

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 Group 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 Chief Risk Officer.

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. The risk strategy is approved by the Board of Management, and discussed with both the Audit Committee of the Supervisory Board and the full 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. At Munich Re, the early identification of risks is primarily operationalised using the emerging risk process. We define emerging risks as new or sudden trends or events that are characterised by a high degree of uncertainty in terms of occurrence probability, expected loss amount, and/or 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 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.

Significant risks

Our general definition of risk is possible future developments or events that could result in a negative prognosis or a negative deviation from the Group's 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. The assessment of whether a risk is significant or not for a company according to the above definition is performed in the responsible risk management functions. The assessment of risks is based on economic principles. We make a basic distinction between risks included in our internal model and covered by risk-based capital and other risks not quantified in the internal model. The risks included in the internal model are divided into the following risk categories: underwriting risk in property-casualty business, underwriting risk in life and health business, market risk, credit risk and operational risk. Sustainability risks can affect all of these risk categories and are therefore an integral part of the management of these 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 specially 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 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 2021.

Solvency capital requirements (SCR)

	Reinsurance		ERGO		Diversification	
	31.12.2021	Prev. year	31.12.2021	Prev. year	31.12.2021	Prev. year
	€m	€m	€m	€m	€m	€m
Property-casualty	11,014	9,306	639	559	-484	-452
Life and health	6,470	6,082	1,360	1,332	-397	-418
Market	7,052	5,617	6,496	6,635	-2,065	-1,522
Credit	2,510	2,762	1,903	2,614	-88	-167
Operational risk	830	796	618	648	-246	-259
Other ¹	459	466	357	313		
Subtotal	28,334	25,029	11,374	12,102		
Diversification effect	-10,281	-9,283	-1,594	-1,235		
Tax	-2,958	-2,989	-1,126	-902		
Total	15,095	12,758	8,653	9,965	-3,209	-3,543

	Group			
	31.12.2021	Prev. year	Change	
	€m	€m	€m	%
Property-casualty	11,169	9,413	1,756	18.7
Life and health	7,434	6,996	438	6.3
Market	11,483	10,730	753	7.0
Credit	4,325	5,210	-885	-17.0
Operational risk	1,202	1,186	16	1.3
Other ¹	816	779	37	4.7
Subtotal	36,428	34,314	2,114	6.2
Diversification effect	-12,332	-11,737	-595	-5.1
Tax	-3,556	-3,396	-160	-4.7
Total	20,540	19,180	1,360	7.1

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

The SCR at Group level increased by 7.1% to €20.5bn compared with €19.2bn as at 31 December of the previous year. This increase was mainly driven by further business growth in property-casualty business and life reinsurance. This was reinforced by the appreciation of the US dollar. The market risk was up owing to a moderately higher equity-backing ratio and currency translation effects. The credit risk decreased year on year chiefly on account of the global rise in interest rates. Other information about the

changes in individual 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. Further risk-relevant

information on property-casualty business can be found in the Notes to the consolidated financial statements under (40) Disclosures on risks from property-casualty insurance business.

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 coverage 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. In addition to natural catastrophes, we include other accumulation risks such as cyber and pandemics, using special models.

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 €8.2bn (6.7bn) for Atlantic Hurricane and €6.9bn (6.0bn) for Earthquake North America (before tax, retained).

As part of our regular validation, we look in particular 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. We regularly adapt our models on the basis of the findings from our validation. In this year's cycle, we took into account the findings from the coronavirus pandemic, for instance in our modelling of certain classes of insurance (especially event cancellation and business interruption) within the pandemic risk model for property-casualty business.

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/or 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 solvency capital requirement increased by around 18.7% at Group level. This reflects continued growth, particularly in US reinsurance business with natural hazard exposure. The appreciation of the US dollar further reinforced the increase.

Solvency capital requirements (SCR) – Property-casualty

	Reinsurance		ERGO		Diversification	
	31.12.2021	Prev. year	31.12.2021	Prev. year	31.12.2021	Prev. year
	€m	€m	€m	€m	€m	€m
Basic losses	4,486	3,948	566	507	-378	-330
Large and accumulation losses	10,532	8,892	360	240	-299	-184
Subtotal	15,018	12,840	926	747		
Diversification effect	-4,004	-3,534	-286	-188		
Total	11,014	9,306	639	559	-484	-452

	Group			
	31.12.2021	Prev. year	Change	
	€m	€m	€m	%
Basic losses	4,674	4,124	550	13.3
Large and accumulation losses	10,593	8,949	1,644	18.4
Subtotal	15,267	13,073	2,194	16.8
Diversification effect	-4,098	-3,660	-438	-12.0
Total	11,169	9,413	1,756	18.7

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. To this end, we model losses and the sum at risk, in particular taking into consideration excess mortalities in connection with the pandemics of the 20th and 21st centuries. We validated our pandemic risk model for life and health business on the basis of the findings from the COVID-19 pandemic. The losses incurred thus far are consistent with the model.

Further relevant information on the risks in life and health insurance can be found in the Notes to the consolidated financial statements under (39) Disclosures on risks from life and health insurance business.

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 life and health reinsurance segment, particularly by exposure in North America and the Asia-Pacific region. We also underwrite longevity risk in the life and health reinsurance segment, especially in the United Kingdom. The longevity risk driver can additionally be found in the products marketed by ERGO in Germany, together with typical risks related to policyholder behaviour, such as the lapse risk. To a lesser extent, we write risks

connected with the increase in treatment costs, which arise in the ERGO field of business in particular.

Risk modelling attributes probabilities to potential modified assumptions. 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 and individual comprehensive profit and loss distributions determined. We then aggregate these 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 for the longevity scenarios and their longer-term effects 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

The solvency capital requirement increased by 6.3% at Group level. The SCR was up in the reinsurance field of business, mainly on account of business growth, with interest-rate and currency translation effects balancing each other out. In the ERGO field of business, the solvency capital requirement largely remained unchanged.

Solvency capital requirements (SCR) - Life and health

	Reinsurance		ERGO		Diversification		Group	
	31.12.2021	Prev. year	31.12.2021	Prev. year	31.12.2021	Prev. year	31.12.2021	Prev. year
	€m	€m	€m	€m	€m	€m	€m	€m
Health	255	247	833	713	-55	-61	1,033	899
Mortality	4,775	4,544	197	223	-12	-15	4,960	4,753
Disability	3,672	3,362	380	445	-20	-30	4,031	3,777
Longevity	1,284	1,214	636	662	-30	-30	1,890	1,846
Other	446	524					446	524
Diversification	-3,963	-3,809	-685	-710			-4,927	-4,802
Total	6,470	6,082	1,360	1,332	-397	-418	7,434	6,996

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 models 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 primary 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 derivatives is taken into account in the calculation of solvency capital requirements. Further information on derivative financial instruments can be found in the Notes to the consolidated financial statements, (8) Other securities at fair value through profit or loss and insurance-related investments.

Solvency capital requirements (SCR) - Market

	Reinsurance		ERGO		Diversification	
	31.12.2021	Prev. year	31.12.2021	Prev. year	31.12.2021	Prev. year
	€m	€m	€m	€m	€m	€m
Equity risk	2,997	2,437	2,806	1,692	-151	-55
General interest-rate risk	1,760	1,515	1,540	2,500	-684	-920
Specific interest-rate risk	1,648	1,824	3,114	3,829	-777	-617
Property risk	1,610	1,591	948	845	-108	-87
Currency risk	4,907	3,364	218	177	-12	-108
Subtotal	12,922	10,731	8,627	9,043		
Diversification effect	-5,870	-5,114	-2,131	-2,408		
Total	7,052	5,617	6,496	6,635	-2,065	-1,522

	Group			
	31.12.2021	Prev. year	Change	
	€m	€m	€m	%
Equity risk	5,652	4,074	1,578	38.7
General interest-rate risk	2,616	3,094	-478	-15.4
Specific interest-rate risk	3,985	5,037	-1,052	-20.9
Property risk	2,450	2,350	100	4.3
Currency risk	5,113	3,433	1,680	48.9
Subtotal	19,816	17,988	1,828	10.2
Diversification effect	-8,333	-7,257	-1,076	-14.8
Total	11,483	10,730	753	7.0

Solvency capital requirement - Market

The solvency capital requirement increased by 7.0% at Group level. Detailed information on the changes in the individual subcategories is available in the following sections.

Equity risk

The year-on-year increase in the equity-backing ratio from 6.0% to 7.7% (after derivatives) was reflected in a material rise in the equity risk.

Interest-rate risk

The moderate increase in the general interest-rate risk in the reinsurance field of business was a consequence of the change in interest-rate exposure in the main currencies. The specific interest-rate risk fell owing to somewhat lower exposure to fixed-interest securities with credit risk exposure, which was partly attributable to increased interest-rate levels.

The interest-rate risks in the ERGO field of business were down, mainly owing to increased interest-rate levels and to a slightly more balanced interest-rate exposure within this field of business.

In the reinsurance field of business, the market value of interest-sensitive investments as at 31 December 2021 was €77.1bn (73.5bn). Measured in terms of modified duration, the interest-rate sensitivity of those investments was 6.0 (6.6), while that of the liabilities was 6.4 (6.7). A decrease in interest rates of one basis point led to a change in available own funds amounting to around €7.9m (11.0m).

In the ERGO field of business, the fair value of interest-sensitive investments was €130.0bn (139.6bn). The modified duration was 9.6 (10.1) for interest-sensitive investments and 9.3 (10.3) for liabilities. A decrease in interest rates of one basis point led to a change in available own funds amounting to around €0.0m (-5.6m).

Property risk

The property risk rose owing to acquisitions and increases in the market values of our property portfolio.

Currency risk

The currency risk increased, primarily due to higher US dollar positions.

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 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, or 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 ratings can be found in the Notes to the consolidated financial statements, (6) Loans ff.

Risk concentrations are mainly in government bonds issued by countries inside and outside the European Union. In addition, corporate bonds, pfandbriefe and similar covered bonds account for a large proportion of the investments.

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 risk-weighted exposures. There are also volume limits for securities lending and repurchase transactions. Group-wide rules for collateral management – for example, for over-the-counter derivatives and catastrophe bonds issued – reduce the resultant credit risk.

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 countries issuing bonds in which Munich Re is most heavily invested. 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 our investments and our liability structure, and with our active Group-wide asset-liability management.

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.

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 2021:

Ceded share of technical provisions according to rating

%	31.12.2021	Prev. year
AAA	4.7	3.2
AA	14.5	24.5
A	49.1	41.3
BBB and lower	5.4	7.2
No rating available	26.2	23.7

Further information on the risks arising out of receivables relating to insurance business can be found in the Notes to the consolidated financial statements, (12) Other receivables.

Solvency capital requirement – Credit

The solvency capital requirement decreased by 17.0% at Group level. The reduction was mainly attributable to higher interest rates, as a result of which the market values of fixed-interest securities fell. This increased the risk buffers available to our life insurance companies, leaving less credit risk with Munich Re.

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 operational risk control system (ORCS), which represents the core element of the internal control system. It addresses not only the requirements relevant for the Group but also the respective local regulations. The identification of operational risks that are significant from a Group perspective is covered by the ORCS and these risks are reviewed and assessed by the risk carriers and process owners on a regular basis. Appropriate measures – up to and including larger projects – are used to correct identified weaknesses. The continued adequacy and effectiveness of the internal control system is regularly reviewed by Group Audit.

A key component of the internal control system 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 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 part of the regular risk and control self-assessments performed by the responsible risk carriers.

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 ORCS findings and both 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

At Group level, the solvency capital requirement increased slightly by 1.3% owing to updated assessments in selected scenarios.

Other risk categories

As is typical throughout the industry and in accordance with regulatory requirements, the risk types specified below are not explicitly capitalised in our internal model. Qualitative risk management is very important for dealing with these risks.

Reputational risk

We define reputational risk as the risk of loss that may result from a deterioration in the Group's public image among clients, shareholders or other parties. Our reputation is affected by our behaviour in a number of areas, such as client relationships, product quality, corporate governance, earnings power, our treatment of employees and corporate responsibility. Reputational risk is closely intertwined with all other risk categories. The assessment of individual business transactions in terms of their reputational risk is performed at field-of-business level 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. We identify strategic risks in particular using our emerging risk process. In addition, strategic risks must be evaluated by the responsible departments (for instance in underwriting or the investment area). This is done in the context of proposals submitted to the competent bodies or the Board of Management for decision. We manage strategic risk by carrying out risk analyses for significant strategic issues and regularly monitoring the implementation of measures deemed necessary. The Group CRO is involved in both the strategic and operational business planning as well as in significant company sales, 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 recognition of the increasing importance of information technology for Munich Re's core processes and the dynamic environment of cyber crime.

The Group CISO, a function that is assigned to risk management, is responsible for the central and Group-wide coordination and control of all activities involving information security risks. Security risk committees have also been set up in the fields of business to assess and manage 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, information security, data protection) and representatives of the divisional units and central divisions.

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.

Further information can be found in the non-financial statement, in the section "Responsible digital transformation, data protection and cyber security".

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 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 extreme insurance scenarios and for adverse situations in the capital markets.

Further information on liquidity risks in life and health and property-casualty insurance business can be found in the Notes to the consolidated financial statements, (39) Disclosures on risks from life and health insurance business, and (40) Disclosures on risks from property-casualty insurance business.

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

		31.12.2021	Prev. year	Change
Eligible own funds ²	€m	46,626	39,919	6,707
Solvency capital requirement	€m	20,540	19,180	1,360
Solvency II ratio	%	227.0	208.1	

- 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 €52.2bn (€46.1bn); Solvency II ratio: 254% (240%).
- 2 Positive economic earnings increased the eligible own funds as at the reporting date by a total of €8.1bn. While the dividend approved by the Board of Management and proposed to the Annual General Meeting for the 2021 financial year reduced the eligible own funds by €1.5bn, the repayment and issue of a subordinated bond did not lead to any material change in the eligible own funds overall. In total, eligible own funds increased in the 2021 financial year. An amount of €0.1bn for other measures was also recognised.

The eligible own funds as at the balance sheet date take into account deductions for the dividend of €1.5bn agreed by the Board of Management and proposed to the Annual General Meeting for the 2021 financial year.

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 with guaranteed minimum interest rates in the eurozone. We take various risk management measures to counter fluctuations in the capital markets that can lead to volatilities in the Group's own funds.

The global economy has largely recovered from the coronavirus pandemic. However, virus mutations may result in setbacks, including in the capital markets. Massive changes in demand and supply structure, in addition to ongoing supply-chain difficulties, have also led to strong price increases, in particular in the energy sector, where they were recently aggravated by geopolitical and climate policy developments. If these increases persist, negative real-income effects and a more restrictive monetary policy may significantly slow the global economy, entailing company insolvencies and adverse consequences for both labour and capital markets. Country credit profiles have continued to worsen as a result of fiscal measures taken in connection with the pandemic. Moreover, rising prices could contribute to social upheavals and political uncertainty.

In geopolitical terms, the focus is on the military conflict between Russia and Ukraine. This may lead to an intensification of the conflict between the USA and Russia and threatens to break up the European peace order. The sanctions imposed on Russia by the Western community of values may have severe repercussions for entire economies. With respect to global capital markets, this crisis in particular has the potential to dramatically increase uncertainty and volatility. In the area of investment, Munich Re could experience direct financial effects from direct investments in Russian or Ukrainian government or corporate bonds. In the insurance area, the main exposures will be from covering political risks as well as from trade credit reinsurance and structured credit reinsurance. In addition, the large number of other major conflicts and trouble spots (possible intensification of the USA's confrontation with Iran for example) could – if they escalate – have perceptible consequences not only at a regional level, but also globally, and increase uncertainty and volatility in capital markets, at least in the short term. There remains a risk of a split in the global technological and economic space driven by geopolitical conflicts, especially between China and the USA. We constantly analyse the potential impact that developments of this sort may have on our risk profile.

Even if general political risks persist in the eurozone, the introduction of the EU's recovery instrument – NextGeneration EU – and the associated cohesion signal have further reduced the risk of disintegration. Nevertheless, in particular the disputes related to the rule-of-law mechanisms also harbour disintegration risks for the EU. In the event of a significant rise in refinancing costs, the increase in sovereign debt could lead to potential falls in ratings and declines in market values for the bonds of the affected countries. Conversely, the "communitisation" of sovereign debt, already underway, could lead to German government bonds losing their safe-haven status in the medium term, which would also involve falls in market values. The increased risk of power outages and energy supply failures could also impact European assets in particular. Despite the EU-UK Trade and Cooperation Agreement concluded as part of Brexit, there remains a risk of the bilateral trade agreement being terminated as part of the renegotiations of the Northern Ireland Protocol.

Global players such as Munich Re are subject to increased fiscal pressure nationally and internationally, as well as a higher audit intensity. Given the current political emphasis on an appropriate taxation of international companies and the recently released OECD model rules for a global minimum tax rate, this trend is likely to continue and intensify.

Climate change

With respect to the ecological dimension of sustainability, climate change represents the central sustainability risk. Climate-related risks arise in the form of physical and transition risks, with interdependencies between both risk types. Physical risks arise as a consequence of extreme weather events (heat, drought, windstorms, hail, etc.) resulting from climate change. Transition risks arise as a consequence of political or economic measures taken for the purpose of conversion to a lower-carbon economy or reactions to changing living conditions in certain regions. Both risks not only have long-term effects, but can also have disruptive, short-term consequences.

Munich Re is therefore working intensively on the impact of climate change on our Group. Our risk-management competence built up over many years, the consideration of findings from current climate research and our risk models allow us to professionally assess changes in natural hazard risks and to adequately account for these risks in the pricing of hedging products as well as in contract wording and in calculating solvency capital requirements.

We take short-term (physical) impacts of climate change into account, particularly in the risk assessment of natural hazards. Examples of this are our updated assessments of the "USA wildfire" scenario in the reinsurance segment and the "Germany and Poland floods" scenario that is of particular significance in the ERGO segment. The occurrence of natural catastrophes with greater frequency or of greater severity than expected could have a substantial adverse impact on Munich Re's results and financial situation.

Munich Re performs scenario analyses to analyse the long-term effects of climate change until the year 2050. The main differences between the three scenarios lie essentially in the following two aspects: on the one hand, whether the 1.5°C target can be achieved, and the other whether this target is realised by means of "soft" or drastic measures.

The increase in litigation risks has been identified as a long-term impact of climate change. This is due to a potential increase in the number of cases where companies are accused of failing to sufficiently take into account in their business strategy the impacts on climate change, of making their products appear more climate-friendly than they are ("greenwashing") or of failing to adequately comply with climate-related public disclosure requirements. Such litigation risks may occur both on the insurance side under third-party liability covers and on the investment side. To increase awareness of this risk and take it into account in future (re)insurance contract

wordings, Corporate Underwriting has established standards that are being conveyed to the employees responsible in information and training sessions.

With respect to our investments, it is essential to take the impacts of climate change as well as regulatory changes into account in our long-term investment strategy. This applies in particular to investments that are illiquid over the long term, which account for an increasing share of our investments.

In summary, we assessed the impacts on our risk exposures in the period of analysis to be immaterial. This is thanks to our ability to regularly adapt models and risk exposures – at short notice, if need be.

Further information, in particular on the highest possible loss attributable to climate-related natural catastrophes for a 200-year event, is available in the section “Insurance” of our combined non-financial statement.

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 imminent 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. Legal risks are dealt with using combined legal expertise within the individual departments and units.

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. In 2021 risk exposures were regularly quantified and compared with the risk appetite. They were reported on and discussed in the relevant committees. At 227%, the Solvency II ratio is at a very comfortable level somewhat above our communicated optimal range of 175–220% (without application of transitional measures).

Munich Re thus continues to have a very solid capital base. Based on up-to-date findings and on our internal model, Munich Re’s Solvency II ratio (without application of transitional measures) would be within the optimal range even in the event of major loss events and negative capital market effects. We therefore assess Munich Re’s risk situation to be manageable and under control.