SFCR 2019
Solvency and Financial Condition Report
Munich Re (Group)

2019

NOT IF, BUT HOW

Munich RE

This document is a translation of the original German version and is intended to be used for informational purposes only. While every effort has been made to ensure the accuracy and completeness of the translation, please note that the German original is binding.

Executive summary

Part		Page
A – Business and performance	The business activities in our reinsurance and ERGO fields of business are broken down into material lines of business and regions. The technical result in reinsurance and ERGO was below the level of the previous year. In property-casualty reinsurance, the decline was driven by higher claims expenditure due to major losses from natural catastrophes. In life and health reinsurance, the lower result was mostly attributable to claims burdens from Australian disability business, which were only partially offset by good results in the USA and Europe. The technical result also fell in the ERGO field of business. Our investment result improved considerably compared with the previous year, in particular due to higher gains on disposals from our portfolio of fixed-interest securities and equities.	5–14
B – System of governance	Munich Re has an effective system of governance that is adequate for the nature, scale and complexity of the risks inherent in its business. The remuneration system introduced in 2018 meets the relevant company and supervisory law requirements, and is in line with our business and risk management strategy. Persons who run the undertaking or perform other key tasks, including the key functions under Solvency II, have the professional qualifications, knowledge and experience to perform the relevant tasks and have the requisite fitness for office. The risk management system, including the own risk and solvency assessment (ORSA), is closely integrated into Group-wide planning, risk strategy and decision-making processes. Processes that are subject to material risks are reviewed on a regular basis as part of the internal control system. The outsourcing of operational activities and functions is monitored.	16–34
C – Risk profile	We quantify the solvency capital requirements (SCR) of the risk categories using an internal model. At Group level, the SCR increased to €17.5bn compared with last year's €14.7bn. Increases were seen in almost all risk categories. In the property-casualty reinsurance segment, the higher capital requirement was mainly attributable to further business growth in areas exposed to natural hazards in accordance with our business strategy. In life and health, the SCR increased mainly due to the fall in interest rates, movements in exchange rates and new business in life reinsurance, and due to the effects of lower interest rates for the ERGO life insurance companies. The credit-risk SCR also rose as a consequence of lower interest rates, as the fair value of fixed-interest investments increased. We use appropriate limit and early-warning systems to manage risks and limit risk concentrations. Risk is mitigated by means of reinsurance and retrocession and through the transfer of risk to the capital markets, for instance using derivative financial instruments.	36–48
D – Valuation for solvency purposes	The differences in measurement between the solvency balance sheet and IFRS financial reporting are outlined for individual balance sheet items. These differences in measurement are mainly attributable to the fact that the solvency balance sheet is fully based on fair value, whilst IFRS uses a mixed measurement model based on fair value and amortised cost accounting. For further ease of comparison between the figures, differences between our IFRS accounts and the solvency balance sheet are explained for individual balance sheet items. Three life primary insurance companies (ERGO Lebensversicherung AG, Victoria Lebensversicherung AG, ERGO Versicherung AG, Vienna) apply a transitional deduction on technical provisions, and four primary insurers offering insurances of the person (ERGO Lebensversicherung AG, Victoria Lebensversicherung AG, DKV Belgium S.A., ERGO Insurance N.V.) use the volatility adjustment (Article 308d and Article 77d of Directive 2009/138/EC).	50–71

E – Capital management	We pursue active capital management, which ensures that our capitalisation is needs-based and risk-commensurate. Our eligible own funds (EOF) total €48.1bn. EOF increased by €4.4bn in the reporting period. Munich Re's solvency capital requirement totalling €17.5bn as at 31 December 2019 is equivalent to a very comfortable solvency ratio of 274%. The solvency ratio shown includes transitional measures under Solvency II and the dividend for the 2019 financial year, as well as a share buy-back programme for 2020/2021, though the latter has been postponed until further notice. Excluding transitional measures, the solvency ratio would have been 237%.	73–85

Due to rounding, there may be minor deviations in summations and in the calculation of percentages in the present report.

Update due to Covid-19: Status as at 3 April 2020

Coronavirus

COVID-19, the novel coronavirus, has been spreading worldwide since early January 2020. The solvency balance sheet as at 31 December 2019 does not reflect the potential impacts of COVID-19.

Measures designed to contain the virus spread in countries such as China, Singapore and Japan seem to be resulting in some initial successes. However, the number of confirmed COVID-19 cases worldwide is rising dramatically. In an effort to slow the spread of the pandemic, many governments have instituted drastic measures – some of which restrict people's freedom of movement, for instance, and hamper economic development. At present, there is great uncertainty as to what extent the measures put into practice will prove to be effective. It is also not at all clear whether the further spread of COVID-19 can be reduced to manageable levels. This uncertainty and the consequently unpredictable repercussions for the economy are evident in the ways capital markets have reacted. It is currently difficult to forecast how things will unfold. At the present time, a worldwide pandemic with a high number of fatalities combined with a rather prolonged global recession cannot be ruled out.

Munich Re risk managers are monitoring current events very closely. As part of our assessment of accumulation risk, we limited exposure on account of a worldwide pandemic. In addition, our pandemic scenario considers capital market upheavals and a rise in credit defaults, which can occur as a result of the pandemic's impact on the global economy. In the property-casualty segment, we expect COVID-19 to result in insurance claims pertaining to cancelled major events. Indirectly, it is possible that losses will also occur in other lines of business. Our loss expectations in life and health insurance depend heavily on the development of death rates, particularly in North America. In the capital markets, we are currently observing a sharp decline in equity markets and a widening of credit risk spreads for bonds. Although this negatively impacts our solvency ratio, hedging partially blunts the impact.

Munich Re has already implemented measures designed to cushion potential further repercussions of the COVID-19 pandemic.

Munich Re continues to have a very solid capital base. Even given the burden from the developments on the capital markets and COVID-19-related claims, the solvency ratio of Munich Re (Group) still remains comfortably within our optimal range of 175 – 220% (without application of the transitional measures). Even if we were to receive additional insurance claims in the range of a 200-year event, as calculated by Munich Re's internal pandemic model, our solvency ratio would still be significantly above 175%. This figure also includes our recommended dividend pay-out and the originally planned share buy-back programme.

As announced on 31 March 2020, we will still be proposing that the Annual General Meeting approve a dividend increase to €9.80 per share. However, we will be postponing the 2020/2021 share buy-back programme until further notice that was originally announced on 26 February 2020, at least until we have a clearer picture both of the actual financial consequences of COVID-19 and of the capital requirements needed to seize any potential organic or inorganic business opportunities.

Munich Re is standing by these decisions, even in light of the statements by the European insurance supervisory authority EIOPA and the German Federal Financial Supervisory Authority BaFin on 2 April 2020. We have been in close contact with BaFin and have provided them with evidence of our solid risk-bearing capacity, even in the face of extreme losses. BaFin expressed no reservations about our dividend pay-out.

A deduction will therefore be made from our eligible own funds as at 31 December 2019 both for the planned dividend as well as for the 2020/2021 share buy-back programme which is postponed until further notice.

Business and performance

A Business and performance

A1 Business

General information

The parent company of Munich Re (Group) is Münchener Rückversicherungs-Gesellschaft Aktiengesellschaft in München (Munich Reinsurance Company Joint-Stock Company in Munich), Königinstrasse 107, 80802 München, Germany. Munich Reinsurance Company is a joint-stock company (Aktiengesellschaft) within the meaning of the German Stock Corporation Act (AktG). Its registered seat is Munich, Germany. In addition to its function as a reinsurer, the parent also fulfils the function of holding company for the Group.

Munich Reinsurance Company has three governing bodies: the Annual General Meeting, the Board of Management and the Supervisory Board. Further details about the governing bodies can be found in section B 1.1 Administrative, management or supervisory bodies (AMSB).

Owing to our international corporate structure, we are subject to a raft of national and international legal systems, standards and corporate governance regulations. Within the Group, our own Code of Conduct binds our management and staff members to engage in ethically and legally impeccable conduct. The principles of the United Nations Global Compact have been integrated in this Code of Conduct. Further information can be found at www.munichre.com/cg-en.

KPMG Bayerische Treuhandgesellschaft Aktiengesellschaft Wirtschaftsprüfungsgesellschaft Steuerberatungsgesellschaft duly audited the Group and Company financial statements and the combined management report as at 31 December 2019, and issued them with an unqualified auditor's opinion. In accordance with Section 341k of the German Commercial Code (HGB), the external auditors of German insurance companies are appointed not by the Annual General Meeting, but by the Supervisory Board.

The supervision of Munich Re is conducted by the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht – BaFin)
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Legal structure

Munich Re is one of the world's leading risk carriers and provides both insurance and reinsurance under one roof. This enables the Group to cover large stretches of the value chain in the risk market. Almost all reinsurance units operate under the uniform brand of Munich Re. ERGO Group AG (ERGO) is active in nearly all lines of life, health and property-casualty insurance. The majority of Munich Re's investments worldwide are managed by MEAG, which also offers its expertise to private and institutional investors outside the Group. For up-to-date information about Munich Re, visit www.munichre.com.

The reinsurance companies of the Group operate globally and in virtually all classes of business. We offer a full range of products, from traditional reinsurance to innovative solutions for risk assumption. Our companies conduct their business from their respective headquarters and via a large number of branches, subsidiaries and affiliated companies. The reinsurance group also includes specialty primary insurers, whose business requires special competence in finding appropriate solutions. In ERGO, we combine all of Munich Re's primary insurance activities. Some 69% of gross premiums written by ERGO derive from Germany, and 31% from international business – mainly from central and eastern European countries. ERGO also operates in Asian markets, particularly in India, China, and Thailand.

Munich Reinsurance Company and ERGO Group AG are under unified control within the meaning of the German Stock Corporation Act (AktG). The relevant statutory regulations, control agreements and Group directives govern the distribution of responsibilities and competences for key decisions between Group management and ERGO. Control and profit-transfer agreements are in place with many Group companies, especially between ERGO Group AG and its subsidiaries.

Material lines of business and regions

Reinsurance
Our international life and health reinsurance business is written in the Life and Health division. This is split into three geographical regions and one international unit that develops specialised solutions for savings and annuity products. The focus of the division's business activities is on traditional reinsurance solutions that concentrate on the transfer of mortality risk. Moreover, we are active in the market for living benefits products. These include products such as occupational disability, long-term care, and critical illness, which have seen increased demand. We also offer capacity for longevity risks. We have concentrated our efforts in this field on the United Kingdom, but are also closely monitoring other markets.

In order to ensure proximity to our clients, we are represented in many markets with local subsidiaries and branches. We write the main portion of our business via our Canadian branch and our subsidiary in the USA. In Europe, we have operations in Germany, the United

Kingdom, Spain and Italy. At the same time, we have a strong local presence in Australia and South Africa, and in all important growth markets in Latin America and Asia. Since 2017, we also have a branch in India. Asian business is centrally managed by a dedicated branch in Singapore, which underlines the strategic importance of this region for life and health reinsurance.

Three other divisions conduct property-casualty reinsurance. The Global Clients and North America division handles our accounts with major international insurance groups, globally operating Lloyd's syndicates and Bermuda companies. It also pools our know-how in the North American market and is responsible for our property-casualty subsidiaries in this region, as well as international special-lines business such as marine, aviation and space, and global large-risk business, which we pooled in our new Facultative & Corporate unit last year.

Our Europe and Latin America Division is responsible for property-casualty business with our clients from Europe, Latin America and the Caribbean. Business units – for example, in London, Madrid, Paris and Milan – afford us market proximity and regional competence. In the South American markets, our Brazilian subsidiary Munich Re do Brasil Resseguradora S.A. and our liaison office in Bogotá help to ensure client proximity. The division also includes the divisional unit Financial Risks. Great Lakes Insurance SE, which has its headquarters in Munich and a large branch office in London, is also assigned to this division. We pool a significant share of our Group-wide business activities in the United Kingdom in these units. Munich Re is prepared for the consequences of the United Kingdom leaving the European Union.

The Asia Pacific and Africa Division conducts property-casualty business with our clients in Africa, Asia, Australia, New Zealand and the Pacific Islands. Branches in Mumbai, Beijing, Seoul, Singapore, Sydney and Tokyo allow us to take full advantage of the business opportunities in the rapidly growing Asia-Pacific insurance market. In the African market, we are represented by our subsidiary Munich Reinsurance Company of Africa Ltd., headquartered in Johannesburg. These units and other liaison offices guarantee our competitiveness in these key growth markets.

ERGO

Via ERGO, we offer products in all the main classes of insurance: life insurance, health insurance, and in nearly all lines of property-casualty insurance, as well as travel insurance and legal protection insurance. With these products – in combination with the provision of assistance, other services and individual consultancy – we cover the needs of private and corporate clients. ERGO serves around 37 million mainly private clients in more than 30 countries, with the focus on Europe and Asia. The latest information on ERGO can be found at www.ergo.com.

With ERGO Versicherung AG, our primary insurance arm is one of Germany's largest providers of property and legal protection insurance. As a specialist in capital-market-oriented insurance, ERGO Vorsorge Lebensversicherung AG is shaping change in the area of private provision and biometric risk products. ERGO Lebensversicherung AG and Victoria Lebensversicherung AG are responsible for running off our traditional life insurance portfolio. DKV Deutsche Krankenversicherung AG is a leading provider and specialist in the healthcare market, catering to both privately and statutorily insured individuals with its broad range of supplementary insurance covers. The specialist travel insurer ERGO Reiseversicherung AG is a market leader internationally as well as in Germany.

In Europe, ERGO is concentrating mainly on expanding its market presence in Poland, the Baltic States, Greece, Spain, Austria and Belgium. By way of example, ERGO is the market leader in property-casualty business in Greece, and is number two in Poland. As experienced experts, our legal protection insurers number among the leading players in each of their markets.

In Asia, ERGO is represented through joint ventures in the rapidly growing markets of India and China, as well as in Thailand. In India, ERGO is well positioned in property-casualty and health insurance. In China, ERGO China Life – a joint venture with the state-owned financial investor SSAIH – is tapping into the potential of the major provinces of Shandong, Jiangsu and Hebei. And in Thailand, too, our affiliate is performing well.

Qualifying holdings in Munich Reinsurance Company

As at 31 December 2019, no shareholdings exceeded 10% of the voting rights.

Related undertakings

Related undertakings in the scope of the Group included in our solvency balance sheet can be found in the S.32.01.22 "Undertakings in the scope of the Group" quantitative reporting template (QRT) in the annex to this report.

Intra-Group transactions

The main material intra-Group transactions of the year under review were cash-pool transactions.

Munich Re pools cash for the purposes of financial management, pooling excess liquidity of the participating Group units in a centralised account at MEAG Cash Management GmbH. The funds are pooled for the purposes of optimising returns on investment, while taking account of the individual investment terms stipulated by the participants. Short-term liquidity from the cash pool is also available to participating undertakings. In the year under review, BaFin was notified of four particularly significant cash-pool transactions.

The networking of the undertakings in our Group results in further intra-Group business relationships. Intra-Group transactions resulted from areas such as financing, reinsurance contracts, service offsetting, cost-sharing agreements, and guarantee agreements. Regular reporting to the supervisory authority takes place by means of quantitative reporting templates provided under Solvency II. In accordance with Section 274(3) of the Insurance Supervision Act (VAG), the supervisory authority is notified immediately of particularly significant transactions.

Significant business events

The reporting period was heavily influenced by major losses from natural catastrophes, which totalled some €2.1bn. The biggest loss events of the year were Typhoons Hagibis and Faxai in Japan, for which we expect total expenditure of around €1.3bn, and Hurricane Dorian, with expected claims costs in the region of €0.4bn.

Determination of consolidated data (significant differences between IFRS and Solvency II)

As a general rule, under IFRS all subsidiaries over which the parent company can exercise control are fully consolidated in the IFRS consolidated financial statements, irrespective of the business they conduct. Under Solvency II, however, the nature of the business plays a role when determining which subsidiaries are included in the Group solvency balance sheet. Here, only those subsidiary undertakings that are insurance companies, insurance holding companies, special purpose vehicles and ancillary services undertakings are fully consolidated. Alternative investment funds and undertakings for the collective investment in transferable securities (UCITS[1]) over which control can be exercised are fully consolidated in the IFRS balance sheet. In accordance with the Solvency II rules, we only recognise these types of undertaking at fair value in the Group solvency balance sheet. Under IFRS, joint ventures and associates are accounted for using the equity method. As a general rule, joint ventures are included in the solvency balance sheet in accordance with the principle of proportional consolidation of data. Currently, Munich Re does not include any proportionately consolidated undertakings in the solvency balance sheet. We recognise undertakings for which we hold at least 20% of the voting rights as associates in our IFRS consolidated financial statements. In the solvency balance sheet, undertakings for which we own a 20% or greater share of the capital or voting rights are categorised as participating interests. For the most part, they are accounted for using the adjusted equity method. Where the share in capital is not equal to that of the voting rights, there are reporting differences between the balance sheets produced under Solvency II and IFRS.

Further information on the determination of consolidated data under Solvency II can be found in section D 1 Holdings in related undertakings, including participations, and in section E 1 Consolidation methods for own funds.

[1] These are investment funds in statutorily defined types of securities and other financial instruments.

A2 Underwriting performance

The premiums and results shown below refer to the figures in our Group annual report in accordance with IFRS as at 31 December 2019.

Group underwriting performance

Munich Re generated a technical result of €2,074m (2,699m[2]) in the reporting year. The combined ratio in property-casualty reinsurance was 101.0% (99.4%) of net earned premiums. The year under review was characterised by increased major losses from natural catastrophes, which – at €2,053m – exceeded the previous year by €797m.

At €329m, the technical result in life and health reinsurance was below the very good previous-year figure (€503m). This is primarily attributable to claims burdens from Australian disability business, which were only partially offset by good results in the USA and Europe. In the ERGO field of business, the technical result declined to €745m (946m2). This decline was due chiefly to the ERGO Life and Health Germany segment; operational performance in the ERGO Property-casualty Germany improved markedly.

Reinsurance

Reinsurance – Life and health

We write the majority of our business in non-euro currencies. Exchange-rate fluctuations therefore have a significant impact on premium development. The exchange-rate effects were positive in 2019. If exchange rates had remained unchanged, our premium income would have risen by 5.1%. The increase was mainly due to business expansion in Asia and in life reinsurance in North America. Premium income decreased slightly following our discontinuation of health reinsurance in the USA.

Based on premium volume, around 40% of our global reinsurance business is written in North America, with the USA (around 25%) ranking before Canada (around 15%). An additional 25% of our premium stems from Europe, with approximately 15% generated in the United Kingdom and Ireland and about 5% in Germany. Another significant share of around 25% stems from Asia and the MENA region. Australia and New Zealand account for slightly more than 5% of premium. We are also well positioned in Africa and Latin America, but due to the small size of these markets, their share of our global business is modest (less than 5% in total).

Gross premium in the USA increased slightly to €2.9bn (2.8bn). We therefore continue to be one of the most important reinsurers in this market, which is the largest worldwide. The technical result exceeded our expectations again, mainly thanks to favourable claims experience overall, and positive reserving effects from health reinsurance business in the process of being run off. We continue to be very satisfied with the development of our new business, both in terms of volume and profitability. After the decrease in premium income in Canada in the previous year, we once again recorded an increase to €1.7bn (1.5bn), thereby retaining our leading market position in traditional business.

At €2.8bn, premium income in Europe was roughly at the same level as in the previous year (€2.7bn), with €1.8bn (1.7bn) deriving from the United Kingdom and Ireland, and a further €597m (676m) from Germany.

In Asia/MENA, our premium income climbed to €3.0bn (2.6bn). New business continued to develop very well. Thanks to our broad diversification, we are in a position to benefit from the growth potential in the region.

Premium generated by our business activities in Australia and New Zealand remained largely constant at €808m (827m). Our main focus here remains the rehabilitation of our existing portfolio.

At €329m, the technical result in life and health reinsurance was below the very good previous-year figure (€503m), and thus also below our expectations for this year. This is primarily attributable to claims burdens from Australian disability business, which were only partially offset by good results in the USA and Europe.

We saw increased claims expenditure in Australian disability business, particularly in the first half of the year – despite continued remediation measures. We performed a detailed analysis of the business, and in Q4 adjusted our provisions to claims experience. This resulted in a negative impact of around €200m. In the course of the year, we also had to increase our provisions for outstanding claims due to lower interest-rate levels. The restructuring of investments in Canada resulted, as expected, in a negative impact on the technical result. There also were a number of positive effects: with the exception of Australia, Munich Re's annual review of its reserves had a favourable impact on the result. This includes in particular reserve releases in health reinsurance. The result was also buoyed by favourable claims experience overall (with the exception of Australia), in particular with business in the USA and Europe. The restructuring of several traditional treaties in Canada also contributed favourably to the result, which further benefited from the development of new business.

Reinsurance – Property-casualty

Premium income in property-casualty reinsurance increased by 8.1% compared with the previous year. Changes in exchange rates had a positive impact on premium development. Approximately 11% of the portfolio is written in euros and 89% in non-euro currencies, of which 55 percentage points is in US dollars and 12 percentage points in pounds sterling. If exchange rates had

[2] Previous year's figures adjusted owing to Changes in accounting policies and other adjustments.

remained the same, premium volume would have risen by 5.0% year on year.

The substantial increase in premium volume to €22,091m (20,437m) was due to an expansion of business across almost all lines and regions. Key drivers included the development of existing and new business with targeted clients in North America, and selective growth in India and China. Fire, liability, marine, credit and bond, and aviation and space business were the main sources of growth.

Reinsurance treaty renewals in 2019 saw prices rise in regions affected by natural catastrophes. In other markets and lines of business, prices remained stable or increased slightly. Despite high losses from natural catastrophes in the previous year, the supply of reinsurance capacity remained high during the 2019 renewals. In the renewals for 2019, prices rose by approximately 0.3%. Overall, we are adhering to our profit-oriented underwriting policy.

Based on premium volume, around 45% of our global property-casualty reinsurance business – including Risk Solutions – is written in North America (including Canada). Around 35% of our premium comes from Europe, of which around half is generated in the United Kingdom. Further substantial shares are contributed by Asia (about 10%), Australia/New Zealand (approximately 5%) and Latin America (approximately 5%).

In the US market, we continued to grow our existing reinsurance business with selected clients and, in addition, wrote profitable new business in the past financial year. As a result, Munich Reinsurance America Inc. posted an increase in premium volume to €4,449m (4,348m). Reinsurance prices saw an improvement as a result of the loss events in the previous year. Natural hazard events in 2019 were in line with expectations – despite the hurricanes, as well as local hail events and tornados.

Premium income at Hartford Steam Boiler Group (HSB Group) amounted to €1,072m (950m). This increase is mainly attributable to growth generated not only by new products, but also with our core business. American Modern also posted a rise in premium income to €1,168m (1,032m) owing to higher prices and new business. The result situation of both companies was gratifying. In Canada, we are represented in the area of non-life business by the Munich Reinsurance Company of Canada and Temple Insurance Company. Premium volume increased to €392m (313m) owing to the acquisition of the business of ERGO D.A.S.

European business is dominated by property business and UK motor business. In the United Kingdom, premium volume remained stable at €3,517m (3,588m). In Continental Europe, premium volume was up despite the difficult market environment. The increase was driven by the targeted development of business with selected clients and markets, e.g. France, and additional profitable new business. At our Swiss subsidiary, New Reinsurance Company Ltd. (New Re), business volume in the area of property-casualty decreased to €542m (608m) owing to rigorous portfolio management. In Germany, we succeeded in keeping premium income virtually stable at €608m (612m) – despite the still-challenging market environment.

The decline in premium to €954m (1,210m) in Australia and New Zealand was attributable to a one-off effect owing to renewal dates being brought forward. The losses from the bushfires in Australia were taken into account.

Premium income in Japan was up on the previous year and totalled €425m (336m). In China, the drop in premium volume to €682m (822m) was mainly due to a one-year agreement concluded in 2018 not being renewed in 2019. We are further expanding our business in India, where we generated an increase in premium income to €367m (206m). Thanks to our local branch, we are well positioned to continue to participate in the expected future growth potential here.

In the Caribbean, Central and South America, we still provide high capacity for the coverage of natural hazards, in particular windstorm and earthquake. Major losses from natural catastrophes in recent years (hurricanes, floods, earthquakes and wildfires) were responsible for increased demand in this field. As a result, we were not only able to defend our strong market position, but actually also raised our premium volume significantly to €1,232m (1,052m). The associated price increases once again resulted in improved margins.

In agricultural reinsurance, we grew our premium volume to €495m (440m), mainly thanks to expanded business with a major client. Claims experience was higher than expected owing to extreme weather and crop conditions in the USA and China, leading to a deterioration in the combined ratio compared with the previous year.

Total premium volume in marine business increased by around 16% to €1,022m (884m), supported by a positive market environment. As in the previous year, the result was once again pleasing.

At €787m, credit and bond reinsurance saw a slight increase in premium volume compared with the previous year (€657m). The increase was attributable mostly to profitable new business in specialty and niche segments, with traditional credit business managing to remain stable.

Thanks to a positive market environment, premium income in direct industrial business, which we operate in our Corporate Insurance Partner unit, rose to €722m (554m). The result saw an improvement compared with the previous year. In mid-2019, the Corporate Insurance Partner unit and facultative business were pooled in the new Facultative & Corporate unit.

Premium in aviation and space business saw a significant increase to €595m (504m) owing to rising prices in the wake of numerous major losses. In aviation reinsurance,

we saw the biggest loss events since 2001, which had a considerable impact on our result in this class of business.

The Capital Partners unit offers our clients a broad spectrum of structured, individual reinsurance and capital market solutions. We also use this unit's services for our own purposes in order to buy retrocession cover on the basis of our defined risk strategy.

Expenditure for major losses was up, and the technical result decreased significantly on the previous year. Adjusted for commissions, Munich Re's customary review of provisions resulted in a reduction in the basic claims provisions for prior years of around €1,154m for the full year, which is equivalent to around 5.6 percentage points of the combined ratio. This positive development related to almost all lines in our portfolio. The safety margin in the provisions remained unchanged year on year.

Major losses – in excess of €10m each – totalled €3,124m (2,152m) in 2019, after retrocession and before tax. This amount includes run-off profits and losses for major claims from previous years, and is equivalent to 15.2% of net earned premium. It is much higher than in the previous year, and above our major-loss expectation of 12% of net earned premium.

The technical result was heavily influenced by major losses from natural catastrophes, as described in this report under A 1 Significant business events.

At €1,071m, man-made major losses were up on the previous year (€896m), which is equivalent to 5.2% (4.8%) of net earned premiums. The number of losses above the major-loss threshold was randomly higher than in previous years. The largest individual losses were recorded in aviation/space and fire.

ERGO

ERGO Life and Health Germany

In the ERGO Life and Health Germany segment, German direct business was renamed Digital Ventures in 2019. Furthermore, ERGO Direkt Lebensversicherung AG from the Digital Ventures division was merged with ERGO Vorsorge Lebensversicherung AG in the Life Germany division with retroactive effect from 1 January 2019.

The increase in gross premiums written in Life to €2,913m (2,831m) was the result of the merger. Without this effect, the figure would have been down on the previous year. The decrease was attributable in particular to lower regular premium income owing to the ongoing portfolio reduction, which could not be sufficiently offset by premium income from new products. The increase in new business resulted chiefly from the merger and a one-time accounting effect from a rate change. We saw growth in both regular-premium and single-premium new business. The increase was significant also in terms of annual premium equivalent, which is the performance measure customary among investors. The technical result declined, largely because the 2018 figure had benefited from a one-off effect from changed assumptions about profit appropriation.

In the Health Germany division, gross premiums written moved up to €5,560m (5,448m); compared with the previous year, they grew by 2.0% in supplementary health insurance and by 0.4% in comprehensive health insurance. Growth in supplementary insurance benefited from the performance of business not similar to life insurance, which increased by 10.4%. The slight increase in comprehensive cover was mainly due to a premium adjustment in private long-term care insurance. Travel insurance, which was up 13.2% to €655m (579m), contributed to premium growth in Health Germany. The lower technical result was mainly attributable to higher claims expenditure.

The decline in gross premiums written in the Digital Ventures division to €765m (1,066m) owed to the merger of ERGO Direkt Lebensversicherung AG with ERGO Vorsorge Lebensversicherung AG. Without this effect, gross premiums written would have been up on the previous year, chiefly thanks to growth of 6.9% in health insurance from our supplementary dental insurance plans. Gross premiums written in property-casualty business were also up, by 12.6%. Our digital insurer nexible was the main driver of this development. The lower technical result was mainly attributable to the merger.

ERGO Property-casualty Germany

As regards premium income, our most important classes of business in the ERGO Property-casualty Germany segment were motor insurance and personal accident insurance. They respectively accounted for around 19% and 17% of the segment's gross premiums written. Gross premiums written developed favourably year on year, climbing to €3,500m (3,377m), mainly on account of growth in fire and property insurance and third-party liability insurance of 7.9% each. Other classes of business – above all marine and engineering – also saw an increase of 6.2% in gross premiums written compared with the previous year, as did motor insurance, at 2.2%. By contrast, gross premiums written were down 2.2% in personal accident insurance and 0.4% in legal protection insurance. The technical result was up on the previous year. Overall, this was due to lower expenditure for major natural catastrophe losses, despite storms Eberhard and Jörn in the first half-year of 2019, and good claims experience in core business. Operating expenses also decreased.

ERGO International

With regard to the segment's gross premiums written, property-casualty insurance accounted for around 57%, health for about 29% and life insurance for approximately 14%. Our biggest markets are Poland, accounting for approximately 31% of the premium volume, Belgium (approx. 18%) and Spain (approx. 17%). Gross premiums written decreased overall to €4,912m (5,057m), mainly owing to the sale of companies outside Germany as part of portfolio optimisation. Adjusted for the sales and for currency effects, gross premiums written in the ERGO

International segment would have increased by 0.5% year on year.

In international property-casualty business, gross premiums written were down 1.7% to €2,791m (2,840m). This decline was mainly attributable to the sale of companies outside Germany in the 2018 and 2019 financial years. Premium growth was strongest in Poland, at 4.0%, and in the Netherlands, at 14.8%. Gross premiums written developed favourably in international health business, climbing by 3.7% to €1,424m (1,374m) between January and December. At €698m (843m), gross premiums written in international life insurance business were down by 17.2% on the previous year. This was due not just to portfolio optimisation, but also to lower premium income in Belgium, where we already stopped taking on new business in 2017.

The technical result decreased compared with the previous year. Lower results in life insurance – especially in Belgium, due to higher impairment losses on deferred acquisition costs owing to the low-interest environment – could not be offset by the positive performance of health and property-casualty business.

A3 Investment performance

Income and expenses with respect to investment activities

Investment result

€m	2019	Prev. year
Regular income	6,751	6,586
Write-ups/write-downs of non-derivative investments	–309	–1,054
Gains/losses on the disposal of non-derivative investments	2,779	1,582
Net balance of derivatives	–717	103
Other income/expenses	–767	–691
Total	**7,737**	**6,526**

Regular income increased slightly on the previous year, primarily due to higher amounts from dividends and private equity investments. The average reinvestment yield in the financial year was 2.1% (2.2%). Due to the low interest rates in the reporting year, yields on new investments remained lower than the average return on our existing portfolio of fixed-interest investments.

We posted lower net write-downs of non-derivative investments, given that in the previous year, our equity portfolio, in particular, had been impacted by heavy price falls on the stock markets. In the financial year under review we also profited from write-ups of our forestry and gold investments.

Net gains on disposal were higher than in the previous year, and chiefly related to our portfolio of fixed-interest securities, as well as – particularly in Q4 – gains from the disposal of equities.

We posted a net loss from write-ups and write-downs of derivatives and from the disposal of derivatives, primarily due to market-related losses on equity derivatives.

The investment result can be broken down by asset class as follows:

Investment result by type of investment (before deduction of income from technical interest)

€m	2019	Prev. year
Land and buildings, including buildings on third-party land	**550**	**563**
Investments in affiliated companies	**10**	**-3**
Investments in associates and joint ventures	**213**	**186**
Loans	**2,070**	**2,092**
Other securities available for sale		
Fixed-interest	4,214	3,408
Non-fixed-interest	1,475	389
Other securities at fair value through profit or loss		
Held for trading		
Fixed-interest	0	0
Non-fixed-interest	15	-6
Derivatives	-595	246
Designated at fair value through profit or loss		
Fixed-interest	17	3
Non-fixed-interest	51	-23
Deposits retained on assumed reinsurance, and other investments	**396**	**280**
Expenses for the management of investments, other expenses	**-678**	**-610**
Total	**7,737**	**6,526**

The result for land and buildings includes rental income of €513m (489m). The expenses for the management of investments include running costs and expenses for repair and maintenance of property totalling €103m (92m). We earned interest income of €1,857m (1,889m) on loans. Other securities available for sale produced regular income of €3,696m (3,506m), while derivatives generated €146m (151m). Interest expenses on non-derivative investments amounted to €11m (8m), administrative expenses to €448m (392m), and other expenses to €126m (126m).

Gains and losses recognised directly in equity

Unrealised gains and losses

€m	31.12.2019	Prev. year
Unconsolidated affiliated companies, associates and joint ventures not accounted for using the equity method	63	66
Associates and joint ventures accounted for using the equity method	105	114
Other securities available for sale		
Fixed-interest	10,738	4,953
Non-fixed-interest	3,632	1,817
Less		
Provision for deferred premium refunds recognised in equity	–6,180	–3,273
Deferred taxes recognised in equity	–1,780	–755
Non-controlling interests	–7	–1
Consolidation and currency translation effects	–209	–207
Total	**6,362**	**2,714**

Unrealised gains on fixed-interest securities available for sale improved significantly on the previous year. The lower interest-rate level was chiefly responsible for the gains made by fixed-interest securities. The valuation reserves on equities increased primarily due to an overall positive market development.

Investments in securitisations

The portfolio of structured credit products at fair value increased slightly as a result of acquisitions, and totalled 2% of the overall portfolio of interest-bearing securities as at the reporting date. This asset class involves securitised receivables (asset-backed securities or mortgage-backed securities), e.g. securitisations of real estate finance, consumer credit or student loans. Around 60% of our structured credit products have a rating of AAA.

A4 Performance of other activities

Munich Re as lessee

There are new accounting rules governing the recognition of leases. As of the 2019 reporting year, we recognise liabilities arising from our lessee agreements as liabilities. These relate predominantly to rented office buildings. Further information on leases can be found in section D 1 Property, plant & equipment held for own use.

Munich Re as lessor

Operating leases mainly involve leased property.

Future minimum lease payments under operating leases

€m	31.12.2019	Prev. year
Up to one year	341	264
Over one year and up to five years	1,040	772
Over five years	765	682
Total	**2,145**	**1,718**

There were several finance leases for property at the balance sheet date, which are listed in the following table:

Due dates

	31.12.2019			Prev. year		
€m	Gross investment	Interest element	Net investment	Gross investment	Interest element	Net investment
Minimum lease payments up to one year	1	0	0	0	0	0
Minimum lease payments of over one year and up to five years	2	1	1	2	1	1
Minimum lease payments of over five years	70	56	14	71	56	15
Total minimum lease payments	**73**	**57**	**16**	**74**	**57**	**17**
Unguaranteed residual values	41	32	10	41	32	9
Total	**114**	**88**	**26**	**115**	**89**	**25**

A5 Other information

There were no matters in the year under review which require disclosure under Other information.

System of governance

B

B System of governance

B1 General information on the system of governance

Administrative, management or supervisory bodies (AMSB)

Münchener Rückversicherungs-Gesellschaft Aktiengesellschaft in München (Munich Reinsurance Company) has three governing bodies: the Annual General Meeting, the Board of Management, and the Supervisory Board. Their functions and powers are defined by law, the Articles of Association, the Co-Determination Agreement applica-ble to Munich Reinsurance Company, and by rules of procedure and internal guidelines. Employee co-determination on the Supervisory Board is governed by the Co-Determination Agreement concluded pursuant to the German Act on the Co-Determination of Employees in Cross-Border Mergers (MgVG). The principle of parity co-determination on the Supervisory Board has been strengthened by taking into account staff employed in the European Union and in the European Economic Area (EU/EEA).

Additional corporate governance requirements are set out in the regulatory requirements for (re)insurance companies, especially the German Insurance Supervision Act (VAG) and the European supervisory regulations (Solvency II). They include specific rules on various issues such as business organisation or the qualifications and remuneration of members of the Board of Management, Supervisory Board members and other individuals.

Annual General Meeting

The documents required by law for the Annual General Meeting and the agenda will be available on the Munich Re website with effect from the day the AGM is called. Shareholders who are unable or do not wish to attend the Annual General Meeting in person may also have their voting rights exercised at the Annual General Meeting by one of the proxies nominated by Munich Reinsurance Company. These proxies will exercise the voting rights solely in accordance with the instructions they receive from the shareholders. Power of attorney and instructions may also be issued to the Company proxies via the internet. In addition, shareholders may watch the whole Annual General Meeting live on the internet and change their instructions right up to the end of the general debate – provided they have issued power of attorney to the Company proxies.

Board of Management

In 2019, the Board of Management of Munich Reinsurance Company initially comprised eight members, and from 18 March 2019 there were nine members; there is one woman on the Board.

The Board of Management is responsible for managing the Company, in particular for setting the Company's objectives and determining strategy. It is bound to act in the Company's best interests. It should take account of the interests of shareholders, employees, and other stakeholders of Munich Reinsurance Company, with the objective of sustainable value creation. The Board of Management is responsible for effecting adequate risk management and risk control in the Company. It must ensure that statutory requirements and internal Company rules are observed, and works to ensure compliance by Group companies.

Working procedures of the Board of Management

The work of the Board of Management, in particular the allocation of responsibilities among the individual Board members, matters reserved for the full Board of Management, and the majority required to pass resolutions, is regulated by rules of procedure issued by the Supervisory Board. The full Board of Management decides on all matters that, either by law, or according to the Articles of Association or rules of procedure, require a resolution of the Board of Management. In particular, it is responsible for matters requiring the approval of the Supervisory Board, for items which have to be submitted to the Annual General Meeting, for tasks which constitute management functions or are of exceptional importance, and for significant personnel issues.

Meetings of the Board of Management take place as required, but generally at least once a month, and are presided over by the Chairman of the Board of Management. The adoption of a resolution requires the majority of votes cast; in the event of a tie, the Chairman has the casting vote. The members of the Board of Management cooperate closely for the benefit of the Company. On an ongoing basis, they inform each other about all important business transactions.

Composition and working procedures of the Board of Management committees

Three Board of Management committees ensure efficient work by the Board of Management: the Group Committee, the Reinsurance Committee, and the Strategy Committee.

Group Committee

The Group Committee (GC) is the central management committee of the Group. It decides in particular on fundamental issues concerning the strategic and financial management of the Group for all fields of business, and on the principles of general business policy and organisation within the Group. The Committee also makes decisions on all matters of fundamental importance relating to the divisions headed by its voting members. In addition, it serves as an executive committee with responsibility for important ongoing issues, in particular the approval of significant individual transactions.

Reinsurance Committee

The Reinsurance Committee (RC) is the central management committee of the reinsurance field of

business. It decides on all matters of fundamental importance for this field of business, except investments.

Strategy Committee

The Strategy Committee (StratC) is the central management committee for fundamental strategic matters in the fields of business (reinsurance, primary insurance). It makes decisions on all strategic matters of fundamental importance for the fields of business, including own investments and administered (third-party) funds.

The following applies to all Board of Management committees: Where decisions within the sphere of responsibility of a committee relate to issues reserved for the full Board of Management, the respective committee will prepare these matters for decision. Committee meetings are held regularly, and as required. Only members of the Board of Management have voting rights on the committees. The committees are further governed by their respective rules of procedure, as adopted by the full Board of Management.

Subcommittees of the Board of Management Committees

Both the Group Committee and the Reinsurance Committee have set up subcommittees. The Group Committee has set up the Group Investment Committee and the Group Risk Committee; the Reinsurance Committee has set up the Global Underwriting and Risk Committee as well as the Board Committee IT Investments. The members of these subcommittees also include other Board members and other senior executives from Munich Reinsurance Company and the Group. Only members of the Board of Management that are members of the main committee have voting rights on these subcommittees.

The work of these subcommittees is governed by their own written rules of procedure. The Group Investment Committee is responsible for substantiating investment principles for the Group and the fields of business, and for other important issues in relation to investments. Both the Group Risk Committee and the Global Underwriting and Risk Committee deal with risk management issues, albeit with different emphases. The Board Committee IT Investments is responsible for IT investments.

Collaboration between Board of Management and Supervisory Board

The Board of Management and the Supervisory Board work together closely and in a spirit of trust for the benefit of the Company.

The Board of Management determines the strategic direction of the Company in conjunction with the Supervisory Board. The Board of Management reports regularly and as needed to the Supervisory Board about all questions relevant to the Company. The Chairman of the Supervisory Board maintains regular contact with the Board of Management between meetings – in particular with the Chairman of the Board of Management – in order to discuss issues of strategy, planning, business development, the risk situation, risk management and Company compliance. The Supervisory Board has defined the Board of Management's information and reporting obligations in detail. Specific types of transaction, such as certain investments and divestments, require the Supervisory Board's consent. The Supervisory Board's approval is also required for sideline activities assumed by members of the Board of Management, and (within the scope of the German Corporate Governance Code) for important transactions involving members of the Board of Management or persons or undertakings closely associated with them.

Changes on the Board of Management

The Company's Board of Management was expanded with effect from 18 March 2019 to include the position of Chief Investment Officer. In this function, Nicholas Gartside is responsible for all of the asset management of Munich Re (Group).

For personal reasons, Hermann Pohlchristoph is not extending his appointment that expires on 30 April 2020, and will leave the Company. Achim Kassow has been appointed as his successor with effect from 1 May 2020, and he will take over responsibility for the Asia Pacific and Africa division and for the central divisions Central Procurement and Services.

Changes on the Supervisory Board

The term of office of the Supervisory Board members expired at the end of the Annual General Meeting on 30 April 2019. The shareholder representatives Bernd Pischetsrieder and Henning Kagermann left the Supervisory Board. Christian Fuhrmann, Marco Nörenberg, Andrés Ruiz Feger, Ina Hosenfelder, Beate Mensch and Angelika Wirtz stepped down from their roles as employee representatives on the Supervisory Board.

Karl-Heinz Streibich and Nikolaus von Bomhard were newly elected to the Supervisory Board by the Annual General Meeting. On the basis of the Co-Determination Agreement, Ruth Brown, Stephan Eberl, Eva-Maria Haiduk, Stefan Kaindl, Gabriele Mücke and Manfred Rassy were elected to the Supervisory Board by the bodies responsible. The periods of office of the new and re-elected members of the Supervisory Board commenced at the end of the Annual General Meeting.

Supervisory Board

Pursuant to the Articles of Association, the Supervisory Board of Munich Reinsurance Company comprises twenty members: half are shareholder representatives and are elected by the Annual General Meeting. The other ten members are elected employee representatives from Group companies in the EU and EEA.

The Supervisory Board advises the Board of Management and monitors the management of the Company, but it is not authorised to take management action in place of the Board of Management. In accordance with a special rule applicable to (re)insurance companies, the Supervisory

Board in particular also appoints the external auditor for the Company and Group financial statements and for the Half-Year Financial Report.

Working procedures of the Supervisory Board

The Supervisory Board has its own rules of procedure, which specify responsibilities, work processes and further modalities for the adoption of resolutions. The Audit Committee also has its own rules of procedure, which have been adopted by the full Supervisory Board.

The Supervisory Board normally meets at least six times during the financial year. Supervisory Board meetings are generally held with the members of the Supervisory Board personally present at the meeting (face-to-face meeting). If the Chairman of the Supervisory Board so rules, meetings of the Supervisory Board may also be held using electronic media, and individual members of the Supervisory Board may attend meetings via electronic media. The members of the Board of Management attend the meetings of the Supervisory Board unless the Chairman of the Supervisory Board decides otherwise. The Supervisory Board should also meet regularly without the Board of Management.

The Supervisory Board is quorate if all its members have been invited to the meeting or called upon to vote, and if ten members, including the Chairman, participate in the vote. Alternatively, it is quorate if fifteen members participate in the vote. Supervisory Board resolutions are adopted by a majority of votes cast, unless the law or the Articles of Association require otherwise. In the event of a Supervisory Board vote being tied, should a second vote on the same motion also result in a tie, the Chairman of the Supervisory Board has a casting vote. The Chairman is authorised to make declarations for the Supervisory Board based on resolutions.

Composition and working procedures of the Supervisory Board committees

The Supervisory Board has set up six committees from among its members – the Standing Committee, the Personnel Committee, the Remuneration Committee, the Audit Committee, the Nomination Committee and the Conference Committee. The committees adopt decisions by the majority of votes cast. With the exception of the Conference Committee, the Chairman of the Supervisory Board has a casting vote in case of a tie. The full Supervisory Board is regularly informed about the work of the committees by their respective chairs.

The main responsibilities of the committees are as follows:

Standing Committee

The Standing Committee prepares meetings of the Supervisory Board, unless another committee is responsible for doing so. It decides on matters of Company business requiring the Supervisory Board's consent, unless the full Supervisory Board or another committee is responsible. The Standing Committee also prepares the Report of the Supervisory Board to the Annual General Meeting, the Declaration of Conformity with the German Corporate Governance Code pursuant to Section 161 of the Stock Corporation Act (AktG), and the Statement on Corporate Governance – including the corporate governance reporting for the Supervisory Board. It also prepares the annual review of the efficiency of the Supervisory Board and its committees. The Standing Committee is also responsible for preparing the Supervisory Board's review of the separate non-financial reporting. This includes preparing the selection and appointment of the auditor for a voluntary external audit of the separate (combined) non-financial statement.

Personnel Committee

The Personnel Committee prepares the appointment of members to the Board of Management. It also prepares the long-term succession planning together with the Board of Management, including setting targets for the number of women on the Board of Management. In addition, the Personnel Committee represents the Company in matters concerning the members of the Board of Management, and is responsible for personnel matters involving members of the Board of Management, unless these are issues that are the responsibility of the full Supervisory Board or the Remuneration Committee. This Committee approves loan transactions between the Company and members of the Board of Management and their related parties. The Personnel Committee also decides whether to approve sideline activities of members of the Board of Management, particularly mandates in supervisory boards or similar committees.

Remuneration Committee

The Remuneration Committee is responsible for preparing the Supervisory Board's resolutions on determining, amending, and regularly reviewing the remuneration system for the Board of Management; this Committee also determines and reviews the total remuneration of the individual members of the Board of Management. In addition, the Remuneration Committee prepares the Supervisory Board's resolutions regarding determination of the level of variable remuneration components, determination of the performance criteria and objectives for variable remuneration, the assessment of objectives in cooperation with the Personnel Committee, and the determination of the variable remuneration to be granted to the individual Board of Management members. This Committee is also responsible for preparing the remuneration components of the employment contracts of members of the Board of Management, and for remuneration reporting with regard to the remuneration of members of the Board of Management and the Supervisory Board.

Audit Committee

The Audit Committee prepares Supervisory Board resolutions on the adoption of the Company's annual financial statements and approval of the Group financial statements. It discusses the material information underlying the Half-Year Financial Report and the quarterly reports, and receives the audit reports, other reports and statements by the external auditor. The Audit Committee

also discusses the essential components of the Solvency II reporting with the Board of Management.

This Committee oversees accounting, the accounting process, and the appropriateness and effectiveness of the internal control system. It also oversees the appropriateness and effectiveness of the risk management system, the compliance management system (including whistleblowing) and handling of material compliance cases, the actuarial function system and the internal audit system. Furthermore, the Audit Committee is responsible for examining potential claims due to breach of duty by members of the Board of Management.

This Committee prepares decisions on the appointment of the external auditor, carries out the selection process, and makes recommendations in this regard to the full Supervisory Board. The Audit Committee is responsible for assessing performance and monitoring the independence of the external auditor; it also assures the quality of the audit and any additional services provided by the external auditor. In particular, it appoints the external auditor for the Company and Group financial statements, determines focal points of the audits and agrees the auditor's fee for the annual audit; the same applies to the review of the Half-Year Financial Report and the review of the solvency balance sheets. Beyond this, the Committee handles the approval and monitoring of non-audit services.

After in-depth deliberations by the Board of Management, the Audit Committee prepares the annual discussion of the risk strategy by the Supervisory Board, and discusses any changes or deviations from the risk strategy with the Board of Management during the year.

In this connection, the Audit Committee hears reports not only from the Board of Management but also directly from the Group Chief Compliance Officer, the Group Chief Auditor, the Group Chief Risk Officer, the Head of the Actuarial Function and, if required, from the General Counsel.

Nomination Committee

The Nomination Committee is made up exclusively of shareholder representatives.

This Committee provides the Supervisory Board with names of suitable candidates that the latter can nominate for election at the Annual General Meeting. As a basis for this, the Committee has developed and adopted a list of criteria for the selection of suitable candidates for the Supervisory Board. It also proposes suitable candidates to the Supervisory Board for the election of shareholder representatives to Supervisory Board committees and as chairs of the respective committees.

Conference Committee

If the first round of voting concerning the appointment or dismissal of members of the Board of Management does not result in the required two-thirds majority, the matter will be addressed by the Conference Committee before a second vote is held in the Supervisory Board.

The tasks and activities of the Supervisory Board in the 2019 financial year are described in more detail in Munich Re's Group Annual Report 2019.

You will find details on the composition and responsibilities of the Board of Management, Supervisory Board and the relevant committees in Munich Re's Group Annual Report 2019 on pages 24 – 28. More information on corporate governance can be found at www.munichre.com/cg-en.

Main duties and responsibilities of the key functions

The following four Group-wide key functions have been implemented at Munich Re:

Compliance

The Head of Group Compliance and Legal (GCL) is the Group Chief Compliance Officer (GCCO) and, as such, the holder of the compliance key function at Munich Re with responsibility for the compliance organisation at Munich Re. The GCCO has an unrestricted right to full disclosure of and access to all information required for the discharge of his compliance duties. He is responsible for the compliance organisation at Group level and at Munich Reinsurance Company level.

The GCCO compiles a written annual compliance report for the Board of Management and the Audit Committee of the Supervisory Board of Munich Reinsurance Company. This report includes compliance topics and incidents of relevance for the Group, as well as measures for the further development of the Group-wide compliance management system (CMS) and other developments relevant for compliance.

You will find a detailed explanation of the main duties and responsibilities in section B 4.

Internal audit

Group Audit is responsible for the internal audit function at Group level and at Munich Reinsurance Company level.

As an independent control function, Group Audit is responsible for reviewing and assessing all components of the system of governance at Munich Re. It prepares independent and objective analyses and recommendations for the Board of Management and senior management, and provides information on the audited activities.

A description of the authorities and independence of the internal audit function is available in section B 5 Internal audit function.

Risk management function

The Group Chief Risk Officer (Group CRO) is Head of Integrated Risk Management (IRM) and is responsible for

the risk management function (RMF). In this role, the Group CRO is responsible for organising and implementting an adequate risk management system at Group level and at Munich Reinsurance Company level. This includes developing the risk strategy, assessing all risks throughout the Group, and ensuring the adequacy of risk management processes.

The independence of the RMF is safeguarded and laid down in the Risk Management Policy at Munich Re (Group). The RMF of the Group is supported by the local mirror functions in the Group undertakings and by specific risk management functions at Munich Reinsurance Company. You will find a detailed description of the main duties and responsibilities of the RMF in section B 3.

Actuarial function

The Head of IRM1.2 Risk Analytics & Reporting is responsible for the actuarial function (AF). The AF is in charge of all activities by the actuarial functions at Group level and at Munich Reinsurance Company level.

The independence of the AF, in particular from the RMF, is safeguarded and laid down in the Risk Management Policy at Munich Re (Group). To discharge its duties, the AF works in close collaboration with the internal actuarial services of the fields of business. The main duties and authorities, and basis of collaboration, are described in section B 6.

The human resources available for all key functions are sufficient in order to meet the internal and external requirements with regard to the adequate performance of the respective function. We also consider the budget and non-monetary resources available to be adequate overall.

Compensation

Principles of the compensation policy

The "Solvency II: Munich Re Group Compensation Policy (MR GCP)" sets uniform and generally applicable standards for compensation policy at Munich Re (Group). Existing compensation policies at the undertakings of Munich Re (Group) remain in force and apply in addition to the MR GCP. The standards comprise substantive, procedural and formal requirements. The object of the MR GCP is to implement the regulatory requirements resulting from Solvency II in accordance with uniform principles for Munich Re (Group). The undertakings of Munich Re (Group) that are obliged to implement these requirements must implement the MR GCP in their own compensation policies, which take into account local conditions.

Pursuant to the MR GCP, the remuneration schemes of Munich Re (Group) must be established, implemented and maintained in line with the respective undertaking's business and risk management strategy, its risk profile, objectives, risk management practices and the long-term interests and performance of the undertaking as a whole. The remuneration schemes must also incorporate measures aimed at avoiding conflicts of interest. Furthermore, the remuneration schemes must promote effective risk management and must not encourage risk-taking that exceeds the risk-tolerance limits of the undertaking.

Pursuant to the MR GCP, specific agreements must be concluded for a group of individuals that includes AMSB members, persons who effectively run the business, key functions and risk takers. These agreements must take the following into account in particular:

Where the remuneration schemes for this group of individuals include both fixed and variable components, such components must be balanced so that the fixed or guaranteed component represents a sufficiently high proportion of the total remuneration. This ensures that employees are not overly dependent on the variable components.

The payment of a substantial portion of the variable remuneration component must contain a flexible, deferred component that takes account of the nature and time horizon of the undertaking's business. This deferral period must be no less than three years and must be aligned with the nature of the business, the risks, and the activities of the employees in question. Further general requirements and specific agreements are regulated by the MR GCP.

AMSB

The principles for the members of the AMSB of Munich Reinsurance Company are documented in the Solvency II: Compensation Policy of Munich Reinsurance Company. They are fully taken into consideration in the compensation systems of the AMSB of Munich Reinsurance Company. With regard to the remuneration for the Board of Management of Munich Reinsurance Company, the relation of fixed and variable remuneration components was chosen such that it is balanced as far as the amount of remuneration is concerned, and does not result in any misplaced incentives to take unreasonable risk.

For the members of the AMSB of other undertakings belonging to Munich Re (Group), the principles are set out in the compensation policy of the individual undertaking. All compensation policies of the undertakings of Munich Re (Group) required to implement this policy must comply with the aforementioned principles of the MR GCP.

Employees

The employees of Munich Reinsurance Company are subject to the principles laid down in the MR GCP. Another policy sets out the principles of compensation and contract terms for top managers in Munich Re's International Organisation.

The Human Resources Policy regulates not only the compensation of all employees that are not covered by the Compensation Policy for top managers in Munich Re's International Organisation, but also other benefits after termination of employment, lump-sum settlements, succession planning and staff development. The Human Resources Policy is in line with regulations at Munich Re

and with the MR GCP. The remuneration components are regulated by internal company agreements and by corresponding policies pursuant to the German Managerial Staff Committee Act (SprAuG) and on the basis of individual contracts.

The remuneration scheme at ERGO is based on statutory, collective bargaining and company requirements and regulations. The principles of compensation are described in the Compensation Policy for ERGO Group AG and its subsidiaries.

Individual and collective performance criteria

AMSB

In 2018, a new remuneration system was introduced for the members of the Board of Management of Munich Reinsurance Company. Details on the new structure of the remuneration system for the Board of Management of Munich Reinsurance Company and on the parameters used are available in the remuneration report of the 2019 Annual Report of Munich Re (Group) under "Remuneration of the members of the Board of Management in 2019".

Members of the Supervisory Board of Munich Reinsurance Company receive fixed remuneration only.

For members of the AMSB of Munich Re (Group) whose variable remuneration is performance-related, the total amount of the variable remuneration is based on a combination of assessments of the performance of the individual and of the divisional unit concerned on the one hand, and the overall performance of the relevant undertaking or the Group on the other. Financial and non-financial criteria must be taken into account as part of the assessment of an individual's performance.

The remuneration structure for the risk takers in the International Organisation is largely geared to the remuneration scheme for members of the Board of Management of Munich Reinsurance Company.

The remuneration system for risk takers on international assignments is largely geared to the principles of remuneration for top managers in Munich Re's International Organisation.

Senior executive staff

The fixed components for Munich Reinsurance Company senior executive staff (including holders of key functions) comprise a fixed annual basic remuneration, paid out as a monthly salary, plus market-standard fringe benefits and remuneration in kind (most notably a company car and a company pension scheme). The variable components are made up of the short-term components "performance-related bonus" and "Company result bonus", and the share-price-linked component Mid-Term Incentive Plan.

As part of the realignment of the variable remuneration component, a transitional solution was agreed for the short-term components "performance-related bonus" and "Company result bonus".

The Company result bonus gives employees a share in corporate success. The key indicator used for the Company result bonus is the return on risk-adjusted capital (RORAC).

The targets correspond to the Group objective for the variable remuneration of members of the Board of Management.

Depending on the degree to which the RORAC target is met, an aggregate amount is calculated that can be distributed among staff as a bonus. The higher the management level, the higher the share of the Company result bonus in the staff member's total remuneration. The way this bonus works ensures that the performance of Munich Re as a whole is systematically reflected in the remuneration of all staff and that the bonus amount bears a reasonable relationship to overall corporate performance.

The Mid-Term Incentive Plan, with a duration of three years, provides senior executive staff with a share in the Company's sustainable added value and is based on quantitative multi-year targets. In addition, the development of the total shareholder return is taken into account. By measuring the objectives and the total shareholder return over a period of three years, a flexible deferred component is achieved under the Mid-Term Incentive Plan. The possibility of a downwards adjustment for exposure to current and future risks is included.

Besides the senior executive staff in Munich, selected executives in Munich Reinsurance Company's International Organisation also participate in the Mid-Term Incentive Plan.

The individual variable components are granted – subject to different weightings – at all management levels. For the first management level below the Board of Management, the share of aggregate variable remuneration is more than 50% of total remuneration (fixed remuneration plus all variable components). Proceeding down the management hierarchy, this percentage decreases successively, making up around one-third at the lowest management level. There is a well-balanced combination of short- and long-term components. At the first management level below the Board of Management, the Mid-Term Incentive Plan makes up around 25% of total remuneration, or more than 50% of overall variable remuneration, so that there is provision for a longer-term incentive system. No guaranteed variable remuneration components are granted.

A total remuneration approach is applied to senior executive positions at ERGO. This includes not only basic and variable remuneration components but also provision for old age and any remuneration in kind.

The remuneration system for senior executive staff at ERGO is structured in such a way that

– it is geared to achievement of the objectives laid down ERGO's strategy; in the case of changes in strategy, the structure of the remuneration system is reviewed and adjusted as required;
– it avoids negative incentives, in particular conflicts of interest and taking disproportionately high risks, and does not run counter to the monitoring function of the control units;
– it takes adequate account of significant risks and their time horizon.

The monetary remuneration for senior executive office-based staff comprises fixed remuneration only. Agreements made prior to 1 January 2018 concerning variable remuneration, the payment of which depends on the achievement of long-term incentives, will remain unaffected until the end of the agreed period in question. The monetary remuneration for senior executive sales staff comprises fixed remuneration and a variable sales success component. We regard all remuneration components – individually and as a whole – as adequate. Information on the structure and changes to the remuneration parameters relevant to senior executive staff are provided in writing.

Non-executive staff

The fixed components for Munich Reinsurance Company non-executive staff comprise a fixed annual basic remuneration, paid out as a monthly salary and as a holiday and Christmas bonus, plus standard market fringe benefits and remuneration in kind. The variable components are made up of the short-term components "performance-related bonus" and "Company result bonus". The components correspond to those of senior executive staff.

All other international staff in the reinsurance field of business are paid an annual Company result component, 50% of which is based on global financial performance indicators. The other 50% is based on local or regional value-based management indicators. Non-executive staff must also undergo individual performance appraisals on which their annual bonus payment depends. For this purpose, objectives are agreed with the staff member's manager at the beginning of the appraisal period, and the achievement of these objectives is appraised at the end of that period.

The remuneration for non-executive staff at ERGO is based on the collective bargaining agreements for the private insurance industry and on internal company agreements concluded at local and regional level.

Non-executive staff also receive fringe benefits that are described in the collective bargaining agreements for the private insurance industry and in internal company agreements concluded at local and regional level.

Supplementary pension or early retirement schemes

AMSB

Members of the AMSB of Munich Re (Group) are generally entitled to pension benefits from a defined contribution plan. Early retirement schemes are geared to the respective country-specific circumstances. Details on supplementary pensions or early retirement schemes for members of the Board of Management of Munich Reinsurance Company are available in the remuneration report of the 2019 Annual Report of Munich Re (Group). Members of the Supervisory Board of Munich Reinsurance Company are not entitled to pension benefits.

Senior executive and non-executive staff

The pension scheme for senior executive and non-executive staff at Munich Reinsurance Company was reorganised as at 1 January 2019. If a disability is deemed to exist, senior executive and non-executive staff receive an occupational disability pension. The amount of disability pension is based on a fixed percentage of the basic salary. Surviving dependants of senior executive or non-executive staff receive a lump-sum payment. If senior executive or non-executive staff leave the service of the Company before a benefit becomes payable, the rules and regulations of the German Company Pension Act apply. In addition, senior executive and non-executive staff who joined the Company prior to 1 January 2019 are members of the Munich Re pension scheme, which is a defined contribution plan.

Senior executive and non-executive staff at ERGO are entitled to a company pension. Under this pension scheme, benefits for senior executive staff are based on individual contractual agreements in the staff member's employment contract, and benefits for non-executive staff on are based on internal company agreements.

Material transactions

If members of the Company's Board of Management or Supervisory Board or any persons closely associated with them undertake transactions with shares, debt instruments of Munich Reinsurance Company or with associated derivatives or other related financial instruments, these transactions must be immediately notified to the Company if the total amount of transactions carried out by the Board member or person closely associated with them in a calendar year totals or exceeds €5,000 (with effect from 1 January 2020: €20,000) within that calendar year.

Munich Reinsurance Company publishes information of this kind on its website without undue delay at https://www.munichre.com/en/company/investors/mandatory-announcements/managers-transactions.html.

B2 Fit and proper requirements

Description of the specific requirements

The Solvency II: Fit and Proper Policy (F&P Policy) of Munich Reinsurance Company existing since 2015, a revised version of which came into force in 2017, lays down criteria, procedures and responsibilities to ensure the fitness and propriety of persons who effectively run the undertaking or perform other key tasks. Insurance undertakings in the EU/EEA and insurance holding companies domiciled in Germany must adopt a policy that is equivalent to the F&P Policy of Munich Reinsurance Company. By contrast, insurance undertakings outside the EU/EEA and non-insurance undertakings worldwide that are classified as risk units are obliged to implement the main requirements of the F&P Policy. Non-insurance undertakings worldwide that are not classified as risk units are only obliged to comply with local legal fit and proper requirements.

Every undertaking that is obliged to implement these requirements must adapt its F&P Policy to the local legal requirements. In the event of a contradiction, local law takes precedence. If the local legal requirements are less stringent than the requirements of the Fit and Proper Policy of Munich Reinsurance Company, the requirements of the latter apply.

The specific requirements of Munich Reinsurance Company concerning skills, knowledge and expertise applicable to the persons who effectively run the undertaking or have other key tasks are based on the relevant supervisory requirements.

Only persons that have the skills, knowledge and expertise necessary to perform the tasks assigned to them in an orderly manner may be employed to effectively run the undertaking or to be responsible for other key tasks. The fitness requirements set out depend on the responsibilities they have and the work they do. Where management duties are to be undertaken, experience in management should be taken into consideration.

Proportionality is to be applied in meeting the requirements concerning the skills, knowledge and expertise of the persons concerned.

The assessment of whether the persons who effectively run the undertaking or perform other key tasks are deemed fit includes an assessment of their professional and formal qualifications, knowledge and relevant experience within the (re)insurance sector, in other financial sectors or in other undertakings, and takes into account the duties assigned to the persons concerned and – where relevant to the position in question – their (re)insurance, financial, accounting, actuarial and management skills.

Persons who effectively run the undertaking

The undertakings of Munich Re (Group) must determine individually which persons effectively run the undertaking.

The persons who effectively run Munich Reinsurance Company include the members of the Board of Management and the heads of branches both inside and – pursuant to a decision by the Board of Management and Supervisory Board – outside the EU/EEA.

Members of the Board of Management have individual responsibility for their divisions and overall responsibility for Munich Reinsurance Company, and must be fit to assume such responsibilities. This is monitored by the Supervisory Board. They must also be able to ensure compliance with the governance requirements at Munich Re (Group) level.

The responsibilities assigned to each individual member of the Board of Management are set out in the distribution of responsibilities.

Collectively, the members of the Board of Management must have appropriate qualifications, experience and knowledge in the following areas as a minimum:

– Insurance and financial markets
– Business strategy and business model
– System of governance
– Financial and actuarial analysis
– Regulatory framework and requirements
– Internal model (risk model)

Each individual member of the Board of Management must have sufficient knowledge of all areas to be in a position to understand and exercise supervision over the actions of other members of the Board of Management. When changes are made to the membership of the Board of Management, the collective knowledge of the members of the Board of Management should be maintained at an appropriate level at all times.

The members of the Board of Management of Munich Reinsurance Company in 2019 have the professional qualifications, knowledge and experience to guarantee the sound and prudent management of Munich Reinsurance Company. They therefore have the requisite fitness.

Heads of branches inside and outside the EU/EEA are subject to the aforementioned requirements concerning members of the Board of Management in proportion to

– the influence they are able to exert on decisions at Munich Reinsurance Company,
– the significance of their branch, and
– the ability of the head of a branch to exert specific influence over outcomes, results and decisions.

All heads of branches of Munich Reinsurance Company meet the fitness and propriety requirements.

Persons responsible for other key tasks

The undertakings of Munich Re (Group) both inside and outside the EU/EEA must determine individually which persons perform other key tasks.

Persons who perform other key tasks at Munich Reinsurance Company include:

– members of the Supervisory Board, and
– holders of key functions (RMF, compliance, internal audit and actuarial function) and their deputies. The holders of key functions have overall responsibility for the Group.

Munich Reinsurance Company currently has no staff who perform additional "other key tasks" at Group level, it has not outsourced key tasks, and it has no staff who perform tasks relating to other key tasks of Munich Reinsurance Company and tasks transferred to them that are specific to those key tasks.

Members of the Supervisory Board must always have the experience and knowledge required to exercise appropriate control over and supervise the Board of Management of Munich Reinsurance Company, and to actively oversee the development of the undertaking. In order to fulfil that function, they must understand the business conducted by the undertaking and be able to assess the risks for the undertaking. Members of the Supervisory Board must be familiar with laws and regulations of relevance to the undertaking. A basic knowledge of risk management specific to insurance is useful. Collectively, the Supervisory Board must in any case have expertise in the areas of investment, underwriting and accounting. Each time a new member of the Supervisory Board is appointed, but at least once annually, it is necessary to demonstrate to the Federal Financial Supervisory Authority (BaFin) which members of the Supervisory Board have expertise in these areas.

Maintenance of fitness includes ongoing training to ensure that the members of the Supervisory Board are in a position to meet changing or increasing requirements relating to their responsibilities at the undertaking.

Notwithstanding that, each and every member of the Supervisory Board must possess sufficient theoretical and practical knowledge of all areas of the business to guarantee that appropriate control is exercised. The knowledge and experience of other members of the Supervisory Board are no substitute for the fitness of an individual member. A member of the Supervisory Board does not, in principle, have to have specialist knowledge, but must be capable of recognising when it is necessary to seek advice.

At least one member of the Supervisory Board must have expertise in accounting or auditing. The members of the Supervisory Board must collectively be familiar with the sector in which Munich Reinsurance Company operates.

The skills, knowledge and expertise needed to exercise supervision may also have been acquired in the course of exercising (previous) functions in other sectors or in public administration, or political mandates, provided that such functions or mandates involved or involve dealing with economic and legal issues over a prolonged period, and were not or have not been purely secondary in nature.

Other specific requirements are set out in the sets of criteria for the shareholder and employee representatives.

The members of the Supervisory Board of Munich Reinsurance Company in 2019 have the professional qualifications, knowledge and experience to supervise the Board of Management of Munich Reinsurance Company in a professional manner. They therefore have the requisite fitness.

Holders of key functions must always be in possession of the professional qualifications, knowledge and experience necessary for them to fulfil their position in the key function. The tasks assigned to each holder of a key function arise from the current responsibilities, and are documented in the requirement profile for each holder of a key function, where the fitness requirements are also described in detail. Collectively, the key functions must guarantee the effectiveness of the system of governance at the undertaking. Deputies of holders of key functions must also be deemed to have the requisite fitness.

The holders of key functions in 2019 have the professional qualifications, knowledge and experience to perform the relevant tasks. They therefore have the requisite fitness.

Assessment of fitness and propriety

The undertakings of Munich Re (Group) that are obliged to implement these requirements must determine in their respective F&P Policy the applicable provisions concerning the assessment of the fitness and propriety of persons who effectively run the undertaking or perform other key tasks.

Munich Reinsurance Company carries out an internal assessment of the fitness and propriety of persons who effectively run the undertaking and perform other key tasks prior to a first appointment, election, assignment of responsibility, or necessary reassessment. A reassessment is performed after a maximum of five years if there have been no grounds for an earlier reassessment. This applies in particular when facts and circumstances give reason to believe that a person may no longer meet the fit or proper requirements, or significant changes are made to the duties assigned. In addition, a reassessment is always carried out when the appointment of a member of the Board of Management is due for renewal and a member of the Supervisory Board is due for re-election.

The assessment or reassessment is carried out on the basis of appropriate documents. When assessing professional qualifications, these documents include a detailed curriculum vitae, employer references and evidence of further training or education. With regard to propriety, these documents comprise the BaFin form "Persönliche Erklärung mit Angaben zur Zuverlässigkeit" (personal declaration with information on propriety), a police certificate of good conduct, and an excerpt from the Gewerbezentralregister (Central Trade Register). The result of the assessment of fitness and propriety and the reasons for the result must be documented.

Munich Reinsurance Company notifies BaFin in writing of the following persons concerned who effectively run the undertaking or perform other key tasks:

– Members of the Board of Management
– Heads of branches in the EU/EEA
– Members of the Supervisory Board
– Holders of key functions

At Munich Reinsurance Company, the following bodies and organisational units are responsible for the assessment of the fitness and propriety of the persons who effectively run the undertaking or are responsible for other key tasks:

– The Supervisory Board is responsible for assessing members of the Board of Management and – taking account of the rules of co-determination – of the members of the Supervisory Board.
– The Board of Management is responsible for the assessment of heads of branches inside and outside the EU/EEA and of holders of key functions.

The persons concerned have a duty towards Munich Reinsurance Company to cooperate in the assessment of their fitness and propriety. In particular, they must submit to Munich Reinsurance Company all necessary documents and declarations on time, in full and in the required form. Members of the Supervisory Board must additionally submit an annual self-assessment of their fitness for the office.

B3 Risk management system including the own risk and solvency assessment (ORSA)

Description of the risk management system: Strategies, processes and reporting procedures

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).

Control and monitoring systems

Our internal control system (ICS) is described in section B 4.

Risk management function

The RMF is one of four key functions within (re)insurance undertakings under Solvency II. The RMF at Munich Re is carried out locally in the individual fields of business, at MEAG – the asset manager of the Group – and in the individual insurance undertakings of the Group, as well as centrally by the central division IRM.

IRM is responsible for an integrated and Group-wide view of all risks. Its responsibility encompasses the recognition of all relevant risks, the quantification of capital requirements and a qualitative risk management process, including the development of the Group's risk strategy.

IRM is responsible for the following in particular:

- Risk identification and control
- Group-wide risk reporting
- Group-wide emerging risk management
- Internal control system and operational risk management
- Group-wide accumulation control
- Information security and business continuity risk management

– Development and maintenance of the Munich Re capital model
– Models to quantify relevant risks; calculation of risk capital
– Allocation of risk capital for management purposes (in coordination with the gatekeeper process defined by Reinsurance Controlling)
– Scenario calibration
– Risk strategy, including the definition of limit and trigger values (risk tolerance) and the ORSA
– Development of replication portfolios for measuring market risk and managing assets (for the reinsurance group)
– Risk governance

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 (including management of cyber risks).

Governance of the internal model

IRM informs the Board of Management and Supervisory Board of Munich Reinsurance Company on an ongoing basis about the correct functioning of the Group-wide internal model. The Group Risk Committee is informed annually by IRM about the results of the validation. It is the responsibility of the Group Risk Committee to guarantee that Munich Re has adequate systems in place for identifying and measuring risks at Group and segment level. This includes the setting of principles and minimum requirements that apply throughout the Group for the development of risk models and systems.

The results of the validation are included in the annual ORSA and are challenged and approved by the Board of Management of Munich Reinsurance Company. Validation is largely carried out by internal staff in the RMF of Munich Reinsurance Company and ERGO Group AG on the basis of a guideline applicable throughout the Group.

The actuarial function supports the RMF, in particular in shaping and implementing the internal model, for instance with regard to homogeneous risk groups or significant risks. The actuarial function also provides its actuarial expertise when testing and validating the internal model.

To ensure the necessary regular exchange of information between the key functions of the Group, the heads of the key functions regularly share important findings, for instance in the form of reports.

Implementation of the risk management system in the Group

We implement risk management consistently throughout the Group with the help of local mirror functions in the Group companies and specific risk management functions at Munich Reinsurance Company. The risk management objectives and principles define the basic framework for a consistent application of risk management standards throughout the Group. Strict adherence to these principles, risk management components and functions may pose a challenge in smaller-sized Group undertakings with limited human resources. In these instances, practical solutions are sought in adherence with the principle of proportionality. This means that the minimum requirements with regard to risk management must always be met taking into account undertaking-specific risks and the nature, size and complexity of the undertaking and its operations.

There is a clear assignment of roles and responsibilities between the central RMF at Group level (central function) and the RMF at individual undertakings (local mirror functions). The central function develops a framework and sets standards, ensures consistent methods, defines risk appetite and permanently ensures a common risk culture. The local units adapt and implement the framework. They act within guidelines, incorporate local specifics (e.g. legal requirements and provisions) and provide local knowledge. Further principles are:

– Standardised risk management set-up for undertakings in terms of risk management components.
– Representation at Board level: Reporting directly to a member of the local board of management (e.g. the Chief Financial Officer, CFO, or Chief Executive Officer, CEO) or the local board or senior management.

In the primary insurance and reinsurance fields of business, important risk management structures, concepts and components such as the ICS and legal entity capital models have been implemented consistently in the bigger undertakings with complex risk situations.

Own risk and solvency assessment – ORSA

The ORSA encompasses processes in the area of risk management, business strategy/planning and capital management. The main task of the ORSA is to combine these processes, to collect and assess the outcome of the individual processes, and to report these results at regular intervals.

It lies within the responsibility of the Group CRO to carry out the Group ORSA. The adequacy of the ORSA Policy is reviewed by the Group Risk Committee on a regular basis. The Group Risk Committee (GRC) recommends to the Board of Management that they give final approval of the document.

The results and findings of the individual procedures and processes throughout the year serve as the basis for the ORSA result report. Once the ORSA has been performed and the results have been challenged and approved by the Board of Management, communication of the results and conclusions is ensured by the Group CRO (or local head of risk management).

Certain circumstances may require a non-regular ORSA (ad-hoc ORSA). Changes in internal and/or external factors leading to a fundamental change in the risk profile and/or own funds of Munich Re, may trigger the need for an ORSA outside the regular time-scale. The results of the non-regular ORSA are reported without delay to the group supervisor outside the regular reporting dates.

The ORSA is closely linked to the Group-wide planning process, the main element of the Group-wide risk strategy and the respective decision-making processes.

The regular ORSA activities associated with the business planning process are conducted annually. The risk and solvency position is monitored on a quarterly basis. The required frequencies for the entirety of processes that contribute to the regular ORSA are defined individually.

The ORSA results and conclusions of the business planning process are submitted to the Board of Management on an annual basis. Findings from regular risk and solvency monitoring activities that are relevant to the ORSA are included in the quarterly internal risk report.

The ORSA report is discussed with the Audit Committee of the Supervisory Board. The main findings and conclusions of the ORSA are presented to the Supervisory Board.

Interaction between capital and risk management

We manage our business on the basis of a consolidated Group view, using a comprehensive internal model to determine the capital needed to ensure that the Group is able to meet its commitments even after extreme loss events. We use the model to determine 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.

Other Munich Re undertakings within the scope of application of Solvency II use either the internal model, where available, or the standard formula under Solvency II to calculate their solvency capital requirement.

The results of the internal model are used for carrying out the ORSA. Further capital requirements (e.g. rating capital) are taken into account accordingly.

The forward-looking assessment of capital adequacy is based on projections of own funds and of capital needs over the business planning time horizon. Where necessary, this information may be complemented by an assessment based on other capital requirements (e.g. rating capital). To this end, the respective models are calibrated to the best estimate exposures pursuant to the planning process.

The target capitalisation levels are set out in the risk strategy of Munich Re. Capital adequacy is assessed on a quarterly basis.

The ORSA identifies the potential capital needed to manage Munich Re according to its risk and business strategy. More specifically, the outcome of the ORSA feeds into the development of a capital management plan over the business planning time horizon.

To sum up, the risk strategy, business strategy and capital management of Munich Re are closely interlinked.

B4 Internal control system

Description of the internal control system

Our internal control system (ICS) is an integrated system for managing operational risks that covers all risk dimensions and areas of the Group. It addresses Group management requirements, while complying with local regulations.

For each field of business, the ICS delivers a risk map at process level, thereby systematically linking every step in a process to the significant risks and the controls relating to them. By making our risk situation transparent in this way, we can react to weaknesses in a targeted manner. This enables us to identify operational risks at an early stage, locate control shortcomings immediately and take effective remedial action.

Controls carried out for the ICS at undertaking level are based on internationally recognised internal control standards.

The Audit Committee of the Supervisory Board regularly requests reports on the effectiveness of the ICS and on changes to the risk and control landscape compared with the previous year. The reports describe the controls applied and state whether all controls considered necessary have been carried out correctly.

The reports of our external auditors and Group Audit support this.

The identification, management and control of risks arising out of the accounting process is indispensable for the production of reliable annual financial statements at both consolidated and solo-undertaking level. Risks significant for financial reporting from a Group perspective are integrated into the ICS in accordance with uniform criteria. The ICS risk map is checked annually by the risk takers, and updated and amended as necessary.

Implementation of the ICS

Based on a standardised methodology, the ICS has been implemented throughout Munich Re. The decision about whether to include a Group undertaking in the standardised ICS was taken on the basis of the principle of proportionality – with due consideration being given to the nature, scale and complexity of the risks inherent in the undertaking's operations, and to compliance with regulatory and legal requirements. The Group undertakings that have not been integrated into the Group standard process control their risks in compliance with the principles of good corporate governance, Group-wide principles of risk management and national laws.

Description of the compliance function

The Board of Management of Munich Reinsurance Company has assigned the development, implementation, monitoring and ongoing improvement of the Group-wide compliance management system (CMS) to the compliance function. The Board of Management of Munich Reinsurance Company expects the legally independent undertakings of the Group to implement these requirements accordingly.

It is the responsibility of the compliance function to define the necessary organisational measures for compliant behaviour for top management, senior management and staff, and to monitor compliance with these measures. Where there is a reasonable suspicion of non-compliant behaviour or there are doubts about compliance with legal or regulatory requirements, the Group Chief Compliance Officer (GCCO) can initiate measures or an investigation. If the compliance requirements are not met, the GCCO reports the matter to the Board of Management or to the responsible member of the Board of Management of the undertaking in question.

To this end, the compliance function has set up an adequate Group-wide compliance organisation that takes into account the relevant structure, business, risks and special features of the business model, and performs the following tasks:

- The early-warning function comprises an assessment of the effects of emerging legal changes on Munich Re. In this context, the undertakings of Munich Re regularly report on changes in their legal environment and their effects (risk of legal change). These are captured by the compliance function at Group level. Where necessary, follow-up measures are taken.
- Risk control duties include the identification, assessment and monitoring of compliance risks within Munich Re. There is a process that identifies risks and defines adequate measures for their clarification, solution and mitigation, and follows up the implementation of these measures.
- Monitoring duties refer to compliance with the relevant legal, regulatory and internal rules and regulations within Munich Re. The compliance organisations of Munich Re develop suitable compliance controls and monitor risk-based compliance with these controls.
- The compliance function of Munich Re (Group) and the Groupwide compliance organisation provide advice and training for top and senior management, managers and staff with regard to compliance issues.

Group Compliance and Legal manages the compliance activities of Munich Re by means of Group-wide terms of reference, and monitors their implementation on the basis of the compliance management system (CMS). The CMS is the methodological framework for the structured implementation of early warning, risk control, consulting and monitoring tasks, and the monitoring of the legal environment.

The seven core areas of the CMS are: compliance culture and strategy; compliance risk management; organisation and procedures; consulting, communication and training;

compliance reporting; monitoring; and documentation of compliance activities.

Each core area comprises different, undertaking-specific compliance activities. The scale and nature of implementtation of these compliance activities focuses on the size of the respective undertaking, and the nature and scale of the business. Irrespective of its organisational set-up, each undertaking belonging to the Group must have appropriate organisational measures in place in order to ensure that legal, regulatory and internal requirements are complied with, including but not limited to the following compliance topics:

– Financial crime
– Financial sanctions
– Antitrust law
– Data protection law

Where other departments or central divisions are responsible for compliance topics, the compliance organisation must monitor the methodological adequacy and effective implementation of these activities (methodological expertise).

The compliance whistleblowing portal was set up as another channel to complement the independent external ombudsman, and thus strengthen compliance within Munich Re. Staff and third parties can use this portal to anonymously report suspected criminal behaviour such as bribery and corruption, contraventions of antitrust laws, insider trading rules and data protection laws, and other activities that may cause reputational damage.

B5 Internal audit function

Mandate of Group Audit

Group Audit supports the Board of Management in performing its management control and monitoring tasks. It audits in particular the appropriateness and effectiveness of the system of governance and internal control system of Munich Re (Group).

Organisational set-up

Group Audit is an independent central division of Munich Reinsurance Company. The Head of Group Audit reports directly to the Chairman of the Board of Management of Munich Reinsurance Company and has an indirect reporting line to the Audit Committee of the Supervisory Board of Munich Reinsurance Company.

Some undertakings of Munich Re (Group) have their own audit units to carry out audits. Functionally, these are downstream audit units of Group Audit that usually have a direct administrative reporting line to the boards of management of the individual undertakings. These downstream audit units have a direct or indirect functional reporting line to Group Audit.

Main duties

A uniform management framework for all Munich Re audit units, including Group Audit itself, is based on the following binding requirements:

- Minimum requirements regarding the specific form of the audit function
- Uniform processes, procedures and methods, instruments, software and standards for planning and executing audits (audit reports, quarterly and annual reports), measures tracking and quality management
- Reporting duties of downstream audit units.

The audit mandate of Group Audit, as the internal audit function of Munich Re, directly covers all fields of business and their subsidiaries. The audit mandate of Group Audit also encompasses topics concerning the Group as a whole, and topics that are relevant for the management and risk management of Munich Re.

Independence and objectivity

The audit activity of Group Audit is based on national and international regulatory requirements and standards for professional internal audit practice. This applies in particular to the principles and rules governing adequate independence and objectivity of the internal audit function. An appropriate position in the organisational structure, a strict segregation of duties, and comprehensive quality assurance for audits ensure that the independence and objectivity of the internal audit function is adequately maintained.

We are not aware of any undue influence on the audit function that might have compromised its independence and objectivity in carrying out its duties in the year under review.

Independence

Group Audit is not subject to any instructions in planning and performing audits, or in evaluating and reporting the audit results.

The right of the Board of Management or Chairman of the Board of Management to request additional audits does not compromise the independence of Group Audit. Group Audit has the right to carry out ad-hoc audits outside the annual planning schedule. Group Audit is obliged to follow instructions only from the Board of Management or Chairman of the Board of Management of Munich Reinsurance Company.

The Head of Group Audit has the opportunity to draw attention to situations in which the independence of the internal audit function could be endangered.

Objectivity

The staff working in Group Audit are not entrusted with non-audit work. In particular, they do not perform tasks that could be incompatible with the audit function. Staff from other departments of the undertaking may not be entrusted with internal audit tasks. However, this does not rule out staff outside Group Audit that are not permanently employed in Group Audit on the grounds of their specialist knowledge or for personal development purposes.

When assigning audit staff to audits, care is taken to ensure that no conflicts of interest arise, so that auditors are able to perform their tasks with adequate impartiality and objectivity.

B6 Actuarial function

Since 1 April 2013, the actuarial function (AF) of Munich Re has been part of the Integrated Risk Management central division that is within the responsibility of the Chief Financial Officer of Munich Reinsurance Company. The AF of the Group also serves as the AF of Munich Reinsurance Company. It defines standards and basic rules for the actuarial functions of all fields of business with regard to Solvency II. The AF of Munich Re is responsible for the following:

- Coordinating the calculations of technical provisions and their regular review
- Ensuring the appropriateness of the methodologies and underlying models used, as well as of the assumptions used in the calculation of the technical provisions
- Assessing the sufficiency and quality of the data used to calculate the technical provisions
- Expressing an opinion on the overall underwriting and acceptance policy
- Expressing an opinion on the adequacy of the reinsurance agreements of the Group
- Preparing a written report for the management and supervisory bodies

For the property-casualty reinsurance, life reinsurance, and ERGO segments, individual segment AFs have been put in place that implement the requirements of the AF in their respective areas and cooperate with the AF. The heads of the relevant central divisions have a direct functional reporting line to the Group AF.

The Group undertakings within the scope of application of Solvency II have their own AFs in place. The AFs of the undertakings allocated to the ERGO field of business have a direct functional reporting line to the segment AF; the AFs for the reinsurance field of business have a direct functional reporting line to the Group AF and also work together with the segment AFs.

The AF of Munich Re notifies the Board of Management of its main activities and their outcome in writing once a year in the Group Actuarial Function Report. Severe events regarding the aforementioned responsibilities are reported by the Group AF on an ad-hoc basis to the Group Committee of the Board of Management. The Group Actuarial Function Report is also submitted to the Audit Committee of the Supervisory Board.

B7 Outsourcing

Outsourcing policy

In accordance with the relevant Solvency II supervisory requirements, the Board of Management of Munich Reinsurance Company has adopted a policy defining the minimum requirements for outsourcing (re)insurance activities and functions to service providers. This outsourcing standard, which applies directly to Munich Reinsurance Company, has been communicated as a Group-wide standard throughout Munich Re (Group), and is monitored accordingly.

The outsourcing policy of Munich Reinsurance Company describes the principles, minimum requirements, responsibilities, processes and reporting requirements to be adhered to during all stages of the outsourcing process, i.e. planning, implementation and termination (including contingency planning) of the relevant organisational measures. In accordance with the principle of materiality, and depending on the risks identified in each case, Munich Reinsurance Company may set different requirements for the granularity of the measures and processes in order to adequately ensure the continuity and unimpaired quality of the outsourced services at all times.

Outsourcing of critical or important operational activities or functions

Munich Re outsources important (re)insurance activities and functions within the Group, and to external service providers. An indicator for important outsourcing is when a Group member outsources an essential part of its (re)insurance activities and functions to a service provider, and the respective Group member is no longer fully capable of delivering its services to policyholders without the outsourced activity or function. From the perspective of Munich Re (Group), on the other hand, the outsourcing is classified as important if it may also cause material risks for Munich Re.

Munich Re (Group) has high expectations and standards regarding service provision, irrespective of whether the services are provided by internal service providers (intra-Group outsourcing) or by external service providers outside the Group. Nevertheless, different internal processes are applied for selecting and managing service providers in each case.

List of important outsourcing activities of Munich Re (Group)

Name of service provider	Scope of outsourcing
MEAG AMG	Outsourcing of asset management of Munich Re (Group).
ERGO Group AG	Outsourcing of important insurance activities and functions of the German insurance undertakings in the ERGO field of business.
ERGO Beratung und Vertrieb AG	Outsourcing of the operations of the Vertrieb AG German insurance undertakings within the ERGO field of business to a central sales entity.

B8 Any other information

Assessment of the adequacy of the system of governance

Munich Re (Group) has a system of governance that is adequate for the nature, scale and complexity of the risks inherent in its business. Its organisational structure is transparent, and there is a clear allocation of tasks and responsibilities. The organisational structure of the entities within the Group is documented, and updated on a regular basis.

The entities of the Group comply with the organisational principle of an adequate segregation of responsibilities. An effective internal communication system is in place. Clear functional and disciplinary reporting lines ensure the prompt transfer of information to all persons who need it in a way that enables them to recognise its importance as regards their respective responsibilities. The adequacy of Munich Re's organisational structure is reviewed on a regular basis by the organisational function at Group and field-of-business level.

The RMF, compliance, internal audit, and AF key functions are in place at Munich Re (Group). At a minimum, they perform their tasks in accordance with supervisory requirements for the respective key function. The responsibilities of the key functions are defined at Group level, and at the level of the individual fields of business or entities of the Group. Outsourced key functions are monitored by the entities concerned in line with requirements.

The terms of reference regarding the operational structure of Munich Re (Group), and the responsibility for meeting these terms, are defined in a policy. Processes that are subject to material risks must fulfil the requirements regarding documentation and communication set out in the policy. Business continuity plans have been developed and implemented.

The Board of Management complies with its responsibility for checking the adequacy of the system of governance on a regular basis. All Group-wide key functions perform regular self-assessments.

Any other material information regarding the system of governance

For the reporting period, there is no other material information regarding the system of governance of Munich Re (Group).

Risk profile

C

C Risk profile

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 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 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 "Solvency capital requirements (SCR)" shows the solvency capital requirement for Munich Re and its risk categories as at 31 December 2019.

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, account was taken for the first time of the static volatility adjustment for DKV Belgium S.A., ERGO Insurance N.V. (Belgium), ERGO Lebensversicherung AG and Victoria Lebensversicherung AG.

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

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	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 provisions.

C1 Underwriting risk

Property-casualty

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.

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. The purpose of these vehicles is to securitise underwriting risks, mostly in the area of natural catastrophes, and to issue catastrophe bonds (insurance-linked securities).

Munich Re mainly uses special purpose vehicles registered in Ireland to transfer risk to the capital markets, but there are currently also two other special purpose vehicles from Bermuda. All special purpose vehicles are properly licensed and registered by the respective supervisory authorities. Underwriting liabilities are always fully funded. In order to minimise potential credit risk, investors' collateral is regularly invested in securities with the highest credit rating – for example, in US treasuries or World Bank bonds. The value of the collateral is checked regularly by a trustee and by means of regular reporting.

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**

→

	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

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.

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 requirement (SCR) Life/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**

C2 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.

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 that of the liabilities[3] was 6.3 (5.8). A decrease in interest rates of one basis point would increase available own funds by approximately €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.

3 The liabilities mainly comprise the technical provisions in accordance with Solvency II (best estimate and risk margin).

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	-5,705	-4,572	-2,373	-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	-8,038	-7,131	-907	-12.7
Total	**10,080**	**9,217**	**863**	**9.4**

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.

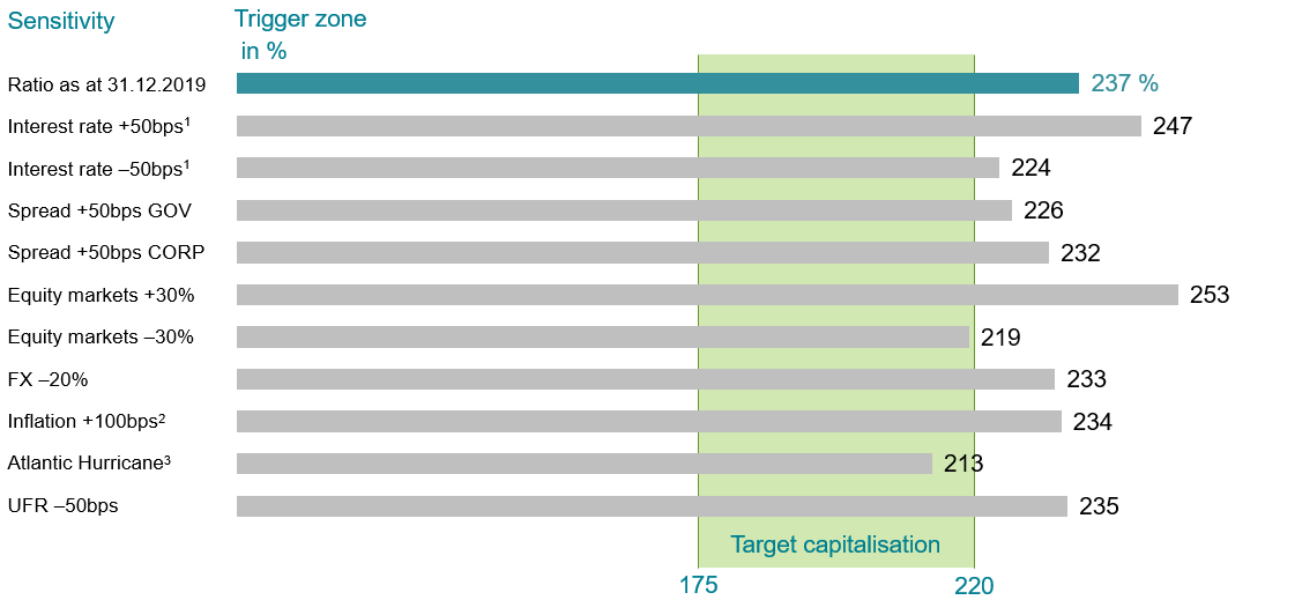
Independently of the scenario-based simulation calculations of the risk model, we determine the sensitivities of basic own funds and of the SCR with respect to possible future changes in certain capital market parameters on a regular basis.

The impact of these market scenarios (and other stress scenarios) on the solvency ratio of Munich Re (Group) is shown in the following table. The solvency ratio of 237% shown is based on calculations which make use of a volatility adjustment to the risk-free interest term structure for four primary insurance companies, but do not apply transitional measures. The Atlantic Hurricane scenario corresponds to a 1-in-200-year event. The ultimate forward rate is not adjusted for stresses on the risk-free interest rate. In the ultimate-forward-rate scenario, the forward rate is reduced by 50 bps given unchanged term for the beginning of the extrapolation period.

For all evaluated sensitivities, Munich Re's capitalisation remains comfortably within or mostly above the target capitalisation set by Munich Re at Group level.

If the same analysis is carried out for Munich Reinsurance Company, each of the solvency ratios for the individual scenarios would be about 40 percentage points higher. This difference is mainly due to the transitional measures applied at individual related undertakings. In calculating own funds for Munich Reinsurance Company, the respective adjustments by related undertakings for long-term guarantees are taken into account in the valuation of shareholdings.

Sensitivities of SII ratio



1 Parallel shift until last liquid point, extrapolation to unchanged UFR. 2 Based on CPI inflation. 3 Based on 200-year event.

Prudent person principle

A number of guidelines and internal processes ensure that we invest in accordance with the prudent person principle.

- We invest only if defined security, quality, profitability and liquidity criteria are met, taking account of adequate mix and diversification requirements. In addition, we ensure that we receive early warning if we are in danger of not meeting our strict liquidity requirements.
- We invest in products only if we understand the risks they involve. To ensure compliance with this principle, every single new investment product is subject to the new-product process for investments.
- We invest for the purpose of covering our underwriting liabilities, replicating significant characteristics of those liabilities on the assets side of our balance sheet and applying our own risk criterion to define a maximum deviation between underwriting and investment cash flows.
- We use derivative financial instruments to reduce our risks and manage our investment portfolio efficiently. The new-product process for investments is applied to any new type of financial derivative before it is used. All financial derivatives are recorded in our systems and taken into account in our risk measurement.
- We make very few investments in assets which are not admitted to trading on a regulated financial market. Furthermore, the investment mandates we give to our asset managers prescribe indices representing the permissible investment universe. Investments are made outside the prescribed indices only to a limited extent.
- We seek to avoid risk concentration where possible, using various risk criteria and early-warning indicators to avoid unwanted concentrations of risk on individual counterparties or sectors.

C3 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 interdependdencies 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.

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

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.

C4 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.

The risk criteria are cumulative, and present successively greater requirements for the liquidity of investments. This includes the following:

Sub-criterion 1: Ability to meet known and expected liquidity requirements

This criterion assesses our ability to meet known and expected liquidity requirements. In the most important units of Munich Re, there is local liquidity planning, and in addition cash flows and fungible liquid investments are monitored centrally. Units with a forecast negative cash flow of at least €0.5bn over a two-year horizon are included in the internal Group risk-reporting system. Appropriate measures must be identified for these units.

Sub-criterion 2: Very large underwriting losses (insurance claims shock)

In addition to the requirements under sub-criterion 1, Munich Reinsurance Company must ensure that for Munich Re as a whole sufficient fungible and liquid investments are available to meet claims payments following a very large underwriting loss event.

Sub-criteria 1 and 2 are deemed to be fulfilled if there is a minimum of 100% cover of the liquidity requirements for various time horizons.

Sub-criterion 3: Margin and collateral requirements

This criterion applies to all units that use derivatives for investments or insurance contracts with simulated market fluctuations (daily value at risk [VaR] of 99.9% for investments and monthly VaR of 98% for insurance contracts) that can cause additional margin or collateral requirements. In this case, an additional cushion of at least the same amount of fungible, liquid investments and/or acceptable collateral must be maintained within the company concerned.

Sub-criterion 4: Liquidity stress testing

This criterion sets a framework for liquidity stress scenarios that are applied to important individual companies of Munich Re. It simulates both market losses for available liquid funds and significant additional liquidity requirements after extreme loss events in areas such as natural catastrophes or life. In addition, liquidity requirements are monitored regarding a possible fall in Munich Re's ratings.

Expected profit included in future premiums (EPIFP)

For Munich Re (Group), the total amount of expected profit included in future premiums, calculated pursuant to Article 260(2) of Delegated Regulation (EU) 2015/35, amounts to €15,659m for life and health insurance and €1,530m for property-casualty insurance.

For Munich Reinsurance Company, the total amount of expected profit included in future premiums, calculated pursuant to Article 260(2) of Delegated Regulation (EU) 2015/35, amounts to €7,296m for life and health insurance and €497m for property-casualty insurance.

C5 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.

C6 Other material risks

We use appropriate procedures to specifically identify and analyse reputational risk, strategic risk and security 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.

C7 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.

Emerging risks

We define emerging risks as trends or sudden events that are characterised by a high degree of uncertainty in terms of occurrence probability, expected loss amount, and potential impact on Munich Re.

Of course, such risks are extremely difficult to identify. We have an established, centrally coordinated emerging risk process in place that draws upon the expertise and experience available across the Group. It provides us with a solid basis of information and diverse opinions that feed into our efforts to adequately assess the risks involved.

We seek to identify trends and faint signals in many ways. For example, regular structured discussions are held in our emerging-risks think tank and our global emerging-risk community, a group of experts who investigate the possible impact of emerging risks on Munich Re. In particular, they look at potential accumulation risks at Group level arising from interconnections and interdependencies between different risks, and further consequences linked directly or indirectly to emerging risks. Cooperation with external partners, such as the CRO Forum's Emerging Risk Initiative, complements our internal early-warning system.

The result of this process is the Emerging Risk Heat Map, which classifies the risks most relevant to Munich Re according to their loss potential, occurrence probability, and urgency of risk-mitigating measures. Such measures may include making changes to underwriting guidelines or setting limits on our risk appetite. In addition, new trends and potential candidates for inclusion in the heat map are added to a trend radar covering different areas – society, technology, economy, environment and government – and monitored on an ongoing basis.

Like in previous years, cyber risks and climate change continue to be the most significant risks on the heat map in terms of loss potential and occurrence probability. Although these risks have been known for some time, and risk management measures have been put in place to address them, the assessment of these risks continues to involve great uncertainty. Other relevant threat scenarios for Munich Re include a prolonged period of low interest rates, or a credit crisis in the most important industrialised countries.

Third-party liability business in the USA is currently a focus of particular attention. The current waves of litigation related to opioids and glyphosate may be seen as part of a bigger trend called social inflation, i.e. the risk of change in claimant behaviour. In more and more instances, there is a disconnect between the amounts of damages awarded by the courts and the circumstances of the case. The jury system in the USA fosters this trend. New mass litigation in the USA could potentially focus on sugar or antibiotic-resistant bacteria.

A joint position paper on medical advances was published at the end of 2019 as part of the CRO Forum's Emerging Risk Initiative. In light of technological advances, it is expected that disease prevention, diagnostics and treatment will improve, which should have a positive impact on mortality and morbidity risks for the insurance industry. On the other hand, there may also be negative effects such as increased adverse selection, driven by new methods of early risk detection, such as genetic testing, resulting in information asymmetry between the policyholder and the insurer.

In 2019, we also conducted in-depth analyses regarding lithium-ion batteries, e-scooters and e-cigarettes as part of our emerging-risks think tank. For example, the growing popularity of e-bikes, e-scooters and other forms of electric mobility increases the fire hazard in private residences, as batteries are typically charged and stored at home. The increasing use of transport robots in warehouses and production facilities likewise increases the fire hazard at commercial sites (e.g. Ocado warehouse fire in Andover, England in 2019). Lithium-ion batteries have therefore been added to the heat map of emerging risks as a new risk.

Regarding e-scooters and e-cigarettes, the accumulation potential for Munich Re is currently considered to be limited. These topics will be monitored further, however, and underwriters are now acutely aware of them.

Valuation for solvency purposes

D

D Valuation for solvency purposes

D1 Assets

Valuation of assets

Pursuant to Article 75(1)(a) of Directive 2009/138/EC, all assets shall be valued at the amount for which they could be exchanged between knowledgeable and willing parties in an arm's length transaction – that means at their fair values. In contrast, IFRS uses a mixed measurement model. That means that some assets are measured at fair value, and others are measured at amortised cost or at par value. If the valuation basis for Solvency II and IFRS is the same, we use the same fair values for both purposes. If the valuation basis is different, we explain the differences in greater detail for the respective assets. If the differences between fair values according to Solvency II and IFRS values are immaterial, assets are measured at their IFRS values.

Assets

€m	Solvency II value	Statutory accounts value
Goodwill		2,941
Deferred acquisition costs		9,272
Intangible assets	0	1,240
Deferred tax assets	102	316
Pension benefit surplus	343	0
Property, plant & equipment held for own use	3,951	2,736
Investments (other than assets held for index-linked and unit-linked contracts)	225,829	215,415
Property (other than for own use)	9,030	5,989
Holdings in related undertakings, including participations	4,736	2,847
Equities	2,786	17,064
Equities – listed	2,008	17,064
Equities – unlisted	778	0
Bonds	152,396	178,840
Government bonds	79,718	178,840
Corporate bonds	63,260	0
Structured notes	6,207	0
Collateralised securities	3,210	0
Collective investments undertakings	50,521	2,689
Derivatives	1,277	2,841
Deposits other than cash equivalents	3,352	3,776
Other investments	1,732	1,369
Assets held for index-linked and unit-linked contracts	7,661	7,562
Loans and mortgages	9,604	7,012
Loans on policies	220	220
Loans and mortgages to individuals	2,967	0
Other loans and mortgages	6,417	6,792
Reinsurance recoverables from:	4,782	4,937
Non-life and health similar to non-life	2,552	3,166
Non-life excluding health	2,360	3,072
Health similar to non-life	192	95
Life and health similar to life, excluding health and index-linked and unit-linked	2,230	1,770
Health similar to life	1,088	72
Life excluding health and index-linked and unit-linked	1,142	1,698
Life index-linked and unit-linked	0	0
Deposits to cedants	15,517	7,938
Insurance and intermediaries receivables	3,950	3,133
Reinsurance receivables	162	8,690
Receivables (trade, not insurance)	2,525	10,415
Own shares (held directly)	751	0
Amounts due in respect of own fund items or initial fund called up but not yet paid in	0	0
Cash and cash equivalents	2,602	4,994
Any other assets, not elsewhere shown	531	953
Total assets	**278,309**	**287,553**

In addition to the differences in the valuation of individual items, the structure of the solvency balance sheet also differs from that of the IFRS balance sheet. Not all balance sheet items are therefore directly comparable. Even where the valuations are identical, the figures within items may not be the same due to differences in composition. The differences are particularly significant for assets shown under investments. There are also differences in the classification of receivables and other assets, which are described under the individual items. Where it was possible to reclassify assets as per IFRS in order to comply with the structure prescribed for the solvency balance sheet, we made this reclassification for comparison purposes.

Use of judgements and estimates in recognition and measurement

Where measurement has to be based on models because no market prices are available for the calculation of the fair values required, judgement must be exercised and estimates and assumptions used. These affect both the assets and the other liabilities shown in the solvency balance sheet.

Our internal processes are geared to determining amounts as accurately as possible, taking into account all the relevant information. The basis for determining amounts is management's best knowledge regarding the items concerned at the reporting date. Nevertheless, it is in the nature of these items that estimates may have to be adjusted in the course of time to take account of new knowledge.
In the sections below, we provide a separate description of the bases, methods and main assumptions used for the recognition, measurement and reporting of each material class of assets in the solvency balance sheet and in financial reporting under IFRS.

Goodwill

No goodwill is shown in the solvency balance sheet.

Under IFRS, goodwill resulting from the initial consolidation of subsidiaries is recognised, and tested for impairment at least annually. We additionally carry out ad-hoc impairment tests if there are indications of impairment.

Deferred acquisition costs

Deferred acquisition costs are not shown as an asset in the solvency balance sheet, but are taken into account in the valuation of the technical provisions.

Under IFRS, deferred acquisition costs comprise commissions and other variable costs directly connected with the acquisition or renewal of insurance contracts.

In life business and long-term health primary insurance, deferred acquisition costs are capitalised and amortised over the duration of the contracts.

In property-casualty business, short-term health primary insurance and health reinsurance, the deferred acquisition costs are amortised on a straight-line basis over the average term of the policies of up to five years.

Deferred acquisition costs are regularly tested for impairment.

Intangible assets

Intangible assets are only shown in the solvency balance sheet if they are accounted for under IFRS and traded in an active market. The latter requirement is deemed to be met if an active market exists for similar assets. Since Munich Re's intangible assets currently do not meet this requirement, no amount is reported for this item in the solvency balance sheet.

Under IFRS, intangible assets mainly comprise acquired insurance portfolios and software. Acquired insurance portfolios are recognised at their present value on acquisition (PVFP – present value of future profits). This is determined as the present value of expected profits from the portfolio acquired, without consideration of new business and tax effects. The acquired insurance portfolios are amortised in accordance with the realisation of the profits from the insurance portfolios underlying the PVFP calculation. They are regularly tested for impairment.

Software is recognised at cost and amortised on a straight-line basis over a period of use of three to five years. We also recognise or reverse impairment losses if required.

Deferred tax assets

Under Solvency II, deferred taxes are determined pursuant to Article 15 in conjunction with Article 9 of Delegated Regulation (EU) 2015/35.

In accordance with Article 9(1) and (2) of the Delegated Regulation, assets and liabilities shall be recognised and valued in accordance with IFRS requirements, provided that these are consistent with Article 75 of Directive 2009/138/EC. Therefore, under Solvency II, deferred tax assets are recognised and valued in accordance with IAS 12. In addition, the relevant interpretative decisions issued by BaFin are taken into account.

Deferred tax assets are calculated on the basis of the difference between the values ascribed to assets recognised and valued in accordance with Article 75 of Directive 2009/138/EC, and the values ascribed to assets recognised and valued for tax purposes. Deferred taxes are determined on the basis of the tax rates of the countries concerned. Changes in tax rates and tax legislation that have already been adopted at the balance sheet date are taken into account.

Deferred tax assets are recognised in cases where asset items have to be valued lower, or liability items higher, in the solvency balance sheet than in the tax accounts of the

Group company concerned, and these differences will be eliminated at a later date with a corresponding effect on taxable income (temporary differences). Also included are deferred tax assets deriving from tax loss carry-forwards and tax credits.

Deferred tax assets are recognised if there are sufficient taxable temporary differences which are expected to reverse in the same period as the deductible temporary differences. For any additional deductible temporary differences, deferred tax assets are recognised only to the extent that it is probable that future profits are available in the same period in which the deductible temporary differences are expected to reverse. A five-year result plan is used as a basis for this purpose.

Deferred tax assets and deferred tax liabilities are disclosed on a net basis in the Munich Re solvency balance sheet, provided that they refer to the same taxable entity and tax office. The offsetting is made to the extent possible with respect to the underlying tax assets and liabilities. In 2019, deferred tax assets and deferred tax liabilities amounting to €9,358 m were offset against each other. After offsetting assets and liabilities, Munich Re's net deferred tax assets amounted to €102m as at 31 December 2019. Net deferred tax liabilities came to €7,226m.

For technical provisions, there was a net surplus of deferred tax assets of €2,878m, taking into account a reduction of deferred tax assets of €3,020m resulting from the application of transitional measures for technical provisions and €71m resulting from the application of volatility adjustments. Differences in recognition and measurement between the solvency balance sheet and the tax accounts resulted in a net surplus of deferred tax assets of €695m derived from provisions for post-employment benefits. Intangible assets are not recognised in the solvency balance sheet, while expenses incurred for internally developed IT products and acquired intangible assets are recognised as assets in the tax accounts. As a result, deferred tax assets amounted to €300m. Furthermore, deferred tax assets of €890m arose from loss carry-forwards and tax credits. Net deferred tax assets for other balance-sheet items amounted to €1,245m.

Investments tend to be valued higher (at fair value) in the solvency balance sheet than in the tax accounts where they are measured at amortised cost, resulting in a significant net surplus of deferred tax liabilities of €10,539m. Deferred tax liabilities of €2,592m arose from the claims equalisation provision, which is shown in the tax accounts but not in the solvency balance sheet.

As at 31 December 2019, deductible temporary differences not recognised as deferred tax assets in the solvency balance sheet amounted to €733m.

Loss carry-forwards and tax credits totalled €7,719m in 2019, resulting in deferred tax assets of €890m.

An overview of tax loss carry-forwards and tax credits break down as shown in the table "Tax loss carry-forwards and tax credits"

Tax loss carry-forwards and tax credits

€m	For which deferred tax assets are recognised	For which deferred tax assets are not recognised	Total
Tax loss carry-forwards	**5,163**	**2,443**	**7,606**
Corporation tax loss carry-forwards	**2,754**	**2,226**	**4,980**
Expiring in up to three years	69	18	87
Expiring in over three years and up to ten years	102	130	232
Expiring in over ten years	180	6	186
Not expiring	2,403	2,072	4,475
Trade tax loss carry-forwards	2,409	217	2,626
Not expiring	2,409	217	2,626
Tax credits	**0**	**113**	**113**
Expiring in up to three years	0	11	11
Expiring in over three years and up to ten years	0	102	102
Expiring in over ten years	0	0	0
Not expiring	0	0	0

Pension benefit surplus

Details about how we recognise the pension benefit surplus are set out in connection with pension benefit obligations in section D 3.

Property, plant & equipment held for own use

Property held for own use

In the solvency balance sheet, owner-occupied property is recognised under "Property, plant & equipment held for own use". In the IFRS accounts, it is shown under other assets.

Under Solvency II, we measure land and buildings at fair value. Valuations for the directly held portfolio are performed by valuers within the Group, and those for the indirectly held portfolio are carried out by external valuers. Determining the sustainability of cash inflows and outflows, taking into account the market conditions at the property location, is material for valuation. The fair value is determined individually per item by discounting the future cash flow to the valuation date.

Under IFRS, land and buildings are measured at amortised cost. Buildings are depreciated on a straight-line basis. If the recoverable amount of land and buildings falls below their carrying amount, the carrying amount is written down to the recoverable amount.

Plant and equipment held for own use

For reasons of simplification, plant and equipment is recognised at its IFRS value in the solvency balance sheet, i.e. at amortised cost. Items are depreciated over their useful lives to reflect the decline in utility, unless they are written down to a lower value for impairment.

As of 2019, our lease agreements are reported in accordance with IFRS 16. The first-time application of this standard affects leasing agreements hitherto classified as operating leases, which will now be recognised in the solvency balance sheet and in accordance with IFRS. Short-term leases with terms shorter than 12 months (and with no option to buy), and lease agreements in which the asset underlying the agreement is of low value, are not recognised in the financial statements. Right-of-use assets under lease agreements are comprised of lease liabilities, lease payments made at the time or before the asset is made available for use, initial direct costs, and restoration obligations.

Munich Re as lessee: Leases relate primarily to land and buildings and the vehicle fleet. They include extension options as well as restrictions regarding the agreement of subleases. Right of use came to €350m as of the balance sheet date, counterbalanced by leasing liabilities of €349m. Munich Re as lessor: Operating leases mainly involve leased property. At the balance sheet date, future minimum lease payments under non-cancellable leases totalled €2,145m.

Finance lease agreements – which are disclosed in our IFRS consolidated financial statements – are not material for our solvency position.

Investments (other than assets held for index-linked and unit-linked contracts)

Property (other than for own use)

For both solvency balance sheet and IFRS purposes, land and buildings not held for own use are measured in the same way as owner-occupied property, i.e. fair values are used for the solvency balance sheet, and amortised cost for IFRS.

Holdings in related undertakings, including participations

This item comprises the following holdings in related undertakings:

– Subsidiary undertakings not fully consolidated
  These include certain collective investment undertakings having separate legal personality (investment companies), financial or credit institutions, investment firms, institutions for occupational retirement provision, alternative investment fund managers, UCITS management companies, non-regulated undertakings carrying out financial activities and ancillary services undertakings classified as immaterial from a Group perspective; and
– jointly controlled entities not proportionally consolidated
  These include certain collective investment undertakings having separate legal personality (investment companies), financial or credit institutions, investment firms, institutions for occupational retirement provision, alternative investment fund managers, UCITS management companies, non-regulated undertakings carrying out financial activities and ancillary services undertakings classified as immaterial from a Group perspective; and
– any Munich Re participations.

Not included in this item are related undertakings taken into account in the consolidated data for the calculation of Group solvency in accordance with Article 335(1)(a – c) of the Delegated Regulation. These include interests in special purpose vehicles as well as subsidiary undertakings and jointly controlled entities that are insurance or reinsurance undertakings (whether or not the latter are from the EEA), insurance holding companies, mixed financial holding companies or material ancillary services undertakings, as these interests must be fully or proportionally consolidated for the calculation of Group solvency. For holdings in jointly controlled entities not included through proportional consolidation, Munich Re uses the valuation hierarchy explained below.

Holdings in related undertakings that are financial or credit institutions, investment firms, institutions for occupational retirement provision, alternative investment fund managers, UCITS management companies or non-regulated undertakings carrying out financial activities are valued on the basis of the proportional share of the undertaking's own funds calculated in accordance with the relevant sectoral rules.

For any other holdings in related undertakings included in this item, Munich Re applies the following valuation hierarchy for determining fair value as at the balance sheet date:

– The default valuation approach is the use of quoted market prices in active markets for the same assets.
– If the use of quoted market prices in active markets for the same assets is not possible because the relevant related undertaking is not listed on a stock exchange, Munich Re measures its holdings
  ▪ based on the share of the excess of assets over liabilities in accordance with the Solvency II valuation rules, if the relevant related undertaking is a collective investment

undertaking having separate legal personality or an insurance or reinsurance undertaking from the EEA;
- based on the equity method pursuant to IAS 28, Investments in Associates and Joint Ventures, if the relevant related undertaking is not a collective investment undertaking having separate legal personality and not an insurance or reinsurance undertaking from the EEA, but is valued based on the equity method in Munich Re's consolidated financial statements pursuant to IFRS as it is considered material. Contrary to IAS 28, goodwill and other intangible assets are deducted from the value determined under IFRS using the equity method;
- based on an alternative valuation method if the relevant related undertaking is not a collective investment undertaking having separate legal personality and not an insurance or reinsurance undertaking, and in addition it is not valued based on the equity method in Munich Re's consolidated financial statements pursuant to IFRS as it is considered immaterial.

Taking into consideration the principles of materiality, Munich Re uses
- the equity method for related undertakings not listed on a stock exchange that are not subject to supervision at individual entity level, and where the share of the excess of assets over liabilities in accordance with Solvency II valuation rules would therefore have to be calculated for Group solvency purposes only;
- an alternative valuation method for related undertakings not listed on a stock exchange that are considered immaterial under IFRS and thus are not valued using the equity method in Munich Re's consolidated financial statements.

In contrast to IFRS, where any material subsidiary is fully consolidated (irrespective of the business activity or type of undertaking), for the calculation of the Group solvency balance sheet, subsidiary undertakings are subject to full consolidation only if they are insurance or reinsurance undertakings (whether or not the latter are from the EEA), insurance holding companies, mixed financial holding companies or material ancillary services undertakings.

Under IFRS, interests in material associates are always accounted for using the equity method, while interests in immaterial subsidiaries and associates are measured at quoted market prices if available. If quoted market prices are not available, the alternative valuation method outlined above is applied, i.e. the undertaking's net asset value or local equity value is normally used.

The complete list of holdings in related undertakings of Munich Re can be found in QRT S.32.01.22 (Undertakings in the scope of the Group).

Other financial assets

In the solvency balance sheet, we value all other financial assets at fair value. Where a price is quoted in active markets (i.e. at market value), that price should be used. If no market price is available, valuation models are used in which observable market inputs are applied as far as possible. The same valuation principles are followed as under IFRS.

Determining fair values

Since market values are not available for all assets and liabilities, IFRS has a valuation hierarchy with three levels. Though Solvency II does not explicitly name the levels, it does provide for equivalent differentiation in the assessment of the fair values used. The allocation reflects which of the fair values derive from transactions in the market and where valuation is based on models because market transactions are lacking.

In the case of Level 1, valuation is based on unadjusted quoted prices in active markets for identical financial assets which Munich Re can refer to at the balance sheet date. If a quoted price in an active market is available, this should always be used. The financial instruments we have allocated to this level mainly comprise equities, equity funds, exchange-traded derivatives, and exchange-traded subordinated liabilities.

Assets allocated to Level 2 are valued using models based on observable market data. If the instrument has a fixed contract period, the inputs used for valuation must be observable for the whole of this period. Moreover, we have allocated to this level such assets for which prices are provided by price quoters but for which there is no proof that these were based on actual market transactions. The financial instruments we have allocated to this level mainly comprise bearer bonds and bond funds, borrowers' note loans, covered bonds, subordinated securities, specified credit structures, derivatives not traded on the stock market, and physical gas.

For assets allocated to Level 3, we use valuation techniques that are also based on unobservable inputs. This is only permissible insofar as no observable market data is available. The inputs used reflect Munich Re's assumptions regarding the factors which market players would consider in their pricing. We use the best available information for this, including internal company data.

The assets allocated to this level of the fair value hierarchy largely comprise land and buildings and real estate funds. Funds that mainly invest in theoretically valued instruments, and investments in infrastructure and in private equity are also allocated to Level 3, along with investments in affiliated companies, associates and joint ventures measured at fair value, and insurance derivatives.

In the case of loans, bank borrowing, liabilities from financial transactions, and bond and note liabilities not traded on an active market, we have decided on a case-by-case basis to which level of the fair value hierarchy to allocate the respective fair values.

Owing to their leverage effect, changes in individual inputs may significantly affect the fair value shown for instruments measured under Level 3. If we make such

adjustments in measuring fair value in the individual case, we explain the resultant effects.

The following table provides an overview of the models used to measure the fair values of our investments when market prices are not available.

Valuation techniques for assets

Bonds	Pricing method	Parameters	Pricing model
Interest-rate risks			
Loans against borrower's note/ registered bonds	Theoretical price	Sector-, rating- or issuer-specific yield curve	Present-value method
Cat bond (host)	Theoretical price	Interest-rate curve	Present-value method
Mortgage loans	Theoretical price	Sector-specific yield curve	Present-value method

Derivatives	Pricing method	Parameters	Pricing model
Equity and index risks			
OTC stock options	Theoretical price	Listing of underlying shares Effective volatilities Money-market interest rate Dividend yield	Black-Scholes (European) Cox, Ross and Rubinstein (American)
Equity forwards	Theoretical price	Listing of underlying shares Money-market interest rate Dividend yield	Present-value method
Interest-rate risks			
Interest-rate swaps	Theoretical price	CSA/swap curve	Present-value method
Swaptions/interest-rate guarantee	Theoretical price	At-the-money volatility matrix and skew OIS/swap curve	Bachelier/ Normal Black
Interest-rate currency swaps	Theoretical price	Swap curve Currency spot rates Money-market interest-rate curve	Present-value method
Inflation swaps	Theoretical price	Zero-coupon inflation swap rates OIS curve	Present-value method
Bond forwards (forward transactions)	Theoretical price	Listing of underlying Swap curve	Present-value method
Currency risks			
Currency options	Theoretical price	Volatility skew Currency spot rates Money-market interest-rate curve	Garman-Kohlhagen (European)
Currency forwards	Theoretical price	Currency spot rates Currency forward rates/ticks Money-market rates	Present-value method
Other transactions			
Insurance derivatives (excluding variable annuities)	Theoretical price	Fair values of cat bonds Historical event data Interest-rate curve	Present-value method
Insurance derivatives (variable annuities)	Theoretical price	Biometric rates and lapse rates Volatilities Interest-rate curve Currency spot rates	Present-value method
Catastrophe swaps	Theoretical price	Fair values of cat bonds Interest-rate curve	Present-value method
Credit default swaps	Theoretical price	Credit spreads Recovery rates Interest-rate curve	Present-value method ISDA CDS Standard Model
Total return swaps on commodities	Theoretical price	Listing of underlying index	Index ratio calculation
Commodity options	Theoretical price	Listing of underlying Effective volatilities Money-market interest rate	Black-Scholes (European) Cox, Ross and Rubinstein (American)

Bonds with embedded derivatives	Pricing method	Parameters	Pricing model
Callable bonds	Theoretical price	Money-market/swap interest-rate curve Issuer-specific spreads Volatility matrix	Hull-White model
CMS floaters	Theoretical price	Money-market/swap interest-rate curve Issuer-specific spreads Volatility matrix	Hull-White model
CMS floaters with variable cap	Theoretical price	OIS/swap interest-rate curve Issuer-specific spreads Volatility skew	Replication model (Hagan)
Inverse CMS floaters	Theoretical price	OIS/swap interest-rate curve Issuer-specific spreads Volatility skew	Replication model (Hagan)
CMS steepeners	Theoretical price	OIS/swap interest-rate curve Issuer-specific spreads Volatility skew Correlation matrix	Replication model (Hagan) Stochastic volatility model
Convergence bonds	Theoretical price	Money-market/swap interest-rate curves Issuer-specific spreads Volatility matrix Correlation matrix	Replication model (Hagan) Stochastic volatility model
Multi-tranches	Theoretical price	At-the-money volatility matrix and skew Swap curve Money-market interest-rate curve Sector-, rating- or issuer-specific yield curve	Bachelier/ Normal Black, Present-value method
FIS loans against borrower's note	Theoretical price	At-the-money volatility matrix and skew Swap curve Money-market interest-rate curve Sector-, rating- or issuer-specific yield curve	Bachelier/ Normal Black, Present-value method
Swaption notes	Theoretical price	At-the-money volatility matrix and skew Swap curve Money-market interest-rate curve Sector-, rating- or issuer-specific yield rate curve	Bachelier/ Normal Black, Present-value method

Funds	Pricing method	Parameters	Pricing model
Real estate funds	–	–	Net asset value
Alternative investment funds (e.g. private equity, infrastructure forestry)	–	–	Net asset value

Other	Pricing method	Parameters	Pricing model
Real estate	Theoretical market price	Interest-rate curve Market rents	Present-value method or valuation
Alternative direct investments (e.g. infrastructure, forestry)	Theoretical market price	Interest-rate curve (among others) Electricity price forecast and inflation forecast	Present-value method or valuation
Bank borrowing	Theoretical market price	Interest-rate curve	Present-value method

Insurance-linked derivatives (excluding variable annuities) are allocated to Level 3 of the fair value hierarchy. The derivative components of catastrophe bonds are measured based on the values supplied by brokers for the underlying bonds, which is why it is not possible to quantify the inputs used that were not based on observable market data. If no observable inputs are available for customised insurance-linked derivatives, the present-value method on the basis of current interest-rate curves and historical event data is used. Due to the low volume involved, the effects of alternative inputs and assumptions are immaterial.

The inputs requiring consideration in measuring variable annuities are derived either directly from market data (in particular volatilities, interest-rate curves and currency spot rates) or from actuarial data (especially biometric and lapse rates). The lapse rates used are modelled dynamically and range between 0.5% and 50%, depending on the

specific insurance product and current situation of the capital markets. Compared with the relevant market risk inputs for the determination of fair values, the impact on the fair value of an increase or decrease in lapse rates would be immaterial. The assumptions with regard to mortality are based on published mortality tables, which are adjusted with a view to the target markets and the actuaries' expectations. The impact of these and other non-observable assumptions is not material. The dependency between different capital market inputs is modelled by correlation matrices. Where the valuation of these products is not based on observable inputs, which is usually the case, we allocate them to Level 3 of the fair value hierarchy.

The other investments allocated to Level 3 are mainly external fund units (in particular, private equity, real estate and funds that invest in a variety of assets that are subject to theoretical valuation). Since market quotes are not available for these on a regular basis, net asset values (NAVs) are provided by the asset managers. We thus do not perform our own valuations using inputs that are not based on observable market data. We regularly subject the valuations supplied to plausibility tests on the basis of comparable investments.

Measurement categories according to IFRS

Unlike in the solvency balance sheet, pursuant to IAS 39 we have four categories of financial instruments with differing measurement requirements. The classification depends on the type and purpose of the financial assets and is determined when the instrument is acquired or issued.

Under IFRS, all financial instruments are initially measured at fair value. If an instrument is not subsequently measured at fair value through profit or loss, transaction costs relating directly to acquisition or issuance are to be taken into account.

The categories for subsequent measurement of financial assets under IAS 39 are listed below:

Loans are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market, including loans on policies. They are measured at amortised cost in accordance with the effective interest method. Write-downs for impairments are made in cases where the repayment of a loan can no longer be expected.

The loans consist of mortgage loans (€6,792m), loans on policies (€220m) and other loans (€45,495m). The other loans mainly comprise covered bonds and government bonds.

In the solvency balance sheet, loans and mortgages – including loans on policies – are not shown as part of the investments, but are recognised at fair value separately from the investments (see D 1 Loans and mortgages).

Fixed-interest or non-fixed-interest securities available for sale that are not designated as at fair value through profit or loss or recognised under loans are accounted for at fair value, with resulting changes in value recognised in equity with no effect on profit or loss. Unrealised gains or losses are calculated taking into account interest accrued and, after deduction of deferred taxes and the amounts apportionable to policyholders by the life and health insurers on realisation (provision for deferred premium refunds), are recognised directly in equity under "other reserves".

Securities at fair value through profit or loss comprise securities held for trading and securities classified as at fair value through profit or loss. Securities held for trading mainly include all derivative financial instruments with positive fair values which we have acquired to manage and hedge risks but which do not meet the requirements of IAS 39 for hedge accounting. Securities designated as at fair value through profit or loss comprise structured securities and securities designated as at fair value in order to avoid accounting mismatches. In addition, loan portfolios are managed based on the fair value of the entire portfolio, which is why it was also designated as at fair value through profit or loss.

In addition to the breakdown into different measurement categories, insurance-related investments are accounted for separately in our IFRS consolidated financial statements. These include investments for unit-linked life insurance contracts (see section D 1 Assets held for index-linked and unit-linked contracts) and other insurance-related investments.

The other insurance-related investments are investments that are not utilised for asset-liability management. These include insurance-linked derivatives, derivatives to hedge variable annuities, weather and commodity derivatives, and physical gas. Insurance risks are defined as risks which - in a modified form - can also be covered by an insurance contract within the meaning of IFRS 4. Other insurance-related investments are accounted for at fair value, and we recognise changes in value in profit or loss. For physical gas, the fair value is reduced by estimated costs to sell.

Other investments, which are also accounted for separately in the IFRS financial statements, comprise deposits with banks totalling €3,776m, investments in renewable energies amounting to €646m, forestry investments of €313m, and physical gold of €409m. Deposits with banks are measured at amortised cost in accordance with the effective interest method. Investments in renewable energies are generally accounted for at amortised cost. Forestry investments fall into the category of biological assets and include standing wood. They are accounted for at fair value less costs of disposal, with impact on profit or loss.

Where financial assets are also to be valued at fair value under IFRS, the valuation is exactly the same as for the solvency balance sheet.

The classification of investments in the solvency balance sheet is fundamentally different from that under IFRS. For supervisory purposes, investments are classified into different types on the basis of the Complementary Identification Codes (CIC). In financial reporting under IFRS, investments are broken down into the measurement categories described above. Therefore, the differences in valuation (compared with IFRS values) are not directly evident from the solvency balance sheet structure. IFRS and the solvency balance sheet do not differ in the valuation of securities available for sale, securities measured at fair value through profit or loss and insurance-related investments. These are generally measured at fair value. Under IFRS, financial assets recognised under loans are measured at amortised cost. As at 31 December 2019, these came to €52,507m compared with a fair value of €64,654m recognised in the solvency balance sheet. Assets recognised as other investments under IFRS are also measured at amortised cost. They amounted to €5,144m at the balance sheet date, which was also the fair value recognised in the solvency balance sheet.

Impairment

For IFRS, at each balance sheet date we assess whether there is any substantial objective evidence of impairment in a financial asset or group of financial assets that are accounted for at amortised cost or at fair value without impact on profit or loss. We determine acquisition cost on the basis of the average purchase price. In the case of an impairment, a write-down is made to the fair value at the balance sheet date and recognised as an expense in the consolidated income statement.

As all assets in the solvency balance sheet are shown at fair value, no impairment rules are required.

For the same reason, no rules exist under Solvency II regarding the unbundling of embedded derivatives or hedge accounting.

Assets held for index-linked and unit-linked contracts

These are investments for policyholders under unit-linked life insurances. Both in the solvency balance sheet and under IFRS (investments for unit-linked life insurance contracts), we account for them at fair value. In our consolidated financial statements (IFRS), we show these investments under the item insurance-related investments.

Loans and mortgages

In the solvency balance sheet, loans and mortgages – including loans on policies - are shown as a separate line item outside the investments. They are measured at fair value.

Under IFRS, we recognise all loans as part of the investments, measuring them at amortised cost. We perform regular impairment tests to check whether their value has fallen and a write-down to fair value is required. If, in a subsequent period, the reasons for the impairment cease to apply, the impairment loss is reversed in profit or loss. The resultant carrying amount may not exceed the original amortised cost.

Reinsurance recoverables

Reinsurance recoverables are dealt with in section D 2 Technical provisions.

Deposits to cedants

Deposits to cedants serve directly as collateral for technical provisions covering business assumed and may not be used by cedants independently. The credit risk is therefore limited. The amount of and changes in these deposits in the financial year generally derive from the values for the changes in the related technical provisions for the reinsured business. Deposits to cedants thus do not have a fixed maturity date, their release generally being dependent on the run-off of the corresponding provisions.

In the solvency balance sheet, deposits to cedants are measured at fair value.

Under IFRS, deposits to cedants (“deposits retained on assumed reinsurance”) are measured at nominal value. If receivables become doubtful, they are written down for impairment.

Insurance and intermediaries receivables

In the solvency balance sheet, insurance and intermediaries receivables are measured at fair value, taking counterparty default risk into account.

Under IFRS, we recognise insurance and intermediaries receivables at face value. We perform regular impairment tests to check whether their value has fallen. The amount of the probable loss is measured as the difference between the amortised cost and the present value of estimated future cash flows. If, in a subsequent period, the reasons for the impairment cease to apply, the impairment loss is reversed in profit or loss. The resultant carrying amount may not exceed the original amortised cost.

Reinsurance receivables

In the solvency balance sheet, reinsurance receivables are measured at fair value, taking counterparty default risk into account.

Under IFRS, we recognise reinsurance receivables at face value. We perform regular impairment tests to check whether their value has fallen. The amount of the probable loss is measured as the difference between the amortised cost and the present value of estimated future cash flows. If, in a subsequent period, the reasons for the impairment cease to apply, the impairment loss is reversed in profit or

loss. The resultant carrying amount may not exceed the original amortised cost.

In the solvency balance sheet (unlike in IFRS), receivables from brokerage and from reinsurance business assumed are not recognised under reinsurance receivables, but under insurance and intermediaries receivables.

Receivables (trade, not insurance)

In the solvency balance sheet, the receivables (trade, not insurance) include in particular receivables from dividends, receivables from profit pooling or transfer agreements, receivables from taxes, and other receivables. These receivables must be measured at fair value. However, for reasons of simplification, receivables from dividends and receivables from profit pooling or transfer agreements are recognised at their IFRS carrying amount, i.e. at amortised cost. Doubtful receivables are written down to the estimated recoverable amount.

Receivables from taxes and other receivables are discounted, taking into account the actual risk-free interest rates and relevant interest-rate spreads. The individual business partner's credit risk is also taken into consideration.

In the solvency balance sheet, all insurance contracts are recognised under technical provisions irrespective of the level of insurance risk involved in the individual contracts. Therefore, receivables resulting from reinsurance contracts with non-significant risk transfer, which do not fall within the scope of IFRS 4, are – notwithstanding IFRS – not reported as receivables, but as part of the technical provisions.

Under IFRS, we recognise receivables at amortised cost. Doubtful receivables are written down to the estimated recoverable amount, and an impairment loss is recognised in profit or loss.

Both reinsurance receivables and insurance and intermediaries receivables are included in other receivables under IFRS, but shown as separate items in the solvency balance sheet.

Own shares (held directly)

This item includes own shares held by Munich Re. Under Solvency II, own shares are measured at fair value. When determining own funds, this amount has to be deducted from basic own funds.

Under IFRS, own shares are not shown separately as an asset in the balance sheet, but have to be deducted from shareholders' equity.

Amounts due in respect of own fund items or initial funds called up but not yet paid in

This item is currently not relevant for Munich Re.

Cash and cash equivalents

Under Solvency II, the face value of cash is considered to be the fair value. Transferable deposits (including cheques) are valued at amortised cost (usually this is the par value). Credit risk is taken into account by write-downs of doubtful deposits and doubtful cheques to the estimated recoverable amount.

Under IFRS, cash held is accounted for at face value.

Any other assets, not elsewhere shown

"Any other assets, not elsewhere shown" covers all assets that cannot be allocated to any other class of assets. In contrast to our IFRS financial reporting, in the solvency balance sheet hedging derivatives (€27m) are reclassified as derivatives.

As a basic principle, in the solvency balance sheet all other assets are to be measured at fair value. Similar to IFRS, prepayments are calculated pro rata temporis and cover the period between the reporting date and the date the corresponding benefit is earned or becomes due. In contrast to IFRS, prepayments are discounted under Solvency II taking into account the actual relevant risk-free interest rate and relevant interest-rate spreads, unless the effect from discounting is immaterial.

In the solvency balance sheet, inventories are measured using the relevant IFRS carrying amounts, i.e. the estimated realisable value. If, in the normal course of business, the value falls below the value of the acquisition costs, inventories are to be written down to this value.

D2 Technical provisions

Description of the valuation methodologies used for solvency purposes

Overall requirements for technical provisions

Insurance and reinsurance undertakings have to establish technical provisions with respect to all of their insurance and reinsurance obligations towards policyholders, cedants and beneficiaries. The value of the technical provisions corresponds to the current amount the undertakings would have to pay if they were to transfer their insurance and reinsurance liabilities immediately to another insurance or reinsurance undertaking. The calculation of technical provisions must make use of and be consistent with information provided by the financial markets and generally available data on underwriting risks (market consistency). Technical provisions must be calculated in a prudent, reliable and objective manner. Following the principles set out above, the calculation of technical provisions is carried out as described below.

Calculation of technical provisions

Technical provisions are calculated using established principles for actuarial valuation. Manuals of methods for Solvency II – and for the calculation of technical provisions in particular – ensure consistent valuation approaches throughout Munich Re. In this context, we set out requirements regarding segmentation of business, data used, economic and operational (e.g. biometric) assumptions, and methods and models.

In general, the value of technical provisions is equal to the sum of a best estimate and a risk margin as explained below.

Technical provisions

€m	Solvency II value
Technical provisions – non-life	59,325
Technical provisions – non-life (excluding health)	56,219
TP calculated as a whole	0
Best estimate	54,634
Risk margin	1,585
Technical provisions – health (similar to non-life)	3,106
TP calculated as a whole	0
Best estimate	2,948
Risk margin	157
Technical provisions – life (excluding index-linked and unit-linked)	134,240
Technical provisions – health (similar to life)	64,424
TP calculated as a whole	0
Best estimate	59,312
Risk margin	5,112
Technical provisions – life (excluding health and index-linked and unit-linked)	69,816
TP calculated as a whole	0
Best estimate	64,579
Risk margin	5,237
Technical provisions – index-linked and unit-linked	8,245
TP calculated as a whole	52
Best estimate	8,083
Risk margin	110
Technical provisions total	**201,810**

The best estimate corresponds to the probability-weighted average of future cash-flows, taking account of future developments and uncertainties. It also takes discount effects into account and uses the relevant risk-free interest-rate term structure. Volatility adjustments are used in the models of the portfolios of ERGO Lebensversicherung AG, Victoria Lebensversicherung AG, DKV Belgium S.A., and ERGO Insurance N.V. (Article 77(d) of Directive 2009/138/EC); matching adjustments are not used. Three life primary insurance companies (ERGO Lebensversicherungs AG, Victoria Lebensversicherung AG and ERGO Versicherung AG, Vienna) apply a transitional deduction to their technical provisions (Article 308(d) of Directive 2009/138/EC).

The calculation of the best estimate is based upon up-to-date and credible information and realistic assumptions, and is performed using adequate, applicable and relevant actuarial and statistical methods. To ensure consistency where possible, most of the economic assumptions are derived at Group level. Non-economic assumptions are mostly based on the characteristics of the insurance portfolio. Expenses are assessed on a going-concern basis. The cash-flow projection used in the calculation of the best estimate takes account of all the cash inflows and outflows required to settle the insurance and reinsurance obligations over their lifetime. The best estimate is calculated gross, without deduction of the amounts recoverable from reinsurance contracts and special

purpose vehicles (e.g. retrocession to the capital market via a cat bond). Those amounts are calculated and reported separately.

For property-casualty (re)insurance, the best estimate is calculated separately for the premium provision and the provision for claims outstanding. Premium provisions are established for future claim events covered by insurance and reinsurance obligations falling within the contract boundary. Provisions for claims outstanding are established for claim events that have already occurred, regardless of whether the claims arising from those events have been reported or not.

The risk margin is set at such a level as to ensure that the value of the technical provisions as a whole (best estimate plus risk margin) is equivalent to the amount that insurance and reinsurance undertakings would be expected to require in order to take over and meet the insurance and reinsurance obligations.

The general principle for the calculation of the risk margin assumes that the whole portfolio of insurance and reinsurance obligations of the entity that calculates the risk margin (the [re]insurance undertaking) is taken over by another undertaking (the reference undertaking). The risk margin covers the following risk categories: underwriting risk, credit risk with respect to reinsurance contracts, arrangements with special purpose vehicles, intermediaries, policyholders and any other material exposures which are closely related to the insurance and reinsurance obligations, and operational risk. The risk margin is calculated by projecting the solvency capital requirement (SCR), covering the risk categories above and using suitable risk drivers. The present value of the total solvency capital requirements is then multiplied by the cost-of-capital rate of 6% prescribed under Solvency II.

The risk margin is allocated to the lines of business on a proportional basis, taking into account both the risk and the best estimate of the technical provisions in the line of business concerned. The best estimate and the risk margin are valued separately. However, where future cash flows associated with insurance or reinsurance obligations can be reliably replicated using financial instruments for which a reliable market value is observable, the value of technical provisions associated with those future cash flows is determined on the basis of the market value of those financial instruments. In this case, separate calculations of the best estimate and the risk margin are not required.

Compared with the previous year, there was a greater change to the model and its underlying assumptions used to calculate the technical provisions. It affected the life and health reinsurance segment, where the incidence rates of Australian occupational disability insurance were adjusted, which would result in an increase of €760m in the reserves As the future premium trend is re-estimated at the same time on the basis of price increases achieved, causing a reduction in the reserve estimate, the reserves only increased by €360m in total.

Under Solvency II, we segment our insurance and reinsurance obligations into homogeneous risk groups, and as a minimum by line of business, when calculating technical provisions.

Valuation of financial guarantees and contractual options

When calculating technical provisions, we take account of the value of financial guarantees and contractual options included in insurance and reinsurance policies. Any assumptions made with respect to the likelihood that policyholders will exercise contractual options, including lapses and surrenders, are based on current and credible information. The assumptions take account, either explicitly or implicitly, of the impact that future changes in financial and non-financial conditions may have on the exercise of those options.

Simplifications used in the calculation of technical provisions

Munich Re does not make use of the simplifications described in Title I, Chapter III, Section 6 of the Delegated Regulation with the exception of the application of Article 57, Article 58(a) and Article 59. Article 57 of the Delegated Regulation permits the use of simplified calculations in the valuation of amounts recoverable from non-proportional reinsurance contracts for non-life primary insurance companies. These simplified calculations account for less than 5.0% of our total amounts recoverable from reinsurance contracts. The simplified calculation of the risk margin pursuant to Article 58(a) of the Delegated Regulation is applied for standard-model entities in primary insurance and a small number of non-EEA reinsurance subsidiaries only. These simplified calculations account for less than 2.0% of our total technical provisions.

Article 59 of the Delegated Regulation allows the risk margin to be fully recalculated only at the end of the year and to be updated to scale for the quarterly closings. In the property-casualty reinsurance segment, we scale according to the best estimates of net technical provisions, as illustrated in the Guidelines on valuation of technical provisions (EIOPA-BoS-14/166, Technical Annex VI).

In addition to these simplifications, Munich Re applies the proportionality principle as set out in Article 29(4) of Directive 2009/138/EC.

Impact of the transitional deduction on technical provisions and of the volatility adjustment

Three life primary insurance companies apply a transitional deduction on technical provisions In line with the requirements defined in Directive 2009/138/EC, at the end of every year, the transitional deduction described in Article 308(d) (i.e. the impact of the transitional measure on technical provisions) will decrease on a straight-line basis from 100% during the year beginning on 1 January 2016 to 0% on 1 January 2032. The use of the transitional deduction on the technical provisions of the three above-mentioned life primary insurance undertakings has no impact on the SCR at Group level.

Four life and health primary insurance companies already mentioned apply a (static) volatility adjustment to the risk-free interest-rate term structure in accordance with Article 77(d) of Directive 2009/138/EC.

The volatility adjustment decreases the technical provisions and increases the eligible own funds of the relevant individual undertakings, which has an effect at Group level.

The adjustment also has an effect on the SCR of the relevant undertakings, which is calculated using the standard formula, but also on the Group's SCR, which is calculated using the internal model.

The quantitative effects of the transitional deduction on technical provisions and the volatility adjustment on eligible own funds and the SCR are illustrated in QRT S.22.01.22 (impact of long-term guarantees and transitional measures) in the annex to this report.

The use of the transitional measures and volatility adjustment results in an immaterial reduction of the minimum capital requirement (MCR).

Uncertainty associated with the amount of technical provisions

The assessment of the best estimate of technical provisions is largely based on available data and actuarial models in conjunction with expert judgement. In view of the uncertainties involved, different experts will arrive at different assumptions based on their individual background, professional experience, or field of discipline. As a result, a certain degree of uncertainty in the models and parameters used is inevitable. Such uncertainty is taken into account in the validation of the technical provisions by testing and examining sensitivities and developing scenarios.

Compared with the uncertainty involved in determining best estimates, the determination of the risk margin as part of the technical provisions is not characterised by a high degree of freedom when selecting assumptions. The risk margin is based on the present value of risk capital projections, and is largely prescribed by regulatory requirements. Some uncertainty is involved, for example, in selecting the specific projection patterns or the degree of diversification.

Description of methods used for IFRS valuation and main differences compared with Solvency II

In accordance with the provisions of IFRS 4, Insurance contracts, underwriting items are recognised and measured on the basis of US GAAP (United States Generally Accepted Accounting Principles).

Recognition and measurement of gross

The technical provisions are shown as gross figures in the balance sheet, i.e. before deduction of the ceded share. The ceded share is calculated and accounted for on the basis of the individual reinsurance agreements. Acquisition costs for insurance contracts are recognised and amortised over the terms of the contracts (see below). The measurement of technical provisions is based on US GAAP FAS 60 (life primary insurance without performance-related participation in surplus, health primary insurance and the bulk of reinsurance treaties), FAS 97 (life primary insurance based on the universal life model, unit-linked life insurance and life reinsurance for assumed business based on FAS 97) and FAS 120 (life primary insurance with performance-related participation in surplus). Credit insurance contracts are accounted for in accordance with the rules of IFRS 4.

Unearned premiums are accrued premiums already written for future risk periods. For primary insurance, these premiums are calculated separately for each insurance policy pro rata temporis; for reinsurance, nominal percentages are used in some cases where the data for a calculation pro rata temporis is not available. Unearned premiums are not discounted. The posting of unearned premiums is restricted to short-term underwriting business; i.e. property-casualty business and parts of personal accident and health business. In the case of long-term business, a provision for future policy benefits is established.

The **provision for future policy benefits** in long-term underwriting business is posted for the actuarially calculated value of obligations arising from policyholders' guaranteed entitlements. As well as life insurance, this concerns portions of health and personal accident insurance, insofar as the business is conducted like life insurance. Measurement is usually based on the prospective method, by determining the difference between the present values of future benefits and future premiums. The biometric actuarial assumptions used for their calculation include, in particular, assumptions relating to mortality, disability and morbidity, as well as assumptions regarding interest-rate development, lapses and costs. These are estimated on a realistic basis at the time the insurance contracts are concluded, and they include adequate provision for adverse deviation to make allowance for the risks of change, error and random fluctuations.

In reinsurance, measurement is carried out partly individually for each risk and partly collectively for reinsured portfolios, using biometric actuarial assumptions based on the tables of the national actuarial associations. These are adjusted for the respective reinsured portfolio, in line with the probabilities observed for the occurrence of an insured event. Discount rates are chosen that reflect the best estimate of expected investment income, less a safety margin. For the major part of the portfolio, these assumptions are fixed at the beginning of the contract and not changed over its duration.

In primary insurance, measurement is generally carried out individually for each risk. In German life primary insurance, biometric actuarial assumptions based on the tables of the German Association of Actuaries (Deutsche Aktuarvereinigung e.V.) are used. We mostly use the tables of the national actuarial associations for the rest of primary insurance business. The actuarial interest rate employed for discounting in life primary insurance is limited by the respective maximum actuarial interest rate prescribed by the supervisory authorities. In health primary insurance, discount rates are chosen that reflect the best estimate of expected investment income, less a safety margin.

The **provision for outstanding claims** is for payment obligations arising from insurance contracts in primary insurance and reinsurance where the size of the claim or the timing of the payment is still uncertain. Part of the provision is for known claims for which individually calculated provisions are posted. Another part is for expenses for claims whose occurrence is not yet known. There are also provisions for claims that are known, but whose extent has turned out to be greater than originally foreseen. All these provisions include expenses for internal and external loss adjustments. The provision for outstanding claims is based on estimates: the actual payments may be higher or lower. The amounts posted are the realistically estimated future amounts to be paid; they are calculated on the basis of past experience and assumptions about future developments (e.g. social, economic or technological factors). Future payment obligations are generally not discounted; exceptions are some provisions for occupational disability pensions and annuities in workers' compensation and other lines of property-casualty business. For determining the provision for outstanding claims, Munich Re uses a range of actuarial projection methods. Where ranges have been calculated, a realistic estimated value for the ultimate loss is determined within these. In applying the statistical methods, we regard large exposures separately.

Other technical provisions mainly include the provision for premium refunds in primary insurance and the provision for profit commission in reinsurance. The former is posted in life and health primary insurance for obligations involving policyholder bonuses and rebates that have not yet been irrevocably allocated to individual contracts at the balance sheet date. These provisions are posted on the basis of national regulations only for German primary insurance business; a retrospective approach is usually taken based on supervisory or individual contractual rules. These technical provisions are not discounted.

Besides this, there are provisions for deferred premium refunds, which are posted for the amounts apportionable to policyholders from the measurement differences between IFRS and local GAAP on the basis of the expected future participation quotas. For unrealised gains and losses on investments available for sale, which are recognised directly in equity, the resultant provision for deferred premium refunds is also posted without impact on profit or loss; otherwise, changes in this provision are recognised in the income statement.

Liability adequacy test

All technical provisions are regularly subjected to a **liability adequacy test in accordance with IFRS 4**. If current experience shows that the provisions posted on the basis of the original assumptions – less the related deferred acquisition costs and the present value of the related premiums – are inadequate to cover the expected future benefits, we adjust the relevant technical provisions with recognition in profit or loss and disclose this under impairment losses in the Notes to the consolidated balance sheet. The appropriateness of unearned premiums and of the provision for outstanding claims is assessed in relation to the realistically estimated future amount to be paid. The appropriateness of the provision for future policy benefits is assessed on the basis of realistic estimates of the actuarial assumptions, the proportional investment result and – for contracts with participation in surplus – future profit sharing.

IFRS recognition and measurement of gross technical provisions for life insurance policies where the investment risk is borne by the policyholders

This item encompasses the provision for future policy benefits in life primary insurance where policyholders bear the investment risk themselves (unit-linked life insurance). The value of the provision for future policy benefits essentially corresponds to the market value of the relevant investments shown under assets.

Recognition and measurement of deferred acquisition costs under IFRS

Deferred acquisition costs comprise commissions and other variable costs directly connected with the acquisition or renewal of insurance contracts. In accordance with IFRS 4, we do not use shadow accounting for deferred acquisition costs in life primary insurance. In life business and long-term health primary insurance, deferred acquisition costs are amortised over the duration of the contracts.

Recognition and measurement of ceded share of technical provisions

The share of technical provisions for business ceded by us is determined from the respective technical provisions in accordance with the terms of the reinsurance agreements (see above). Appropriate allowance is made for the credit risk.

Explanation of the differences between valuation methods under Solvency II and IFRS

Definition of insurance contract and scope

In line with Solvency II, technical provisions (and reinsurance recoverables, respectively) are established for all (re)insurance contracts independent of the level of insurance risk underlying a particular contract. This means that Solvency II covers all insurance business, including products or contracts which do not meet the definition of an insurance contract under IFRS 4 or US GAAP.

In cases where it can be verified that the basis risk is not material, technical provisions (and reinsurance recoverables, respectively) may be established for insurance-related non-indemnity contracts (e.g. cat bonds and client-specific insurance derivatives) under Solvency II.

Separating components from an insurance contract

In some cases, it may be required or permitted to separate certain components from insurance contracts. Such contracts may fall partially within the scope of IFRS 4 and partially within the scope of other standards. Under Solvency II, components may not be separated.

Recognition

In line with FAS 60, under IFRS a liability for unpaid claims costs, including estimates of incurred but not reported claims and claims adjustment expenses, is accrued when insured events occur. For long-term contracts, a liability for future policy benefits is accrued when premium income is recognised. Premiums for long-term contracts are recognised when due from policyholders. Usually, the liability for future policy benefits is established when the insurance contract begins, as this is the point in time when the first premium is due.

In contrast, Solvency II requires initial recognition at the date the (re)insurer becomes a party to the contract or the date the (re)insurance contract begins, whichever date occurs earlier.

Measurement

Cash flows

In accordance with IFRS, for obligations to policyholders that have not yet been irrevocably allocated to individual contracts at the balance sheet date, provisions for premium refunds are posted in life and health primary insurance. Besides this, there are provisions for deferred premium refunds, which are posted for the amounts apportionable to policyholders from the measurement differences between IFRS and local GAAP on the basis of the expected future participation quotas. For unrealised gains and losses on investments available for sale, which are recognised directly in equity, the resultant provision for deferred premium refunds is also posted without impact on profit or loss.

By contrast, Solvency II requirements explicitly prescribe that "all payments to policyholders and beneficiaries, including future discretionary bonuses, which insurance and reinsurance undertakings expect to make, whether or not those payments are contractually guaranteed" are to be taken into account in the calculation of technical provisions, unless those payments represent surplus funds. Consequently, expected future discretionary bonuses are taken into consideration in the cash flows used for the calculation of technical provisions in line with Solvency II.

Additional differences may occur, e.g. resulting from the inclusion of general overhead expenses in Solvency II technical provisions.

Contract boundary

In line with FAS 60, a liability for future policy benefits is established for long-term contracts under IFRS. The liability is the present value of estimated future policy benefits to be paid, less the present value of future premiums to be collected from policyholders. There are no specific provisions with respect to the boundary for the determination of future premiums and future policy benefits.

On the other hand, actuarial practice has evolved depending on the type of product. There might be cases where this leads to a differing contract boundary than under Solvency II requirements.

Discounting

Under Solvency II, we use the basic risk-free interest rates, depending on currency and maturity, when discounting technical provisions. As at the reporting date, we do not make use of any transitional measures regarding the relevant risk-free interest rate term structure. Four life primary insurance companies make use of volatility adjustment pursuant to Article 77(d) of Directive 2009/138/EC.

Explanations regarding the discounting of technical provisions under IFRS can be found in the section "Recognition and measurement of gross technical provisions under IFRS".

Risk margin

Under Solvency II, the cost of capital for assuming risk has to be explicitly taken into account. It is referred to as the risk margin, and is calculated using a cost-of-capital approach.

By contrast, actuarial assumptions in line with IFRS include adequate provision for adverse deviation to make allowance for the risks of change, error and random fluctuations. No explicit risk margin is calculated.

Non-performance risk

Appropriate allowance for credit risk is made in line with both IFRS and Solvency II when calculating the ceded share of technical provisions (i.e. reinsurance recoverables under Solvency II). The methodology for determining the allowance for credit risk is not prescribed under IFRS. Under Solvency II, we comply with the relevant requirements for the determination of the counterparty default adjustment.

Acquisition costs

Under IFRS, acquisition costs for insurance contracts are capitalised and amortised over the terms of the contracts. They are regularly tested for impairment using a liability adequacy test.

Under Solvency II, acquisition costs are taken into consideration as part of the cash flows when calculating technical provisions.

Short-term contracts

For IFRS, a distinction is made between short-term and long-term (re)insurance business (see above). There is no equivalent concept under Solvency II.

Transitional deduction on technical provisions and volatility adjustment

Three life primary insurance undertakings apply a transitional deduction on technical provisions. Four life and health primary insurance undertakings make use of a volatility adjustment pursuant to Article 77(d) of Directive 2009/138/EC. Under IFRS, there is no corresponding deduction or volatility adjustment.

Quantification of differences between IFRS and Solvency II technical provisions

In addition to the qualitative assessment of differences in the valuation of technical provisions between IFRS and Solvency II, the following table provides a quantitative overview. The starting point is IFRS technical provisions allocated to Solvency II lines of business.

The item "Reclassification of balance sheet items", for example, includes deferred acquisition costs recognised under IFRS, accounts receivable and payable not yet due, and contracts not accounted for as insurance under IFRS. These are added to the technical provisions under IFRS to obtain a basis which is comparable to the technical provisions under Solvency II.

Subsequently, an adjustment is made for the underlying economic assumptions. It mainly comprises the effects of discounting based on the EIOPA interest rate in line with Solvency II requirements, offset by discount effects may also already be included in the IFRS technical provisions.

The adjustment for quantified differences in methodology is derived from individual assessments of major methodological differences between IFRS and Solvency II. They allow for a detailed consideration of business-specific differences in the models and assumptions for technical provisions under IFRS and Solvency II.

For the remaining differences, no further quantitative attribution to specific drivers is carried out. They largely stem from methodological differences involving a variety of minor drivers.

In a last step, the risk margin is added to the Solvency II technical provisions, as it is not explicitly determined in the IFRS balance sheet.

Reconciliation of technical provisions, IFRS vs. Solvency II

						31.12.2019
€m	Non-life	Health (similar to non-life)	Health (similar to life)	Life	Unit- and index-linked	Total
IFRS technical provisions	**64,269**	**3,270**	**59,970**	**87,198**	**8,171**	**222,878**
Reclassification of balance sheet items	–6,737	–380	–3,167	–8,404	1,108	–17,581
Adjustment of economic assumptions	–2,125	51	4,072	–2,261	0	–264
Quantified methodological differences	–155	28	–1,968	–2,777	0	–4,871
Other differences	–618	–21	498	134	–712	–718
SII technical provisions – best estimate[1]	54,634	2,948	59,404	73,890	8,568	199,444
Risk margin	1,585	157	5,112	5,237	110	12,202
SII technical provisions without LTG guarantees and transitionals[1]	56,219	3,105	64,516	79,127	8,679	211,646
Impact of transitionals	0	0	–62	–9,074	–425	–9,561
Impact of volatility adjustment	0	0	–30	–237	–9	–276
SII technical provisions with LTG guarantees and transitionals	**56,219**	**3,106**	**64,424**	**69,816**	**8,245**	**201,810**

[1] Including technical provisions calculated as a whole and before impact of long-term guarantees and transitional measures.

Reinsurance recoverables under Solvency II

General requirements for calculation

The calculation of amounts recoverable from reinsurance contracts and special purpose vehicles by insurance and reinsurance undertakings complies with the rules relating to technical provisions. The amounts recoverable from reinsurance contracts and special purpose vehicles are calculated consistently with the boundaries of the insurance or reinsurance contracts to which they relate.

Under Solvency II, separate calculations are carried out for

- the amounts recoverable from special purpose vehicles,
- the amounts recoverable from finite reinsurance contracts, and
- the amounts recoverable from other reinsurance contracts.

Furthermore, a separate calculation is carried out for the amounts recoverable from reinsurance contracts and special purpose vehicles for non-life insurance obligations regarding premium provisions and provisions for claims outstanding.

When calculating amounts recoverable from reinsurance contracts and special purpose vehicles, the time difference between recoverables and direct payments is taken into account.

Where cash flows from the special purpose vehicles to the insurance or reinsurance undertaking do not directly depend on the claims against the insurance or reinsurance undertaking ceding risks, the amounts recoverable from those special purpose vehicles for future claims are only taken into account to the extent that it can be verified in a prudent, reliable and objective manner that the structural mismatch between claims and amounts recoverable is not material.

For the purpose of calculating the amounts recoverable from reinsurance contracts and special purpose vehicles, cash flows only include payments in relation to compensation of insurance events and unsettled insurance claims. Payments in relation to other events or settled insurance claims are accounted for outside the amounts recoverable from reinsurance contracts and special purpose vehicles and other elements of the technical provisions. Where a deposit has been made for the cash flows, the amounts recoverable are adjusted accordingly to avoid a double counting of the assets and liabilities relating to the deposit.

The cash flows relating to provisions for claims outstanding include the compensation payments relating to the claims accounted for in the gross provisions for claims outstanding of the insurance or reinsurance undertaking ceding risks. The cash flows relating to premium provisions include all other payments.

Counterparty default adjustment

The result from the calculation of the best estimate is adjusted to take account of expected losses due to default of the counterparty. That adjustment is based on an assessment of the probability of default of the counterparty and the average loss resulting therefrom.

The adjustment to take account of expected losses due to default of a counterparty is calculated as the expected present value of the change in cash flows underlying the amounts recoverable from that counterparty that would arise if the counterparty defaults, including as a result of insolvency or dispute, at a certain point in time. For that purpose, the change in cash flows does not take into account the effect of any risk-mitigating technique that reduces the credit risk of the counterparty, other than riskmitigating techniques based on collateral holdings. The risk-mitigating techniques that are not taken into account are recognised separately, without increasing the amount recoverable from reinsurance contracts and special purpose vehicles.

The calculation takes into account possible default events over the lifetime of the reinsurance contract or arrangement with the special purpose vehicle, and whether and how the probability of default varies over time. It is carried out separately by each counterparty and for each line of business. In non-life insurance, it is also carried out separately for premium provisions and provisions for claims outstanding.

D3 Other liabilities

According to Article 75(1)(b) of Directive 2009/138/EC, all other liabilities are to be valued at fair value in the solvency balance sheet. When valuing liabilities, no adjustment is made to take account of the own credit standing of the insurance or reinsurance undertaking. Under IFRS, we generally measure other liabilities at amortised cost or at par value; only derivatives with negative market values are measured at fair value. As the valuation basis for Solvency II and IFRS is different, we explain the differences in greater detail for each of the liability items mentioned below. Where the differences between the fair values in the solvency balance sheet and the IFRS values are immaterial, we use the latter to measure other liabilities, as explained in more detail below.

In addition to the differences in valuation, the structure of the solvency balance sheet also differs from that of the IFRS balance sheet. Therefore, the balance sheet items are not directly comparable. Where such differences in allocation exist, they are explained for the individual items. Where it was possible to reclassify liabilities as per IFRS in order to comply with the structure prescribed for the solvency balance sheet, we made this reclassification.

Contingent liabilities

In the solvency balance sheet, contingent liabilities are to be recognised as a liability if they are material, i.e. if information about the current or potential amount or nature of the liability could influence the decision-making or judgement of the intended user of that information. As a further precondition for recognition, an outflow of resources must be more than a remote possibility.

We measure such contingent liabilities based on the expected present value of future cash flows required to settle the contingent liability over its lifetime, using the relevant risk-free interest rate term structure. At Munich Re, valuation is made on a market-consistent basis in accordance with CDS spreads observable in the capital markets. It is assumed that the (present) value of a contingent liability is the same as the present value of the (probability-weighted) CDS premium payable in order to hedge against the financial risks arising from the contingent liability. Contingent liabilities that cannot be reliably measured and do not meet the recognition criteria are not recognised.

Under IFRS, contingent liabilities are generally not recognised. However, disclosure in the notes to the financial statements is required if there is more than a remote possibility that such a liability will result in an obligation to make a payment.

Other liabilities

€m	Solvency II value	Statutory accounts value
Contingent liabilities	14	0
Provisions other than technical provisions	1,472	1,543
Pension benefit obligations	3,686	3,748
Deposits from reinsurers	1,651	1,028
Deferred tax liabilities	7,226	1,908
Derivatives	720	1,726
Debts owed to credit institutions	113	557
Financial liabilities other than debts owed to credit institutions	1,850	297
Insurance & intermediaries payables	3,081	2,989
Reinsurance payables	204	4,293
Payables (trade, not insurance)	4,161	6,828
Subordinated liabilities	4,234	3,839
Subordinated liabilities not in BOF	116	0
Subordinated liabilities in BOF	4,118	3,839
Any other liabilities, not elsewhere shown	110	5,343
Other liabilities total	**28,522**	**34,100**

Provisions other than technical provisions

Both in the solvency balance sheet and under IFRS, our valuation of other provisions is based on a best estimate of the amount that would be required to settle the liabilities as at the balance sheet date, i.e. the amount we would reasonably have to pay to satisfy the liabilities or transfer them to a third party as at the balance sheet date. If there is a range of possible estimates having an equal degree of probability, the midpoint of the range is used. If the interest-rate effect is material, we value the provision at the present value of the expected expenditure. If it is immaterial, we disregard it.

Pension benefit obligations

The following explanations do not relate exclusively to pension benefit obligations, but also take into account other material employee benefits.

Under Solvency II, we measure obligations for employee benefits in accordance with IAS 19. According to IAS 19, there are two different types of pension obligations: defined contribution plans and defined benefit plans.

Under defined contribution plans, the undertakings pay fixed contributions to an insurer or a pension fund. This covers the undertakings' obligations in full. Therefore, under both IFRS and Solvency II, a defined contribution plan is not recognised as an obligation in the balance sheet. In 2019, the contributions paid to defined contribution plans totalled €68m.

Under defined benefit plans, the staff member is promised a particular level of retirement benefit either by the undertakings or by a pension fund. The undertakings' contributions needed to finance this are not fixed in advance. If pension obligations are covered by assets held by a legally separate entity (e.g. a fund or a contractual trust agreement in the form of a two-way trust) – assets that may only be used to cover the pension commitments given and are not accessible to creditors – the pension obligations are shown less the amount of these plan assets. If the fair value of the assets exceeds the related outsourced pension benefit obligations, this asset is recognised as a "pension benefit surplus".

Actuarial gains or losses from obligations for employee benefits and plan assets result from the deviation of actual risk experience from estimated risk experience. Since under IFRS, Munich Re recognises actuarial gains and losses directly in the period in which they occur, there is no difference to Solvency II.

In accordance with the definitions in IAS 19, the obligations for employee benefits recognised in the balance sheet break down as follows:

Major benefits for employees

€m	Solvency II value
Short-term obligations (provisions for holidays and overtime, bonuses)[1]	250
Defined benefit plans (including medical cover)	3,748
Other long-term benefits (semi-retirement and early retirement, provisions for anniversary benefits, multi-year performance)[2]	315
Benefits on termination of employment contract (semi-retirement, severance payments)	19

[1] Part of SII balance sheet item "Payables (trade, not insurance)".
[2] Part of SII balance sheet item "Provisions other than technical provisions".

Munich Re undertakings generally give commitments to their staff in the form of defined contribution plans or defined benefit plans (within the meaning of IAS 19). The type and the amount of the pension obligation are determined by the conditions of the respective pension plan.

The most important plans are the following:

The pension obligations of Munich Reinsurance Company include disability and old-age pensions, and pensions for surviving dependants. The amount of the pensions generally depends on salary and length of service. The defined benefits granted up to 31 December 2007 are financed through a fund. New members on or after 1 January 2008 receive pension commitments in the form of defined contribution plans financed by means of intra-Group insurance contracts securing the obligations under pension schemes. The fund and insurance contracts have been grouped in a contractual trust agreement (CTA).

The pension obligations of the ERGO include disability and old-age pensions, and pensions for surviving dependants. The amount of the pensions generally depends on salary and length of service. The commitments are generally funded through pension provisions. New members receive pension commitments in the form of defined contribution plans financed by means of intra-Group insurance contracts securing the obligations under pension schemes. There are also medical-care benefit obligations.

The pension obligations of Munich Reinsurance America, Inc. include pensions for employees and surviving dependants. The amount of the pensions generally depends on includable compensation and length of service. The plan is financed through a trust and pension provisions. The plan was closed to new members effective 1 January 2006, and to all remaining members effective 31 December 2011. With effect from 1 January 2012, all members now receive pension commitments in the form of defined contribution plans. There are also retiree medical-care benefit obligations.

Under Solvency II, pension obligations are recognised in accordance with IAS 19, using the projected unit credit method. The calculation includes not only the pension entitlements and current pensions known at the balance sheet date, but also their expected future development.

The discount rate applied to these obligations is based on the yields for high-quality bonds (e.g. corporate or government bonds). The currency and term of the bonds correspond to the currency and estimated term of the obligations.

The mortality and disability assumptions are based on local tables used for the valuation of pension benefit obligations; these may be adapted to reflect the experience of the respective undertaking. Rates of employee turnover and early retirement are based on the individual experience of the Munich Re undertakings.

Actuarial assumptions

%	2019	Prev. year
Discount rate	1.2	2.2
Future increases in entitlement/salary	1.8	1.8
Future pension increases	1.5	1.5
Medical cost trend rate	3.5	3.6

Munich Re uses generally recognised biometric actuarial assumptions, adjusted as a rule to take account of company-specific circumstances.

Breakdown of the fair value of plan assets for defined benefit plans

%	31.12.2019	Prev. year
Quoted market price in an active market		
Fixed-interest securities	40	41
Non-fixed-interest securities	23	22
Equities	5	4
Investment funds	18	17
Other	0	1
Other	0	1

Breakdown of the fair value of plan assets for defined benefit plans

%	31.12.2019	Prev. year
No quoted market price in an active market		
Cash or cash equivalents	0	0
Real estate	1	1
Fixed-interest securities	0	0
Non-fixed-interest securities	3	3
Equities	0	0
Investment funds	3	3
Other	0	0
Insurance contracts	32	31
Other	1	1

Deposits from reinsurers

Deposits from reinsurers are collateral for technical provisions covering business ceded to reinsurers and retrocessionaires. As a rule, the changes in these deposits derive from the changes in the relevant technical provisions covering ceded business. Deposits from reinsurers thus do not have a fixed maturity date, their release generally being dependent on run-off of the corresponding provisions.

In the solvency balance sheet, we measure deposits from reinsurers at fair value. Under IFRS, we recognise these liabilities at nominal value.

Deferred tax liabilities

Under Solvency II, deferred taxes are determined pursuant to Article 15 in conjunction with Article 9 of Delegated Regulation (EU) 2015/35.

In accordance with Article 9(1) and (2) of the Delegated Regulation, assets and liabilities must be recognised and valued in accordance with IFRS requirements, provided that these are consistent with Article 75 of Directive 2009/138/EC. Therefore, under Solvency II, deferred tax liabilities are recognised and valued in accordance with IAS 12.

Deferred taxes are calculated on the basis of the difference between the values ascribed to liabilities recognised and valued in accordance with Article 75 of Directive 2009/138/EC, and the values ascribed to liabilities recognised and valued for tax purposes. Deferred tax liabilities are recognised in cases where asset items have to be valued higher, or liability items lower, in the solvency balance sheet than in the tax accounts of Munich Re, and these differences will be eliminated at a later date with a corresponding effect on taxable income (temporary differences).

Further information on the recognition of deferred taxes can be found in section D 1 Deferred tax assets.

Financial liabilities including derivatives and debts owed to credit institutions

In the solvency balance sheet, financial liabilities including derivatives and debts owed to credit institutions are to be measured at fair value. After initial recognition, no adjustments are made to take account of the own credit standing of the insurance or reinsurance undertaking. Thus, financial liabilities are measured at fair value at the reporting date without taking account of any improvement or deterioration in Munich Re's own credit risk. If the impact of such an improvement or deterioration is immaterial, we do not adjust the fair values accordingly.

For Munich Re bonds and derivatives traded on a stock exchange, the fair values are the stock-market prices, if available. For the other financial liabilities, we determine the fair values using net present-value methods with observable market inputs. Further details are set out below:

- With regard to the valuation models used for determining the fair value of derivatives, reference is made to the table "Valuation techniques for financial instruments" and the explanations given in section D 1 Determining fair values.
- For the bonds we have issued, we use the market prices provided by price quoters to determine fair value.
- The fair values of our debts owed to credit institutions are determined using the present-value method, in part exclusively using observable market inputs, and partly also taking into account non-observable inputs.

Under IFRS, we measure our financial liabilities at amortised cost using the effective interest method – except for derivatives with a negative market value, which are recognised at fair value.

More details on fair value measurement, the measurement hierarchy levels and the models used for determining fair

values can be found in section D 1 under Determining fair values.

Insurance and intermediaries payables

In the solvency balance sheet, insurance and intermediaries payables must be recognised at fair value; under IFRS, they must be recognised at the amount actually required to redeem or settle them. In contrast to the solvency balance sheet, under IFRS we also recognise interest-bearing accumulated participation in life insurance surplus under this item.

Reinsurance payables

In the solvency balance sheet, reinsurance payables must be recognised at fair value; under IFRS, they are recognised at the amount actually required to redeem or settle those payables.

Unlike in financial reporting under IFRS, under Solvency II payables from brokerage and from reinsurance business assumed are not recognised under reinsurance payables, but under insurance and intermediaries payables.

Payables (trade, not insurance)

In the solvency balance sheet, the item "Payables (trade, not insurance)" covers in particular payables from dividends, payables from profit pooling or transfer agreements, payables from taxes, and other payables. These payables are measured at fair value at the reporting date without taking account of any improvement or deterioration in the undertaking's own credit risk. However, for reasons of simplification, we measure payables from dividends and payables from profit pooling or transfer agreements at their IFRS carrying amount, i.e. at amortised cost.

Payables from taxes and other payables are discounted, taking into account the actual risk-free interest rates and relevant interest-rate spreads.

Both reinsurance payables and insurance and intermediaries payables are included in other payables under IFRS, but shown as separate items in the solvency balance sheet.

Under Solvency II, all insurance contracts are recognised under technical provisions irrespective of the level of insurance risk involved in the individual contracts. Therefore, payables resulting from insurance or reinsurance contracts with non-significant risk transfer are – notwithstanding IFRS – not reported as payables, but as part of the technical provisions.

Subordinated liabilities

Subordinated liabilities are liabilities which, in the event of liquidation or insolvency, are only satisfied after the claims of other creditors.

They are recognised at fair value in the solvency balance sheet. For Munich Re subordinated bonds, we take the stock market prices as fair values. Credit spreads relevant for Munich Re are obtained from an external provider and are based on CDS. For valuation purposes, the quoted stock-market prices are adjusted taking into account the change in credit spread from the date of issuance until the valuation date, multiplied by the modified duration for the stock-market price at the valuation date.

For the other subordinated liabilities, we determine the fair values using net present-value methods with observable market inputs. Whether or not subordinated liabilities are eligible for inclusion in own funds is of no importance for valuation purposes.

Under IFRS, we value all subordinated liabilities at amortised cost using the effective interest method.

Any other liabilities, not elsewhere shown

This item includes liabilities from prepayments received prior to the reporting date that are not earned or due until after the balance sheet date. Liabilities for these prepayments are recognised at the reporting date to take into account that the prepayments received relate to outstanding obligations of the undertaking. Thus, recognition is mandatory to represent the correct amount of own funds as at the reporting date.

In contrast to our financial reporting, in the solvency balance sheet derivatives (€720m) are reclassified as derivatives.

Any other liabilities generally have to be measured at fair value in the solvency balance sheet. Where the discounting effect is immaterial, we do not discount the liabilities concerned.

D4 Alternative methods for valuation

Detailed information on determining the fair values of the individual assets and other liabilities can be found in section D 1 under Determining fair values. The valuation techniques described therein are regularly tested by our asset managers as regards their suitability for valuation of the assets and liabilities concerned, and adapted if necessary.

D5 Any other information

We do not know of any other material information not already covered in the other sections of Part D.

Capital management

E

E Capital management

E1 Own funds

Aims, policies and processes to manage own funds

Through active capital management, we strive to ensure that Munich Re's capital satisfies all applicable standards. In addition to the capital requirements determined using our internal risk model, more far-reaching requirements by regulatory authorities, rating agencies and our key insurance markets must be met.

We aim to ensure that our financial strength is such that it enables us to take advantage of profitable opportunities for growth, is not significantly affected by normal fluctuations in capital market conditions, and remains at a reasonable level even in the wake of major loss events or substantial falls in the stock markets. At the same time, we also define an appropriate level of Group own funds as one which does not lastingly exceed that which is required. Excess capital is returned to our shareholders via dividends and share buy-backs. In practice, capital repatriation comes up against limits because German commercial law (the German Commercial Code; HGB) forces our parent, Munich Reinsurance Company, to maintain the claims equalisation provision in local GAAP accounting at a level that exceeds the economic requirements. This restricts the revenue reserves and profit distribution possibilities, but stabilises results in years with high claims expenditure.

Capital management planning takes place as part of our annual medium-range business planning. Relevant capital management key performance indicators are regularly checked as part of the risk management system. There were no significant changes during the reporting period. Munich Re will pay a higher dividend of €9.80 per share for the past financial year, provided that the Annual General Meeting approves. Munich Re's shares thus remain a high-return investment.

Differences between IFRS equity and Solvency II excess of assets over liabilities

The main differences between the IFRS equity of Munich Re and the excess of assets over liabilities in the solvency balance sheet are due to the differing rules for recognition and valuation.

The Solvency II methodology makes more extensive use of market values in the balance sheet than IFRS. For example, investments are recognised in the solvency balance sheet at market value, whereas under IFRS this applies only to securities available for sale. By contrast, goodwill and other intangible assets are valued at zero. The valuation methodology for underwriting items in accordance with Solvency II differs significantly from the valuation in our IFRS consolidated financial statements. The value of the technical provisions in accordance with Solvency II corresponds to the current amount that insurance and reinsurance undertakings would have to pay if they were to transfer their insurance and reinsurance liabilities immediately to another insurance or reinsurance undertaking.

The quantitative statement of the differences can be seen in the table below.

Excess of assets over liabilities (Solvency II) in comparison with IFRS equity

€m	Solvency II	IFRS[1]	Difference
a) Goodwill and other intangible assets	0	3,837	–3,837
b) Surplus funds	0	–2,863	2,863
c) Investments, including deposits retained on assumed reinsurance and cash	261,213	243,240	17,973
d) Subordinated liabilities	–4,234	–3,839	–395
e) Deferred tax (net)	–7,124	–1,592	–5,532
f) Other assets and liabilities	–5,677	–9,292	3,615
g) Underwriting assets and liabilities	–196,201	–198,916	2,715
Excess of assets over liabilities (Solvency II) in comparison with IFRS equity	**47,977**	**30,576**	**17,402**

[1] Some IFRS figures have been reclassified to ensure comparability with Solvency II.

Consolidation methods for own funds

Group solvency is calculated on the basis of the consolidated accounts (Method 1; namely as set out in Article 230 of Directive 2009/138/EC). The table "Consolidation method for Group own funds" shows how consolidated data is calculated for the respective related undertakings in the Group.

Consolidation method for Group own funds

Type of undertaking	SII Delegated Regulation (EU) 2015/35 Article	Determination of consolidated data (method 1)
Dominant influence		
Insurance and reinsurance undertakings, insurance holding companies and mixed financial holding companies	335 (1) (a)	Full consolidation
Ancillary services undertakings	335 (1) (a)	Full consolidation
Institutions for occupational retirement provision	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
Credit institutions, investment firms and financial institutions	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
Alternative investment fund managers	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
UCITS management companies	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
Special purpose vehicles meeting the requirements of Article 211	335 (1) (b) 329 (3)	Not taken into account
Other special purpose vehicles	335 (1) (b)	Full consolidation
Non-regulated undertakings that conduct financial transactions	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
Other undertakings	335 (1) (f) 13	Other methods*
Undertakings for collective investment in transferable securities (UCITS/AIF)	335 (1) (f) 13	Other methods*
Significant influence/joint venture		
Insurance and reinsurance undertakings, insurance holding companies and mixed financial holding companies	335 (1) (c), (d)	Proportional share of the own funds calculated in accordance with the relevant sectorial rules
Ancillary services undertakings	335 (1) (c), (f)	Proportional consolidation and/or other methods*
Institutions for occupational retirement provision	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
Credit institutions, investment firms and financial institutions	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
Alternative investment fund managers	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
UCITS management companies	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
Non-regulated undertakings that conduct financial transactions	335 (1) (e)	Proportional share of the own funds calculated in accordance with the relevant sectoral rules
Other undertakings	335 (1) (f) 13	Other methods*
Undertakings for collective investment in transferable securities (UCITS/AIF)	335 (1) (f) 13	Other methods*

* Other methods – valuation hierarchy in accordance with Article 13 of Delegated Regulation (EU) 2015/35

Composition of own funds

Eligible own funds

The starting point for the calculation of the eligible own funds is the excess of assets over liabilities.

Then the basic own funds are calculated by adjusting the excess of assets over liabilities according to Solvency II for the factors relevant to Munich Re.

Subordinated liabilities should be added provided that they are available at all times to cover losses on a going concern basis. Munich Re's subordinated liabilities meet this requirement. Share buy-backs that have been announced but not completed as at the reporting date, own shares and foreseeable dividends must be deducted from own funds. Certain own-fund items belonging to Munich Re subsidiaries are subject to further restrictions with regard to their transferability and fungibility at Group level. These own-fund items must also be deducted.

In addition, the carrying amounts of shareholdings in companies in other financial sectors such as credit institutions and investment firms must be deducted. Finally, capital calculated in accordance with sectoral regulations that is allocated to other financial sectors is included to obtain the Group's eligible own funds.

For Solvency II, own funds are divided into four levels of quality – known as tiers – depending on their ability to absorb losses. Tier 1 unrestricted is the highest quality, and Tier 3 is the lowest.

The division into tiers meets the requirements of the Solvency II Directive (Articles 93 to 96), the Delegated Regulation (Articles 69 to 78) and EIOPA-BoS-14/168 – Guidelines on classification of own funds. The following own-fund items are classified as Tier 1 unrestricted: Share capital, share premium account related to ordinary share capital, surplus funds and the reconciliation reserve. Classification of the surplus funds as Tier 1 unrestricted takes into consideration the national legal provisions of the respective units. We have classified the subordinated liabilities essentially as Tier 2 owing to the underlying contractual terms and conditions.

An amount equal to the value of net deferred tax assets is classified as Tier 3 own funds.

The tables "Own funds" contain information about the structure, amount and tier allocation of eligible own funds as at 31 December 2019 and as at 31 December 2018. They also show the deductions of non-available own funds as a result of restrictions on transferability and fungibility. At Munich Re, these are essentially surplus funds, subordinated liabilities, minority interests and net deferred tax assets.

As can be seen in the table "Own funds", there are no significant restrictions on the fungibility and transferability of eligible own funds to meet the Groups solvency capital requirement. Restrictions are considered significant if an omission or misstatement of related information could influence the decision-making process or judgement of the users. Furthermore, it is clear that there is no effect due to limits in respect of eligible own funds classified as Tier 2, Tier 3, or Tier 1 unrestricted. Allocation of the own-fund items to the individual tiers has remained unchanged compared with the previous year.

Own funds

31.12.2019

€m	Total	Tier 1 - unrestricted	Tier 1 - restricted	Tier 2	Tier 3
Basic own funds before deduction for participations in other financial sector					
Ordinary share capital (gross of own shares)	588	588		0	
Share premium account related to ordinary share capital	6,845	6,845		0	
Surplus funds	2,863	2,863			
Non-available surplus funds at group level	213	213			
Reconciliation reserve	33,816	33,816			
Subordinated liabilities	4,118		13	4,057	48
Non-available subordinated liabilities at group level	48		0	0	48
An amount equal to the value of net deferred tax assets	184	0			184
The amount equal to the value of net deferred tax assets not available at the group level	78				78
Minority interests (if not reported as part of a specific own fund item)	204	204	0	0	0
Non-available minority interests at group level	194	194	0	0	0
Deductions					
Deductions for participations in other financial undertakings, including non-regulated undertakings carrying out financial activities	274	274	0	0	0
Total of non-available own fund items	534	407	0	0	127
Total deductions	**808**	**681**	**0**	**0**	**127**
Total basic own funds after deductions	**47,811**	**43,634**	**13**	**4,057**	**106**
Own funds of other financial sectors					
Credit institutions, investment firms, financial institutions, alternative investment fund managers, UCITS management companies	76	76	0	0	
Institutions for occupational retirement provision	195	195	0	0	0
Non-regulated entities carrying out financial activities	3	3	0	0	0
Total own funds of other financial sectors	**274**	**274**	**0**	**0**	**0**
Total available own funds to meet the consolidated group SCR (excluding own funds from other financial sector and from the undertakings included via D&A)	47,811	43,634	13	4,057	106
Total available own funds to meet the minimum consolidated group SCR	47,704	43,634	13	4,057	
Total available own funds to meet the consolidated group SCR (excluding own funds from other financial sector and from the undertakings included via D&A)	47,811	43,634	13	4,057	106
Total eligible own funds to meet the minimum consolidated group SCR	46,363	43,634	13	2,716	
Minimum consolidated Group SCR (Article 230)	**13,582**				
Ratio of eligible own funds to Minimum Consolidated Group SCR	**341%**				
Total eligible own funds to meet the group SCR (including own funds from other financial sector and from the undertakings included via D&A)	**48,085**	**43,909**	**13**	**4,057**	**106**
Group SCR	**17,531**				
Ratio of eligible own funds to group SCR including other financial sectors and the undertakings included via D&A	**274%**				

Own funds

31.12.2018

€m	Total	Tier 1 - unrestricted	Tier 1 - restricted	Tier 2	Tier 3
Basic own funds before deduction for participations in other financial sector					
Ordinary share capital (gross of own shares)	588	588		0	
Share premium account related to ordinary share capital	6,845	6,845		0	
Surplus funds	2,606	2,606			
Non-available surplus funds at group level	210	210			
Reconciliation reserve	29,088	29,088			
Subordinated liabilities	4,079		13	4,020	46
Non-available subordinated liabilities at group level	46		0	0	46
An amount equal to the value of net deferred tax assets	344				344
The amount equal to the value of net deferred tax assets not available at the group level	83				83
Minority interests (if not reported as part of a specific own fund item)	198	198	0	0	0
Non-available minority interests at group level	168	168	0	0	0
Deductions					
Deductions for participations in other financial undertakings, including non-regulated undertakings carrying out financial activities	287	287	0	0	0
Total of non-available own fund items	506	378	0	0	129
Total deductions	**793**	**665**	**0**	**0**	**129**
Total basic own funds after deductions	**42,953**	**38,660**	**13**	**4,020**	**261**
Own funds of other financial sectors					
Credit institutions, investment firms, financial institutions, alternative investment fund managers, UCITS management companies	86	86	0	0	
Institutions for occupational retirement provision	199	199	0	0	0
Non-regulated entities carrying out financial activities	3	3	0	0	0
Total own funds of other financial sectors	**287**	**287**	**0**	**0**	**0**
Total available own funds to meet the consolidated group SCR (excluding own funds from other financial sector and from the undertakings included via D&A)	42,953	38,660	13	4,020	261
Total available own funds to meet the minimum consolidated group SCR	42,692	38,660	13	4,020	
Total available own funds to meet the consolidated group SCR (excluding own funds from other financial sector and from the undertakings included via D&A)	42,953	38,660	13	4,020	261
Total eligible own funds to meet the minimum consolidated group SCR	41,091	38,660	13	2,419	
Minimum consolidated Group SCR (Article 230)	**12,096**				
Ratio of eligible own funds to Minimum Consolidated Group SCR	**340%**				
Total eligible own funds to meet the group SCR (including own funds from other financial sector and from the undertakings included via D&A)	**43,241**	**38,947**	**13**	**4,020**	**261**
Group SCR	**14,670**				
Ratio of eligible own funds to group SCR including other financial sectors and the undertakings included via D&A	**295%**				

The solvency ratio shown of 274% (295%) includes transitional measures under Solvency II. The following capital measures are included as deductible items: the dividend of €1.4bn proposed by the Board of Management for the 2019 financial year and a share buy-back programme for 2020/2021 in the amount of €1bn; though the latter has been postponed until further notice. The purchases not yet made under the 2019/2020 share buy-back pro-gramme (€339m) were also taken into account. Without transitional measures, the solvency ratio would have been 237% (245%) as at 31 December 2019.

The table "Reconciliation reserve" shows the calculation of the Group's reconciliation reserve as at 31 December 2019 and the previous year. The EPIFP are also given. The reconciliation reserve is subject to fluctuation during the year, mainly on account of the development of economic earnings and capital measures (share buy-back programmes, capital increases, dividends, etc.). ALM reflects the influence of the capital market environment on the valuation of asset and liability items in the solvency balance sheet, and hence the volatility of the reconciliation reserve. It is therefore a fundamental pillar of our value-based management system and the focal point of our investment strategy. Key characteristics of underwriting and other liabilities are taken into account in structuring our investment portfolio. With ALM, we aim to ensure that changes in macroeconomic factors influence the value of our investments and our technical provisions and liabilities in a similar way. For this purpose, where possible, we mirror important features of liabilities – such as maturity patterns, currency structures and inflation sensitivities – on the assets side of the balance sheet by acquiring investments with similar characteristics. This reduces our vulnerability to capital market fluctuations and stabilises our economic capital resources.

Reconciliation reserve

€m	31.12.2019	31.12.2018
Excess of assets over liabilities	47,977	43,042
Own shares (held directly and indirectly)	751	713
Foreseeable dividends, distributions and charges	2,725	2,661
Other basic own fund items	10,685	10,580
Reconciliation reserve before deduction for participations in other financial sector	**33,816**	**29,088**
Expected profits		
Expected profits included in future premiums (EPIFP) – Life business	15,659	13,185
Expected profits included in future premiums (EPIFP) – Non-life business	1,530	955
Total EPIFP	**17,189**	**14,140**

Composition of subordinated liabilities

€ m	Total	Tier 1 total	Tier 1 counted under transitionals	Tier 2 total	Tier 2 counted under transitionals	Tier 3
Dated subordinated liabilities	4,106	0	0	4,057	0	48
Undated subordinated liabilities with a contractual opportunity to redeem	13	13	13	0	0	0
Total subordinated liabilities	**4,118**	**13**	**13**	**4,057**	**0**	**48**

Subordinated liabilities

Munich Re's subordinated liabilities came to €4.1bn (4.1bn) as at the reporting date. In addition to Munich Reinsurance Company, both ERGO Versicherung Aktiengesellschaft, Vienna, and HSB Group, Inc., Dover, also recognised subordinated liabilities totalling €61m (59m) as at the reporting date.

Subordinated liabilities subject to transitional measures[1] can be seen in the table "Composition of subordinated liabilities". Overall, two subordinated bonds of ERGO Versicherung Aktiengesellschaft, Vienna, totalling €13m are subject to transitional measures. They were issued before Solvency II came into force, and could be used as at 31 December 2015 to at least 50% to meet the available solvency margin requirements under Solvency I. They are thus classified as Tier 1 restricted.

The four (four) Munich Reinsurance Company subordinated bonds totalling €4.0bn (4.0bn) meet the criteria for Tier 2 classification under Solvency II. In particular, the following requirements are met; that the original maturity is at least ten years and that the earliest, first contractual opportunity to redeem is five years after the date of issuance.

Change in own funds

Eligible own funds increased by €4,356m in the reporting period (after adjusting the opening balance). The main drivers are presented in the table "Change in own funds". The economic earnings led to an increase of €7,413m in eligible own funds in the reporting period, whilst the change in eligibility restrictions amounted to –€28m. In addition, capital measures of –€2,362m and a decrease in value of €666m – due in particular to some transitional measures expiring – decreased the eligible own funds.

Change in own funds

€m	
Eligible own funds as at 31 December 2018	**43,241**
Opening adjustments[1]	488
Economic earnings	**7,413**
Operating impact	5,950
Market variances	2,798
Other incl. tax	-1,336
Capital management	-2,362
Change in eligibility restrictions	-28
Value change due to transitionals and volatility adjustments	-667
Eligible own funds as at 31 December 2019	**48,085**

1 Changes to eligible own funds that do not represent economic value added in the period – such as mergers and acquisitions, model changes and subsequent corrections.

[1] Transitional measures for own funds pursuant to Article 308b(9) and (10) of Directive 2014/51/EU dated 16 April 2014 amending Directive 2009/138/EC

E2 Solvency capital requirement and minimum capital requirement

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%.

In the 2019 financial year, when calculating the solvency capital requirements of Munich Re (Group), account was taken of the static volatility adjustment for DKV Belgium S.A., ERGO Insurance N.V., ERGO Lebensversicherung AG and Victoria Lebensversicherung AG.

The application of transitional measures in some subsidiary undertakings has no effect on the solvency capital requirement of Munich Re (Group).

An SCR breakdown by risk category can be found in the annex to this report, QRT S.25.03.22 "Solvency capital requirements – for Groups on full internal models". Under "Other risks", we include contributions from institutions for occupational retirement provisions and financial institutions to Munich Re's solvency capital requirement. The item also includes the SCR contributions of insurance or reinsurance undertakings, insurance or reinsurance undertakings in third countries, insurance holding companies and mixed financial holding companies that are not subsidiaries of the parent company.

The solvency capital requirement is reduced by €3.0bn on account of the loss absorbency of deferred taxes. A considerable portion of this figure comprises deferred tax liabilities that are directly attributable to Munich Reinsurance Company. Irrespective of the fact that – in the event of losses – no taxes must be paid for the current financial year in question, we state deferred tax assets resulting from a loss only if they are not greater than the deferred tax liabilities.

The increase in the SCR compared with the previous year is mainly due to increased exposure in risk-capital-intensive areas of the property-casualty and life and health reinsurance segments.

Further details about the SCR broken down by risk category can be found in Part C Risk profile.

The minimum consolidated Group SCR is calculated from the total minimum capital requirements for the solo undertakings in the Group. The minimum capital requirement (MCR) of the solo undertakings is calculated by means of a factor approach, primarily on the basis of premiums and technical provisions. At the same time, the MCR must constitute at least 25% but no more than 45% of the SCR. For solo undertakings outside the European Economic Area, the local minimum capital requirements are applied. The minimum consolidated Group SCR was €13.6bn as at 31 December 2019.

The main sources of diversification in the internal model are our broad spread across the different risk categories (underwriting, market, credit) and our combination of primary insurance and reinsurance business. We also take into account dependencies between the risks that generally result in higher capital requirements than would be the case if no dependency were assumed.

The following companies also use the Munich Re internal model to calculate their solvency capital requirement at solo undertaking level:

– Munich Reinsurance Company, Munich, Germany;
– Munich Re of Malta p.l.c., Ta' Xbiex, Malta;
– DKV Deutsche Krankenversicherung AG, Cologne, Germany;
– ERGO Versicherung AG, Düsseldorf, Germany;
– ERGO DIREKT Versicherung AG, Nuremberg, Germany; and
– Great Lakes Insurance SE, Munich, Germany.

Munich Re underwrites risks as a member of the association of underwriters known as Lloyd's via the company Munich Re Syndicate Ltd., London. The risks of these companies are taken into account in the Munich Re internal model; at the same time, they are also taken into account in the Lloyd's internal model.

E3 Use of the duration-based equity risk sub-module in the calculation of the solvency capital requirement

Munich Re does not use a duration-based equity risk sub-module to calculate the solvency capital requirement at the consolidated Group level.

Germany did not exercise the option to permit the use of a duration-based equity risk sub-module to calculate the solvency capital requirement.

E4 Differences between the standard formula and any internal model used

Scope of the internal model

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 take account of the one-year time horizon and to provide a stable and appropriate estimate of our risk parameters.

The dependencies are calibrated by means of scenarios that affect more than one risk category simultaneously and comparisons with relevant standards. We also take account in our risk model of the risk-mitigating effect of technical provisions in life and health primary insurance.

We then determine the effect of the loss absorbency of deferred taxes.

The internal model adequately covers material quantifiable risks arising from underwriting (property-casualty, life and health), market risk, credit risk, and operational risk. It also covers biometric risks from pension liabilities in all of Munich Re's areas of operation.

Details about the stated categories and about non-quantified risks can be found in Part C Risk profile.

Methods of the internal model

The core principles used in modelling the individual risk categories are set out below:

Property-casualty underwriting risk

We apply appropriate methodology in our modelling for basic losses, large losses and accumulation losses – especially those resulting from natural catastrophes and cyber risks. Basic losses are modelled using stochastic simulation methods, which are used to calculate the difference in the ultimate loss status. For the modelling of large and accumulation losses, we use collective models, determining the frequency and loss amount using historical loss experience and based on physical models.

The methodology used for modelling property-casualty risks at the relevant undertakings of ERGO Group AG is generally the same as that applied at Munich Re (Group) level. Where the risk profiles of these undertakings display particular features, the methodology is adapted accordingly.

Life and health underwriting risk

Mortality, longevity, disability, customer behaviour, administration expenses and the costs of benefits paid in health insurance are modelled as separate risk drivers in the internal model.

In life reinsurance, possible future scenarios are determined by Monte Carlo simulations of those risk drivers.

The modelling in life primary insurance and German health primary insurance is based on stress scenarios; their effect on the stochastic valuation models is analysed.

Market risk

Market risks are modelled in the internal model by means of a Monte Carlo simulation of possible future capital market scenarios, taking account of risk drivers relevant to Munich Re (Group) at a granular level. We revalue our assets and liabilities for each simulated market scenario, thus showing the probability distribution for changes to basic own funds.

Credit risk

A Monte Carlo simulation is used to model credit risk in the internal model, and we take particular account of the creditworthiness of each counterparty.

Operational risk

We use scenarios based on expert estimates to quantify operational risk in the internal model.

Material differences to standard formula

The most relevant deviations between the assumptions of the standard formula and the risk profile of Munich Re are:

- The standard formula does not take sufficient account of the effects of Munich Re's diversified portfolio structure. This applies to both underlying exposures and markets, and to the broad geographic diversification.
- The standard formula oversimplifies risks that are not material for most European insurance undertakings. The most important examples of solvency capital requirements with respect to Munich Re that are insufficiently recognised in the standard formula are the requirements for
    - non-proportional property insurance,
    - our global portfolio of natural catastrophe covers,
    - life reinsurance, and
    - assets in foreign currencies that are required for the operation of non-European subsidiaries.

– By applying the standard formula to Munich Reinsurance Company, subsidiaries are depicted on the basis of equity stress and are therefore treated differently to Munich Re (Group) as regards the corresponding calculation. In contrast, the internal model takes account of the actual risk drivers for Munich Reinsurance Company and Munich Re (Group) in the same transparent way.

As a result of these limitations of the standard formula, Munich Re decided to use an internal model to calculate its solvency capital requirements. Below, we compare the assumptions of the internal model with those of the standard formula, and explain why the approach taken in the internal model is more appropriate.

The quantitative impact of the differences between the standard formula and the internal model on the resulting SCR is typically much larger in the reinsurance segment than in the primary insurance segment. This is mainly due to the fact that the standard formula was designed for an average-sized European insurance undertaking, and not for a global reinsurance portfolio as in the reinsurance segment. Consequently, the solvency capital requirements based on the standard formula are to a large extent inappropriate for most lines of business or geographical areas in reinsurance. For primary insurance in the European Economic Area (EEA), our business profile matches the assumptions of the standard formula better than in the reinsurance segment. Nevertheless, the internal model also provides a more appropriate view of the risks for Munich Re in this segment.

Life underwriting risk

The life reinsurance model simulates the deviations of projected net cash flows from the best estimate on the basis of stochastically varying biometric and lapse risk drivers. The value at risk of 99.5% over a one-year period is derived using the linear regression finance approach (LRFA). Each risk driver comprises a process, basis, trend and calamity risk component. The standard formula is less sophisticated, with each biometric risk driver being represented by only one deterministic scenario, which is generated by level stress on the best-estimate assumptions.

Where possible, the parameters of the Life Re module of the internal model are estimated from historical data. The mortality trend risk parameters are estimated based on historic population mortality rates. Basis risk is calibrated such that the model reproduces the standard deviation of historical operating assumption change rates. The stress parameters used for life primary insurance SCR calculations are derived from application of the Life Re model to ERGO portfolio data sets. This is carried out by means of stress scenarios on the basis of stochastic corporate models.

The pandemic model in the internal model explicitly contains an allowance for the portfolio's age distribution covered and its underlying base mortality.

Health underwriting risk

For NSLT (not similar to life techniques) health business, premium and reserve risk is calculated similar to the non-life underwriting risk in the standard formula (loading factors). Overall, reinsurance business is NSLT. Therefore, non-life insurance techniques are used to calculate the economic risk capital.

In primary insurance, health insurance using similar to life techniques (SLT health business) is handled similarly to life primary insurance business. Account is taken of the fact that in the health insurance segment, premiums or benefits may be adjusted after a certain period of time.

Non-life underwriting risk

In the standard formula, the premium and reserve risk is determined using loading factors applied to premium measures and technical provisions. In the internal model, premium and reserve risk is measured incorporating historical loss experience and loss development patterns, at the level of a Munich Re risk-specific segmentation.

For catastrophe risk, the standard formula distinguishes between EEA exposures (higher granularity of input data) and non-EEA exposures (more simplistic approach). In the internal model, the risk from natural catastrophes – one of the biggest risks on Munich Re's balance sheet – is modelled using a stochastic and risk-sensitive approach which captures key accumulation risks in all geographical locations. The same holds true for man-made catastrophe accumulations.

For both catastrophe and non-catastrophe risks, the geographical diversification inherent in Munich Re's global portfolio is only partially recognised in the standard formula.

Market risk

The calculation of market risk figures is based on risk drivers that describe the change in value of financial instruments.

The calibration of the scenarios describing the possible future realisation of these risk drivers is based on long-term historical data (over-the-cycle calibration). A comparison of the risk drivers used within the internal model with the standard formula approach shows that the granularity of the internal model (with more than 500 distinct risk drivers) is far more elaborate than the standard formula approach. In addition, the internal model captures specific risk drivers that are not accounted for in the standard formula, namely spreads on sovereign bonds, inflation expectations, and implied volatilities on equities and interest rates.

In most relevant cases in this risk category, there is no significant difference between the corresponding quantiles of the scenarios and the shocks of the standard formula.

Credit risk

The counterparty default risk in the standard formula only captures the risk of default for specific assets (namely those that are not covered by the spread risk module in the market risk calculation). By contrast, the credit risk SCR under the internal model takes account of all items involving credit risk. Besides fixed-interest investments, this includes deposits with ceding institutions, reinsurance recoverables, receivables, counterparty risk on derivatives, cash, and guarantees.

In addition to losses from defaults, the internal model covers potential losses from rating downgrades.

Operational risk

Under the standard formula, the operational risk (OpRisk) SCR is determined using a simplistic factor-based approach as a function of premiums, technical provisions and the basic SCR. Under the internal model, by contrast, individual OpRisk scenarios are examined, and the SCR is determined by considering both estimates from relevant experts and insights from the internal control system.

Risk measures and time period used in the internal model

The risk measures and time period used in the internal model for purposes of calculating the SCR are compliant with the requirements of Article 101(3) of Directive 2009/138/EC.

The confidence level used for the SCR is the value-at-risk (VAR) measure on the 99.5% quantile.

Data used in the internal model

A common data policy has been established for Munich Re that sets Group-wide data quality standards. An individual data directory is compiled for each solo undertaking in the Group. This provides justification that the calculation of the regulatory capital according to the internal model is based on data of sufficient quality.

When using the term data, we refer to the numerical, statistical or classification information, but not qualitative information. This also applies to information used to develop model assumptions. The assumptions themselves are not regarded as data.

A specific Solvency II requirement is the compilation of a data directory. It comprises all data used in the internal model, specifying its source, characteristics and usage. Responsibility for the data directory's input and maintenance lies with the respective process owners.

In accordance with Solvency II requirements, the quality of data has to meet the criteria of accuracy, completeness and appropriateness.

The interpretation of the three data quality criteria is defined at a high level, and is applicable to all areas where the assessment of the data quality is required. The data used in the respective areas is highly complex and diverse, and so the principle of proportionality is naturally important with the principles-based approach. Applying the principle of proportionality when considering data quality means that the requirements should be seen in relation to the intended purpose of the analysis or assessment. For portfolios where underlying risks are considered simple in terms of nature, scale and complexity, "appropriate" is interpreted differently than in a situation where the risks are complex. This means that we proceed on the assumption that less detailed data is required for the assessment of more simple risks.

While the assessment of the last two criteria (completeness and appropriateness) should be considered at a higher level, accuracy is assessed at a more granular level.

E5 Non-compliance with the minimum capital requirement and non-compliance with the solvency capital requirement

Munich Re had adequate own funds at all times during the reporting period to cover MCR and SCR.

E6 Any other information

We do not have any other material information about Munich Re's capital management.

Annex

Z

Z Annex

Templates in accordance with Commission Implementing Regulation (EU) 2017/2190 of 24 November 2017

S.02.01.02

Balance sheet assets

€m	Solvency II value
Goodwill	
Deferred acquisition costs	
Intangible assets	0
Deferred tax assets	102
Pension benefit surplus	343
Property, plant & equipment held for own use	3,951
Investments (other than assets held for index-linked and unit-linked contracts)	225,829
Property (other than for own use)	9,030
Holdings in related undertakings, including participations	4,736
Equities	2,786
Equities – listed	2,008
Equities – unlisted	778
Bonds	152,396
Government bonds	79,718
Corporate bonds	63,260
Structured notes	6,207
Collateralised securities	3,210
Collective investments undertakings	50,521
Derivatives	1,277
Deposits other than cash equivalents	3,352
Other investments	1,732
Assets held for index-linked and unit-linked contracts	7,661
Loans and mortgages	9,604
Loans on policies	220
Loans and mortgages to individuals	2,967
Other loans and mortgages	6,417
Reinsurance recoverables from:	4,782
Non-life and health similar to non-life	2,552
Non-life excluding health	2,360
Health similar to non-life	192
Life and health similar to life, excluding health and index-linked and unit-linked	2,230
Health similar to life	1,088
Life excluding health and index-linked and unit-linked	1,142
Life index-linked and unit-linked	0
Deposits to cedants	15,517
Insurance and intermediaries receivables	3,950
Reinsurance receivables	162
Receivables (trade, not insurance)	2,525
Own shares (held directly)	751
Amounts due in respect of own fund items or initial fund called up but not yet paid in	0
Cash and cash equivalents	2,602
Any other assets, not elsewhere shown	531
Total assets	**278,309**

Balance sheet - liabilities

€m	Solvency II value
Technical provisions – non-life	59,325
Technical provisions – non-life (excluding health)	56,219
TP calculated as a whole	0
Best estimate	54,634
Risk margin	1,585
Technical provisions – health (similar to non-life)	3,106
TP calculated as a whole	0
Best estimate	2,948
Risk margin	157
Technical provisions – life (excluding index-linked and unit-linked)	134,240
Technical provisions – health (similar to life)	64,424
TP calculated as a whole	0
Best estimate	59,312
Risk margin	5,112
Technical provisions – life (excluding health and index-linked and unit-linked)	69,816
TP calculated as a whole	0
Best estimate	64,579
Risk margin	5,237
Technical provisions – index-linked and unit-linked	8,245
TP calculated as a whole	52
Best estimate	8,083
Risk margin	110
Contingent liabilities	14
Provisions other than technical provisions	1,472
Pension benefit obligations	3,686
Deposits from reinsurers	1,651
Deferred tax liabilities	7,226
Derivatives	720
Debts owed to credit institutions	113
Financial liabilities other than debts owed to credit institutions	1,850
Insurance & intermediaries payables	3,081
Reinsurance payables	204
Payables (trade, not insurance)	4,161
Subordinated liabilities	4,234
Subordinated liabilities not in BOF	116
Subordinated liabilities in BOF	4,118
Any other liabilities, not elsewhere shown	110
Total liabilities	**230,332**
Excess of assets over liabilities	**47,977**

S.05.01.02

Premiums, claims and expenses by line of business

€m	Medical expense insurance	Income protection insurance	Workers' compen-sation insurance	Motor vehicle liability insurance	Other motor insurance	Marine, aviation and transport insurance	Fire and other damage to property insurance	
Premiums written								
Gross – Direct Business	1,482	816	10	2,074	1,085	932	3,652	
Gross – Proportional reinsurance accepted	400	289	131	2,072	1,492	789	5,337	
Gross – Non-proportional reinsurance accepted								
Reinsurers' share	19	25	3	152	84	137	524	
Net	1,863	1,080	138	3,994	2,494	1,584	8,465	
Premiums earned								
Gross – Direct Business	1,483	815	10	2,042	1,090	865	3,414	
Gross – Proportional reinsurance accepted	391	270	129	2,058	1,456	789	5,278	
Gross – Non-proportional reinsurance accepted								
Reinsurers' share	22	24	2	141	86	132	497	
Net	1,851	1,061	137	3,959	2,459	1,522	8,195	
Claims incurred								
Gross – Direct Business	999	232	9	1,211	723	637	1,804	
Gross – Proportional reinsurance accepted	242	124	78	1,504	900	651	3,199	
Gross – Non-proportional reinsurance accepted								
Reinsurers' share	31	12	0	68	38	84	220	
Net	1,209	344	87	2,647	1,585	1,204	4,784	
Changes in other technical provisions								
Gross - Direct Business	3	1	0	-2	0	0	-12	
Gross – Proportional reinsurance accepted	0	0	0	1	0	0	0	
Gross - Non-proportional reinsurance accepted								
Reinsurers' share	0	0	0	0	0	0	-6	
Net	3	1	0	-1	0	0	-6	
Expenses incurred	**632**	**449**	**38**	**1,303**	**898**	**538**	**3,316**	
Other expenses								
Total expenses								

I

	Line of business for: non-life insurance and reinsurance obligations (direct business and accepted proportional reinsurance)						Line of business for: accepted non-proportional reinsurance			Total
	General liability insurance	Credit and suretyship insurance	Legal expenses insurance	Assistance	Miscel-laneous financial loss	Health	Casualty	Marine, aviation, transport	Property	
	1,456	155	901	85	276	0				12,925
	2,277	606	199	2	397	0				13,990
						0	869	130	2,570	3,658
	142	62	146	14	31	3	4	8	261	1,614
	3,591	698	954	73	642	86	865	122	2,309	28,959
	1,432	147	912	83	264	0				12,556
	2,331	586	202	1	363	0				13,856
						0	848	133	2,535	3,603
	134	49	145	13	33	3	4	8	261	1,553
	3,630	685	969	71	594	84	844	124	2,274	28,461
	881	49	442	32	112	0				7,131
	1,405	94	31	1	135	0				8,363
						0	553	103	2,035	2,731
	72	21	99	0	10	-4	1	6	6	664
	2,214	122	374	33	237	42	552	97	2,029	17,561
	0	0	0	0	-6	0				-16
	0	0	0	0	0	0				1
						0	0	0	-1	-1
	0	0	0	0	0	0	0	0	0	-6
	0	0	0	0	-6	0	0	0	-1	-10
	1,403	**289**	**528**	**37**	**300**	**33**	**269**	**47**	**506**	**10,586**
										42
										10,628

Premiums, claims and expenses by line of business

	Line of business for: life insurance obligations					
					Annuities stemming from non-life insurance contracts and relating to	
€m	Health insurance	Insurance with profit participation	Index-linked and unit-linked insurance	Other life insurance	Health insurance obligations	Other insurance obligations*
Premiums written						
Gross	6,116	2,946	406	165	0	0
Reinsurers' share	4	113	0	8	0	0
Net	6,112	2,833	406	158	0	0
Premiums earned						
Gross	6,113	2,947	407	165	0	0
Reinsurers' share	4	114	0	8	0	0
Net	6,109	2,834	406	157	0	0
Claims incurred						
Gross	4,499	4,401	1,588	107	36	44
Reinsurers' share	10	123	0	2	0	7
Net	4,489	4,278	1,588	105	36	37
Changes in other technical provisions						
Gross	-757	1,193	-365	77	0	0
Reinsurers' share	0	5	0	0	0	0
Net	-757	1,188	-365	77	0	0
Expenses incurred	**927**	**577**	**109**	**67**	**0**	**0**
Other expenses						
Total expenses						

* With the exception of health insurance obligations.

	Life reinsurance obligations		
€m	Health reinsurance	Life reinsurance	Total
Premiums written			
Gross	4,048	7,338	21,020
Reinsurers' share	442	704	1,271
Net	3,606	6,634	19,749
Premiums earned			
Gross	4,039	4,628	18,299
Reinsurers' share	442	555	1,122
Net	3,597	4,073	17,177
Claims incurred			
Gross	3,059	6,128	19,862
Reinsurers' share	121	201	463
Net	2,938	5,927	19,399
Changes in other technical provisions			
Gross	640	-698	90
Reinsurers' share	218	214	438
Net	421	-912	-348
Expenses incurred	**858**	**1,247**	**3,786**
Other expenses			**19**
Total expenses			**3,805**

S.05.02.01

Premiums, claims and expenses by country

		Top 5 countries (by amount of gross premiums written) – non-life obligations					
€m	Home country	USA	United Kingdom	Poland	Spain	Australia	Total - Top 5 and home country
Premiums written							
Gross - Direct Business	3,576	2,508	2,784	1,389	669	36	10,963
Gross – Proportional reinsurance accepted	524	5,309	1,197	124	458	702	8,315
Gross – Non-proportional reinsurance accepted	125	1,287	336	10	75	208	2,041
Reinsurers' share	160	401	300	86	18	0	964
Net	4,065	8,703	4,018	1,438	1,185	946	20,355
Premiums earned							
Gross - Direct Business	3,549	2,403	2,678	1,327	664	30	10,652
Gross – Proportional reinsurance accepted	514	5,390	1,361	101	403	712	8,481
Gross – Non-proportional reinsurance accepted	125	1,255	338	10	75	205	2,008
Reinsurers' share	148	381	299	94	13	2	935
Net	4,040	8,667	4,078	1,345	1,130	945	20,206
Cliams incurred							
Gross - Direct Business	1,819	1,239	1,571	760	487	108	5,984
Gross – Proportional reinsurance accepted	778	3,378	815	29	224	425	5,648
Gross – Non-proportional reinsurance accepted	-190	881	-15	8	-14	26	696
Reinsurers' share	42	184	111	80	3	1	421
Net	2,365	5,314	2,260	716	695	558	11,908
Changes in other technical provisions							
Gross - Direct Business	-1	0	-5	0	0	0	-6
Gross – Proportional reinsurance accepted	1	0	0	0	0	0	1
Gross – Non-proportional reinsurance accepted	0	0	0	0	0	0	0
Reinsurers' share	-6	0	0	0	0	0	-6
Net	6	0	-5	0	0	0	1
Expenses incurred	**2,584**	**3,222**	**1,396**	**528**	**269**	**198**	**8,197**
Other expenses							**36**
Total expenses							**8,233**

Premiums, claims and expenses by country

		Top 5 countries (by amount of gross premiums written) – life obligations					
€m	Home country	USA	Canada	United Kingdom	Japan	Australia	Total - Top 5 and home country
Premiums written							
Gross	8,918	2,873	1,680	1,111	1,015	775	16,371
Reinsurers' share	1	237	13	5	0	0	256
Net	8,917	2,636	1,667	1,106	1,015	774	16,115
Premiums earned							
Gross	8,918	164	1,680	1,125	1,015	775	13,676
Reinsurers' share	1	133	13	5	0	0	152
Net	8,917	31	1,667	1,120	1,015	774	13,524
Claims incurred							
Gross	9,412	2,635	1,143	1,048	165	763	15,166
Reinsurers' share	0	135	12	2	0	2	150
Net	9,412	2,500	1,132	1,046	165	762	15,016
Changes in other technical provisions							
Gross	-87	8	48	-24	421	-31	334
Reinsurers' share	0	40	-2	1	0	1	39
Net	-87	-32	50	-24	421	-32	294
Expenses incurred	**1,813**	**251**	**307**	**50**	**255**	**389**	**3,066**
Other expenses							**0**
Total expenses							**3,066**

S.22.01.22

Impact of long term guarantees and transitional measures

€m	Amount with Long Term Guarantee measures and transitionals	Impact of transitional on technical provisions	Impact of transitional on interest rate	Impact of volatility adjustment set to zero	Impact of matching adjustment set to zero
Technical provisions	201,810	9,561	0	276	0
Basic own funds	47,811	-6,541	0	-205	0
Eligible own funds to meet Solvency Capital Requirement	48,085	-6,815	0	-205	0
Solvency Capital Requirement	17,532	0	0	254	0

S.23.01.22

Own funds

€m	Total	Tier 1 - unrestricted	Tier 1 - restricted	Tier 2	Tier 3
Basic own funds before deduction for participations in other financial sector					
Ordinary share capital (gross of own shares)	588	588		0	
Non-available called but not paid in ordinary share capital at group level	0	0		0	
Share premium account related to ordinary share capital	6,845	6,845		0	
Initial funds, members' contributions or the equivalent basic own – fund item for mutual and mutual-type undertakings	0	0		0	
Subordinated mutual member accounts	0		0	0	0
Non-available subordinated mutual member accounts at group level	0		0	0	0
Surplus funds	2,863	2,863			
Non-available surplus funds at group level	213	213			
Preference shares	0		0	0	0
Non-available surplus funds at group level	0		0	0	0
Share premium account related to preference shares	0		0	0	0
Non-available share premium account related to preference shares at group level	0		0	0	0
Reconciliation reserve	33,816	33,816			
Subordinated liabilities	4,118		13	4,057	48
Non-available subordinated liabilities at group level	48		0	0	48
An amount equal to the value of net deferred tax assets	184				184
The amount equal to the value of net deferred tax assets not available at the group level	78				78
Other items approved by supervisory authority as basic own funds not specified above	0	0	0	0	0
Non available own funds related to other own funds items approved by supervisory authority	0	0	0	0	0
Minority interests (if not reported as part of a specific own fund item)	204	204	0	0	0
Non-available minority interests at group level	194	194	0	0	0
Own funds from the financial statements that should not be represented by the reconciliation reserve and do not meet the criteria to be classified as Solvency II own funds					
Own funds from the financial statements that should not be represented by the reconciliation reserve and do not meet the criteria to be classified as Solvency II own funds	0	0			
Deductions					
Deductions for participations in other financial undertakings, including non-regulated undertakings carrying out financial activities	274	274	0	0	0
Whereof deducted according to art 228 of the Directive 2009/138/EC	0	0	0	0	0
Deductions for participations where there is non-availability of information (Article 229)	0	0	0	0	0
Deduction for participations included by using D&A when a combination of methods is used	0	0	0	0	0
Total of non-available own fund items	534	407	0	0	127
Total deductions	**808**	**681**	**0**	**0**	**127**
Total basic own funds after deductions	**47,811**	**43,634**	**13**	**4,057**	**106**

Own funds

€m	Total	Tier 1 - unrestricted	Tier 1 - restricted	Tier 2	Tier 3
Ancillary own funds					
Unpaid and uncalled ordinary share capital callable on demand	0			0	
Unpaid and uncalled initial funds, members' contributions or the equivalent basic own fund item for mutual and mutual – type undertakings, callable on demand	0			0	
Unpaid and uncalled preference shares callable on demand	0			0	0
A legally binding commitment to subscribe and pay for subordinated liabilities on demand	0			0	0
Letters of credit and guarantees under Article 96(2) of the Directive 2009/138/EC	0			0	
Letters of credit and guarantees other than under Article 96(2) of the Directive 2009/138/EC	0			0	
Supplementary members calls under first subparagraph of Article 96(3) of the Directive 2009/138/EC	0			0	
Supplementary members calls – other than under first subparagraph of Article 96(3) of the Directive 2009/138/EC	0			0	0
Non available ancillary own funds at group level	0			0	0
Other ancillary own funds	0			0	0
Total ancillary own funds	**0**			**0**	**0**
Own funds of other financial sectors					
Credit institutions, investment firms, financial institutions, alternative investment fund managers, UCITS management companies	76	76	0	0	
Institutions for occupational retirement provision	195	195	0	0	0
Non regulated entities carrying out financial activities	3	3	0	0	0
Total own funds of other financial sectors	**274**	**274**	**0**	**0**	
Own funds when using the D&A, exclusively or in combination of method 1					
Own funds aggregated when using the D&A and combination of method	0	0	0	0	0
Own funds aggregated when using the D&A and a combination of method net of IGT	0	0	0	0	0
Total available own funds to meet the consolidated group SCR (excluding own funds from other financial sector and from the undertakings included via D&A)	47,811	43,634	13	4,057	106
Total available own funds to meet the minimum consolidated group SCR	47,704	43,634	13	4,057	
Total eligible own funds to meet the consolidated group SCR (excluding own funds from other financial sector and from the undertakings included via D&A)	47,811	43,634	13	4,057	106
Total eligible own funds to meet the minimum consolidated group SCR	46,363	43,634	13	2,716	

Own funds

€m	Total	Tier 1 - unrestricted	Tier 1 - restricted	Tier 2	Tier 3
Minimum consolidated Group SCR (Article 230)	**13,582**				
Ratio of eligible own funds to Minimum Consolidated Group SCR	**341%**				
Total eligible own funds to meet the group SCR (including own funds from other financial sector and from the undertakings included via D&A)	**48,085**	**43,909**	**13**	**4,057**	**106**
Group SCR	**17,531**				
Ratio of eligible own funds to group SCR including other financial sectors and the undertakings included via D&A	**274%**				

Reconciliation reserve

€m	31.12.2019
Excess of assets over liabilities	47,977
Own shares (held directly and indirectly)	751
Forseeable dividends, distributions and charges	2,725
Other basic own fund items	10,685
Adjustment for restricted own fund items in respect of matching adjustment portfolios and ring fenced funds	0
Other non available own funds	0
Reconciliation reserve before deduction for participations in other financial sector	**33,816**
Excpected profits	
Expected profits included in future premiums (EPIFP) – Life business	15,659
Expected profits included in future premiums (EPIFP) – Non- life business	1,530
Total EPIFP	**17,189**

S.25.03.22

Solvency capital requirement – for groups on full internal models

€m	Calculation of solvency capital requirement
Unique number of component	
201 – Property-casualty	8,833
202 – Life and health	6,359
203 – Market	10,080
204 – Credit	4,206
205 – Operational risk	1,051
207 – Loss-absorbing capacity of deferred taxes	-2,987
208 – Other risk	670
Calculation of solvency capital requirement	
Total undiversified components	28,213
Diversification	-10,681
Capital requirement for business operated in accordance with Art. 4 of Directive 2003/41/EC	0
Solvency capital requirement excluding capital add-on	**17,532**
Capital add-ons already set	0
Solvency capital requirement	**17,532**
Other information on SCR	
Amount/estimate of the overall loss-absorbing capacity of technical provisions	-4,410
Amount/estimate of the overall loss-absorbing capacity of deferred taxes	-2,987
Total amount of notional solvency capital requirements for remaining part	0
Total amount of notional solvency capital requirements for ring-fenced funds	0
Total amount of notional solvency capital requirement for matching adjustment portfolios	0
Diversification effects due to RFF nSCR aggregation for Article 304	0
Minimum consolidated Group solvency capital requirement	13,582
Information on other entities	
Capital requirement for other financial sectors (non-insurance capital requirements)	202
Capital requirement for other financial sectors (non-insurance capital requirements) – Credit institutions, investment firms and financial institutions, alternative investment fund managers, UCITS management companies	44
Capital requirement for other financial sectors (non-insurance capital requirements) – Institutions for occupational retirement provisions	157
Capital requirement for other financial sectors (non-insurance capital requirements) – Capital requirement for non-regulated entities carrying out financial activities	1
Capital requirement for non-controlled participation requirements	0
Capital requirement for residual undertakings	0

List of abbreviations

AF	Actuarial Function
AG	Aktiengesellschaft (German joint-stock company)
AIF	Alternative investment fund
ALM	Asset-Liability management
AMG	Asset management company
BaFin	German Federal Financial Supervisory Authority
Bps	Basis point
CDS	Credit default Swap
CEE	Credit Equivalent Exposures
CIC	Complementary Identification Code
CMS	Compliance Management System
CRO	Chief Risk Officer
CTA	Contractual trust agreement
DA	Delegated Acts
DCGK	Deutscher Corporate Governance Kodex
DKV	Deutsche Krankenversicherung
EC	European Community
EEA	European Economic Area
EIOPA	E uropean Insurance and Occupational Pensions Authority
EOF	Anrechnungsfähige Eigenmittel
EPIFP	Expected Profit included in future Premiums
EU	European Union
FAS	Financial Accounting Standard
F&P	Fit and Proper
GC	Group Committee
GCCO	Group Chief Compliance Officer
GCL	Group Compliance and Legal
GmbH	Gesellschaft mit beschränkter Haftung (German limited liability company)
HGB	German Commercial Code
HSB	Hartford Steam Boiler
IAS	International Accounting Standard
ICS	Internal control system
IFRS	International Financial Reporting Standard
Inc.	Incorporated
IRM	Integrated Risk Management
ISDA	International Swaps and Derivates Association
IT	Information Technology
LLC	Limited liability company
LRFA	Linear regression finance approach
Ltd.	Limited
MBS	Mortgage-backed Securities
MCR	Minimum capital requirement
MEAG	MUNICH ERGO Asset Management GmbH
MENA	Middle East North Africa
MR GCP	Munich Re Group Compensation Policy
NAVs	Net asset values
OIS	Overnight index swap
OpRisk	Operational risk
ORSA	Own risk and solvency Assessment
OTC	Over the counter
p.l.c.	Public limited company
Pty. Ltd.	Proprietary Limited
PVFP	Present value of future profits
QRT	Quantitative reporting templates
RC	Reinsurance Committee
RI	Reinsurance
RMF	Risk management function
RORAC	Return on risk-adjusted capital
S&P	Standard & Poor's
SCR	Solvency capital requirement
SFCR	Solvency and Financial Condition Report
SSAIH	Shandong State-Owned Assets Investment Holdings
SII	Solvency II
UCITS	Undertakings for collective investment in Transferable securities
US GAAP	United States Generally Accepted Accounting Principles
VAG	German Insurance Supervision Act
VaR	Value at risk
WTO	World Trade Organization

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Editorial note
Munich Re publications generally refer to all persons in the masculine form to make reading easier. Such references should be understood as applying to both men and women, according to context.

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