risk centrally.

In addition, **risk concentrations** and risk drivers are identified by using separate model-based analyses, taking into account event categories and areas of business specified by regulatory requirements. Such concentrations can occur, for example, if IT systems are supplied by just a few companies or if business processes are outsourced to a limited number of service providers.

## 14.4.2 Identifying operational risk

### Loss database

The groupwide collation of loss data in a central database allows the Bank sector to identify, analyze, and evaluate loss events, highlighting patterns, trends, and concentrations of operational risk. This datagathering covers a number of areas but focuses particularly on data for gross losses with a value of €1,000 or more related to risks that have been incurred, for example in connection with the risk factors specified in sections 14.5 to 14.11. The

recorded gross losses upward from a defined threshold value are managed as part of the corrective action management process.

## Risk self-assessment

Senior managers from all management units assess operational risk using a scenario-supported risk selfassessment process in order to identify and evaluate all material operational risks and ensure maximum possible transparency regarding the risk position. The main potential risks for all first-level risk categories as defined by the CRR are calculated and described using risk scenarios. The scenarios also enable risk concentrations to be identified.

### **Risk indicators**

In addition to the loss database and risk selfassessment, risk indicators help the Bank sector to identify risk trends and concentrations at an early stage and detect weaknesses in business processes. A system of warning lights is used to indicate risk situations based on specified threshold values. Risk indicators within the Bank sector are collected systematically and regularly on a wide scale.

## 14.4.3 Limiting operational risk

The limits for operational risk are used as the basis for central monitoring of the risk capital requirement at the Bank sector level. The risk capital requirement for the Bank sector is broken down into risk contributions for each management unit using a risk-sensitive allocation procedure so that the management units in the Bank sector can be monitored centrally. These risk contributions are then monitored centrally using limits for each management unit.

14.4.4 Mitigating and avoiding operational risk Continual improvement of business processes is one of the methods used with the aim of **mitigating** operational risk. The transfer of risk by means of insurance or outsourcing as permitted by liability regulations provides further protection.

Operational risk is **avoided**, for example, by rejecting products that can be identified during the new product process as entailing too much risk.

In all relevant management units, a comprehensive contingency and crisis management system (with business continuity plans covering critical processes) has been established to ensure the continuation of business in the event of process disruption or system breakdown. These business continuity plans are regularly reviewed and simulated to ensure they are fully functional. The contingency and crisis management system at DZ BANK has been certified in accordance with ISO 22301, which applies worldwide.

## 14.5 HR risk

## 14.5.1 Specific risk factors

Disputes in connection with the collective bargaining process can give rise to a risk of strikes. The possibility cannot be ruled out that simultaneous industrial action at all sites over several days could cause lasting disruption to processes and workflows. Moreover, sensitive internal and external interfaces could be jeopardized by long-term business interruptions. This could restrict operating activities and have a negative impact on reputation.

Unless the necessary number of suitable managerial and administrative staff can be attracted within the required timeframe, and/or existing managers and employees can be retained in the Bank sector entities, there will be a heightened risk that, in particular, appointments to key regulatory functions will not be made or will not be made satisfactorily as a result of inadequate expertise in terms of either quality or quantity. This could lead to sanctions from the banking supervisor and a qualified audit opinion in the consolidated and separate financial statements and group management reports and management reports prepared by the entities in the Bank sector, which could impact negatively on the reputation of individual entities in the Bank sector and of the DZ BANK Group as a whole.

### 14.5.2 Risk management

The entities in the Bank sector have developed a mechanism known as a **Human Resources KPI cockpit** with standardized KPIs. The Human Resources KPI cockpit is intended to integrate HR strategies between the management units, increase transparency, and ensure comparability between the HR management systems in the Bank sector as well as help the management units to manage their HR activities. To this end, the cockpit specifies 21 KPIs across the following four categories: value added/finance, employer appeal, organization/efficiency, and innovation/learning.

The entities in the Bank sector pursue the objective of preventing or minimizing HR risk by identifying negative trends and abnormalities, and then initiating corrective action. HR risk is monitored using the following 4 risk factors: exit risk, availability risk, skills and qualifications risk, motivational risk.

Long-term professional development, a high level of trainee recruitment, and a staff potential-promotion program for managers aim to ensure that staff members undergo the continuing development and training that will also make it possible to meet future staffing requirements from within the organization. In the interest of long-term staff retention, there are programs to establish and enhance the organization's appeal as a place to work, such as corporate health management and support for achieving a work-life balance.

Compliance functions and a comprehensive internal control system are used to counter fraud and negligence. Examples include internal rules on the minimum absence for employees with responsibility for trading positions.

Risk Controlling at DZ BANK has specified relevant KPIs for HR management as risk indicators. The key figures are collated on a monthly basis as part of the risk indicator process and include training days per employee, employee workload, resignation rate, total staff turnover rate, and the percentage of vacant positions.

The HR division of DZ BANK is involved in designing the standard scenarios relating to HR risk and validates the scenario assessment of the other entities in the Bank sector, particularly with regard to basis of calculation, frequency of occurrence, and loss level.

## 14.6 IT risk

## 14.6.1 Specific risk factors

Malfunctions or breakdowns in data processing systems or in the programs used on these systems, including attacks from external sources – such as hackers or malware –, could have an adverse impact on the ability of the entities in the Bank sector to efficiently maintain the processes necessary to carry out operating activities, protect saved data, ensure sufficient control, or continue to develop products and services. Furthermore, such malfunctions or breakdowns could lead to the temporary or permanent loss of data or to unauthorized data access, modification, or publication. This could restrict operating activities and have a negative impact on reputation.

### 14.6.2 Risk management

The entities in the Bank sector use computers and data processing systems to carry out their operating activities. Practically all business transactions and activities are processed electronically using appropriate IT systems. These systems are networked with each other and are operationally interdependent.

Processes in the IT units of the entities in the Bank sector are designed with risk issues in mind and are monitored using a variety of control activities in order to ensure that IT risk is appropriately managed. The starting point is to determine which risks are unavoidable in certain aspects of IT. Detailed requirements can then be specified. These requirements determine the extent to which checks need to be carried out and are intended to ensure that all activities are conducted in compliance with the previously defined risk appetite.

IT units apply comprehensive physical and logical precautionary measures to guarantee the security of data and applications and to ensure that day-to-day operations are maintained. Measures used by the Bank sector to counter the risk of a partial or complete loss of IT systems include segregated data processing centers in which the data and systems are mirrored, special access security, fire control systems, and an uninterruptible power supply supported by emergency power generators. Regular exercises are carried out to test defined restart procedures to be used in emergency or crisis situations with the aim of checking the efficacy of these procedures. Data is backed up and held within highly secure environments in different buildings.

**DZ BANK's** risk assessment methodology for IT risk is made available centrally by information security management and applied locally by the managers responsible for the various applications using toolsupported control processes. All variances identified in these processes are assessed from the perspective of the associated risks. All IT risks classified as material are included in regular information security reports to the Board of Managing Directors.

The risks identified in the information security control processes are also taken into account by the IT division, information security management, and the locally based OpRisk coordinators for the purposes of evaluating the risk self-assessment scenarios as part of the management of operational risk. The IT risk groups, comprising IT operating risk, IT outsourcing risk, IT security risk, and IT project risk, are each allocated one or more scenarios in the risk selfassessment. When the risk self-assessment is completed, the results of the decentralized risk assessment are compared with internal IT estimates and then analyzed. The results of the risk selfassessment process are also used as parameters for assessing IT risk events in the following year.

## 14.7 Outsourcing risk

## 14.7.1 Specific risk factors

When business activities are outsourced, there is a risk that a service provider could fail or cease to be available as a result of insurmountable technical or financial difficulties.

There is also a risk that the services performed by the service provider might not meet the contractually agreed requirements. The consequences could be that only some of the outsourced processes or services can be provided, or even that the outsourced processes or services cannot be provided at all. This could lead to a loss of business and to claims for damages from customers. In turn, this could also have a negative impact on reputation.

## 14.7.2 Risk management

The entities in the Bank sector have outsourced activities and processes to third-party service providers to a considerable extent.

The process of assessing the risk and determining the degree to which an outsourcing arrangement is material is mostly carried out as part of the analysis of outsourcing risk by the division responsible for the outsourcing with the involvement of a number of corporate and functional units, including legal affairs, business continuity management, and compliance, and in consultation with the local coordinators for operational risk. Internal audit is also involved as part of its auditing activities.

COM acts as a central point of contact for outsourcing matters at DZ BANK and lays down standards for handling outsourcing activities and their operational management. The RSA Archer outsourcing management tool is used within COM as the central application for recording outsourcing projects at DZ BANK and for managing the external service providers. At DZ BANK, external service providers are managed by the department responsible for the outsourcing in accordance with the currently applicable guidelines for external procurement management. Service meetings are regularly held with service providers to facilitate communication and coordinate the IT services and other services to be provided by the third parties concerned. Compliance with contractually specified service level agreements is monitored by means of status reports and uptime statistics. The external service providers submit annual audit reports in which they evaluate and confirm the effectiveness of the general controls and procedures.

Business continuity plans, specific contractual liability provisions, and exit strategies are used to reduce outsourcing risk.

## 14.8 Legal risk

Tax risk with legal risk implications is not included in this section; it is described in section 14.9.1 below.

#### 14.8.1 Specific risk factors

Legal risk may arise from changes in the way that the authorities or the courts interpret legal provisions. In particular, the Bank sector entities may have to adjust their business models to offset adverse effects on their competitiveness caused by new or enhanced regulatory requirements relating to liquidity, capital, processes, and/or reporting, or by changes in other regulatory frameworks. These effects could reduce the Bank sector entities' appeal as partners in business transactions.

## 14.8.2 Risk management

In the entities of the Bank sector, responsibility for managing legal disputes normally lies with their organizational units responsible for dealing with legal issues.

The entities in the Bank sector pursue a strategy of avoiding legal risk. The organizational units responsible for assessing legal issues therefore continuously monitor proposed legislation and regulatory requirements that are legally relevant, as well as developments in decisions by the courts. On this basis, these units identify legal risk and are involved in informing the departments concerned as soon as possible and implementing any necessary changes. The legal affairs units are responsible for reviewing and assessing circumstances from a legal perspective and also for coordinating any legal proceedings. The latter consists of both defending claims pursued against the entities in the Bank sector and enforcing claims by the management units against third parties.

If any legal risk is identified, the management unit concerned assesses the risk parameters in terms of their probability of occurrence and possible impact. In addition, the amounts in dispute in the divisions are calculated quarterly as part of the assessment of risk indicators and, if they exceed certain thresholds, the affected divisions must prepare a report. As part of the annual risk self-assessment in the management and control of operational risk, the legal affairs divisions of the management units help to assess the standard scenarios for legal risk. The results are taken into account when determining the economic capital.

Identified risks are limited and mitigated by organizational measures, either legal or procedural, or are taken into account by recognizing appropriate loss allowances.

The legal affairs divisions in the Bank sector entities also submit reports on risk-related issues to the member(s) of the Board of Managing Directors with relevant responsibility, independently of the established regular reports on cases pending before the courts.

14.8.3 Provisions recognized on the balance sheet The entities in the Bank sector report potential losses arising from legal risk in accordance with the relevant (consolidated) financial reporting standards, which includes recognizing any provisions that may be required. This also encompasses potential risk in connection with cases pending before the courts. Disclosures covering the provisions recognized for risks arising from ongoing legal disputes are included in note 69 of the notes to the consolidated financial statements.

Any concentrations of risk owing to similarities between individual cases are taken into consideration. Comparable cases are aggregated to form a group.

The entities in the Bank sector have recognized provisions for legal risk arising in connection with capital market and credit products.

### 14.9 Tax risk

### 14.9.1 Specific risk factors

Tax risk can arise from adverse **changes in tax circumstances** (tax legislation, decisions by the courts), adverse **changes in the interpretation by tax authorities of existing tax legislation**, and adverse **changes in non-tax regulation**. Further risks could arise as a result of adverse changes in tax law or in decisions by the courts, which could also have retroactive implications.

As a result of tax audits, an alternative assessment of the tax risk or, in some cases, other information could give rise to **retrospective tax liabilities** for periods that have already been assessed. As there are still outstanding audits by the tax authorities relating to a number of financial years, there is a risk that retrospective tax payments could be required and these payments would be subject to interest charges. Such events could also have a negative impact on reputation.

#### 14.9.2 Risk management

The entities in the Bank sector have decentralized systems for managing tax risk. Within the management units, responsibility for managing tax risk normally lies with the organizational units responsible for dealing with tax issues.

The entities in the Bank sector pursue a strategy of avoiding tax risk. The starting point for managing tax risk is the ongoing process of identifying, recording, and monitoring risk. If any tax risk is identified, the risk parameters are assessed in terms of their probability of occurrence and possible impact in quantitative and qualitative terms. Identified risks are limited and mitigated by means of tax organizational measures. Business transactions are assessed for tax purposes on the basis of current tax legislation, taking into account the latest decisions by the courts and interpretations by the authorities. The outcome is factored into the measurement of loss allowances.

The tax department at DZ BANK reports the groupwide data relevant to risk to the head of the Group Finance division and to the member of the Board of Managing Directors with relevant responsibility. Separately, and depending on materiality thresholds, ad hoc risk reports are also submitted to the above individuals.

## 14.10 Compliance risk

## 14.10.1 Specific risk factors

The entities in the Bank sector are exposed to operational risk, especially the risk that the implemented compliance and risk management systems could be inadequate for completely preventing or uncovering violations of legal provisions, for identifying and assessing all relevant risks for the entities in the Bank sector, or for initiating appropriate corrective measures.

Violations of legal provisions may have legal implications for the entity concerned, for the members of its decision-making bodies, or for its employees. They may give rise, for example, to fines, penalties, retrospective tax payments, or claims for damages by third parties. The reputation of individual entities in the Bank sector and the DZ BANK Group as a whole could also suffer as a result. These effects could reduce the Bank sector entities' appeal as partners in business transactions and lead to losses in value.

### 14.10.2 Risk management

In the context of their operating activities, the entities in the Bank sector must comply with various legal requirements in a large number of countries. These include prohibitions on accepting or granting benefits in connection with efforts to attract business, and prohibitions on other unfair business practices.

The management of risk arising from non-compliance with applicable laws, regulatory requirements, and internal rules and regulations is described in section 3.5.5.

14.11 Risks in connection with the (consolidated) financial reporting process

## 14.11.1 Specific risk factors

The main risks in the (consolidated) financial reporting process are that, as a result of unintended misstatements or deliberate action, the group management reports, annual financial statements, and management reports of DZ BANK and the other entities in the Bank sector might not provide a true and fair view of financial position and financial performance and/or that publication might be delayed. This could then have an adverse impact on investors' confidence in the DZ BANK Group and in the individual entities in the Bank sector or on their reputation. Furthermore, sanctions could be imposed, for example by the supervisory authorities. These effects could reduce the Bank sector entities' appeal as partners in business transactions.

### 14.11.2 Risk management

In order to limit operational risk in this area of activity, DZ BANK and the other entities in the Bank sector have set up internal control systems for the (consolidated) financial reporting process as an integral component of the control systems put in place for the general risk management process. The functionality of these control systems is described in section 3.5.10.

## 14.12 Loss events

Losses from operational risk do not follow a consistent pattern. Instead, the overall risk profile can be seen from the total losses incurred over the long term and is shaped by a small number of large losses. Consequently, comparisons between net losses in a reporting period and those in a prior-year period are not meaningful. Prior-year figures are therefore not disclosed.

Over the course of time, there are regular fluctuations in the pattern of losses as the frequency of relatively large losses in each individual case is very low. Presenting the change in losses meaningfully therefore requires a sufficiently long and unchanging time horizon for reporting purposes. The data is therefore selected from the loss history for the past 4 quarters and on the basis of the date on which the expense is recognized in the income statement.

Fig. 36 shows the losses reported in the past 4 quarters, classified by loss event category.

In the **Bank sector**, the 'Execution, delivery, and process management' event category accounted for the largest proportion (46 percent) of net losses. The net loss in this event category was mainly attributable to 20 loss events, broken down as follows: 15 loss events resulted from failures in process implementation or in process design; a further 4 loss events were due to disagreements with business partners; 1 loss event was in connection with tax matters. The 'External fraud' event category accounted for 34 percent of net losses. Most of these losses related to 4 cases of prohibited transactions involving lending documents that had been falsified or improperly used and 1 case of hacker activity.



- Execution, delivery, and process management
- External fraud
- Clients, products, and business practices
- Property damage
- Business disruption and system failures
- Employment practice and workplace safety
- 1 In accordance with the CRR, losses caused by operational risks that are associated with risks such as credit risk are also shown.

Accounting for 80 percent of total net losses, the largest event category at **DZ BANK** was also 'Execution, delivery, and process management'. The loss amount was attributable to some of the loss events referred to above.

Losses did not reach a critical level relative to the expected loss from operational risk at any point during 2019, either in the Bank sector or at DZ BANK.

## 14.13 Risk position

Using the internal portfolio model, the **Bank sector's** risk capital requirement (including capital buffer requirement) for operational risk as at December 31, 2019 was calculated at €859 million (December 31, 2018: €804 million) with a limit of €926 million (December 31, 2018: €1,030 million).

As at December 31, 2019, the corresponding requirement at **DZ BANK** was €459 million (December 31, 2018: €417 million). The limit as at December 31, 2019 was €472 million (December 31, 2018: €499 million).

The risk capital requirement (including capital buffer requirement) for the Bank sector and for DZ BANK were within the applicable limit at every measurement date during 2019.

## Insurance sector

## 15 Basic principles of risk management in the Insurance sector

#### 15.1 Risk strategy

The principles of risk management in the Insurance sector are based on the risk strategy of the DZ BANK Group for the Insurance sector. The risk strategy is derived from the business strategies, taking into account the strategic 4-year plan approved by the R+V Board of Managing Directors.

Life actuarial risk is managed with the objectives of holding a broadly diversified product portfolio and of developing existing products while designing new ones. Pension, endowment and risk insurance, working life and semi-retirement products, and index-linked products are underwritten in order to diversify the life insurance and pension provision portfolios. The actuarial assumptions are designed so as to build in safety margins and address changes in the latest findings in order to withstand both the current risk situation as well as potential changes in this situation. Where products have policyholder participation, this represents the main instrument for mitigating risk. Underwriting guidelines and risk audits are used to prevent anti-selection. The risk exposure in the case of large individual risks may be limited by taking out appropriate reinsurance.

The objectives of managing **health actuarial risk** are a risk-conscious underwriting policy, cost/benefit management, the development of existing products, and the design of new products. In this case too, the actuarial assumptions build in safety margins and address changes in the latest findings in order to withstand both the current risk situation as well as potential changes in this situation. The risk exposure in the case of large individual risks may be limited by taking out appropriate reinsurance.

The management of **non-life actuarial risk in direct business** aims to optimize portfolios in terms of risk and reward. R+V focuses on business in Germany, offering a full range of non-life insurance products. The assumption of risk in connection with expanding its market share is accepted subject to the proviso that the business is profitable. Underwriting guidelines and size restrictions ensure targeted risk selection. Depending on its risk-bearing capacity, R+V reviews whether to purchase reinsurance cover to reduce earnings volatility, insure against major and cumulative claims, and protect and boost existing financial strength and earnings power.

In **inward non-life business**, R+V also aims to optimize the portfolio from a risk/reward perspective. Risk selection is based on binding underwriting guidelines and the exclusions of liability defined in those guidelines. The assumption of reinsurance risk is managed by using individual liability and aggregate limits in the sales and underwriting policy.

R+V's investments particularly give rise to interest-rate risk, spread risk, and equity risk. R+V's **market risk strategy** is determined by the regulatory investment principles specified in section 124 VAG and by internal rules.

Insurance companies must invest all assets so as to ensure the security, quality, liquidity, and profitability of the portfolio as a whole; the location of the assets must also ensure that they are available. In addition, well-established collaboration arrangements between R+V's underwriting and investment departments as part of the management of assets and liabilities are used to match insurance contract benefit obligations on the balance sheet with investment opportunities.

The market risk assumed by R+V reflects the investment portfolio structure developed as part of strategic asset allocation taking into account the individual risk-bearing capacity and long-term income requirements of R+V subsidiaries. The risk is managed in compliance with the limits specified at DZ BANK Group level.

The management of market risk is connected with the following fundamental objectives of risk policy: ensuring competitive returns on investments taking into account individual risk-bearing capacities, achieving defined minimum investment returns in stress scenarios, and securing a certain hidden asset level to ensure consistent earnings. The aim is also to guarantee that there is a sufficient proportion of fungible investments. The methods used to limit life insurance risk include policyholder participation set at an appropriate level, a discount rate in line with the capital market situation, and recognition of supplementary change-in-discount-rate reserves.

In line with the risk strategy for **counterparty default risk**, R+V aims to maintain a high average credit

rating for its portfolios, avoid concentrations of issuers at portfolio level, and comply with the limits that have been set for counterparties and debtors of insurance and reinsurance companies.

The risk strategy for **operational risk** aims to further raise awareness of operational risk.

The objective of the **reputational risk strategy** is to promote the image of the R+V brand with due regard to the need for transparency and credibility.

## 15.2 Organization, responsibility, and risk reporting

The risk management process, which is implemented across all entities in the R+V subgroup, defines rules for the way in which risks are identified, analyzed, assessed, managed and monitored, and the way in which they are reported and communicated. These rules form the basis for a central **early-warning** system.

Participations are also included in the R+V subgroup's risk management system. Risk-bearing capacity is reviewed and measured at least once a quarter and the process includes a review of binding key performance indicators and threshold values. Corrective action must be initiated if a specified index value is exceeded. Riskbearing capacity and all material risks are then finally evaluated each quarter by the Risk Committee.

Reports are submitted to the Board of Managing Directors of R+V in the event of material changes in risk. Company information that has a bearing on risk exposure is passed to the relevant supervisory bodies at R+V, both quarterly and on an ad hoc basis.

## **16 Actuarial risk**

16.1 Definition and business background

## 16.1.1 Definition

Actuarial risk is the risk that the actual cost of claims and benefits deviates from the expected cost as a result of chance, error or change. It is broken down into the following categories defined by Solvency II:

- Life actuarial risk
- Health actuarial risk
- Non-life actuarial risk.

Life actuarial risk

Life actuarial risk refers to the risk arising from the assumption of life insurance obligations, in relation to the risks covered and the processes used in the conduct of this business. Life actuarial risk is calculated as the combination of capital requirements for, as a minimum, the following sub-modules:

- Mortality risk describes the risk of loss or an adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of mortality rates, where an increase in the mortality rate leads to an increase in the value of insurance liabilities.
- Longevity risk describes the risk of loss or an adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of mortality rates, where a decrease in the mortality rate leads to an increase in the value of insurance liabilities.
- Disability-morbidity risk describes the risk of loss or an adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of disability, sickness, or morbidity rates.
- Life catastrophe risk describes the risk of loss or adverse change in the value of insurance liabilities, resulting from the significant uncertainty of pricing and assumptions when recognizing provisions related to extreme or unusual events.
- Lapse risk describes the risk of loss or an adverse change in the value of insurance liabilities, resulting from changes in the level or volatility of the rates of policy lapses, cancellations, renewals, and surrenders.
- Life expense risk describes the risk of loss or an adverse change in the value of insurance liabilities, resulting from changes in the level, trend, or volatility of the expenses incurred in servicing insurance or reinsurance contracts.

## Health actuarial risk

Health actuarial risk refers to the risk arising from the assumption of health and casualty insurance obligations, in relation to the risks covered and the processes used in the conduct of this business.

## Non-life actuarial risk

Non-life actuarial risk refers to the risk arising from the assumption of non-life insurance obligations, in relation to the risks covered and the processes used in the conduct of this business. It is calculated as the combination of capital requirements for the following submodules:

- Premium and reserve risk describes the risk of loss or an adverse change in the value of insurance liabilities, resulting from fluctuations in the timing, frequency, and severity of insured events, and in the timing and amount of claim settlements.
- Non-life catastrophe risk describes the risk of loss or an adverse change in the value of insurance liabilities, resulting from the significant uncertainty of pricing and assumptions when recognizing provisions related to extreme or unusual events.
- Lapse risk describes uncertainty about the continuation of the direct insurance and reinsurance contracts. It results from the fact that the lapse of contracts that are profitable for the insurance company will lead to a reduction in own funds.

### 16.1.2 Business background

In the DZ BANK Group, considerable actuarial risk arises from the business activities of R+V. The risk arises from the direct life insurance and health insurance business, the direct non-life insurance business, and the inward reinsurance business.

### 16.2 Specific risk factors

In the case of long-term products, which constitute the bulk of R+V's **direct life insurance business**, there is a risk of negative variances over the term of the contracts compared with calculation assumptions because of the length of time covered by the contracts. The relevant risk factors include changes in life expectancy, increasing rates of disability-morbidity, and disproportionately sharp cost increases. If the actual trends in life expectancy, disability-morbidity, and costs vary from the calculation assumptions, there is a risk over the medium to long term that the gross profit generated from life insurance will decline.

In **health insurance** at R+V, which accounts for a substantial proportion of health actuarial risk, there is a risk of higher claims caused by the behavior of the policyholders and service providers. In such cases, R+V generally has the option of adjusting premiums. Sharp premium increases could have negative

implications for the level of new business at R+V in the future.

R+V's direct non-life insurance and inward nonlife reinsurance business involves the provision of cover for a range of disasters. This includes both natural disasters, such as earthquakes, storms, and floods, and man-made disasters. These events cannot be predicted. Generally speaking, there is both the risk of particularly significant individual loss events and also the risk of a large number of loss events that are each not necessarily significant in themselves. As a result, in any one year, the actual impact from the size and frequency of losses could exceed the forecast impact. Climate change represents an additional risk factor in connection with the occurrence of natural disasters. It is reasonable to expect that climate change will lead to an increase in weather-related natural disasters over the long term.

## 16.3 Management of life actuarial risk

#### 16.3.1 Risk measurement

The risk for insurance contracts subject to **mortality risk** is modeled as a permanent 15 percent increase in mortality.

The risk for insurance contracts subject to **longevity** risk is modeled as a 20 percent increase in longevity.

The overall solvency requirement for **disabilitymorbidity risk** is analyzed on the basis of a permanent 35 percent rise in the disability rates expected for the next 12 months, a permanent 25 percent rise in the disability rates expected for the period after those 12 months, and a permanent 20 percent decrease in all expected likely cases of policyholders being able to return to work.

The risk for insurance contracts affected by **life catastrophe risk** is modeled as an immediate increase of 0.15 percentage points in mortality rates in the next 12 months.

The risk for insurance contracts subject to **lapse risk** is modeled for the following scenarios: for an increase in lapses, a 50 percent rise in the lapse rate; for a decrease in lapses, a 50 percent reduction in the lapse rate; for a mass lapse event, lapse of 40 percent of the contracts.

The overall solvency requirement for **life expense risk** is based on the following stress scenarios: a permanent 10 percent rise in the costs reflected in the measurement of the insurance liabilities; an increase of 1 percentage point in the cost inflation rate.

## 16.3.2 Risk management in direct life insurance business

Actuarial risk is taken into account by carrying out a prudent cost calculation while products are still in development. This applies to the development of existing products as well as the design of new types of insurance. Safety margins are included in the actuarial assumptions to achieve this. The assumptions are structured in such a way that they not only withstand the current risk situation, but should also accommodate potential changes in the risk position. Actuarial control systems are used to decide whether the cost calculation for future new business needs to be changed. The calculation is also adjusted on an ongoing basis in line with the latest actuarial findings. The appointed actuary carries out reviews as part of product development and during the course of the term of contracts to verify that the actuarial assumptions used are appropriate.

A number of measures are taken to prevent a concentration of risks in the portfolio. Before contracts are signed, extensive risk reviews are carried out to limit **mortality and disability-morbidity risks**. In general, risk is only assumed in compliance with fixed underwriting guidelines. High levels of individual or cumulative risk are limited by reinsurance.

Generally speaking, the risk is mitigated if the insured risks are diversified. For example, an increase in mortality has an adverse impact on endowment life and risk insurance policies, but at the same time has a positive impact on the longevity risk associated with pension insurance.

Cost control tools are used to manage life expense risk.

Lapse risk is mitigated by structuring life insurance contracts to provide maximum flexibility should policyholders' circumstances change. A range of different options during the term of an insurance contract enables customers to maintain their contract instead of canceling it. Appropriate design of policyholder participation and, in particular, the final bonus also counteracts lapse risk. In addition, advance notice of **policyholder participation** in the form of declarations of future bonuses is also a key instrument with which to reduce actuarial risk relating to life insurance.

16.4 Management of health actuarial risk

## 16.4.1 Risk measurement

Health actuarial risk is calculated by combining the capital requirements for the subcategories 'similar to life techniques, health actuarial risk' (risk on health insurance pursued on a similar technical basis to that of life insurance), 'non-similar to life techniques, health actuarial risk' (risk on health insurance pursued on a similar technical basis to that of non-life insurance), and 'health catastrophe risk'.

The methods described in the sections on life actuarial risk and non-life actuarial risk are used to measure risk in the subcategories.

Health actuarial risk also includes significant parts of the group's casualty insurance business as well as its health and occupational disability insurance business.

16.4.2 Risk management in health and casualty insurance

Risk management in health insurance business In the health insurance business, the Insurance sector aims to manage actuarial risk by means of an **underwriting policy**, the features of which are underwriting guidelines and selection of risk, and management of benefits and costs. In many of the health insurance rate scales, deductibles are used to control the extent of claims. Provisions are recognized to ensure that all benefit obligations under insurance contracts can be met. The appointed actuary carries out monitoring as part of product development and over the course of time to verify that the actuarial assumptions used are appropriate.

In accordance with VAG provisions, R+V carries out an annual comparison of its calculations with the insurance benefits it is required to pay. If this comparison of claims for an observation unit within a particular scale of insurance rates reveals a variance that is other than temporary, the relevant **premiums** are adjusted. All actuarial assumptions are reviewed and specified in consultation with an independent trustee. A safety margin factored into premiums is also intended to ensure that obligations can be met if claims are higher than the level provided for in cost calculations.

In the health insurance business, the **decrement tables** include assumptions regarding mortality and the probability of other relevant withdrawal factors. Under the requirements set out in the German Health Insurance Supervision Regulation (KVAV), these assumptions must be specified and reviewed from the perspective of prudent risk assessment. It is for this reason that a new mortality table is developed annually by the Verband der privaten Krankenversicherung e.V. (PKV) [Association of German private healthcare insurers] in consultation with BaFin. In accordance with statutory provisions, R+V carries out an annual comparison of its calculations with the most recently published mortality tables.

When determining **lapse probabilities** for the purposes of its calculations, R+V uses both its own observations and the latest figures published by BaFin.

Where premiums were adjusted on January 1, 2019, R+V used the new PKV mortality table valid for 2019 to determine both new business premiums and those **premium adjustments** in existing business.

Unisex insurance rate scales are offered in R+V's **new business**. The cost calculation for these rates is not only based on the existing gender breakdown, but also takes into account the expected pattern of switching by existing policyholders to the new rates. The appropriateness of the composition of the portfolio resulting from the calculations is reviewed by actuaries using comparable calculations.

Risk management in casualty insurance business The risk situation in the casualty insurance division is characterized by the fact that it is fixed-sum insurance and not indemnity insurance. Consequently, the maximum benefit per insured person is restricted to the sum insured.

A risk review also forms part of the underwriting policy in the case of casualty insurance. Premiums are reviewed on an ongoing basis to ensure that they remain appropriate. Claims are assessed on a caseby-case basis. 16.5 Management of non-life actuarial risk

### 16.5.1 Risk measurement

The capital requirements for **premium and reserve risk** are calculated on the basis of risk factors and volume measures for all branches of insurance in which business is conducted. The risk factors (e.g. the standard deviation as a percentage of the volume measure) describe the degree of threat posed by the risk. The volume measure for the **premium risk** is essentially the net premium income earned in the financial year and in the first and second years after that. The net claims provisions in the form of a bestestimate valuation constitute the volume measure for the **reserve risk**.

The capital requirement for **catastrophe risk** is calculated as an aggregation of four risk modules. These are natural catastrophe risk (broken down into the following natural hazards: hail, storm, flood, earthquake, and subsidence), the catastrophe risk of non-proportional reinsurance in non-life insurance, risk of man-made catastrophe, and other catastrophe risk in non-life insurance. Catastrophe risk is calculated using the volume measures of sums insured and premiums. Risk mitigation through reinsurance is taken into consideration.

To determine the overall solvency requirement as part of internal risk assessment, empirical distributions are generated for the relevant parameters for parts of the **direct insurance portfolio**, such as the claim amount and the number of claims per sector and claim type (e.g. basic claims, major claims, catastrophe claims). The value-at-risk can then be determined with the required confidence level directly from the underwriting result modeled in this way, recorded as a loss function. The parameters for the analyzed distributions are set using historical portfolio data and related planning data. They are therefore intended to reflect the actual risk position of the entity concerned.

The risk modeling for calculating basic claims relating to the natural hazard earthquake and basic claims and minor cumulative events relating to the natural hazards hail, storm, and flood is based on mathematical/ statistical methods. The minimum and maximum claim amounts for minor cumulative events are derived from the group's own claims history. Modeling is based on the group's own claims data.

The risk modeling for major cumulative events relating to the natural hazards hail, storm, flood, and earthquake uses probability-based natural hazard models. This approach uses catastrophe claims that have been modeled by external providers for each natural hazard and take account of the specific risk profile.

In its **inward reinsurance business**, R+V deploys a simulation tool for stochastic modeling of catastrophe risk. To model the natural catastrophe risk on an individual contract basis, event catalogs from external providers containing predefined scenarios based on historical observations are used. The event catalogs cover the main countries and natural hazards related to the underwritten risk in the inward reinsurance concerned. In the case of countries and natural hazards for which there is no event catalog, modeling is based on R+V's own claims history. This involves generating scenarios for the current portfolio on the basis of historical major claims.

For inward reinsurance purposes, modeling based on the group's own claims history is also used to determine the overall solvency requirement for the risk of **man-made catastrophe**. This involves generating scenarios for the current portfolio on the basis of the historical major claims.

The overall solvency requirement for **lapse risk** is determined on the basis of a stress scenario involving the lapse of 40 percent of those insurance contracts whose lapse would lead to an increase in the bestestimate valuation for the premium provision.

## 16.5.2 Risk management in direct non-life insurance business

**Premium and reserve risk** is managed through risk selection, risk-oriented premiums and products, and profit-oriented underwriting guidelines. In order to maintain a balanced risk profile, R+V ensures it has reinsurance cover for major individual risks. Managers use planning and control tools to ensure they are in a position at an early stage to identify unexpected or adverse portfolio or claim trends and to initiate appropriate corrective action in response to the changes in the risk situation. To make these risks manageable, pricing is based on a calculation that uses mathematical/statistical modeling.

The measurement of the overall solvency requirement for **natural catastrophe risk** is supplemented by analysis of the policy portfolio. This analysis carried out with the aid of tools such as the ZÜRS Geo information system (zoning system for flooding, backwater flooding, and heavy rainfall) investigates risk concentrations and changes in these concentrations over time. The use of geographical diversification and the deployment of underwriting guidelines form the basis for managing risks arising from natural disasters.

To reduce actuarial risk, R+V purchases facultative and obligatory reinsurance cover, formulates risk exclusions, and designs risk-appropriate deductible models. Risk-bearing capacity is reviewed as part of the reinsurance decision-making process. This is used as the basis for reinsurance structures and liability layers.

In order to prevent or limit losses, R+V provides a network of different subsidiaries that offer specialist services to help customers and sales partners with contract, risk prevention, or restructuring issues.

In compliance with Solvency II requirements, mathematical/statistical methods are used to calculate future payment obligations for the purpose of measuring insurance liabilities. Insurance liabilities are measured separately for premium and claims provisions. R+V's own experience, actuarial statistics, and additional sources of information are used for the calculations. The methods deployed are based on generally accepted principles of actuarial practice.

## 16.5.3 Risk management in inward non-life business

R+V counters **premium and reserve risk** by continuously monitoring the market as well as the economic and political situation, by managing risk in accordance with its corporate strategy, and by setting insurance rates appropriate to the risk involved. The risk is managed on the basis of an earnings-driven underwriting policy. The assumption of risk is circumscribed by mandatory underwriting guidelines and limits that restrict potential liability arising from both individual and cumulative claims. R+V takes account of economic capital costs when underwriting risk. Compliance with these requirements is monitored.

The material actuarial risks in the inward reinsurance portfolio are **catastrophe risk**, long tail risk, reserve risk and also far-reaching changes in the trends underlying the main markets. The actual and potential losses arising from the level and frequency of claims under natural disaster insurance are recorded and assessed using industry-standard software and R+V's own additional verification systems. The portfolio is continuously monitored for possible concentrations of natural disaster risk.

The objective in managing natural disaster risk is to ensure that there is a broad balance of risk across all categories and that the risk is diversified geographically around the globe.

Limits are set to support central management and limitation of cumulative risks arising from individual natural hazards. One of the mechanisms for managing risk is a systematic check on the cumulative authorized limits for natural disaster risks. The monitoring and management of limits may include the reallocation or adjustment of capacities. The modeled exposures remained within the authorized limits.

Action that can be taken to mitigate the risk includes management of deductibles and retrocession taking into account risk-bearing capacity and the effective costs of retrocession. Minimum requirements apply in relation to the credit rating of retrocessionaires. To minimize peak risk in connection with natural disasters in Europe, R+V has entered into a retrocession agreement as part of its inward reinsurance business. R+V monitors the claims rate trend promptly and continuously, allowing it to initiate preventive measures so that it always has a sufficient level of reserves. The reserves position is monitored in a number of ways, including by means of an expert report, which is prepared once a year.

**16.6 Claims rate trend in non-life insurance** The claims rate (net) in **direct non-life insurance** fell below the prior-year level, as anticipated. Natural disaster events Eberhard and Jörn/Klaus gave rise to claims incurred totaling €83 million. The claims rate in the **inward reinsurance business** went up year on year. Notable natural disaster events included Hurricane Dorian and typhoons Hagibis and Faxai, which gave rise to a total expense of €169 million.

Changes in claims rates and settlements (net of reinsurance) in direct non-life insurance and inward non-life reinsurance business are shown in Fig. 38.

## 16.7 Risk position

As at December 31, 2019, the **overall solvency** requirement for life actuarial risk amounted to  $\notin$ 977 million (December 31, 2018:  $\notin$ 921 million). The limit was set at  $\notin$ 1,200 million as at the reporting date (December 31, 2018:  $\notin$ 1,100 million) and was not exceeded on any measurement date during the reporting year.

As at December 31, 2019, the **overall solvency** requirement for health actuarial risk was measured at  $\in$ 244 million (December 31, 2018:  $\in$ 234 million) with a limit of  $\notin$ 410 million (December 31, 2018:  $\notin$ 350 million). Again, the risk capital requirement remained below the limit on every measurement date during 2019.

As at December 31, 2019, the **overall solvency** requirement for non-life actuarial risk amounted to  $\notin 3,597$  million (December 31, 2018:  $\notin 3,300$  million). The increase was primarily the result of the growth in the volume of business. The limit, which was fixed at  $\notin 3,960$  million as at the reporting date (December 31, 2018:  $\notin 3,650$  million), was not exceeded on any measurement date during the reporting period.

The overall solvency requirement for the various types of non-life actuarial risk is shown in Fig. 37. The rise in the overall solvency requirement compared with the prior year resulted first and foremost from business growth. This applied particularly to premium and reserve risk.

The changes in actuarial risk in direct non-life insurance in 2020 will continue to be shaped by the strategy of achieving profitable growth in all segments of R+V.

In its inward reinsurance business, R+V intends to expand its portfolio, which is well diversified in terms of geography and sector, by continuing the earningsdriven underwriting policy it has pursued in previous years.

FIG. 37 – INSURANCE SECTOR: OVERALL SOLVENCY REQUIREMENT FOR NON-LIFE ACTUARIAL RISK

€million	Dec. 31, 2019	Dec. 31, 2018
Premium and reserve risk	2,254	2,004
Non-life catastrophe risk	2,295	2,167
Lapse risk	74	97
Total (after diversification)	3,597	3,300

#### FIG. 38 – INSURANCE SECTOR: CLAIMS RATE AND SETTLEMENTS (NET OF REINSURANCE)<sup>1</sup>

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Claims rate (net) as percentage of premiums earned										
Including major/natural disaster claims	76.3	76.2	76.6	76.1	76.2	75.5	78.2	75.6	77.7	77.3
Excluding major/natural disaster claims	72.7	71.1	72.8	72.3	74.0	73.8	69.1	72.7	71.4	75.0
Settlements (net) as percentage of provision for incoming claims										
Non-life	0.6	1.1	3.1	3.6	1.6	2.1	0.5	0.3	1.9	4.8

1 Direct non-life insurance business and inward non-life reinsurance.

## 17 Market risk

## 17.1 Definition and business background

## 17.1.1 Definition

Market risk describes the risk arising from fluctuation in the level or volatility of market prices of assets, liabilities, and financial instruments that have an impact on the value of the assets and liabilities of the entity. It reflects the structural mismatch between assets and liabilities, in particular with respect to their maturities. In accordance with the breakdown specified in Solvency II, the bulk of credit risk within market risk is assigned to spread risk. The other parts of credit risk are measured within counterparty default risk and other risk types.

Market risk is broken down into the following subcategories:

- Interest-rate risk describes the sensitivity of the values of assets, liabilities, and financial instruments to changes in the term structure of interest rates or to the volatility of interest rates.
- Spread risk describes the sensitivity of the values of assets, liabilities, and financial instruments to changes in the level or volatility of credit spreads above the risk-free interest rate term structure. Default risk and migration risk are also included in this subcategory. The credit spread is the difference in interest rates between a high-risk and a risk-free fixed-income investment. Changes in the credit risk premiums lead to changes in the market value of the corresponding securities.
- Equity risk describes the sensitivity of the values of assets, liabilities, and financial instruments to changes in the level or volatility of the market prices of equities. Equity investment risk is also a part of equity risk. Equity risk arises from existing equity exposures as a result of market volatility.
- Currency risk describes the sensitivity of the values of assets, liabilities, and financial instruments to changes in the level or volatility of exchange rates. Currency risk arises as a result of exchange rate volatility either from investments held in a foreign currency or the existence of a currency imbalance between insurance liabilities and investments.
- Real-estate risk describes the sensitivity of the values of assets, liabilities, and financial instruments

to changes in the level or volatility of the market prices of real estate. Real-estate risk can arise as a result of negative changes in the fair value of real estate held directly or indirectly. This may be the result of a deterioration in the specific characteristics of the real estate or a general change in market prices (for example in connection with a real-estate crash).

 Concentration risk represents the additional risk for an insurance or reinsurance company stemming either from lack of diversification in the asset portfolio or from a large exposure to the risk of default by a single issuer of securities or a group of related issuers.

## 17.1.2 Business background

Market risk arises in the insurance business as a result of investing activities. It is caused by the timing difference between the payment of premiums by the policyholder and the payments for claims and benefits by the insurance company, and by endowment-type business in personal insurance.

## 17.2 Specific risk factors

Generating the guaranteed return required in its life insurance business may present R+V with additional challenges if interest rates remain low or turn negative and credit spreads remain narrow. On the other hand, if **interest rates** were to rise significantly in the near future or **credit spreads** on bonds were to widen, this would lead to a substantial fall in the fair values of R+V's investments used to cover the obligations to policyholders. Falls in fair value of this nature could have a temporary impact on operating profit at R+V, or a permanent impact if investments have to be sold.

Because cash flows in connection with insurance liabilities in the area of life insurance can be forecast and R+V's investments are diversified, the risk that bonds might have to be sold at a loss before their maturity date is low.

Default risk may arise from a **deterioration in the financial circumstances of issuers or debtors**. This could lead to the recognition of credit-risk-related impairment losses or to partial or total defaults on loans and receivables.

R+V's investments have a high credit rating. In the dominant public and financial sectors, they are also largely loans and advances in the form of government bonds and German and European Pfandbriefe backed by collateral in accordance with statutory requirements.

## 17.3 Risk management

## 17.3.1 Market risk measurement

The measurement of market risk involves analyzing shock scenarios specified in **Solvency II** requirements, in some cases supplemented by the group's own parameterization.

The capital requirements for **interest-rate risk** are determined on the basis of shock scenarios calculated for an increase in interest rates and a decrease in interest rates. R+V uses the shock factors in the standard formula to calculate the overall solvency requirement for interest-rate risk.

The capital requirements for **spread risk** are calculated using a factor approach based on the relevant lending volume. The level of the shock factor is determined by the security's rating and the modified duration of the investment. With loan securitizations, a distinction is made between single, double, and multiple securitization structures. Depending on which is applicable, different rating-dependent shock factors are used. R+V uses its own shock factors, based on a portfolio model and with particular regard to concentration risk, to calculate the overall solvency requirement.

The capital requirements for **equity risk** are determined on the basis of stress scenarios calculated for a decrease in market value. The stress amounts depend on the equity type, e.g. whether it is listed on a regulated market in a member state of the European Economic Area or Organisation for Economic Cooperation and Development (OECD). The capital requirement for equity risk is based on the relevant equity exposure. It is determined using modeling and risk quantification based on observable data. The parameters are increased in order to take account of default risk and concentration risk. Default risk describes the risk of loss resulting from issuer insolvency.

**Currency risk** is calculated using a scenario approach that reflects the impact of a decrease or increase in the exchange rate for a foreign currency. The shock factor for determining the overall solvency requirement is based on the individual currency portfolio of R+V. Lower factors are applied for currencies that are pegged to the euro than for those that are not pegged to the euro.

The calculation of **real-estate risk** looks at both property held directly (e.g. land and buildings) and real-estate funds. The shock factor for determining the overall solvency requirement for real-estate risk is a stress scenario adapted from the standard formula and reflects the fact that direct holdings consist overwhelmingly of investments in German real estate and fund holdings consist primarily of European real estate.

The overall solvency requirement for **concentration risk** is not calculated separately because this risk is taken into account in the calculations for equity risk, spread risk, and counterparty default risk.

17.3.2 Principles of market risk management The risk attaching to investments is managed in accordance with the guidelines specified by EIOPA, the stipulations in the VAG, the information provided in regulatory circulars, and internal investment guidelines (for details, see 'Market risk strategy' in section 15.1). R+V aims to ensure compliance with the internal provisions in the risk management guidelines for investment risk and with other regulatory investment principles and regulations by means of investment management, internal control procedures, a forward-looking investment policy, and organizational measures. The management of risk encompasses both economic and accounting aspects.

R+V continuously expands and refines the range of instruments used to identify, assess, and analyze the risk attaching to new investments and to monitor risk in the investment portfolio, in order to be able to respond to any changes in the capital markets and to detect, limit, or avoid risk at an early stage.

R+V counters investment risk by observing the principle of achieving the greatest possible security and profitability while safeguarding liquidity. By maintaining a mix and diversification of investments, R+V's investment policy aims to take into account the objective of mitigating risk.

R+V monitors changes in all types of market risk through constant measurement and a process of reporting to the relevant bodies. Risk in all subcategories is quantified through specific economic calculations. Stress tests represent an important earlywarning system. In addition to natural diversification via maturity dates, issuers, countries, counterparties and asset classes, limits are also applied in order to mitigate risk.

Asset/liability management investigations are carried out at R+V. The necessary capital requirement to maintain solvency is reviewed on an ongoing basis with the support of stress tests and scenario analyses. Specifically, reviews are carried out to assess the effects of a long period of low interest rates and volatile capital markets. R+V uses derivatives to manage market risk.

## 17.3.3 Management of individual market risk categories

In the management of **interest-rate risk**, R+V adheres to the principle of a mix and diversification of investments, combined with balanced risk-taking in selected asset classes and duration management that takes account of the structure of obligations. Furthermore, the use of pre-emptive purchases helps to provide a constant return from investments and to manage changes in interest rates and duration. A portion of the fixed-income investment portfolio has also been protected against a fall in prices.

In the management of **spread risk**, R+V pays particular attention to high credit ratings for investments, with the overwhelming majority of its fixed-income portfolio being held in investment-grade paper (see also Fig. 44 in section 17.4.2). The use of third-party credit risk evaluations and internal expert assessments, which are often more rigorous than the credit ratings available in the market, serves to further minimize risk.

Mortgage lending is also subject to internal rules that help to limit default risk. Analysis has shown that accounting considerations do not require any loan loss allowances to be recognized at portfolio level.

The management of **equity risk** is based on a coresatellite approach in which the core comprises shares in large, stable companies in indices that can be hedged to which satellite equities are added to improve the risk/return profile. Asymmetric strategies are also used to reduce or increase equity exposure under a rules-based approach. At R+V, equities are used as part of a long-term investment strategy to guarantee that obligations to policyholders can be satisfied; generating profits by exploiting short-term fluctuations to sell shares is not its objective. The risk of having to sell equities at an inopportune moment is mitigated by the broadly diversified portfolio of investments.

**Currency risk** is controlled by systematic foreignexchange management. Virtually all reinsurance assets and liabilities are denominated in the same currency.

**Real-estate risk** is mitigated by diversifying holdings across different locations and types of use.

**Concentration risk** is reduced by mixing and diversifying investments. This is particularly apparent from the granular structure of the issuers in the portfolio.

## 17.3.4 Distinctive features of managing market risk in personal insurance business

Due to the persistently low level of interest rates, there is a risk that the guaranteed minimum return agreed for certain products when contracts are signed cannot be generated on the capital markets over the long term. This particularly applies to life insurance contracts and casualty insurance contracts with premium refund clauses that guarantee minimum returns. In the case of products with long-term guarantees, there is a risk of negative variances over the term of the contracts compared with calculation assumptions because of the length of time covered by the contracts. The main reasons for variances are the change in the capital market environment and maturity mismatches between investments and insurance contracts. A protracted period of low interest rates increases the market risk arising from investments.

Market risk can be countered by writing new business that takes into account the current capital market situation and by taking the following action to boost the portfolio's risk-bearing capacity. It is crucial to ensure that there is enough free capital that can be made available even in adverse capital market scenarios. The necessary capital requirement to maintain solvency is reviewed on an ongoing basis with the aid of stress tests and scenario analyses as integral components of asset/liability management.

Risk is essentially mitigated by recognizing a supplementary change-in-discount-rate reserve as specified in the Regulation on the Principles Underlying the Calculation of the Premium Reserve (DeckRV) and adding to the discount rate reserves for existing contracts, thereby reducing the average interest liabilities. In 2019, R+V added a total of €647 million to these supplementary reserves in its life insurance business, bringing the overall amount to €3,919 million. The addition to these reserves for casualty insurance with premium refund was €4 million, bringing the total to €38 million. Following the amendment to the DeckRV at the end of 2018, there will be a further increase in the supplementary change-in-discount-rate reserve, although this will be in smaller steps over a longer period (using the 'corridor method').

Policyholder participation in the form of future declarations of bonuses is also a key instrument used to reduce market risk attaching to life insurance.

The breakdown of benefit reserves by discount rate for the main life and casualty insurance portfolios is shown in Fig. 39.

FIG.	39 –	INSU	RANCE	SECTOR:	BENEFIT	RESERVES	BY	DISCOUNT
RAT	E FOF	R THE	MAIN	INSURAN	ICE PORT	FOLIOS <sup>1</sup>		

Discount rate	Proportio benefit rese	n of total rve in 2019 <sup>2</sup>	Proportion of total benefit reserve in 2018 <sup>2</sup>		
	(€ million)	(%)	(€ million)	(%)	
0.00%	5,938	9.1	5,713	9.3	
0.08%	2	-	1	-	
0.10%	-	-	-	-	
0.25%	891	1.4	853	1.4	
0.35%	23	-	-	-	
0.40%	2	-	-	-	
0.50%	118	0.2	59	0.1	
0.75%	24	-	41	0.1	
0.90%	4,850	7.4	2,720	4.4	
1.00%	75	0.1	8	-	
1.25%	2,467	3.8	2,266	3.7	
1.50%	24	-	29	-	
1.55%	29	-	-	-	
1.75%	5,723	8.7	5,292	8.6	
1.80%	315	0.5	36	-	
2.00%	654	1.0	445	0.7	
2.25%	11,251	17.2	10,536	17.1	
2.50%	88	0.1	87	0.1	
2.75%	8,238	12.6	7,876	12.8	
3.00%	2,326	3.5	2,798	4.5	
3.25%	7,172	10.9	7,000	11.3	
3.50%	3,564	5.4	3,857	6.2	
3.75%	215	0.3	258	0.4	
4.00%	7,294	11.1	7,346	11.9	

1 The table covers the following insurance products that include a guaranteed rate of return:

Casualty insurance policies with premium refund
 Casualty insurance policies with premium refund as pension insurance

- Pension insurance policies

 Endowment insurance policies, including capital accumulation, risk and credit insurance policies, pension plans with guaranteed insurance-based benefits
 Capital deposit products.

2 The share of the total benefit reserve attributable to supplementary insurance policies is listed under the relevant basis of calculation for the associated main insurance policy.

A summary of the actuarial assumptions for calculating the benefit reserves for the main life and casualty insurance portfolios is presented in note 11 of the notes to the consolidated financial statements. It forms part of the notes on the accounting policies applicable to the 'Benefit reserve' line item on the balance sheet.

The company actuarial discount rate calculated in accordance with the procedure developed by the Deutsche Aktuarvereinigung e.V. (DAV) [German Actuarial Association] is used in determining the health insurance discount rate. This procedure is based on a fundamental professional principle issued by the DAV for determining an appropriate discount rate. As a result of these calculations, there was only a reduction in the discount rate in 2019 for observation units with a premium adjustment effective January 1, 2019 if a premium adjustment had not already been carried out with effect from January 1, 2018.

## 17.3.5 Managing risk arising from defined benefit pension obligations

The R+V entities have pension obligations (defined benefit obligations) to their current and former employees. By entering into such direct defined benefit obligations, they assume a number of risks, including risks associated with the measurement of the amounts recognized on the balance sheet, in particular risk arising from a change in the discount rate, risk of longevity, inflation risk, and risk in connection with salary and pension increases. A requirement may arise to adjust the existing provisions for pensions and other post-employment benefits as a result of decisions by the courts, legislation, or changes in the (consolidated) financial reporting. All the plan assets at R+V without exception are assets in reinsured pension schemes and are subject to interest-rate risk. The strategy adopted for the pension assets is predominantly driven by the defined benefit obligations.

## 17.4 Lending volume

17.4.1 Reconciliation of the lending volume The amount and structure of the lending volume are key factors for the aspects of credit risk reflected in market risk and counterparty default risk. To identify possible risk concentrations, the volume liable to credit risk is broken down by sector, country group, and rating class. Not relevant

#### FIG. 40 - INSURANCE SECTOR: RECONCILIATION OF THE LENDING VOLUME

€billion										
				Recond	iliation			Lend	ing volu	me for the consolidated financial statements
for in manag	ternal Iement	Scor	ne of	Definitio	on of the	Carr	ying nt and			
acco	unts	consoli	idation	lending	volume	measu	rement			
Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,	Dec. 31,	(note 57 to the consolidated financial
2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	statements)
								9.7	9.3	of which: mortgage loans
								7.2	7.4	of which: promissory notes and loans
								9.1	9.6	of which: registered bonds
								0.7	-	of which: other loans
								11.3	9.2	of which: variable-yield securities
								55.8	49.0	of which: fixed-income securities
								0.4	0.2	of which: derivatives (positive fair values)
								0.4	0.3	of which: deposits with ceding insurers
98.0	86.9	-1.2	-1.9	0.4	0.2	-2.4	-0.3	94.8	84.9	Total
				E	Balance a	s at Dec.	31, 2019	-3.2	-3.2%	
				E	Balance a	s at Dec.	31, 2018	-2.0	-2.3%	•
										-

Fig. 40 shows a reconciliation of the lending volume on which the risk management is based to individual balance sheet items in order to provide a transparent illustration of the link between the consolidated financial statements and risk management. There are discrepancies between the internal management and external (consolidated) financial reporting measurements for some portfolios owing to the focus on the risk content of the items. Other main reasons for the discrepancies between the two sets of figures are differences in the scope of consolidation, differences in the definition of lending volume, and various differences in recognition and measurement methods.

### 17.4.2 Change in lending volume

As at December 31, 2019, the total lending volume of R+V had increased by 13 percent to €98.0 billion (December 31, 2018: €86.9 billion). This increase was attributable to the interest-rate-related rise in fair values and the expansion of the investment portfolios in connection with the growth in the insurance business.

The volume of lending in the **home finance** business totaled €10.8 billion as at December 31, 2019 (December 31, 2018: €9.9 billion). Of this amount, 89 percent was accounted for by loans for less than 60 percent of the value of the property (December 31, 2018: 90 percent). The volume of home finance was broken down by finance type as at the reporting date

as follows (figures as at December 31, 2018 shown in parentheses):

- Consumer home finance:
  €9.9 billion (€9.3 billion)
- Commercial home finance:
  €0.1 billion (€0.1 billion)
- Commercial finance: €0.7 billion (€0.5 billion).

In the home finance business, the entire volume disbursed is usually backed by traditional **loan collateral**.

The financial sector and the public sector, which are the dominant **sectors**, together accounted for 71 percent of the total lending volume as at December 31, 2019, as was also the case at the end of 2018. This lending mainly comprised loans and advances in the form of German and European Pfandbriefe backed by collateral in accordance with statutory requirements. Loans and advances to the public sector and consumer home finance (retail) highlight the safety of this investment.

Fig. 41 shows the sectoral breakdown of the lending volume in the Insurance sector.

An analysis of the **geographical breakdown** of lending in Fig. 42 reveals that Germany and other industrialized countries continued to account for the lion's share of the lending volume as at December 31, 2019 – as they also did at December 31, 2018 – with a share of 90 percent. European countries dominated within the broadly diversified exposure in industrialized countries.

The high proportion of obligations in connection with the life insurance business requires investments with longer maturities. This is also reflected in the breakdown of **residual maturities** shown in Fig. 43.

As at December 31, 2019, 83 percent of the total lending volume had a residual maturity of more than 5 years. This was the same percentage as at December 31, 2018. By contrast, just 3 percent of the total lending volume was due to mature within 1 year as at the reporting date (December 31, 2018: 2 percent).

The **rating structure** of the lending volume in the Insurance sector is shown in Fig. 44. Of the total lending volume as at December 31, 2019, 79 percent continued to be attributable to investment-grade borrowers (December 31, 2018: 80 percent).

The lending volume that is not rated, which made up 18 percent of the total lending volume (December 31, 2018: 17 percent), essentially comprised low-risk consumer home finance for which external ratings were not available.

To rate the creditworthiness of the lending volume, R+V uses external ratings that have received general approval. It also applies its own expert ratings in accordance with the provisions of Credit Rating Agency Regulation III to validate the external credit ratings. R+V has defined the external credit rating as the maximum, even in cases where its own rating is better. The ratings calculated in this way are matched to the DZ BANK credit rating master scale using the methodology shown in Fig. 23 (section 8.6.1).

As at the reporting date, the **10 counterparties associated with the largest lending volumes** accounted for 18 percent of R+V's total lending volume (December 31, 2018: 21 percent).

#### FIG. 41 – INSURANCE SECTOR: LENDING VOLUME, BY SECTOR

€ billion	Dec. 31, 2019	Dec. 31, 2018
Financial sector	47.2	40.0
Public sector	22.5	21.3
Corporates	17.3	15.6
Retail	9.9	9.3
Industry conglomerates	1.0	0.6
Other	-	-
Total	98.0	86.9

FIG.	42 -	INSUF	RANCE	SECTOR:	LENDING	VOLUME,	BY	COUNTRY	Y
GRC	OUP								

€ billion	Dec. 31, 2019	Dec. 31, 2018
Germany	35.7	31.9
Other industrialized countries	52.9	46.6
Advanced economies	1.2	1.1
Emerging markets	5.1	4.2
Supranational institutions	3.1	3.1
Total	98.0	86.9

FIG.	43 – INSURANCE	SECTOR:	LENDING	VOLUME,	ΒY	RESIDU	AL
MA <sup>.</sup>	TURITY						

€ billion	Dec. 31, 2019	Dec. 31, 2018
≤ 1 year	2.6	2.1
> 1 year to $\leq$ 5 years	13.7	12.9
> 5 years	81.7	71.9
Total	98.0	86.9

FIG. 44 – INSURANCE SECTOR: LENDING VOLUME, BY RATING CLASS

€ billio	n	Dec. 31, 2019	Dec. 31, 2018
	1A	26.2	25.1
	1B	14.3	11.9
	1C	-	-
de	1D	9.0	7.7
gra	1E	-	-
lent	2A	8.2	7.4
estm	2B	6.9	5.5
Inve	2C	6.2	5.5
	2D	2.8	2.7
	2E	-	-
	3A	4.0	4.1
	3B	1.0	0.8
<mark>e</mark>	3C	0.7	0.4
gra	3D	-	-
ent	3E	0.4	0.4
stm	4A	0.2	0.1
nve	4B	0.2	0.1
on-i	4C	0.1	0.2
ž	4D	-	-
	4E	-	-
Defau	lt	-	-
Not ra	ted	17.8	15.0
Total		98.0	86.9

17.4.3 Credit portfolios with increased risk content R+V's exposure in credit portfolios with increased risk content is analyzed separately because of its significance for the risk position in the Insurance sector. The figures presented here are included in the above analyses of the total lending volume.

Investments in **eurozone periphery countries** totaled  $\notin 6,812$  million as at December 31, 2019 (December 31, 2018:  $\notin 6,158$  million), a rise of 11 percent. Fig. 45 shows the country breakdown of the exposure.

### 17.5 Risk position

As at December 31, 2019, the **overall solvency** requirement for market risk amounted to €3,575 million (December 31, 2018: €3,205 million) with a limit of €3,850 million (December 31, 2018: €4,350 million). This increase in market risk was attributable to the expansion of the investment portfolios in connection with the growth in the insurance business. It was also due to the fall in the potential for risk mitigation arising from the projection of lower future policyholder participation, which in turn was caused by the fall in interest rates in 2019. The limit was not exceeded on any measurement date during 2019.

Fig. 46 shows the overall solvency requirement for the various types of market risk.

The overall solvency requirement includes a capital buffer requirement for market risk. This capital buffer requirement covers the spread and migration risk arising from sub-portfolios of Italian government bonds. Since the recalculation of the overall solvency requirement as at December 31, 2018, it has also taken account of the increase in market risk stemming from a further refinement of the method for measuring interest-rate risk. R+V is currently working in cooperation with DZ BANK to establish whether there is any need for changes in connection with the supervisory review process carried out by EIOPA under Commission Delegated Regulation (EU) 2015/35 (Solvency II Regulation). The capital buffer relating to the refinement of the measurement of interest-rate risk will be removed again once the new methodology has been implemented.

As at December 31, 2019, the capital buffer requirement for market risk totaled €206 million (December 31, 2018: €333 million).

FIG. 45 – INSURANCE SECTOR: EXPOSURE IN EUROZONE PERIPHERY COUNTRIES

€million	Dec. 31, 2019	Dec. 31, 2018
Italy	3,897	4,081
of which: public sector	2,814	2,983
of which: non-public sector	1,083	1,099
of which: financial sector	782	836
Spain	2,915	2,077
of which: public sector	1,524	1,402
of which: non-public sector	1,391	675
of which: financial sector	1,128	468
Total	6,812	6,158
of which: public sector	4,338	4,384
of which: non-public sector	2,474	1,773
of which: financial sector	1,910	1,304

FIG.	46 – INSURANCE	SECTOR: OVERALL	SOLVENCY	REQUIREMENT
FOR	MARKET RISK			

€million	Dec. 31, 2019	Dec. 31, 2018
Interest-rate risk	1,168	1,465
Spread risk	1,446	1,248
Equity risk	1,837	1,496
Currency risk	218	165
Real-estate risk	390	359
Total (after diversification)	3,575	3,205

## **18 Counterparty default risk**

**18.1 Definition and business background** Counterparty default risk reflects possible losses due to unexpected default or deterioration in the credit standing of counterparties and debtors of insurance and reinsurance companies over the following 12 months. It covers risk-mitigating contracts, such as reinsurance arrangements, securitizations and derivatives, and receivables from intermediaries, as well as any other credit risk that is not otherwise covered by risk measurement.

Counterparty default risk takes account of collateral or other security that is held by the insurance or reinsurance company and any associated risks.

#### **18.2 Specific risk factors**

Counterparty default risk can arise as a result of unexpected default or deterioration in the credit standing of mortgage loan borrowers, counterparties of derivatives, reinsurance counterparties or policyholders, or insurance brokers.

## 18.3 Risk management

18.3.1 Measurement of counterparty default risk and management of limits

The capital requirements for counterparty default risk are determined on the basis of the relevant exposure and the expected losses per counterparty.

R+V manages counterparty default risk at individual entity level.

Transactions involving derivatives are subject to internal guidelines, particularly those regarding volume and counterparty limits. The various risks are monitored and transparently presented as part of the internal reporting system. Only economic hedges are used and they are not reported on a net basis in the consolidated financial statements.

R+V uses the views expressed by the international rating agencies in conjunction with its own credit ratings to help it to assess counterparty and issuer risk. Compliance with the limits for major counterparties is reviewed on an ongoing basis, with checks on limit utilization and compliance with investment guidelines.

18.3.2 Mitigating counterparty default risk Default management mitigates the risks arising from defaults on receivables relating to direct insurance operations with policyholders and insurance brokers. The risk of default on receivables is also addressed by recognizing general loan loss allowances, which are calculated on the basis of past experience. The average ratio of defaults to gross premiums written over the past 3 years was 0.1 percent, which was unchanged on the figure as at December 31, 2018.

The default risk for receivables arising from inward and ceded reinsurance business is limited by constantly monitoring credit ratings and making use of other sources of information in the market. As was the case at the end of 2018, virtually all receivables arising from ceded reinsurance, which amounted to €14 million as at December 31, 2019 (December 31, 2018: €23 million), were due from entities with a rating of A or higher. In 2019, receivables arising from reinsurance did not represent a material risk due to the excellent credit quality of the reinsurers. There were no material defaults in 2019 or in previous years.

## 18.4 Risk position

As at December 31, 2019, the **overall solvency** requirement for counterparty default risk was

€90 million (December 31, 2018: €64 million) with a **limit** of €100 million (December 31, 2018: €100 million). The limit was not exceeded on any measurement date during 2019.

## **19 Reputational risk**

**19.1 Definition and business background** Reputational risk is defined as the risk of losses that could arise from possible damage to the reputation of R+V or of the entire industry as a result of a negative perception among the general public (for example, customers, business partners, shareholders, authorities, media).

Reputational risk can arise as an independent risk (primary reputational risk) or as an indirect or direct consequence of other types of risk, such as operational risk (secondary reputational risk).

### **19.2 Specific risk factors**

If R+V acquires a negative reputation, there is a risk that existing or potential customers will be unsettled with the result that existing business relationships might be terminated or it might not be possible to carry out planned transactions. There is also a risk that R+V's adverse reputation is then transferred to the entities in the Bank sector and it may no longer be possible to guarantee the backing of stakeholders, such as network partners and employees, necessary to conduct business operations.

### 19.3 Risk management

One of the main objectives of R+V is to ensure that the R+V brand enjoys a positive image in the cooperative financial network and among the public at large. To prevent any damage to this image, R+V ensures that quality standards are adhered to in product development and in all other parts of the value chain. In addition, R+V's corporate communications are coordinated centrally within the Chief Executive Officer's area of responsibility so that any inaccurate presentation of circumstances can be countered. Media reports about the insurance industry in general and R+V in particular are monitored and continuously analyzed across all R+V departments. A continuous improvement process pays close attention to ratings and market comparisons covering service, product quality, and advisory expertise, which are key parameters as far as customer satisfaction is concerned.

For the purposes of managing reputational risk, R+V uses risk indicators that are intended to facilitate early identification of risk trends and increase the transparency of risk exposures. A system of warning lights is used with the aim of highlighting risk situations based on qualitative and quantitative threshold values.

R+V's reputational risk is not specifically quantified within the Solvency II framework. However, it is implicitly included in the overall solvency requirement for life actuarial risk (lapse risk).

## 20 Operational risk

**20.1 Definition and business background** Operational risk is defined as the risk of loss arising from inadequate or failed internal processes, personnel, or systems, or from external events. It includes legal risk.

Operational risk in the Insurance sector is broken down into the following components:

- HR risk
- IT risk
- Legal risk
- Tax risk.

Operational risk could arise in any division of R+V.

### 20.2 Central risk management

The **risk capital requirement** for operational risk in the Insurance sector is determined in accordance with the standard formula in Solvency II. The risk calculation uses a factor approach, taking account of premiums, provisions and, in the case of unit-linked business, costs.

R+V uses scenario-based risk self-assessments and risk indicators to manage and control operational risk. In the **risk self-assessments**, operational risk is assessed in terms of the probability of occurrence and the level of loss. Qualitative assessments can be used in exceptional cases.

**Risk indicators** are intended to help the Insurance sector to identify risk trends and concentrations at an early stage and to detect weaknesses in business processes. A system of warning lights is used to indicate risk situations based on specified threshold values. To support the management of operational risk, all R+V's business processes are structured in accordance with the requirements of the **framework guidelines** for employee authority and power of attorney in R+V companies. Divisions not covered by these guidelines are subject to other policy documents, including policies on new business and underwriting.

The **internal control system** is a key instrument used by R+V to **limit operational risk**. Rules and controls in each department and reviews of the use and effectiveness of the internal control system carried out by Group Audit at R+V aim to avert the risk of errors and fraud. Payments are largely automated. Powers of attorney and authorizations stored in user profiles, as well as automated submissions for approval based on a random generator, are also used. Manual payments are approved by a second member of staff.

Business interruptions could mean that processes and workflows are disrupted over several days. Moreover, sensitive internal and external interfaces could be jeopardized by long-term business interruptions.

To ensure that it is operational at all times, R+V has a fully integrated **business continuity management system** (BCM system) with a central coordination function. This also includes the contingency and crisis management system and is documented in the business continuity, contingency, and crisis management guidelines. The security and BCM conference with representatives from all divisions provides specialist support and is intended to help coordinate activities within the R+V subgroup. Reports on significant findings relevant to risk and on any exercises and tests that have been carried out are also submitted to the Risk Committee.

The purpose of BCM is to ensure that R+V's operating activities can be maintained in the event of an emergency or crisis. To this end, time-critical business processes are recorded with the necessary resources. Any necessary documentation (such as business continuity planning) is prepared and reviewed. Special organizational structures, such as the R+V crisis management team and the individual business continuity teams in the divisions, have also been set up to deal with emergency and crisis situations.

#### 20.3 HR risk

## 20.3.1 Specific risk factors

The future success of R+V is dependent upon capable managers and employees with the necessary skills and qualifications. There is fierce competition for managerial and administrative staff in the labor market, driven by high demand and insufficient numbers of suitable individuals. Unless the necessary number of suitable managerial and administrative staff can be attracted within the required timeframe, and/ or existing managers and employees can be retained, there will be a risk that tasks will not be performed or will not be performed satisfactorily as a result of inadequate expertise in terms of either quality or quantity. This could restrict operating activities and have a negative impact on reputation.

#### 20.3.2 Risk management

R+V uses the mechanisms of professional development and talent management with a view to ensuring that staff members undergo the continual development and training that will also make it possible to meet future staffing requirements from within the organization. The tools it uses for this purpose include a system for assessing high-potential employees, succession planning, and skills upgrading programs.

In the interest of long-term staff retention, R+V runs programs to establish and enhance its appeal as a place to work.

R+V counters operational risk in sales and distribution by providing continuing professional development courses for field sales staff. R+V applies the code of conduct for sales and distribution of the Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV) [German Insurance Association]. This code focuses on a relationship between customers, insurance companies, and brokers that is defined by fairness and trust. The requirements set out in the code of conduct are reflected in the principles, policies, and processes of each company.

## 20.4 IT risk

#### 20.4.1 Specific risk factors

The main type of operational risk to which R+V is exposed is the risk of malfunctions or breakdowns in data processing systems or in the programs used on these systems, including attacks from external sources, such as hackers or malware. Such events could have an adverse impact on R+V's ability to efficiently maintain the processes necessary to carry out operating activities, protect saved data, ensure sufficient control, or continue to develop products and services. Furthermore, such malfunctions or breakdowns could lead to temporary or permanent loss of data. If operational risk of this nature were to materialize, it could restrict operating activities and have a negative impact on reputation.

#### 20.4.2 Risk management

Quality assurance in IT follows best practice. A meeting is held every working day to discuss current topics and assign people to work on them. In addition, appropriate measures relating to adherence to service level agreements (e.g. system availability) are decided upon at monthly meetings attended by the IT divisional managers.

Physical and logical precautionary measures have been established for the purpose of data and application security and to ensure that day-to-day operations are maintained. A particular risk would be a partial or total breakdown in data processing systems.

R+V counters this risk by using two segregated data processing centers in which the data and systems are mirrored, special access security, fire control systems, and an uninterruptible power supply supported by emergency power generators. Exercises are carried out to test a defined restart procedure to be used in disaster situations with the aim of checking the efficacy of this procedure. Data is backed up and held within highly secure environments in various buildings. Furthermore, data is mirrored to a tape library at a remote, off-site location.

Various IT security management procedures are used to identify, assess, and document cyber risks and then to systematically allocate these risks for processing. The processing status and risk treatment are tracked and reported centrally each month.

## 20.5 Legal risk

#### 20.5.1 Specific risk factors

Legal risk may arise from adverse changes in the legal environment, including adverse changes in the way that the authorities or the courts interpret legal provisions. If such risks were to materialize, this could have a detrimental impact on R+V's appeal as a partner in business transactions.

## 20.5.2 Risk management

R+V monitors and analyzes relevant decisions by the courts with a view to mitigating legal risk by identifying any need for action in good time and implementing specific corrective measures.

Legal disputes arising from the processing of insurance claims or benefit payments are covered by insurance liabilities, and therefore do not form part of operational risk.

## 20.6 Tax risk

## 20.6.1 Specific risk factors

Tax risk can arise from adverse changes in **tax circumstances** (tax legislation, decisions by the courts) or in the **interpretation by tax authorities** of existing tax legislation. As a result of tax audits, an alternative assessment of tax matters or errors in the calculation of the basis of tax assessments could give rise to **retrospective tax liabilities** for periods that have already been assessed. As there are still outstanding audits by the tax authorities relating to a number of financial years, there is a risk that retrospective tax payments could be required and these payments would be subject to interest charges. Such events could also have a negative impact on reputation.

## 20.6.2 Risk management

R+V has established a tax compliance management system to minimize tax risk. Business transactions are assessed for tax purposes on the basis of current tax legislation, taking into account the latest decisions by the courts and interpretations by the authorities.

## 20.7 Risk position

As at December 31, 2019, the **overall solvency** requirement for operational risk amounted to €644 million (December 31, 2018: €557 million). The rise in the overall solvency requirement compared with the prior year resulted first and foremost from business growth. The limit applicable at the reporting date was set at €680 million (December 31, 2018: €640 million). The limit was not exceeded on any measurement date during 2019.

# 21 Risks from entities in other financial sectors

All entities that form part of the regulatory R+V Versicherung AG insurance group are generally included in the calculation of group solvency. This also applies to non-controlling interests in insurance companies and to entities in other financial sectors.

## The non-controlling interests in insurance

**companies** mainly relate to reinsurance and insurance companies over which R+V can exercise significant influence but without having complete control. The risk capital requirement for non-controlling interests in insurance companies is included on a pro-rata basis in accordance with Solvency II. As at December 31, 2019, no non-controlling interests in insurance companies were included in the risk measurement. At R+V, the **entities in other financial sectors** mainly consist of pension funds and occupational pension schemes.

The **risk factors** applicable for risks from entities in other financial sectors are generally the same as the risk factors for the risks subject to capital requirements under Solvency II.

Risk is quantified for the pension funds and occupational pension schemes in accordance with the requirements currently specified by the insurance supervisor. This means applying the capital requirements in Solvency I, which are essentially calculated by applying a factor to the volume measures of benefit reserves and capital at risk.

R+V Pensionskasse AG is exposed to risks comparable with those faced by the life insurance entities in the R+V subgroup. The main risk management activities applicable in this case are those relating to life actuarial risk (section 16.3.2), market risk (section 17.2), counterparty default risk (section 18.2), and operational risk (section 20.2).

The risk situation in a pension fund is determined to a significant degree by the nature of the pension plans offered. In pension plans offered by R+V involving defined contributions with a minimum benefit, it must be ensured that at least the sum of the contributions paid into the plan (net of any contributions covering biometric risk assumed by R+V) is available on the agreed pension start date.

R+V also offers pension plans that include guaranteed insurance-based occupational incapacity cover as well as pension benefits and benefits for surviving dependants. Market risk and all the risk types covered by actuarial risk are relevant as far as occupational pension provision is concerned. Longevity risk is also important in relation to pensions because of the guaranteed benefits involved. Again, the risk management activities relating to life actuarial risk, market risk, counterparty default risk, and operational risk apply in this case. R+V aims to ensure that the ongoing pension plan contributions and the benefit reserve include sufficient amounts to cover the costs of managing pension fund contracts.

In the pension plans involving a benefit commitment without any insurance-based guarantees, R+V does not assume responsibility for any of the pension fund risk or investment risk because the benefits promised by the pension fund are subject to the proviso that the employer will also make up any difference required. This also applies to the period in which pensions are drawn. If the employer fails to make up the difference required, R+V's commitment is reduced to insurancebased guaranteed benefits based on the amount of capital still available.

As at December 31, 2019, the **overall solvency** requirement for risks in connection with entities in other financial sectors stood at  $\notin$ 111 million (December 31, 2018:  $\notin$ 111 million) with a **limit** of  $\notin$ 112 million (December 31, 2018:  $\notin$ 145 million). The limit was not exceeded on any measurement date during 2019.