

Risk report

Risk governance and risk management system

Risk management organisation

Organisational structure

Munich Re has set up a governance system as required under Solvency II. The main elements of this system are the risk management, compliance, audit and actuarial functions. At Group level, risk management is part of the Integrated Risk Management division (IRM) and reports to the Chief Risk Officer (Group CRO). In addition to the Group functions, there are risk management units in the fields of business, each headed up by its own CRO.

Risk governance

Our risk governance ensures that an appropriate risk and control culture is in place by clearly assigning roles and responsibilities for all material risks. Risk governance is supported by various committees at Group and field-of-business level. The Board of Management must consult the risk management function on major decisions to be taken.

Defining the risk strategy

The risk strategy, which is aligned with Munich Re's business strategy, defines where, how and to what extent we are prepared to incur risks. The further development of our risk strategy is embedded in the annual planning cycle, and hence in our business planning. It is approved by the Board of Management, and discussed with the Audit Committee of the Supervisory Board as a material element of the own risk and solvency assessment (ORSA) process.

We determine the risk strategy by defining risk tolerances for a number of risk criteria and limits for risk concentrations that are based on the capital and liquidity available, and on our earnings target, and provide a frame of reference for the Group's operating divisions.

Implementation of strategy and the risk management cycle

The risk appetite defined by the Board of Management is reflected in our business planning and integrated into the management of our operations. If capacity shortages or conflicts with the limit system or regulations arise, defined escalation and decision-making processes are followed. These have been designed to ensure that the interests of the business and risk management considerations are weighed and reconciled with each other as far as possible.

Our implementation of risk management at the operational level embraces the identification, analysis and assessment of all material risks. This provides a basis for risk reporting, the control of limits and monitoring.

Risk identification is performed by means of appropriate processes and indicators, which are complemented by expert opinions. Our process for early identification of risks also encompasses emerging risks, which we define as

potential trends or sudden events that are characterised by a high degree of uncertainty in terms of occurrence probability, expected loss amount, and possible effects on Munich Re.

As part of the risk analysis, a quantitative and qualitative assessment of all risks at consolidated Group level is made in order to take into account possible interactions between risks across all fields of business. Internal risk reporting provides the Board of Management with regular, detailed information on the risk situation, as regards the individual risk categories and the entire Group alike. This ensures that negative trends are identified in sufficient time for countermeasures to be taken. The purpose of our external risk reporting is to provide clients, shareholders and the supervisory authorities with a clear overview of the Group's risk situation. Actual risk limits are derived from the risk strategy: taking the defined risk appetite as a basis, limits, rules and any risk-reducing measures required are approved and implemented. We also have a comprehensive early-warning system that draws our attention to any potential shortages of capacity.

Quantitative risk monitoring based on indicators is carried out both centrally and within units. We monitor risks that cannot be expressed directly as an amount either centrally or in our units, depending on their materiality and allocation. The risk management system is regularly audited by Group Audit, external auditors and the Federal Financial Supervisory Authority (BaFin).

Significant risks

Our general definition of risk is possible future developments or events that could result in a negative deviation from the Group's prognoses or targets. We classify risks as "significant" if they could have a long-term adverse effect on Munich Re's assets, financial situation or profitability. We have applied this definition consistently to each business unit and legal entity, taking account of its individual risk-bearing capacity. In doing so, we differentiate between risks depicted in our internal model and other risks.

Risks depicted in the internal model

Solvency capital requirement - Internal model

Munich Re has a comprehensive internal model that determines the capital needed to ensure that the Group is able to meet its commitments even after extreme loss events. We use the model to calculate the capital required under Solvency II (the solvency capital requirement, or SCR).

The SCR is the amount of eligible own funds that Munich Re needs to have available, with a given risk tolerance, to cover unexpected losses in the following year. It corresponds to the value at risk of the economic profit and loss distribution over a one-year time horizon with a confidence level of 99.5%, and thus equates to the economic loss for Munich Re that, given unchanged exposures, will be exceeded each year with a statistical probability of 0.5%. Our internal model is based on

pecially modelled distributions for the risk categories property-casualty, life and health, market, credit and operational risks. We use primarily historical data for the calibration of these distributions, complemented in some areas by expert judgement. Our historical data covers a long period to take account of the one-year time horizon and to provide a stable and appropriate estimate of our risk parameters. We continue to take account of diversification effects we achieve through our broad spread across various

risk categories and the combination of primary insurance and reinsurance business. We also take into account dependencies between the risks, which can result in higher capital requirements than would be the case if no dependency were assumed. We then determine the effect of the loss absorbency of deferred taxes.

The table shows the solvency capital requirement for Munich Re and its risk categories as at 31 December 2019.

Solvency capital requirements (SCR)

	Reinsurance		ERGO		Diversification	
	31.12.2019	Prev. year	31.12.2019	Prev. year	31.12.2019	Prev. year
	€m	€m	€m	€m	€m	€m
Property-casualty	8,774	7,557	434	425	-375	-347
Life and health	5,525	4,527	1,215	1,116	-380	-356
Market	6,257	5,513	5,975	5,746	-2,152	-2,042
Credit	2,500	2,112	1,867	1,156	-161	-107
Operational risk	706	752	565	528	-220	-218
Other ¹	435	446	235	221		
Subtotal	24,197	20,907	10,291	9,192		
Diversification effect	-8,836	-7,764	-1,158	-1,985		
Tax	-2,793	-2,346	-787	-633		
Total	12,568	10,798	8,347	6,574	-3,383	-2,702

	Group			
	31.12.2019	Prev. year	€m	Change
	€m	€m	€m	%
Property-casualty	8,833	7,634	1,199	15.7
Life and health	6,359	5,288	1,071	20.3
Market	10,080	9,217	863	9.4
Credit	4,206	3,161	1,045	33.1
Operational risk	1,051	1,063	-12	-1.1
Other ¹	670	667	3	0.4
Subtotal	31,199	27,030	4,169	15.4
Diversification effect	-10,681	-9,912	-769	-7.8
Tax	-2,987	-2,448	-539	-22.0
Total	17,531	14,670	2,861	19.5

1 Capital requirements for other financial sectors, e.g. institutions for occupational retirement provision.

At Group level, the SCR increased slightly to €17.5bn compared with €14.7bn as at 31 December of the previous year. It was due to increases in almost all risk categories. The increase in the property-casualty category is mainly a consequence of further growth in business with natural hazard exposure in line with our business strategy. The SCR in life and health increased, mainly due to the fall in interest rates, movements in exchange rates and new business in life reinsurance. The main driver behind the increase in market risk is higher risk exposure in the reinsurance field of business and the effects of lower interest rates for the ERGO life insurance companies. The credit risk SCR is also rising as a consequence of lower interest rates, as the fair value of fixed-interest investments increases. This effect is more pronounced for the ERGO life insurance companies, as the fall in interest rates reduces the risk-mitigating effect of policyholders' bonuses. In comparison with the previous year, the mitigating effect of policyholders' participation in profits in the ERGO field of

business is now shown in full in the individual risk categories, whereby ceteris paribus the values in the risk categories are reduced. In contrast, the diversification effect takes account of the fact that the risk-mitigating funds are only available once to absorb losses. This year, when calculating solvency capital requirements, for the first time account was taken of the static volatility adjustment for DKV Belgium S.A., ERGO Insurance N.V. (Belgium), ERGO Lebensversicherung Aktiengesellschaft and Victoria Lebensversicherung Aktiengesellschaft.

Other information about the changes in the different risk categories and details about risk concentrations can be found in the following sections.

Property-casualty underwriting risk

The property-casualty risk category encompasses the underwriting risks in the property, motor, third-party liability, personal accident, marine, aviation and space,

and credit classes of insurance, together with special lines also allocated to property-casualty. Additional information on risks in property-casualty insurance can be found in the Notes to the consolidated financial statements on pages 167 ff.

Underwriting risk here is defined as the risk of insured losses being higher than our expectations. The premium and reserve risks are significant components of the underwriting risk. Premium risk is the risk of future claims payments relating to insured losses that have not yet occurred being higher than expected. Reserve risk is the risk of technical provisions established being insufficient to cover losses that have already been incurred. In measuring loss provisions, we follow a cautious reserving approach and assess uncertainties conservatively. In every quarter, we also compare notified losses with our loss expectancy, in order to sustain a high level of reserves.

We differentiate between large losses involving a cost exceeding €10m in one field of business, losses affecting more than one risk or more than one line of business (accumulation losses), and all other losses (basic losses). For basic losses, we calculate the risk of subsequent reserving being required for existing risks within a year (reserve risk) and the risk of under-rating (premium risk). To achieve this, we use actuarial methods that are based on standard reserving procedures, but take into account the one-year time horizon. The calibration for these methodologies is based on our own historical loss and run-off data. Appropriate homogeneous segments of our property-casualty portfolio are used for the calculation of the reserve and premium risks. To aggregate the risk to whole-portfolio level, we apply correlations that take account of our own historical loss experience.

We limit our risk exposure by setting limits not only for natural catastrophe risks, for example, but also for potential man-made losses. Our experts develop scientifically sound scenarios for possible natural events

that quantify the probability of occurrence and damage potential. Based on these scenarios, the potential effects on our portfolio are determined using stochastic models.

Our internal model considers the resulting accumulation-risk scenarios to be independent events. Munich Re's greatest natural hazard exposure lies in the scenarios "Atlantic Hurricane" and "Earthquake North America". Our estimates of exposure for the coming year to the peak scenarios for a return period of 200 years are €6.3bn (5.0bn) for Atlantic Hurricane and €5.9bn (4.9bn) for "Earthquake North America" (before tax, retained).

In addition to natural hazard risks, exposure to cyber risks has also increased once again year on year.

As well as analysing the stress scenarios, we also look at the sensitivity of results produced by the risk model for large and accumulation losses to changes in the return periods or loss amounts for events, or a change in the business volumes written. We also consider the effect of changes of dependency assumptions on the results.

Another measure for controlling underwriting risks is the targeted cession of a portion of our risks to other carriers via external reinsurance or retrocession. Most of our companies have intra-Group and/or external reinsurance and retrocession cover.

In addition to traditional retrocession, we use alternative risk transfer for natural catastrophe risks in particular. Under this process, underwriting risks are transferred to the capital markets via special purpose vehicles.

Solvency capital requirement – Property-casualty

The increase in capital requirements by 15.7% at Group level is mainly a consequence of the further increase in business exposed to natural hazards in the reinsurance field of business (including specialised primary insurance business) in line with our business strategy.

Solvency capital requirements (SCR) – Property-casualty

	Reinsurance		ERGO		Diversification	
	31.12.2019	Prev. year	31.12.2019	Prev. year	31.12.2019	Prev. year
	€m	€m	€m	€m	€m	€m
Basic losses	3,895	3,894	393	368	-243	-264
Large and accumulation losses	8,282	7,003	153	192	-108	-141
Subtotal	12,177	10,896	545	559		
Diversification effect	-3,403	-3,340	-111	-134		
Total	8,774	7,557	434	425	-375	-347

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	Group			
	31.12.2019	Prev. year	Change	
	€m	€m	€m	%
Basic losses	4,044	3,997	47	1.2
Large and accumulation losses	8,327	7,053	1,274	18.1
Subtotal	12,371	11,051	1,320	11.9
Diversification effect	-3,537	-3,417	-120	-3.5
Total	8,833	7,634	1,199	15.7

Life and health underwriting risk

The underwriting risk is defined here as the risk of insured benefits payable in life or health insurance business being higher than expected. Of particular relevance are biometric risks and policyholder-behaviour risks, such as lapses and lump-sum options. We differentiate between risks that have a short-term or long-term effect on our portfolio. In addition to the simple risk of random fluctuations resulting in higher claims expenditure in a particular year, the adverse developments with a short-term impact that we model notably include rare – but costly – events such as pandemics. More information on the risks in life and health business can be found in the Notes to the consolidated financial statements on pages 165 ff.

Life primary insurance products in particular, and a large part of our health primary insurance business, are long term in nature, and the results they produce are spread over the entire duration of the policies. This can mean that negative developments in risk drivers with long-term effects sustainably reduce the value of the insurance portfolio (trend risks). The risk drivers mortality and disability are dominated by the reinsurance field of business, particularly by exposure in North America and the Asia-Pacific region. The longevity risk driver can be found in the products marketed by ERGO in Germany, together with typical risks related to policyholder behaviour, such as the lapse risk, but above all we also underwrite longevity risk in the reinsurance field of business, especially in the United Kingdom. To a lesser extent, risks connected with the increase in treatment costs arise in the ERGO field of business in particular.

Risk modelling attributes probabilities to potential modified assumptions, and produces a complete profit and loss distribution. We use primarily historical data extracted from our underlying portfolios to calibrate these probabilities, and additionally apply general mortality rates for the population to model the mortality trend risk. To enable us to define appropriate parameters for the modelling of the

range of areas in which we operate, portfolios with a homogeneous risk structure are grouped together. We then aggregate the individual profit and loss distributions taking account of the dependency structure to obtain an overall distribution.

Our largest short-term accumulation risk in the life and health risk category is a severe pandemic. We counter this risk by examining our overall exposure in detail using scenario analysis, and by defining appropriate measures to manage the risks.

In reinsurance, we control the assumption of biometric risks by means of a risk-commensurate underwriting policy. Interest-rate and other market risks are frequently ruled out by depositing the provisions with the cedant, with a guaranteed rate of interest from the deposit. In individual cases, these risks are also hedged by means of suitable capital-market instruments. We also limit our exposure to individuals and groups of persons in life insurance.

For primary insurance, substantial risk minimisation is achieved through product design. In case of adverse developments, parts of the provision for premium refunds – which are recognised and reversed in profit or loss – are of great significance for risk-balancing. In health primary insurance, most long-term contracts include the possibility and/or obligation to adjust premiums. Practically, however, there are limits to the resilience of policyholders.

Limits are laid down for the pandemic scenarios, which affect the portfolio in the shorter term, and the longevity scenarios with their longer-term effect in conformity with the risk strategy. We continue to analyse the sensitivity of the internal model to the input parameters on a regular basis. This relates to the interest rate, the biometric risk drivers and customer behaviour.

Solvency capital requirement – Life and health

In the reinsurance field of business, the increase in solvency capital requirements is mainly due to lower interest rates, the depreciation of the euro against

main currencies, and new business. In the ERGO field of business, lower euro interest rates result in a slight increase in solvency capital requirements.

Solvency capital requirements (SCR) – Life and health

	Reinsurance		ERGO		Diversification		Group	
	31.12.2019	Prev. year	31.12.2019	Prev. year	31.12.2019	Prev. year	31.12.2019	Prev. year
	€m	€m	€m	€m	€m	€m	€m	€m
Health	304	292	602	517	-51	-42	855	766
Mortality	4,025	3,331	247	241	-16	-16	4,255	3,555
Disability	2,970	2,373	418	313	-22	-15	3,366	2,671
Longevity	985	813	641	722	-26	-24	1,600	1,511
Other	484	290					484	290
Diversification	-3,242	-2,571	-694	-676			-4,200	-3,506
Total	5,525	4,527	1,215	1,116	-380	-356	6,359	5,288

Market risk

We define market risk as the risk of economic losses resulting from price changes in the capital markets. It includes equity risk, general interest-rate risk, specific interest-rate risk, property-price risk and currency risk. The general interest-rate risk relates to changes in the basic yield curves, whereas the specific interest-rate risk arises from changes in credit risk spreads – for example, on euro government bonds from various issuers, or on corporate bonds. We also include in market risk the risk of changes in inflation rates and implicit volatilities (cost of options). Fluctuations in market prices affect not only our investments, but also the underwriting liabilities – especially in life insurance. Due to the long-term interest-rate guarantees given in some cases and the variety of options granted to policyholders in traditional life insurance, the amount of the liabilities can be highly dependent on conditions in the capital markets.

Market risks are modelled by means of Monte Carlo simulation of possible future market scenarios. We revalue our assets and liabilities for each simulated market scenario, thus showing the probability distribution for changes to basic own funds.

We use appropriate limit and early-warning systems in our asset-liability management to manage market risks. Derivatives such as equity futures, options and interest-rate swaps – which are used mainly for hedging purposes – also play a role in our management of the risks. The impact of options is taken into account in the calculation of solvency capital requirements. Information on derivative financial instruments can be found in the Notes to the consolidated financial statements on pages 140 ff.

Solvency capital requirements (SCR) – Market

	Reinsurance		ERGO		Diversification	
	31.12.2019	Prev. year	31.12.2019	Prev. year	31.12.2019	Prev. year
	€m	€m	€m	€m	€m	€m
Equity risk	2,792	2,433	1,479	1,169	-109	-50
General interest-rate risk	1,549	1,194	2,800	3,362	-1,338	-891
Specific interest-rate risk	1,623	1,381	3,081	2,530	-632	-692
Property risk	1,540	1,442	758	787	-55	-91
Currency risk	4,457	3,633	232	220	-59	-80
Subtotal	11,962	10,084	8,348	8,068		
Diversification effect	-5,080	-4,572	-1,469	-2,321		
Total	6,257	5,513	5,975	5,746	-2,152	-2,042

	Group			
	31.12.2019	Prev. year	Change	
	€m	€m	€m	%
Equity risk	4,162	3,552	610	17.2
General interest-rate risk	3,012	3,664	-652	-17.8
Specific interest-rate risk	4,071	3,220	851	26.4
Property risk	2,243	2,138	105	4.9
Currency risk	4,630	3,773	857	22.7
Subtotal	18,118	16,348	1,770	10.8
Diversification effect	-6,682	-7,131	449	6.3
Total	10,080	9,217	863	9.4

Solvency capital requirement – Market

Equity risk

The higher equities exposure after derivatives of 6.4% compared with the previous year (5.2%) was reflected in a rise in the solvency capital requirement.

Interest-rate risk

The rise in the general and specific interest-rate risk in the reinsurance field of business was the result of an increased interest-rate exposure due to a lower degree of matching maturities between investments and liabilities, and a moderate increase in credit risk exposure. As the interest-rate exposure of reinsurance runs contrary to that of ERGO, this has a risk-minimising effect at Group level.

In the ERGO field of business, the change in reporting of the effect of policyholders' participation in profits and the introduction of static volatility adjustment will lead initially ceteris paribus to a reduction in the market risk figures. In specific interest-rate risk, this effect is overcompensated by the fact that the available risk buffers in the life units are reduced by the general decline in interest rates, leaving more specific interest-rate risk with the shareholder.

In the reinsurance field of business, the market value of interest-sensitive investments as at 31 December 2019 was €71.0bn (€67.8bn). Measured in terms of modified duration, the interest-rate sensitivity of those investments was 6.5 (5.0), while the modified of the liabilities¹ was 6.3 (5.8). A decrease in interest rates of one basis point would increase available own funds by ca. €11.8m (4.0m).

In the ERGO field of business, the fair value of interest-sensitive investments was €134.4bn (127.8bn). The modified duration was 9.4 (8.8) for interest-sensitive investments and 10.1 (9.2) for liabilities. A decrease in interest rates of one basis point would decrease available own funds by approximately €12.5m (7.6m). This resulted in exposure to falling interest rates arising mainly out of the long-term options and guarantees in life insurance business.

Property risk

As a consequence of increases in market values of our property portfolio, property risk is increasing.

Currency risk

The currency risk is rising, primarily due to an increase in US dollar positions.

¹ The liabilities mainly refer to technical provisions under Solvency II (best estimate and risk margin).

Credit risk

We define credit risk as the financial loss that Munich Re could incur as a result of a change in the financial situation of a counterparty. In addition to credit risks arising out of investments in securities and payment transactions with clients, we actively assume credit risk through the writing of credit and financial reinsurance and in corresponding primary insurance business.

Munich Re determines credit risks using a portfolio model, which is calibrated over a longer period (at least one full credit cycle), and which takes account of both changes in fair value caused by rating migrations and debtor default. The credit risk arising out of investments (including deposits retained on assumed reinsurance, government bonds and credit default swaps – CDSs) and reserves ceded is calculated by individual debtor. If the credit risk does not exclusively depend on the debtor's creditworthiness, but also on other factors (such as subordination, guarantees or collateralisation), these are also taken into account. We use historical capital-market data to determine the associated migration and default probabilities. Correlation effects between debtors are derived from the sectors and countries in which they operate, and sector and country correlations are based on the interdependencies between the relevant stock indices. The calculation of the credit risk in "other receivables" is based on internal expert assessments. We also capitalise the credit risk for highly rated government bonds. Information on the ratings of the fixed-interest securities and loans can be found in the Notes to the consolidated financial statements on pages 138 ff.

Risk concentrations are mainly in government bonds issued by countries inside and outside the European Union. In addition, pfandbriefs and similar covered bonds account for a large proportion of the investments. These partly result in issuer risk, and partly in risks related to the assets belonging to the cover pool.

We use a cross-balance-sheet counterparty limit system valid throughout the Group to monitor and control our Group-wide credit risks. The limits for each counterparty (a group of companies or country) are based on its financial situation as determined by the results of our fundamental analyses, ratings and market data, and the risk appetite defined by the Board of Management. The utilisation of limits is calculated on the basis of credit-equivalent exposure (CEE). There are also volume limits for securities lending and repurchase transactions. Group-wide rules for collateral management – for example, for over-the-counter (OTC) derivatives and catastrophe bonds issued – enable the associated credit risk to be reduced. Exposure to issuers of interest-bearing securities and CDSs in the financial sector is limited by a financial sector limit at Group level.

In monitoring the country risks, we do not simply rely on the usual ratings, but perform independent analyses of the political, economic and fiscal situation in the most important of the countries issuing paper in which we might potentially invest. On this basis, and taking account of the investment requirements of the fields of business in the respective currency areas and countries, limits or action to be taken are approved. These are mandatory throughout the Group for investments and the insurance of political risks.

With the help of defined stress scenarios, our experts forecast potential consequences for the financial markets, the fair values of our investments, and the present values of our underwriting liabilities. At Group level, we counter any negative effects with the high degree of diversification in both our investments and our liability structure, and with our active Group-wide asset-liability management.

We manage credit default risk in retrocession and external reinsurance with the assistance of limits determined by the Retro Security Committee. Our reserves ceded to reinsurers were assignable to the following rating categories as at 31 December:

Ceded share of technical provisions according to rating

%	31.12.2019	Prev. year
AAA	0.6	0.0
AA	21.9	27.8
A	36.6	31.2
BBB and lower	6.8	8.5
No rating available	34.1	32.6

Further information on the risks arising out of receivables relating to insurance business can be found in the Notes to the consolidated financial statements on page 142.

Solvency capital requirement – Credit

In comparison with the previous year, credit risk rose by €1,045m to €4,206m. This was mainly driven by the fall in interest rates, which duly increased the credit risk SCR due to increases in the fair value of fixed-interest securities. This effect is more pronounced for the ERGO life insurance companies, as the fall in interest rates reduces the risk-mitigating effect of policyholders' bonuses.

The sensitivities in the credit risk model are regularly checked against the most important input parameters. This primarily concerns the recovery rates from insolvent debtors, the probabilities of debtor migration between rating classes, and the parameters for correlations between debtors. All validations demonstrated the appropriateness of the modelling approaches used.

Operational risk

We define operational risk as the risk of losses resulting from inadequate or failed internal processes, incidents caused by the actions of personnel or system malfunctions, or external events. This includes criminal acts committed by employees or third parties, insider trading, infringements of antitrust law, business interruptions, inaccurate processing of transactions, non-compliance with reporting obligations, and disagreements with business partners.

Operational risks are managed through our internal control system (ICS). It addresses Group management requirements, while complying with local regulations. Appropriate measures – up to and including larger projects – are used to correct identified weaknesses or mistakes. The identification of risks that are significant from a Group perspective is covered by our ICS, and these risks are reviewed by the risk carriers and process owners on a regular basis. Furthermore, the design of the ICS and compliance with the system is regularly reviewed by Group Audit.

A key component of the ICS lies in ensuring the reliability of annual financial statements at both consolidated and solo-undertaking level, and the identification, management and control of risks arising out of the accounting process. The Group has established an accounting manual and a system providing regular information on changes to rules applied throughout the Group. Financial accounting and reporting are subject to materiality thresholds to ensure that the cost of the internal controls performed is proportionate to the benefits derived. The risks that are significant from a Group perspective for our financial reporting are covered by the ICS and are reviewed by the risk carriers on a regular basis.

We use scenario analyses to quantify operational risks. The results are fed into the modelling of the solvency capital requirement for operational risks and are validated using various sources of information, such as the ICS and internal and external loss data.

The sensitivity in the internal model is regularly checked against the most important input parameters. This mainly relates to the dependence of the result on frequency and loss amounts and the parameters for the correlations between scenarios. The analyses showed no anomalies in the year under review.

Solvency capital requirement – Operational risk

The SCR requirement for operational risk as at 31 December 2019 was €1,051m, slightly lower than in the previous year.

Other risk categories

We use appropriate procedures to specifically identify and analyse reputational risk, strategic risk, security risk and liquidity risk. These risks are also assessed and managed in our risk management process.

Reputational risk

We define reputational risk as the risk of damage to Munich Re's reputation as a consequence of a negative public image resulting in a deterioration in its credit rating, corporate value, etc. The reputational-risk aspect of relevant issues is assessed in the fields of business by "Reputational Risk Committees". Where a reputational risk could potentially have an impact on Munich Re, central divisions at Group level are involved in the assessment.

Strategic risk

We define strategic risk as the risk of making wrong business decisions, implementing decisions poorly, or being unable to adapt to changes in the operating environment. Existing and new potential for success in the Group and the fields of business in which it operates creates strategic risks, which we manage by carrying out risk analyses for significant strategic issues and regularly monitoring the implementation of measures deemed necessary. The Chief Risk Officer is involved in operational business planning and the processes for significant company mergers and acquisitions.

Security risk

We define security risks as risks resulting from threats to the security of our employees, data, information, and property. We are intensifying our analysis of cyber risks in particular in recognition of the increasing importance of information technology for Munich Re's core processes and the dynamic growth of cyber crime.

Security risk committees have been set up in the fields of business to steer and coordinate measures aimed at managing security risks. The members of the security risk committees are managers from operational units (e.g. IT Security), the control functions (for example, risk management, the Information Security Officer, data protection) and representatives of the divisional units and central divisions. The role of Group Chief Information Security Officer with central and Group-wide responsibility for information security has been created to strengthen the risk management function in this area.

To further improve cyber security, we are working on initiatives both specific to and across the fields of business to ensure a level of protection in line with our information security strategy. Additional expansion of human resources in cyber security is also envisaged.

Liquidity risk

Our objective in managing liquidity risk is to ensure that we are in a position to meet our payment obligations at all times. To guarantee this, the liquidity position at our units is continuously monitored and subject to stringent requirements for the availability of liquidity. The short-term and medium-term liquidity planning is submitted to the Board of Management on a regular basis.

The medium-term strategic build-up of more illiquid investments (such as infrastructure investments) is leading to a gradual switch from liquid funds to illiquid assets, which has already been taken into account for the planned investments in the liquidity planning.

The liquidity risk is managed within the framework of our holistic risk strategy, with the Board of Management defining limits on which minimum liquidity requirements for our operations are based. These risk limits are reviewed annually, and compliance with the minimum requirements is continuously monitored. Using quantitative risk criteria, we ensure that Munich Re has sufficient liquidity available to meet its payment obligations even under adverse scenarios, with the liquidity position being assessed both for insurance catastrophe scenarios and for adverse situations in the capital markets.

Further information on liquidity risks in life and health insurance business and in property-casualty business can be found in the Notes to the consolidated financial statements on pages 165 ff. and 167 ff.

Solvency ratio under Solvency II

The solvency ratio under Solvency II is the ratio of the eligible own funds to the solvency capital requirement.

Solvency II ratio¹

		31.12.2019	Prev. year	Change
Eligible own funds ²	€m	41,544	35,995	5,549
Solvency capital requirement	€m	17,531	14,670	2,861
Solvency II ratio	%	237.0	245.4	

- 1 Eligible own funds excluding the application of transitional measures for technical provisions; including the application of transitional measures for technical provisions, the own funds amounted to €48.1bn (€43.2bn); Solvency II ratio: 274% (295%).
- 2 Economic earnings increased the eligible own funds as at the reporting date by a total of around €7.4bn. At the same time, the dividend approved by the Board of Management and proposed to the Annual General Meeting for the 2019 financial year and the potential 2019/2020 share buy-back had a reducing effect of approximately €2.4bn. There is also a further €0.5bn for other measures.

The eligible own funds as at the balance sheet date take into account deductions for the dividend agreed by the Board of Management and proposed to the Annual General Meeting for the 2019 financial year of €1.4bn, and purchases not yet made under the share buy-back programme for 2019/2020 in the amount of €339m. In order to make the effects of potential further capital measures on the Solvency II ratio transparent to financial statement users, we further recognise a possible share buy-back programme for 2020/2021 in the amount of €1bn.

Other risks

Economic and financial-market developments and regulatory risks

Munich Re is heavily invested in the eurozone, and in reinsurance in particular in the US dollar currency area. We attach importance to maintaining a correspondingly broad diversification of investments to cover our technical provisions and liabilities. However, low interest rates continue to pose major challenges, in particular for life insurance companies in the eurozone. We take various risk management measures to counter fluctuations in the capital markets that can lead to volatilities in the Company's own funds.

The further course of the trade dispute between the USA and China and the threat of a possible pandemic in connection with the Coronavirus currently represent significant risk factors for global economic development. Slower global growth would pose new challenges for export-dependent countries, especially many emerging markets. In geopolitical terms, the focus remains on the large number of major conflicts and trouble spots which – if they escalate – could have perceptible consequences not only at a regional level, but also globally. These include the conflict between the USA and North Korea, the various crises in the Middle East, and a possible intensification of the USA's confrontation with Iran or Russia. With respect to global capital markets, each of these crises has the potential to dramatically increase uncertainty and volatility, at least in the short term.

In the medium term, there is also a risk of a split in the global technological and economic space driven by the geopolitical conflict between China and the USA. We constantly analyse the potential impact that developments of this sort may have on our risk profile.

A number of political risks persist in the eurozone, including those resulting from the conflict of national interests. In Italy, refinancing costs have fallen significantly since the change of government in 2019, and the new government seems willing to compromise to pursue an EU-friendly course. In addition, the European Central Bank has reduced potential tensions by further relaxing monetary policy. A return to a tighter monetary policy – for example, due to an unexpectedly rapid rise in inflation – could lead to higher borrowing costs for Italy and some other countries. Higher credit spreads and possible falls in ratings would lead to corresponding falls in market values for the bonds of the affected countries.

The exit negotiations between the EU and the United Kingdom have been concluded, and the United Kingdom officially left the EU on 31 January 2020. A transition phase has come into force until the end of 2020, by which time the negotiations concerning the future relationships between the EU and the United Kingdom should be concluded – with a special focus on trading relationships. As the UK has so far strictly refused to accept that there may be an extension of the transition phase, there is a risk that negotiations will not be concluded in time and that trade between the two regions will be on the basis of WTO rules as from 2021. This would imply a significant deterioration of the status quo, with corresponding consequences for the individual EU countries. A number of Munich Re insurance and reinsurance units conduct business in the United Kingdom, and the UK's departure from the EU will have implications for that business. We have adapted our local organisations to the direct effects of Brexit. These preparation measures will enable Munich Re to continue to write business in the UK, regardless of the outcome of the negotiations. In addition, there may be indirect effects on our business – for instance, owing to negative economic development, wider fluctuations in exchange rates or rising inflation. As things stand at present we do not expect any significant negative direct or indirect effects overall on Munich Re's assets, liabilities, financial position or results.

In Germany, government action with implications for private health insurance cannot be ruled out, especially if political parties advocating a "citizens' insurance scheme" influence the policies of a future Federal Government. At the present time, however, it is not possible to predict what these implications might be.

Global players such as Munich Re are subject to increased fiscal pressure nationally and internationally, as well as a higher audit intensity. This trend is likely to become even stronger given the political spotlight on the taxation of international enterprises.

Climate change

Climate change represents one of the greatest long-term risks of change for the insurance industry. We expect climate change to lead to a lasting increase in extreme weather events, affecting natural hazard risks. Our risk-management competence built up over many years, the consideration of findings from current climate research and our highly developed risk models allow us to professionally assess these altered natural hazard risks and to adequately account for these risks in the solvency capital requirement as well as in contract wording and pricing. In addition to the physical risks arising out of climate change, our analyses increasingly look at how risks are changing as the transition to low-carbon economies proceeds, due to the replacement of carbon-based energy technologies, for example (transitional risks). We are also closely monitoring developments of direct and indirect climate liability risks. For example, claims for damages as a consequence of greenhouse gas emissions could be recognised in court – for instance, in connection with rising sea levels on coasts.

Legal risks

As part of the normal course of business, Munich Re companies are involved in court, regulatory and arbitration proceedings in various countries. The outcome of pending or impending proceedings is neither certain nor predictable. However, we believe that none of these proceedings will have a significant negative effect on the financial position of Munich Re.

Summary

In accordance with the prescribed processes, our Board committees explicitly defined the risk appetite for significant risk categories in the year under review, and quantified it with key figures. We determined and documented the risk appetite across the Group hierarchy and communicated it throughout the Group. During the whole of 2019, risk exposures were regularly quantified and compared with the risk appetite. We assess Munich Re's risk situation to be manageable and under control.