Interim management report

Report on economic position

Business development

- Profitable premium growth in a market shaped by surplus capacities
- Underwriting result in property and casualty reinsurance significantly boosted
- Return on investment ahead of full-year expectations at 3.1%

Hannover Re can look back on a positive business development in both its business groups of Property & Casualty and Life & Health reinsurance. The first half of 2018 was notable for minimal large losses and sustained demand for innovative reinsurance solutions.

In a market environment still characterised by surplus capacities Hannover Re was able to assert its position in property and casualty as well as life and health reinsurance. Against a backdrop of continued low interest rates, investment income also played a robust and important part in the Group's success. This is borne out by the fact that our Group net income rose to EUR 555.3 million (EUR 535.0 million), an increase of 3.8% compared to the first half of 2017 which had similarly been extensively free of large losses.

Gross premium written by the Group climbed by 11% as at 30 June 2018 to just under EUR 10.0 billion (EUR 9.0 billion). At constant exchange rates the increase would have been 18.1%. The first half of 2018 thus puts us very much on track to achieve our full-year guidance, which we had raised in the first quarter to currency-adjusted growth of more than 10%. The level of retained premium rose slightly to 91.3% (90.3%). Net premium earned increased by 10.8% to EUR 8.3 billion (EUR 7.5 billion). Growth of 17.9% would have been booked at constant exchange rates.

Bearing in mind the ongoing challenging market climate, the performance of our investments in the first six months was highly satisfactory. The portfolio of assets under own management grew to EUR 40.9 billion (31 December 2017: EUR 40.1 billion). It is gratifying to note that ordinary investment income remained stable year-on-year at EUR 632.5 million (EUR 635.1 million). This is especially true of the income generated from our fixed-income securities, although earnings booked from real estate and private equity were also on a par with or – in the latter case – even slightly above the level of the previous year.

Interest on funds withheld and contract deposits fell to EUR 113.8 million (EUR 123.4 million). Net realised gains stood at EUR 53.4 million (EUR 83.4 million). Our financial assets measured at fair value through profit or loss gave rise to net gains of EUR 19.6 million (EUR 10.6 million) in the period under review. The impairments taken in the reporting period were once again only very minimal. Income from investments under own management contracted to EUR 629.8 million (EUR 656.0 million) as at 30 June 2018.

A bond issued by our company in April with a volume of EUR 750 million gives us access to additional liquidity, inter alia for longer-term prefinancing business in life and health reinsurance. This issue, which has a coupon of 1.125% and a maturity of 10 years, enables us to leverage the continued low interest rate level in Europe and benefit from increased flexibility in the management of our investments.

The operating profit (EBIT) for the first half-year 2018 grew by 13.5% to EUR 907.3 million (EUR 799.4 million). Earnings per share amounted to EUR 4.60 (EUR 4.44).

Hannover Re's equity base remained robust as at 30 June 2018 on a level of EUR 8.3 billion (31 December 2017: EUR 8.5 billion) despite the dividend payment of EUR 603.0 million. The book value per share stood at EUR 69.00 (31 December 2017: EUR 70.72). The annualised return on equity amounted to 13.2% as at 30 June 2018 (31 December 2017: 10.9%).

Results of operations, financial position and net assets

Property and casualty reinsurance

- Earnings and premium growth amid sustained intense competition
- Large losses lower than in the similarly lightly impacted comparable period
- Significant increase in the underwriting result

Even after the previous year's heavy windstorm losses, worldwide property and casualty reinsurance remains fiercely competitive; the supply of reinsurance coverage continues to far outstrip demand. Although the business results posted by insurers have come under pressure in some areas, the capital resources of most market players are still adequate. Nevertheless, we are seeing rising demand for reinsurance because primary insurers are making increasing use of reinsurance solutions to limit the volatility of their results.

The additional capacities originating from the insurance-linked securities (ILS) market are a further factor in the sustained pressure on prices and conditions – especially in US natural catastrophe business. In the wake of the recent large losses it was notable that most investors remained loyal to the ILS market with a view to profiting from rising prices as a consequence of the high loss expenditure. Owing to the additional capacity, however, the price increases failed to materialise in the expected amount.

This general business environment shaped the various rounds of treaty renewals in the first half of the year. The renewal season for Japan took place as at 1 April, together with more modest treaty renegotiations – in terms of volume – for the markets of Australia, New Zealand, Korea and North America. The total premium volume booked from these treaty renewals increased by 10.3%. The part of our North American treaty business up for renegotiation was renewed at adequate prices. We modestly expanded the property portfolio in response to advantageous conditions, especially under programmes that had suffered losses.

In Japan rates for casualty business improved on the back of prior losses. The premium contracted slightly, however, in view of a planned share reduction in a large-volume treaty. We similarly chose not to renew shares of some business in South Korea; prices and conditions were not sufficiently attractive owing to the competition prevailing in this market. Hannover Re did, however, book pleasing growth in the area of agricultural risks.

The gross written premium for our total portfolio in property and casualty reinsurance rose by 19.2% as at 30 June 2018 to EUR 6.5 billion (EUR 5.4 billion). This was again a reflection of the sustained surge in demand for reinsurance solutions offering solvency relief, not only in Europe but also in North America. We were thus able to more than offset premium declines in other areas. At constant exchange rates, gross written premium in property and casualty reinsurance would have grown by as much as 27.6%. The level of retained premium was higher than in the corresponding period of the previous year at 91.4% (89.4%). Net premium earned increased by 20% to EUR 5.2 billion (EUR 4.3 billion); adjusted for exchange rate effects, the growth would have been 28.4%.

Net expenditure on large losses as at 30 June 2018 totalled EUR 93.3 million, a figure below the level of the similarly lightly impacted comparable period (EUR 122.9 million). The largest catastrophe losses included the European winter storm Friederike and an earthquake in Papua New Guinea. Altogether, major loss expenditure remained well below our budgeted amount of EUR 351 million for the first six months.

The underwriting result for total property and casualty reinsurance improved by 37.4% to EUR 204.7 million (EUR 149.0 million). The combined ratio of 95.7% (96.5%) is still within the bounds of our planning with an eye to our target ratio of 96% or lower for the full financial year.

Investment income was thoroughly gratifying at EUR 503.0 million (EUR 475.5 million). Driven by slightly higher realised gains, income from assets under own management grew by 2.7% to EUR 486.7 million (EUR 473.7 million). The income generated from investments held by ceding companies increased to EUR 16.3 million (EUR 1.8 million).

Overall, the operating profit (EBIT) for the Property & Casualty reinsurance business group increased by 8.6% as at 30 June 2018 to EUR 688.8 million (EUR 634.3 million). The EBIT margin of 13.3% (14.7%) was again well above our minimum target of 10%. Group net income for the segment contracted by 2.1% to EUR 434.4 million (EUR 444.0 million) owing to higher tax expenditure.

Key figures for property and casualty reinsurance

in EUR million	2018					2017	
	1.1.–31.3.	1.4.–30.6.	+/– previous year	1.1.–30.6.	+/– previous year	1.4.–30.6.	1.1.–30.6.
Gross written premium	3,578.7	2,888.4	+10.5%	6,467.1	+19.2%	2,612.7	5,427.5
Net premium earned	2,424.9	2,750.0	+28.1%	5,174.8	+20.0%	2,147.0	4,312.8
Underwriting result	91.8	112.9	+93.6%	204.7	+37.4%	58.3	149.0
Net investment income	268.0	235.0	+1.2%	503.0	+5.8%	232.1	475.5
Operating result (EBIT)	338.9	349.9	+7.8%	688.8	+8.6%	324.5	634.3
Group net income	234.8	199.6	-12.7%	434.4	-2.1%	228.6	444.0
Earnings per share in EUR	1.95	1.66	-12.7%	3.60	-2.1%	1.90	3.68
EBIT margin [1]	14.0%	12.7%		13.3%		15.1%	14.7%
Combined ratio [2]	95.9%	95.6%		95.7%		97.4%	96.5%
Retention	91.6%	91.3%		91.4%		90.3%	89.4%

[1] Operating result (EBIT)/net premium earned
[2] Including funds withheld

Life and health reinsurance

- Consistently favourable developments across international markets
- US financial solutions business beats expectations
- Operating result boosted against a backdrop of stable premiums

Life and health reinsurance somewhat exceeded our expectations in the first half of 2018.

The situation on the German market was virtually unchanged. According to the SFCRs (Solvency and Financial Condition Reports) published in May, the capital adequacy ratios of German primary insurers calculated under Solvency II continued to show an improving trend year-on-year as at the end of 2017. With the insurance industry still hoping for accommodations from policy makers, reinsurance offerings in the area of financial solutions designed to ease the strain associated with the additional statutory reserve requirement for the interest rate risk (Zinszusatzreserve) or to deliver solvency relief attracted only muted interest.

In the rest of Europe the development of our business was highly promising. In the case of Western European markets, a trend can be discerned among new and existing customers alike towards the expansion of product portfolios – especially when it comes to risk-oriented covers. The United Kingdom continued to see intense competition, which was further exacerbated by pricing pressure in the market and hampered business profitability.

Markets in Central Europe for the most part maintained their favourable course and are typically showing growth, leading to profitable new business for our portfolio.

In Eastern European markets, most notably Ukraine, Bulgaria, Azerbaijan and Russia, market developments were in line with expectations and we were able to build on the positive movements of the previous year.

In Asian countries interest in financial solutions was again very lively. Furthermore, it was evident that health insurance products were increasingly coming into focus for primary insurers. Particularly in China, economic growth was extremely dynamic and went hand-in-hand with a further rise in demand for insurance protection. This opened up thoroughly favourable opportunities for our company to write new business. In Japan and Korea, too, we were able to write new business in the areas of both risk solutions and financial solutions.

In Australia the regulatory framework for retirement provision was adjusted, which will likely prompt a need for action on both the insurance and reinsurance side with an eye to the underlying insurance products. The primary market saw further moves towards consolidation among larger banks and the resulting sales of life insurance portfolios. These dynamic developments promise an attractive business potential for our Australian subsidiary.

We view Latin America as a growing insurance market, albeit one that is under intense competitive pressure. We were able to successfully renew our portfolio and also generated additional new business, thereby maintaining our market position on a consistently stable, high level.

In the United States the financial solutions business written by our subsidiary developed very favourably in line with our expectations. Rate increases have been initiated to improve the results of our legacy US mortality business from older underwriting years. While these actions negatively impact earnings in the short term, the long-term effects on profitability will nevertheless be positive. We were pleased to see that the mortality in the period under review came in below our revised expectations. The charge to earnings from this business was consequently significantly lower than in the previous year. All in all, then, both the mortality solutions and the health and special risk segments performed better than forecast.

Primary insurers in international markets are showing enthusiastic and steadily rising interest in the field of automated underwriting. So-called "lifestyle" insurance products, which particularly target the sector of the population focused on a healthy lifestyle through integrated wellness components, are also taking on growing prominence. Insurers around the world are increasingly recognising the demand here and hence also the need for holistic solutions of this type.

The gross premium volume in life and health reinsurance posted a modest decline of 1.5% as at 30 June 2018 to EUR 3.5 billion (EUR 3.6 billion). Growth of 3.7% would have been booked at unchanged exchange rates. The retention was virtually stable at 91.2% (91.6%). Net premium earned was also unchanged at EUR 3.2 billion (EUR 3.2 billion). Growth would have come in at 3.8% at constant exchange rates.

Bearing in mind the low interest rate environment, we are satisfied with the investment income of EUR 239.1 million (EUR 301.7 million). While ordinary investment income remained stable, realised gains and losses came in lower. Income from assets under own management consequently contracted to EUR 141.6 million (EUR 180.2 million). The income booked from securities deposited with our ceding companies fell to EUR 97.5 million (EUR 121.5 million).

The operating result (EBIT) as at the end of the first half-year amounted to EUR 219.4 million (EUR 165.2 million), an improvement of 32.8% compared to the previous year's level. The strategic target is to increase the operating result (EBIT) by 5% per year. Group net income totalled EUR 146.8 million (EUR 114.2 million).

Key figures for life and health reinsurance

in EUR million	2018					2017[1]	
	1.1.–31.3.	1.4.–30.6.	+/– previous year	1.1.–30.6.	+/– previous year	1.4.–30.6.	1.1.–30.6.
Gross written premium	1,766.2	1,752.0	-4.7%	3,518.2	-1.5%	1,838.2	3,570.1
Net premium earned	1,574.4	1,596.3	-3.1%	3,170.7	-1.5%	1,648.0	3,220.3
Investment income	122.8	116.3	-24.2%	239.1	-20.8%	153.4	301.7
Operating result (EBIT)	95.9	123.5	+63.6%	219.4	+32.8%	75.4	165.2
Net income after tax	51.1	95.7	+78.5%	146.8	+28.5%	53.6	114.2
Earnings per share in EUR	0.42	0.79	+78.5%	1.22	+28.5%	0.44	0.95
Retention	90.7%	91.7%		91.2%		91.8%	91.6%
EBIT margin[2]	6.1%	7.7%		6.9%		4.6%	5.1%

[1] Restated pursuant to IAS 8
[2] Operating result (EBIT)/net premium earned

Investments

- High-quality diversified investment portfolio maintained
- Ordinary investment income virtually on a par with the previous year
- Return on investment beats expectations at 3.1%

The investment climate was rather volatile in the period under review in the face of numerous geopolitical and economic policy issues. In February, for example, the expectation of higher interest rates as a consequence of an anticipated rise in inflation was reflected around the world in stock market corrections and sharply increased volatility. Our company remained unaffected, however, thanks to the liquidation of our equity portfolio in the previous year. The turbulence on the stock market had scarcely any effect on other markets.

In the area of fixed-income securities, however, the dominant factor was still the generally low level of interest rates. The US dollar segment, which saw further significant interest rate increases at a pace not anticipated by the market, was once again the exception here. Appreciable rate increases were also observed across all maturities in the sterling bond market, whereas EUR-denominated bonds have seen scarcely any changes since the beginning of the year. German government bonds are still being sold at negative returns well into the medium maturities. It was only the repeated flare-up of anxieties surrounding instability in Italy that triggered disquiet in this sector.

Credit spreads on European and US corporate bonds recorded sometimes significant increases in the first half of the year across almost all rating classes, although they remain at historic lows owing to the declines of past years. In this respect it is important to monitor the levels at which the potential for funding companies starts to become restricted. Overall, while the unrealised gains on our fixed-income securities thus fell to EUR 571.3 million (EUR 1,021.5 million) as at 30 June 2018, we benefit from higher interest rates and credit spreads when it comes to new investments and the reinvestment of assets.

Our portfolio of assets under own management grew to EUR 40.9 billion (31 December 2017: EUR 40.1 billion). We adjusted the allocation of our investments to the individual classes of securities in the first half of the year in that we somewhat modified the nature of our government bond holdings and expanded our portfolio of instruments with inflation-linked coupons and redemption amounts. By taking this step we are counteracting inflation risks in property and casualty reinsurance. Through the reduction of certain positions in the area of high-yield bonds we also smoothed the risk profile of our investments and generated liquidity for future opportunities in the capital market as well as for financing transactions in life reinsurance. The modified duration of our portfolio of fixed-income securities remained virtually unchanged year-on-year at 4.9 (4.8).

Ordinary investment income excluding interest on funds withheld and contract deposits amounted to EUR 632.5 million as at 30 June 2018, a figure on a par with the comparable period (EUR 635.1 million). Particularly bearing in mind the continued low interest rates, it is highly gratifying that we were able to maintain the ordinary income from fixed-income securities on a stable level year-on-year while also booking slightly stronger earnings from real estate and private equity. We were thus very successful in offsetting the loss of dividend income from the equity portfolio that we had liquidated in the previous year. Interest on funds withheld and contract deposits retreated to EUR 113.8 million (EUR 123.4 million).

Impairments of altogether just EUR 21.1 million (EUR 23.1 million) were taken. Of this amount, EUR 4.5 million (EUR 2.2 million) was attributable to alternative investments. Scheduled depreciation on directly held real estate increased marginally to EUR 16.6 million (EUR 15.0 million), a reflection of our growing ongoing involvement in this area. Once again, the impairments were not opposed by any write-ups. The net balance of gains realised on disposals stood at EUR 53.4 million (EUR 83.4 million). The decrease compared to the previous year reflects the fact that as part of portfolio restructuring activities owing to the steeper US yield curve we realised not inconsiderable hidden losses. These were, however, more than offset by highly profitable realisations on the reduction of high-yield bonds. In addition, we are already benefiting from the rising interest rate level for our reinvestments.

We recognise a derivative for the credit risk associated with special life reinsurance treaties (ModCo) under which securities deposits are held by cedants for our account; the performance of this derivative in the period under review gave rise to unrealised losses of EUR 5.9 million (gain of EUR 3.3 million) recognised in income. In economic terms we assume a neutral development for this item over time, and hence the volatility that can occur in specific quarters provides no insight into the actual business development. Altogether, the unrealised gains in our assets recognised at fair value through profit or loss amounted to EUR 19.6 million. This contrasted with unrealised gains of EUR 10.6 million in the corresponding period of the previous year.

Despite diminished returns from funds withheld and contract deposits we thus generated very healthy investment income. The key drivers were stable ordinary income from fixed-income securities as well as very good earnings from real estate and private equity. The net investment income of EUR 743.6 million was slightly below the level of the comparable period (EUR 779.4 million). Income from assets under own management accounted for an amount of EUR 629.8 million (EUR 656.0 million), producing an annualised average return (including effects from ModCo derivatives) of 3.1%. The half-year result is thus appreciably higher than our expected target of 2.7% for the full year.

Net investment income

in EUR million	2018					2017	
	1.1.–31.3.	1.4.–30.6.	+/– previous year	1.1.–30.6.	+/– previous year	1.4.–30.6.	1.1.–30.6.
Ordinary investment income [1]	315.8	316.7	+0.2%	632.5	-0.4%	316.0	635.1
Result from participations in associated companies	1.3	0.5	-58.2%	1.8	-68.3%	1.3	5.7
Realised gains/losses	48.8	4.5	-92.3%	53.4	-36.0%	59.3	83.4
Appreciation [2]	11.0	10.0	-17.6%	21.1	-8.7%	12.2	23.1
Change in fair value of financial instruments [3]	6.1	13.5		19.6	+84.8%	(0.4)	10.6
Investment expenses	28.2	28.2	+0.6%	56.3	+1.3%	28.0	55.6
Net investment income from assets under own management	332.8	297.0	-11.6%	629.8	-4.0%	336.0	656.0
Net investment income from funds withheld	58.7	55.1	+9.1%	113.8	-7.8%	50.5	123.4
Total investment income	**391.5**	**352.1**	**-8.9%**	**743.6**	**-4.6%**	**386.5**	**779.4**

1 Excluding expenses on funds withheld and contract deposits
2 Including depreciation/impairments on real estate
3 Portfolio at fair value through profit or loss and trading

Opportunity and risk report

Risk report

- Hannover Re has a very strong capital position, which is constantly reviewed against the backdrop of possible changes in the risk profile.
- Our risk management system continuously monitors newly added and changing risks and is able to respond flexibly to changes in internal and external factors.

Risk landscape of Hannover Re

In the context of its business operations the Hannover Re Group enters into a broad variety of risks. These risks are deliberately accepted, steered and monitored in order to be able to act on the associated opportunities. The parameters and decisions of the Executive Board with respect to the risk appetite of the Hannover Re Group are fundamental to the acceptance of risks. They are based on the calculations of risk-bearing capacity. Through our business operations on all continents and the diversification between our Property & Casualty and Life & Health reinsurance business groups we are able to effectively allocate our capital in light of opportunity and risk considerations and generate a higher-than-average return on equity. Along with our principal business operations as a reinsurer of property & casualty and life & health business, we also transact primary insurance in selected niche markets as a complement to our core reinsurance business. With this approach we are well positioned for further profitable growth. In this context crucial importance attaches to our risk management in order to ensure that, among other things, risks to the reinsurance portfolio remain calculable and also exceptional major losses do not have an unduly adverse impact on the result.

The risk landscape of Hannover Re encompasses:

- underwriting risks in property & casualty and life & health reinsurance which originate from our business activities and manifest themselves inter alia in fluctuations in loss estimates as well as in unexpected catastrophes and changes in biometric factors such as mortality,
- market risks which arise in connection with our investments and also as a consequence of the valuation of sometimes long-term payment obligations associated with the technical account,
- counterparty default risks resulting from our diverse business relationships and payment obligations inter alia with clients and retrocessionaires,
- operational risks which may derive, for example, from deficient processes or systems and
- other risks, such as reputational risks as well as strategic and emerging risks.

At the present time our most significant risks are the default and spread risks within the market risks, the reserving and catastrophe risks within the underwriting risks of property and casualty reinsurance and the risk of changes in mortality within the underwriting risks of life and health reinsurance.

Strategy implementation

Our current corporate strategy encompasses ten guiding principles that safeguard the realisation of our vision "Creating value through reinsurance" across the various divisions. The following principles of the corporate strategy constitute the key strategic points of departure for our Group-wide risk management:

- We manage risks actively.
- We maintain an adequate level of capitalisation.
- We are committed to sustainability, integrity and compliance.

Our risk strategy is derived from the corporate strategy. It is the core element in our handling of opportunities and risks. The risk strategy specifies more closely the goals of risk management and documents our understanding of risk. We have defined eight overriding principles within the risk strategy:

1. We monitor adherence to the risk appetite set by the Executive Board.
2. We integrate risk management into value-based management.
3. We promote an open risk culture and the transparency of our risk management system.
4. We fulfil regulatory requirements.
5. We fulfil the requirements of rating agencies.

6. We act in light of materiality and proportionality considerations.
7. We make balanced use of both quantitative and qualitative methods.
8. We ensure the independence of the risk management function.

The risk strategy, risk register and central system of limits and thresholds – as integral components of our Risk and Capital Management Guideline – are reviewed at least once a year. In this way we ensure that our risk management system is kept up-to-date.

We manage our total enterprise risk such that we can expect to generate positive IFRS Group net income with a probability of 90% p.a. and the likelihood of the complete loss of our economic capital and shareholders' equity under IFRS does not exceed 0.03% p.a. These indicators are monitored using our internal capital model and the Executive Board is informed quarterly about adherence to these key parameters as part of regular reporting. The necessary equity resources are determined according to the requirements of our economic capital model, regulatory parameters, the expectations of rating agencies with respect to our target rating and the expectations of our clients. Above and beyond that, we maintain a capital cushion in order to be able to act on new business opportunities at any time.

Major external factors influencing risk management

Brexit: In view of the slow progress of negotiations in 2017, it is increasingly likely that the status of legal relations between the European Union and United Kingdom will not be entirely resolved by the withdrawal date of 30 March 2019. Consequently, the Hannover Re Group must also be prepared for a "hard" Brexit and the associated workload and expenses. With this in mind, Hannover Re has set up a Group-wide working group to address readiness measures. The major impacts will be felt by our entities in the United Kingdom. The "Hannover Re Life UK Branch" and "Inter Hannover UK Branch" write significant premium volumes in life reinsurance as well as property and casualty insurance respectively. The legal status of a locally authorised entity in the United Kingdom in the form of a "third-country branch" will be sought in order to continue operations after a hard Brexit. This would be necessary in the event of the United Kingdom not recognising EU supervision and/or the Solvency II regulatory regime in the future. This will, however, entail an increased regulatory workload and capital expenditure. "Argenta Holdings plc" is a stand-alone subsidiary in the United Kingdom and already authorised as a member of Lloyd's. Furthermore, the business volume transacted with the EU is minimal with a premium share of less than 5%. Argenta will therefore be affected only marginally. We also write business in the United Kingdom through Group companies in Hannover and Ireland. In this regard we do not anticipate any significant changes as a result of Brexit.

All in all, our current analyses indicate that the implications of Brexit are manageable for the Hannover Re Group.

US tax reform: The changes in tax legislation adopted by the US administration at the end of 2017 entered into force on 1 January 2018. They provide for new tax regulations that have far-reaching implications for subsidiaries operating in the United States. On the one hand, the reform cuts the corporate tax rate from 35% to 21%. On the other hand, the legislative package includes the introduction of the so-called "Base Erosion and Anti-Abuse Tax" (BEAT). In this connection, premiums for ceded insurance risks within the corporate group are also included in the taxable base and will in future be taxed at a rate of 5% to 12.5% (rising over the next nine years). Extensive restructuring activities were undertaken within the Group in the first half of 2018 in order to avert this increased burden of taxation. As a consequence of these moves, large parts of US business are now no longer ceded to Hannover Re Ireland but rather to Hannover Life Re America Bermuda.

Risks from electronic data retention: Recent years have seen the increasing emergence of risks relating to electronic systems and their data. Hannover Re, in common with other companies, is at risk of attacks on its IT systems and has put in place extensive safeguards. Furthermore, Hannover Re offers reinsurance coverage for risks connected with electronic systems and the associated data. The dynamic pace of developments in the context of digitalisation presents a particular challenge to the assessment of such risks.

Natural catastrophe risks and climate change: The above-average number of natural disasters in 2017 was optimally reflected in the assumptions underlying the natural perils models used for pricing and managing natural catastrophe risks. The possibility that the increased storm activity is due to progressive global warming cannot be ruled out. Hannover Re works together with partners to closely monitor the implications of global warming for extreme weather events so as to be able to incorporate the insights obtained into the models.

US mortality business: In view of the deterioration in the performance of, most notably, the large block of business acquired by Hannover Re at the beginning of 2009, the technical provisions calculated in accordance with IFRS and in the economic balance sheet according to Solvency II were reassessed by a project set up specifically for this purpose. This resulted in a substantial increase in the technical provisions under Solvency II. Under IFRS the provisions continued to be calculated according to the lock-in principle because the value

in force (VIF) of the book of US mortality business remained positive overall. The actual mortality experience in the first half of 2018 proved to be better than anticipated. As part of our portfolio management we initiated rate adjustments for the portfolio in question. Insofar as the affected cedants exercise their right of recapture, this can lead to charges to the IFRS result.

Capital market environment: On the investment side we expect to see increased volatility on equity and credit markets worldwide. We take the view, however, that we are suitably prepared with our rather defensively oriented investment posture.

Risk capital

In the interests of our shareholders and clients we strive to ensure that our risks remain commensurate with our capital resources. Our quantitative risk management provides a uniform framework for the evaluation and steering of all risks affecting the company as well as of our capital position. In this context, the internal capital model is the central tool and constitutes a stochastic enterprise model. It covers all subsidiaries and business groups of the Hannover Re Group. The core variable in risk and enterprise management is the economic equity, which is calculated according to market-consistent measurement principles and also constitutes the basis for calculating the own funds under Solvency II. Hannover Re's full internal capital model reflects all risks that influence the development of the economic equity. These are split into underwriting risks, market risks, counterparty default risks and operational risks. For each of these risk classes we have identified a number of risk factors for which we define probability distributions. These risk factors include, for example, economic indicators such as interest rates, exchange rates and inflation indices, but also insurance-specific indicators such as the mortality of a particular age group within our portfolio of insureds in a particular country or the number of natural catastrophes in a certain region and the insured loss amount per catastrophe. The specification of the probability distributions for the risk factors draws upon historical and publically available data as well as on the internal data resources of the Hannover Re Group. This process is further supplemented by the know-how of internal and external experts. The fit of the probability distributions is regularly checked by our specialist departments, although more importantly it is also verified in the context of the regular, company-wide use of the capital model when assessing risks and allocating the cost of capital. Hannover Re calculates the required risk capital as the Value at Risk (VaR) of the economic change in value over a period of one year with a confidence level of 99.97%. This reflects the goal of not exceeding a one-year ruin probability of 0.03%. The internal target capitalisation of the Hannover Re Group is therefore significantly higher than the confidence level of 99.5% required under Solvency II. For its capitalisation under Solvency II Hannover Re has set as a limit a capital adequacy ratio of 180% and as a threshold a capital adequacy ratio of 200%.

In contrast to a standard model, our internal capital model enables us to optimally map the risk structure of our reinsurance business and hence also to continue to efficiently fulfil our regulatory capital requirements under Solvency II. Our excess capital coverage at the target confidence level of 99.97% is currently very comfortable. Hannover Re is well capitalised and our available capital comfortably exceeds the required capital, both from the economic and the regulatory perspective.

We hold additional capital above all to meet the requirements of the rating agencies for our target rating and to be able to act flexibly on business opportunities. We strive for a rating from the rating agencies most relevant to our industry that facilitates and secures our access to all reinsurance business worldwide. Hannover Re is analysed by the rating agencies Standard & Poor's (S & P) and A. M. Best as part of an interactive rating process, meaning that both these rating agencies are also given access to confidential information about Hannover Re. The current financial strength ratings are assessed as "AA-" (Very Strong, stable outlook) by Standard & Poor's and "A+" (Superior, stable outlook) by A. M. Best. Standard & Poor's evaluates Hannover Re's risk management as "Very Strong", the best possible rating.

In awarding these ratings the agencies highlighted the company's very good risk management, the consistent and systematic implementation of corporate strategy by management and the excellent capital resources. Hannover Re's internal capital model is also examined as part of the rating. Based on this review, Standard & Poor's factors the results of the internal capital model of the Hannover Re Group into the determination of the target capital for the rating.

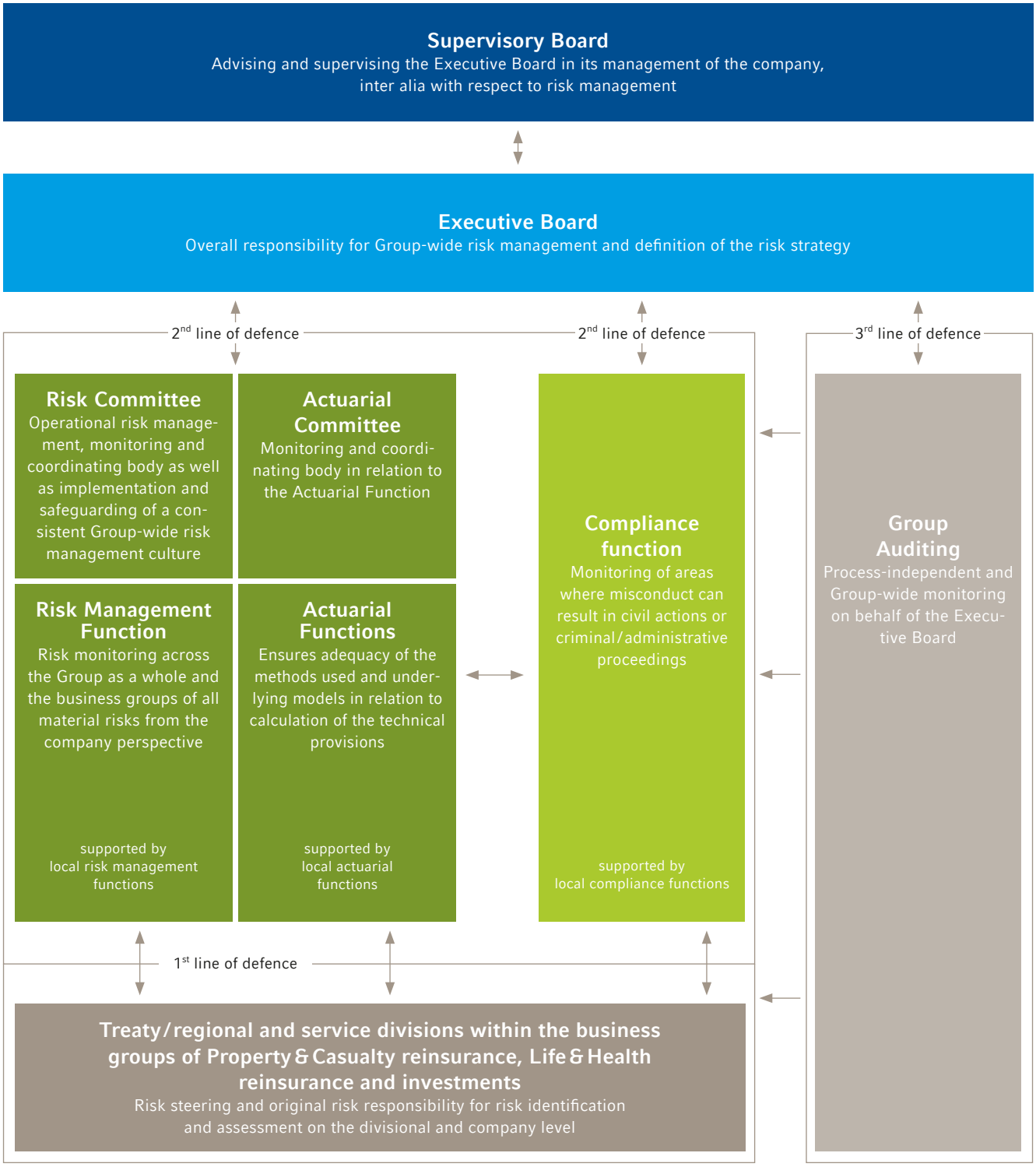
Organisation and processes of risk management

Hannover Re has set up risk management functions and bodies Group-wide to safeguard an efficient risk management system. The organisation and interplay of the individual functions in risk management are crucial to our internal risk steering and control system. The central functions of risk management are closely interlinked in our system and the roles, tasks and reporting channels are clearly defined and documented in terms of the so-called "three lines of defence". The first line of defence consists of risk steering and the original risk responsibility on the divisional or company level. The second line of defence

consists of the core functions of risk management, the actuarial function and the compliance function. These units are responsible for monitoring and control. The third line of defence is the process-independent monitoring performed by the internal audit function. The chart below provides an overview of the central functions and bodies within the overall system as well as of their major tasks and powers.

The actuarial units and risk management functions within the Group meet regularly in order to support Group-wide risk communication and establish an open risk culture. In addition, risk management requirements are formulated in guidelines that are communicated throughout the organisation.

Central functions of risk monitoring and steering



Key elements of our risk management system

Our risk strategy and our Risk and Capital Management Guideline including the system of limits and thresholds for material risks of the Hannover Re Group describe the central elements of our risk management system. This is subject to a constant cycle of planning, action, control and improvement. Systematic risk identification, analysis, measurement, steering and monitoring as well as risk reporting are especially crucial to the effectiveness of the system as a whole.

This guideline describes, among other things, the major tasks, rights and responsibilities, the organisational framework conditions and the risk control process. The rules, which are derived from the corporate strategy and the risk strategy, additionally take account of the regulatory minimum requirements for risk management as well as international standards and developments relating to appropriate enterprise management.

Risk-bearing capacity concept

The establishment of the risk-bearing capacity involves determining the total available risk coverage potential and calculating the funds required to cover all risks. This is done in conformity with the parameters of the risk strategy and the risk appetite defined by the Executive Board. The quantitatively measurable individual risks and the risk position as a whole are evaluated using our risk model. A central system of limits and thresholds is in place to monitor material risks. This system incorporates – along with other risk-related key figures – in particular the indicators derived and calculated from the risk-bearing capacity. Adherence to the overall risk appetite is verified on an ongoing basis.

Risk identification

A key source of information for monitoring risks is the risk identification carried out on a periodic basis. All identified risks are documented in a central register containing all material risks. Risk identification takes the form of, among other things, structured assessments, interviews or scenario analyses. External insights such as recognised industry know-how from relevant bodies or working groups are incorporated into the process. Risk identification is important for ensuring that our risk management consistently remains up-to-date.

Risk analysis and assessment

In principle, every risk that is identified and considered material is quantitatively assessed. Only risk types for which quantitative risk measurement is currently impossible or difficult are qualitatively assessed (e.g. strategic risks, reputational risks or emerging risks). Qualitative assessment can take the form of, for example, expert evaluations. Quantitative assessment of material risks and the overall risk position is performed using Hannover Re's internal capital model. The model makes allowance for risk concentration and risk diversification.

Risk steering

The steering of all material risks is the task of the operational business units on the divisional and company level. In this context, the identified and analysed risks are either consciously accepted, avoided or minimised. The risk/reward ratio is factored into the division's decision. Risk steering is assisted by the parameters of the central and local underwriting guidelines and by defined limits and thresholds.

Risk monitoring

The monitoring of all identified material risks is a core function of risk management. This includes, inter alia, monitoring execution of the risk strategy as well as adherence to the defined limits and thresholds and to risk-related methods and processes. A further major task of risk monitoring is the ascertainment of whether risk steering measures were carried out and whether the planned effect of the measures is sufficient.

Risk communication and risk culture

Risk management is firmly integrated into our operational processes. It is assisted by transparent risk communication and the open handling of risks as part of our risk culture. Risk communication takes the form, for example, of internal and external risk reports, information on current risk complexes in the intranet and training opportunities for staff. The regular sharing of information between risk-steering and risk-monitoring units is also fundamental to the proper functioning of risk management.

Risk reporting

Our risk reporting provides systematic and timely information about all material risks and their potential implications. The central risk reporting system consists primarily of regular risk reports, e.g. on the overall risk situation, adherence to the parameters defined in the risk strategy or on the capacity utilisation of natural catastrophe scenarios. Complementary to the regular risk reporting, immediate internal reporting on material risks that emerge at short notice takes place as necessary. The already existing range of risk reports was supplemented by further reports in the context of Solvency II requirements and the associated Pillars II and III.

Process-integrated and -independent monitoring and quality assurance

Irrespective of internally assigned competencies, the Executive Board is responsible for the orderly organisation of the company's business. This also encompasses monitoring of the internal risk steering and control system. Process-independent monitoring and quality assurance of risk management is carried out by the internal audit function and external instances (regulators, independent auditors and rating agencies). Most notably, the independent auditors review the trigger mechanism and the internal control system. The risk management system is rounded off with process-integrated procedures and rules, such as those of the internal control system.

Internal control system

We organise our business activities in such a way that they are always in conformity with all legal requirements. The internal control system (ICS) is an important subsystem that serves, among other things, to secure and protect existing assets, prevent and reveal errors and irregularities and comply with laws and regulations. The core elements of Hannover Re's ICS are documented in a guideline that establishes a common understanding of the differentiated execution of the necessary controls. In the final analysis, it is designed to systematically steer and monitor the implementation of our corporate strategy. This guideline defines concepts, stipulates responsibilities and provides a guide for the description of controls. In addition, it forms the basis for the accomplishment of internal objectives and the fulfilment of external requirements imposed on Hannover Re. The ICS consists of systematically structured organisational and technical measures and controls within the enterprise.

These include, among other things:

- the principle of dual control,
- separation of functions,
- documentation of the controls within processes,
- and technical plausibility checks and access privileges in the IT systems.

The proper functioning of the ICS necessitates the involvement of management, executive staff and employees on all levels.

The financial reporting of the parent company and the Group must satisfy international and national financial reporting standards as well as regulatory requirements. This is safeguarded in the area of accounting and financial reporting by processes with integrated controls which ensure the completeness and accuracy of the annual and consolidated financial statements. A structure made up of differentiated criteria, control points and materiality thresholds assures our ability to identify and minimise the risk of material errors in the annual and consolidated financial statements at an early stage.

We use a central IT solution with standardised accounting and consolidation processes, posting rules and interfaces for data delivery in order to draw up the consolidated financial statement. Access rights for the reporting systems are assigned through an approval process. All components of the accounting-related internal control system, the processes for the organisation and implementation of consolidation tasks and for the preparation of the consolidated financial statement as well as the accompanying controls are consistently documented. In order to safeguard and continuously improve the adequacy of the control system it is subject to regular review and evaluation. In this regard, the internal audit function ensures that the quality of the control system is constantly monitored. All relevant accounting principles are collated in a Group Accounting Manual that sets out uniform Group-wide rules for the recognition, measurement and reporting of items in the consolidated financial statement. The process for updating and, if necessary, adjusting these rules is clearly regulated with respect to information channels, responsibilities and period of validity. Not only that, we provide prompt Group-wide notification of significant developments and modified requirements in Group financial reporting.

Within the scope of our control system the Group companies are responsible for Group-wide adherence to the accounting policies and the internal control guidelines. The managing directors and chief financial officers of the Group companies defined as material in our control system affirm at each closing date to the Executive Board of Hannover Rück SE – as the leading company with the Group – the completeness, correctness and reliability of the financial data that they pass on to Group Accounting. Data for the preparation of the consolidated financial statement is delivered using a networked IT application. The relevant data for Group financial reporting is collected in a database and processed via automatic interfaces in a consolidation system. As part of the financial reporting process we perform preventive and detective checks on the reported figures in order to minimise the probability and reduce the impacts of a potentially incorrect disclosure. Depending upon the results of our checks, these figures can be corrected if necessary. Given that our Group financial

reporting is heavily dependent on IT systems, these systems also need to be subject to controls. Authorisation concepts regulate system access and for each step content-based as well as system-side checks have been implemented, by means of which errors are analysed and promptly eliminated.

Internal risk assessment

Hannover Re calculates the economic equity as the difference between the market-consistent value of the assets and the market-consistent value of the liabilities. While fair values are available for most investments, the market-consistent valuation of reinsurance treaties necessitates a specific valuation model. We establish the market-consistent value of technical items as the present value of projected payments using actuarial methods. This is adjusted by a risk loading that factors in the fluctuation in future payments. Such fluctuations result from risks that cannot be hedged by means of capital market products, such as underwriting risks. For the discounting of future cash flows we use the risk-free basic yield curves without volatility adjustment or matching adjustment calculated in accordance with Solvency II rules. The market prices for options and guarantees embedded in insurance contracts are determined or approximated using option valuation models from the field of financial mathematics. The significance of these options and guarantees in our portfolio is, however, minor.

The available economic capital, which is available as liable capital for policyholders, is composed of the economic equity and the hybrid capital and includes the deduction of foreseeable dividends as required by Solvency II. The internal capital model is based on current methods from actuarial science and financial mathematics. In the case of underwriting risks, we are able to draw on a rich internal data history to estimate the probability distributions, e. g. for the reserve risk. For risks from natural perils we use external models, which are adjusted in the context of a detailed internal review process such that they reflect our risk profile as closely as possible. In the area of life and health reinsurance long-term payment flows are modelled under various scenarios. With respect to all the aforementioned risks we use internal data to define scenarios and probability distributions. The internal data is enhanced by way of parameters set by our internal experts. These parameters are especially significant in relation to extreme events that have not previously been observed.

When it comes to aggregating the individual risks, we make allowance for dependencies between risk factors. Dependencies arise, for example, as a consequence of market shocks, such as the financial crisis, which simultaneously impact multiple market segments. What is more, several observation periods may be interrelated on account of market phenomena such as price cycles. In dealing with these dependencies, however, it is our assumption that not all extreme events occur at the same time. The absence of complete dependency is referred to as diversification. Hannover Re's business model is based inter alia on building up the most balanced possible portfolio so as to achieve the greatest possible diversification effects and in order to deploy capital efficiently. Diversification exists between individual reinsurance treaties, lines, business segments and risks. We define the cost of capital to be generated per business unit according to the capital required by our business segments and lines and based on their contribution to diversification.

Underwriting risks in property and casualty reinsurance

Risk management in property and casualty reinsurance has defined various overall guidelines for efficient risk steering. These include, among other things, the use of retrocessions to reduce volatility and conserve capital. It is also crucially important to consistently maximise the available risk capacities on the basis of the risk management parameters of the Hannover Re Group and to steer the acceptance of risks systematically through the existing central and local underwriting guidelines. Our conservative reserving level is a key factor in our risk management. We make a fundamental distinction between risks that result from business operations of past years (reserve risk) and those stemming from activities in the current or future years (price/premium risk). In the latter case, special importance attaches to the catastrophe risk.

Diversification within the Property & Casualty reinsurance business group is actively managed through allocation of the cost of capital according to the contribution made to diversification. A high diversification effect arises out of the underwriting of business in different lines and different regions with different business partners.

The reserve risk, i. e. the risk of under-reserving losses and the resulting strain on the underwriting result, is a high priority in our risk management. We attach the utmost importance to a conservative reserving level and therefore traditionally have a high confidence level. In order to counter the risk of under-reserving we calculate our loss reserves based on our own actuarial estimations and establish, where necessary, additional reserves supplementary to those posted by our cedants as well as the segment reserve for losses that have already occurred but have not yet been reported to us.

The statistical run-off triangles are another monitoring tool used by our company. They show the changes in the reserve over time as a consequence of paid claims and in the recalculation of the reserves to be established as at each balance sheet date. Their adequacy is monitored by the actuarial units.

In order to partially hedge inflation risks Hannover Re holds securities in its portfolio with inflation-linked coupons and redemption amounts. An inflation risk exists particularly inasmuch as the liabilities (e.g. loss reserves) could develop differently than assumed at the time when the reserve was constituted because of inflation. The specified bonds protect these parts of the loss reserves against inflation risks.

For the purpose of assessing our material catastrophe risks from natural hazards (especially earthquake, windstorm and flood) we use licensed scientific simulation models, supplemented by the expertise of our own specialist departments, that deliver probability distributions for losses from natural catastrophes. The monitoring of the risks resulting from natural hazards is rounded out by scenario analyses.

Within the scope of the process for managing natural catastrophe risks, the Executive Board defines the risk appetite for natural perils once a year on the basis of the risk strategy by specifying the portion of the economic capital that is available to cover risks from natural perils. This is a key basis for our underwriting approach in this segment. As part of our holistic approach to risk management across business groups, we take into account numerous relevant scenarios and extreme scenarios, determine their effect on portfolio and performance data, evaluate them in relation to the planned figures and identify alternative courses of action.

For the purposes of risk limitation, maximum amounts are also stipulated for various extreme loss scenarios and return periods in light of profitability criteria. Risk management ensures adherence to these maximum amounts. The Executive Board, Risk Committee and P&C Executive Committee are kept regularly updated on the degree of capacity utilisation.

The price/premium risk lies primarily in the possibility of a random claims realisation that diverges from the claims expectancy on which the premium calculation was based. Regular and independent reviews of the models used for treaty quotation as well as central and local underwriting guidelines are vital management components. We have put in place a multi-step quotation process to ensure the quality of our portfolios. In addition, Hannover Re's regional and treaty departments prepare regular reports on the progress of their respective renewals. The reporting in this regard makes reference inter alia to significant changes in conditions, risks (such as inadequate premiums) as well as to emerging market opportunities and the strategy pursued in order to accomplish targets. The development of the combined ratio in property and casualty reinsurance is shown in the table below:

Combined and catastrophe loss ratio

in %	1H 2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Combined ratio (property and casualty reinsurance)	95.7	99.8	93.7	94.4	94.7	94.9	95.8	104.3	98.2	96.6	95.4
Thereof catastrophe losses[1]	1.8	12.3	7.8	7.1	6.1	8.4	7.0	16.5	12.3	4.6	10.7

[1] Net share of the Hannover Re Group for natural catastrophes and other major claims in excess of EUR 10 million gross as a percentage of net premium earned (until 31 December 2011: in excess of EUR 5 million gross)

Underwriting risks in life and health reinsurance

All risks directly connected with the life of an insured person are referred to as biometric risks. They include in particular the miscalculation of mortality, life expectancy, morbidity, occupational disability and health risks. Biometric risks are the material risks for our company in the area of life and health reinsurance. Our goal is to strike a balance between biometric risks. Counterparty default risks are also material since we partly prefinance our cedants' new business acquisition costs. Furthermore, we are exposed to catastrophe risks, especially events involving a high number of fatalities in our insurance portfolio.

The reserves are determined on the basis of secure biometric actuarial bases in light of the information provided by our clients. The biometric actuarial bases used and the lapse assumptions are continuously reviewed with an eye to their adequacy and where necessary adjusted. This is done using the company's own empirical data as well as market-specific insights. Our current risk profile in life and health reinsurance is dominated by mortality and longevity risks. This is due to the fact that under some of our contracts we pay death benefits, while under others we pay survival benefits. The volume of our annuity portfolio contributes to diversification within life and health reinsurance.

Diversification is a central management tool for our company. We seek to spread risks as far as possible across different risk classes and different regions. In our pricing of reinsurance treaties we provide incentives to further increase diversification.

Through our quality assurance measures we ensure that the reserves established by ceding companies in accordance with local accounting principles satisfy all requirements with respect to the calculation methods used and assumptions made (e. g. use of mortality and morbidity tables, assumptions regarding the lapse rate). In addition, the assumptions are continuously reviewed on the basis of empirical data and modified if necessary. New business is written in all regions in compliance with underwriting guidelines applicable worldwide, which set out detailed rules governing the type, quality, level and origin of risks. These global guidelines are revised annually and approved by the Executive Board. Special underwriting guidelines give due consideration to the particular features of individual markets. By monitoring compliance with these underwriting guidelines we minimise the risk of an inability to pay or of deterioration in the financial status of cedants. Regular reviews and holistic analyses (e. g. with an eye to lapse risks) are carried out with respect to new business activities and the assumption of international portfolios. Large transactions are also examined by our risk management department. Individual actuarial reports and documentation ensure that regular scrutiny also takes place on the level of the subsidiaries. The interest rate risk, which in the primary sector is important in life business owing to the guarantees that are given, is of only minimal relevance to our company thanks to the design of our reinsurance treaties. We have confidence in the entrepreneurial abilities of our underwriters and grant them the most extensive possible powers. In our decentralised organisation we manage risks where they arise using a consistent Group-wide approach in order to obtain an overall view of the risks in life and health reinsurance. Our global underwriting guidelines provide underwriters with an appropriate framework for this purpose.

In recent years we have already reported regularly on the fact that results in our US mortality business have been poorer than anticipated. The reason for this development is the negative earnings performance of a large portfolio that we acquired, as reported at the time, at the beginning of 2009. The other US mortality business that we have written is, by contrast, performing highly satisfactorily and showing good growth. In consequence, this business overall - i. e. including the poorly performing portfolio - shows a positive value in force (VIF). For this reason, in accordance with the lock-in principle, the assumptions made at the time of treaty formation constitute the basis of reserving that is applicable for IFRS accounting purposes.

In view of the unsatisfactory performance of the aforementioned portfolio, we had already initiated a project at the end of 2016 with the aim of, firstly, exploring the actuarial assumptions in a greater degree of detail and, secondly, deploying our available means to improve results through portfolio management measures on an even more targeted basis. This primarily involves rate management pursuant to contractual rights. Based on the information available to us today, we continue to assume a positive VIF for our US mortality business as a whole. This assumption is based in large measure on the value of the cash flows that will be generated through rate management actions. Should additional information lead to the determination that this is no longer the case, this would result in a one-off charge to the IFRS result. Similarly, the IFRS result may also incur one-off charges if the cedants affected by rate adjustments exercise their right of recapture.

The risks arising out of life and health reinsurance are reflected in the internal capital model.

Market risks

Faced with a challenging capital market climate, particularly high importance attaches to preserving the value of assets under own management and the stability of the return. Hannover Re's portfolio is therefore guided by the principles of a balanced risk/return profile and broad diversification. Based on a risk-averse asset mix, the investments reflect both the currencies and durations of our liabilities. Market price risks include equity risks, interest rate risks, foreign exchange risks, real estate risks, default and spread risks.

With a view to preserving the value of our assets under own management, we constantly monitor adherence to a trigger mechanism based on a clearly defined traffic light system that is applied across all portfolios. This system defines clear thresholds and escalation channels for the cumulative fluctuations in fair value and realised gains/losses on investments since the beginning of the year. These are unambiguously defined in conformity with our risk appetite and trigger specified information and escalation channels if a corresponding fair value development is overstepped.

The short-term loss probability measured as the "Value at Risk" (VaR) is another vital tool used for monitoring and managing market price risks. It is calculated on the basis of historical data, e.g. the volatility of the securities positions under own management and the correlation between these risks. As part of these calculations the decline in the fair value of our portfolio is simulated with a certain probability and within a certain period. The VaR of the Hannover Re Group determined in accordance with these principles specifies the decrease in the fair value of our securities portfolio under own management that with a probability of 95% will not be exceeded within ten trading days. A multi-factor model is used to calculate the VaR indicators for the Hannover Re Group. It is based on time series of selected representative market parameters (equity prices, yield curves, spread curves, exchange rates, commodity prices and macro-economic variables). All asset positions are mapped on the level of individual positions within the multi-factor model; residual risks (e.g. market price risks that are not directly explained by the multi-factor model) can be determined through back-calculation and are incorporated into the overall calculation. The model takes into account interest rate risks, default and spread risks, systematic and specific equity risks, commodity risks and option-specific risks.

Stress tests are conducted in order to be able to map extreme scenarios as well as normal market scenarios for the purpose of calculating the Value at Risk. In this context, the loss potentials for fair values and shareholders' equity (before tax) are simulated on the basis of already occurred or notional extreme events.

Further significant risk management tools – along with the various stress tests used to estimate the loss potential under extreme market conditions – include sensitivity and duration analyses and our asset/liability management (ALM). The internal capital model provides us with quantitative support for the investment strategy as well as a broad diversity of VaR calculations. In addition, tactical duration ranges are in place, within which the portfolio can be positioned opportunistically according to market expectations. The parameters for these ranges are directly linked to our calculated risk-bearing capacity.

Equity risks derive from the possibility of unfavourable changes in the value of equities, equity derivatives or equity index derivatives in our portfolio. Their relevance to our investments has, however, declined because at the end of the previous year we liquidated our portfolio of non-strategic listed equities and equity funds, leaving only a minimal holding in the context of strategic participations. Our exposure to the private equity market remains unchanged. In this case, changes in fair value are influenced less by general market conditions than by more company-specific valuations. Consequently, the risks are associated primarily with the business model and profitability and to a lesser extent with the interest rate component in the consideration of cash flow forecasts.

The portfolio of fixed-income securities is exposed to the interest rate risk. Declining market yields lead to increases and rising market yields to decreases in the fair value of the fixed-income securities portfolio. The credit spread risk should also be mentioned. The credit spread refers to the interest rate differential between a risk-entailing bond and risk-free bond with the same maturity. Changes in these risk premiums, which are observable on the market, result – analogously to changes in pure market yields – in changes in the fair values of the corresponding securities.

Foreign exchange risks are especially relevant if there is a currency imbalance between the technical liabilities and the assets. Through extensive matching of currency distributions on the assets and liabilities side, we reduce this risk on the basis of the individual balance sheets within the Group. The short-term VaR therefore does not include quantification of the foreign exchange risks. We regularly compare the liabilities per currency with the covering assets and optimise the currency coverage by regrouping assets. In so doing, we make allowance for collateral conditions such as different accounting requirements. Remaining currency surpluses are systematically quantified and monitored within the scope of economic modelling.

Real estate risks result from the possibility of unfavourable changes in the value of real estate held either directly or through fund units. They may be caused by a deterioration in particular qualities of a property or by a general downslide in market values. Real estate risks continued to grow in importance for our portfolio owing to our ongoing involvement in this sector. We spread these risks through broadly diversified investments in high-quality markets of Germany, Europe as a whole and the United States; each investment is preceded by detailed analyses of the property, manager and market concerned.

We use derivative financial instruments only to the extent needed to hedge risks. The primary purpose of such financial instruments is to hedge against potentially adverse developments on capital markets. Part of our cash flows from the insurance business as well as currency risks arising because currency matching cannot be efficiently achieved are partially hedged using forward exchange transactions. Hannover Re holds further derivative financial instruments to hedge interest rate risks from loans taken out to finance real estate. In addition, Hannover Re has taken out hedges in the form of equity swaps to hedge price risks in connection with the stock appreciation rights granted in 2014 under the Share Award Plan. These are intended to neutralise changes in the fair values of the awarded stock appreciation rights. Contracts are concluded with reliable counterparties and for the most part collateralised on a daily basis so as to avoid credit risks associated with the use of such derivative transactions. The remaining exposures are controlled according to the restrictive parameters set out in the investment guidelines.

Derivatives in connection with the technical account play a minor role in Hannover Re's portfolio.

Our investments entail credit risks that arise out of the risk of a failure to pay (interest and/or capital repayment) or a change in the credit status (rating downgrade) of issuers of securities. We attach equally vital importance to exceptionally broad diversification as we do to credit assessment conducted on the basis of the quality criteria set out in the investment guidelines. We measure credit risks in the first place using the standard market credit risk components, especially the probability of default and the potential amount of loss – making allowance for any collateral and the ranking of the individual instruments depending on their effect in each case.

We then assess the credit risk first on the level of individual securities (issues) and in subsequent steps on a combined basis on the issuer level. In order to limit the risk of counterparty default we set various limits on the issuer and issue level as well as in the form of dedicated rating quotas. A comprehensive system of risk reporting ensures timely reporting to the functions entrusted with risk management.

Rating structure of our fixed-income securities[1]

Rating classes	Government bonds		Securities issued by semi-governmental entities[2]		Corporate bonds		Covered bonds/asset-backed securities	
	in %	in EUR million	in %	in EUR million	in %	in EUR million	in %	in EUR million
AAA	78.1	11,254.8	61.1	3,973.7	1.2	134.3	62.7	1,927.8
AA	12.7	1,829.8	26.2	1,707.3	14.4	1,659.9	20.8	637.6
A	5.4	780.9	5.7	373.3	33.9	3,900.9	9.7	296.7
BBB	2.0	288.6	1.5	97.9	42.8	4,934.9	5.0	153.9
< BBB	1.8	258.0	5.5	358.8	7.7	883.6	1.8	55.4
Total	**100.0**	**14,412.1**	**100.0**	**6,511.0**	**100.0**	**11,513.5**	**100.0**	**3,071.4**

1 Securities held through investment funds are recognised pro rata with their corresponding individual ratings.
2 Including government-guaranteed corporate bonds

On a fair value basis EUR 4,091.2 million of the corporate bonds held by our company were issued by entities in the financial sector. Of this amount, EUR 3,259.2 million was attributable to banks. The vast majority of these bank bonds (66.5%) are rated "A" or better. Our investment portfolio under own management does not contain any written or issued credit default swaps.

Counterparty default risks

The counterparty default risk consists primarily of the risk of complete or partial failure of the counterparty and the associated default on payment. Since the business that we accept is not always fully retained, but instead portions are retroceded as necessary, the counterparty default risk is material for our company in reinsurance transactions. Our retrocession partners are carefully selected and monitored in light of credit considerations in order to keep the risk as small as possible. This is also true of our broker relationships, which entail a risk inter alia through the potential loss of the premium paid by the cedant to the broker. We minimise these risks, among other things, by reviewing all broker relationships with an eye to criteria such as the existence of professional indemnity insurance, payment performance and proper contract implementation. The credit status of retrocessionaires is continuously monitored. On the basis of this ongoing monitoring a Security Committee decides on measures where necessary to secure receivables that appear to be at risk of default. This process is supported by a Web-based risk management application, which specifies cession limits for the individual retrocessionaires participating in protection cover programmes and determines the capacities still available for short-, medium- and long-term business. Depending on the type and expected run-off duration of the reinsured business, the selection of reinsurers takes into account not only the minimum ratings of the rating agencies Standard & Poor's and A.M. Best but also internal and external expert assessments (e.g. market information from brokers). Overall, retrocessions conserve our capital, stabilise and optimise our results and enable us to act on opportunities across a broader front, e.g. following a major loss event. Regular visits to our retrocessionaires give us a reliable overview of the market and put us in a position to respond quickly to capacity changes. Alongside traditional retrocessions in property and casualty reinsurance we also transfer risks to the capital market.

Counterparty default risks are also relevant to our investments and in life and health reinsurance because we prefinance acquisition costs for our ceding companies. Our clients, retrocessionaires and broker relationships as well as our investments are therefore carefully evaluated and limited in light of credit considerations and are constantly monitored and controlled within the scope of our system of limits and thresholds. In terms of the Hannover Re Group's major companies, EUR 538.2 million (12.2%) of our accounts receivable from reinsurance business totalling EUR 4,394.0 million were older than 90 days as at the balance sheet date. The average default rate over the past four years was 0.06%.

Operational risks

Operational risks refer to the risk of losses occurring because of the inadequacy or failure of internal processes or as a result of events triggered by employee-related, system-induced or external factors. In contrast to underwriting risks (e.g. the reserve risk), which we enter into in a deliberate and controlled manner in the context of our business activities, operational risks are an indivisible part of our business activities. The focus is therefore on risk minimisation. Unlike market, counterparty default and underwriting risks, operational risks are categorised as non-financial risks.

With the aid of the Self-Assessment for Operational Risks we determine the maturity level of our operational risk management system and define action fields for improvements. The assessment is carried out, for example, by assessing the maturity level of the risk management function or of the respective risk monitoring and reporting. The system enables us, among other things, to prioritise operational risks and is used to calculate the capital commitment in our internal capital model.

Within the overall framework of operational risks we consider, in particular, business process and data quality risks, compliance risks, outsourcing risks, fraud risks, personnel risks, information/IT security risks and business interruption risks.

Business process risks are associated with the risk of deficient or flawed internal processes, which can arise inter alia as a consequence of an inadequate process organisation. The criteria that we have defined for managing the risk result in a high process quality. Data quality is similarly a very critical success factor, especially in risk management, because – among other things – the validity of the results delivered by the internal model depends primarily on the data provided.

Compliance risks are associated with the risk of breaches of standards and requirements, non-compliance with which may entail lawsuits or official proceedings with not inconsiderable detrimental implications for the business activities of the Hannover Re Group. Regulatory compliance, compliance with the company's Code of Conduct, data privacy and compliance with anti-trust and competition laws have been defined as issues of particular relevance. The compliance risk also extends to tax and legal risks. Among other things, we use sanctions screening software on parts of the Hannover Re Group's portfolio to filter out individuals who are subject to sanctions on account of a criminal or terrorist background. Suitable steps are taken if such individuals are identified. Business partners are also screened in this way. Responsibilities within the compliance organisation are regulated and documented Group-wide and interfaces with risk management have been put in place. The set of tools is rounded off with regular compliance training programmes.

Outsourcing risks can result from the outsourcing of functions, services and/or organisational units to third parties outside Hannover Re. Mandatory rules have been put in place to limit this risk; among other things, they stipulate that a risk analysis is to be performed prior to a material outsourcing. In the context of this analysis a check is carried out to determine, inter alia, what specific risks exist and whether outsourcing can even occur in the first place. In addition, our external partners are subject to regular due diligence checks.

In selected market niches we transact primary insurance business that complements our reinsurance activities. In so doing, just as on the reinsurance side, we always work together with partners from the primary sector – such as insurance brokers and underwriting agencies. This gives rise to risks associated with such distribution channels, although these are minimised through the careful selection of agencies, mandatory underwriting guidelines and regular checks.

Fraud risks refer to the risk of intentional violations of laws or regulations committed by members of staff (internal fraud) and/or by externals (external fraud) for personal gain. This risk is reduced by the internal control system as well as by the audits conducted by Group Auditing on a Group-wide and line-independent basis.

The proper functioning and competitiveness of the Hannover Re Group can be attributed in large measure to the expertise and dedication of our staff. In order to minimise personnel risks, we pay special attention to the skills, experience and motivation of our employees and foster these qualities through outstanding personnel development and leadership activities. Regular employee surveys and the monitoring of turnover rates ensure that such risks are identified at an early stage and scope to take the necessary actions is created.

Information technology risks and information security risks arise, inter alia, out of the risk of the inadequate integrity, confidentiality or availability of systems and information. By way of example, losses and damage resulting from the unauthorised passing on of confidential information, the malicious overloading of important IT systems or from computer viruses are material to the Hannover Re Group. Given the

broad spectrum of such risks, a diverse range of steering and monitoring measures and organisational standards, including for example the requirement to conclude confidentiality agreements with service providers, have been put in place. In addition, our employees are made more conscious of such security risks through practically oriented tools, including for example information campaigns and training activities.

When it comes to reducing business interruption risks, the paramount objective is the quickest possible return to normal operations after a crisis, for example through implementation of existing contingency plans. Guided by internationally accepted standards, we have defined the key framework conditions and – among other measures – we have assembled a crisis team to serve as a temporary steering body in the event of an emergency. The system is complemented by regular exercises and tests.

Other risks

Of material importance to our company in the category of other risks are primarily emerging risks, strategic risks, reputational risks and liquidity risks. Reputational risks are categorised as non-financial risks.

The hallmark of emerging risks is that the content of such risks cannot as yet be reliably assessed – especially on the underwriting side with respect to our treaty portfolio. Such risks evolve gradually from weak signals to unmistakable tendencies. It is therefore vital to detect these risks at an early stage and then determine their relevance. For the purpose of early detection we have developed an efficient process that spans divisions and lines of business and we have ensured its linkage to risk management. Operational implementation is handled by an expert working group assembled specially for this task. The analyses performed by this working group are used Group-wide in order to pinpoint any necessary measures (e.g. the implementation of contractual exclusions or the development of new reinsurance products). By way of example, the risks associated with possible climate change are analysed by this working group. Global warming would have implications not only for natural perils, but also for human health, the world economy, the agricultural sector and much more besides. These problematic issues may also be relevant to our treaty portfolio – in the form not just of risks but also opportunities, such as increased demand for reinsurance products. Further examples of emerging risks include cyber risks, shortage of resources and nanotechnology.

Strategic risks derive from a possible imbalance between the corporate strategy of the Hannover Re Group and the constantly changing general business environment. Such an imbalance might be caused, for example, by incorrect strategic policy decisions, a failure to consistently implement the defined strategies and business plans or an incorrect allocation of resources. We therefore regularly review our corporate strategy in a multi-step procedure and adjust our processes and the resulting guidelines as and when required. We have defined performance criteria and indicators for the operational implementation of the strategic guidelines; these are authoritative when it comes to determining fulfilment of the various targets. With the "Strategy Cockpit" the Executive Board and responsible managers have at their disposal a strategy tool that assists them with the planning, elaboration and management of strategic objectives and measures and safeguards their overall perspective on the company and its strategic risks. In addition, the process for the management of strategic risks is assessed annually as part of the monitoring of business process risks.

Reputational risks refer to the risk that the trust put in our company by clients, shareholders, employees or the public at large may be damaged. This risk has the potential to jeopardise the business foundation of the Hannover Re Group. A good corporate reputation is therefore an indispensable prerequisite for our core business as a reinsurer. Reputational risks may arise out of all business activities conducted by the Hannover Re Group. Reputational damage may be caused, inter alia, by a loss of data that becomes public knowledge or financial difficulties on account of an underwriting risk. In addition to the risk identification methods already described, we use a number of different techniques for risk minimisation, such as our defined communication channels (e.g. Crisis Communication Guideline), a professional approach to corporate communications, tried and tested processes for specific crisis scenarios as well as our established Code of Conduct.

The liquidity risk refers to the risk of being unable to meet our financial obligations when they become due. The liquidity risk consists of the refinancing risk, i.e. the necessary cash cannot be obtained or can only be raised at increased costs, and the market liquidity risk, meaning that financial market transactions can only be completed at a poorer price than expected due to a lack of market liquidity. Core elements of the liquidity management of our investments are, in the first place, management of the maturity structure of our investments on the basis of the planned payment profiles arising out of our technical liabilities and, secondly, regular liquidity planning as well as the asset structure of the investments. Above and beyond the foreseeable payments, unexpected and exceptionally large payments may pose a threat to liquidity. In reinsurance business, however,

significant events (major losses) are normally paid out after a lead time that can be reliably planned. As part of our liquidity management we have nevertheless defined asset holdings that have proven to be highly liquid even in times of financial stress. In addition, we manage the liquidity of the portfolio by checking on each trading day the liquidity of the instruments contained therein; their underlying parameters are verified on a regular and ad hoc basis. These measures serve to effectively reduce the liquidity risk.

Opportunity report

Speed is one of the qualities used to measure a successful knowledge transfer. Quick solutions and staying one step ahead of the competition is the name of the game. Hannover Re searches systematically for new business opportunities in order to generate sustainable growth and strengthen the company's profitable development. With a view to identifying opportunities and successfully translating ideas into business, Hannover Re adopts a number of closely related approaches in order to achieve holistic opportunity and risk management. Of significance here is the interplay without overlaps of the various functions within opportunity and risk management, which is ensured by defined interfaces.

Major elements in Hannover Re's business opportunity management include its various market-specific innovations in the Life & Health and Property & Casualty reinsurance business groups. Not only that, Hannover Re has set up an organisational unit for "Innovation Management". This service unit deals systematically with ideas and potential business possibilities and it concentrates its activities on opening up additional growth opportunities.

A key project initiated back in 2016 went by the name "Journey Re". It forged a connection to students, university graduates and young professionals with a view to developing new business models for primary insurance and reinsurance and translating the creativity that exists outside the industry into new business opportunities. The principal venues for this global ideas competition were Berlin, Boston, Dublin and Johannesburg. The results of the project were refined in a subsequent incubator phase with the participation of external partners.

The networking of the innovative minds involved in these activities gives rise to close links with other projects, working groups and bodies, such as with the working group on "Emerging Risks und Scientific Affairs" in regard to emerging risks and opportunities (see page 24 et seq. "Other risks"). This working group carries out qualitative assessments of emerging risks. As a result, however, not only are the potential risks explored but also any available business opportunities. In the year under review, for example, issues such as "Political crimes" and the "Regulatory environment" were analysed by the working group.

If a business idea is translated into reality and a new reinsurance product results, the normal procedure – provided the criteria defined for this purpose by Risk Management are applicable – is to work through the so-called new product process. This process is supported by Risk Management at Hannover Re. The process is always worked through if a contractual commitment is to be entered into in a form not previously used by Hannover Re or if a new type of risk is to be insured. If this is the case, all material internal and external influencing factors are examined beforehand by Risk Management (e.g. implications for the overall risk profile or the risk strategy) and evaluated. Risk Management ensures that before it can be used or sold a new reinsurance product must be approved by the Executive Board.

Overall assessment by the Executive Board

Based on our currently available insights arrived from a holistic analysis of the opportunities and risks, the Executive Board of Hannover Re cannot discern any risks that could jeopardise the continued existence of the Hannover Re Group in the short or medium term or have a material and lasting effect on its assets, financial position or net income. We are convinced that:

- our established system of risk management affords us a transparent overview of the current risk situation at all times
- our overall risk profile is appropriate, and
- our opportunity management plays an important part in Hannover Re's profitable growth.

As an internationally operating reinsurance group, we move in a highly complex environment. Nevertheless, thanks to our business activities in all lines of reinsurance we are able to achieve optimal risk spreading through geographical and risk-specific diversification while at the same time maintaining a balanced opportunity/risk profile. We consider the risks described in the above sections to be manageable, particularly because our steering and monitoring measures are effectively and closely interlinked. Despite these diverse mechanisms, individual and especially accumulation risks can decisively affect our assets, financial position and net income. In accordance with our understanding of risk, however, we consider not only risks but also at the same time opportunities. We therefore only enter into those risks that go hand-in-hand with opportunities. Our steering and monitoring tools as well as our organisational and operational structure ensure that we identify risks at an early stage and are able to act on our opportunities. Our central monitoring tool is the system of risk management that we have installed Group-wide, which brings together both qualitative and quantitative information for the purpose of effective risk monitoring. Most notably, the interplay between domestic and foreign risk management functions affords us a holistic and Group-wide overview.

Our own evaluation of the manageability of existing risks is confirmed by various financial indicators and external assessments. Specific monitoring indicators, reporting limits and potential escalation steps are defined on a mandatory basis in our central system of limits and thresholds for the material risks of the Hannover Re Group. As a result, the system provides us with a precise overview of potentially undesirable developments in the defined risk tolerances and enables us to react in a timely manner. One testament to our financial stability, for example, is the growth of our shareholders' equity: the total policyholders' surplus (hybrid capital, non-controlling interests and shareholders' equity) stands at 144% of the corresponding figure from 2011. In this context, our necessary equity resources are determined by the requirements of our economic capital model, solvency regulations, the assumptions of rating agencies with respect to our target rating and the expectations of our clients and shareholders. This increase gives us a sufficient capital cushion to be able both to absorb risks and act on business opportunities that may arise. Similarly, our very good ratings also testify to our financial stability. The quality of our Enterprise Risk Management (ERM) is evaluated separately by Standard & Poor's and received the highest possible rating of "Very Strong". Special attention is paid here to our established risk culture, which promotes the development of appropriate risk monitoring systems and strategic risk management. The evaluation encompasses in particular the areas of risk culture, risk controls, the management of emerging risks, risk models and strategic risk management. This external appraisal confirms the quality of our holistic approach to risk management.

In addition, the risk trigger mechanism and internal monitoring system are reviewed annually by the independent auditor.

The Group-wide risk management system is also a regular part of the audits conducted by the internal audit function.

For additional information on the opportunities and risks associated with our business please see the Group Annual Report 2017.

Outlook for 2018

Forecast

- Profit guidance for the current year of more than EUR 1 billion confirmed
- Considerable strains anticipated in life and health reinsurance in the second half-year owing to treaty recaptures in US mortality business
- Double-digit growth forecast in property and casualty reinsurance with a combined ratio of less than 96%
- Targeted return on investment of at least 2.7% for assets under own management confirmed

Despite the continued challenging general conditions facing the international (re)insurance industry and – especially in Europe – the protracted low level of interest rates, Hannover Re expects to be able to continue operating profitably on a sustained basis even in this environment. For the current financial year we expect to grow gross premium for the Group – based on constant exchange rates – by more than 10%, hence beating the figure of around 5% targeted at the beginning of the year. A large part of the growth in excess of our original expectations derives from property and casualty reinsurance and here especially from contracts in the area of structured reinsurance.

Following the good results in the first six months, we expect growth and earnings figures in property and casualty reinsurance to develop favourably for the full financial year as well. Allowing for loss expectancies, especially in relation to large events, we anticipate a combined ratio of less than 96%. Furthermore, we also expect to beat our target EBIT margin of at least 10%.

Building on the positive outcome of the renewals as at 1 January and 1 April 2018 for our company, we also enjoyed thoroughly successful rounds of renewals on 1 June and 1 July 2018. This is all the more pleasing because market conditions continue to be intensely competitive. This was especially true of the 1 June renewals. When it came to the renegotiation of reinsurance treaties in Florida, which primarily cover natural catastrophe losses from windstorm events and had suffered in some instances considerable losses in the previous year, we maintained our profit-oriented underwriting policy – as a consequence of which our exposure to natural catastrophe risks remained comfortably within our risk appetite, which was unchanged from the previous year. On the other hand, we were able to significantly improve our position with a number of larger accounts, particularly in North America and Europe. The premium volume from the portfolio up for renewal on 1 June and 1 July 2018 consequently grew by 16%.

In life and health reinsurance we expect to incur a substantial strain on our result in the second half of the year due to anticipated treaty recaptures in US mortality business. The reason here is the very poor performance of a large block of business that we acquired at the beginning of 2009 and have already reported on regularly in the past. In the second quarter of 2018 we exercised our right to raise the reinsurance rates for all similar treaties that form part of this business. In this connection the ceding companies have the right to recapture the treaties. Nevertheless, these recaptures will have positive effects in the long run because we thereby avoid future losses that would have occurred without the rate increases.

At this stage we have already been given notice of treaty recaptures that will trigger a pre-tax strain of USD 264 million – notifications that were received after the balance sheet date. It should, however, be assumed that this amount will increase further during the second half of the year. In the unlikely event that all treaties were to be recaptured, the resulting strain could be in the region of USD 500 million to USD 600 million. In this case, the EBIT of around EUR 200 million expected for 2018 in life and health reinsurance would no longer be attainable. On the other hand, the charge to earnings from US mortality business in subsequent years would be extensively eliminated, and we could therefore anticipate a substantial surge in profitability.

For life and health reinsurance excluding US mortality business we expect the favourable development of the first six months to be sustained in the second half of the year, especially in relation to the earnings figures. What is more, we see good opportunities here for further profitable expansion of our portfolio. In the Scandinavian markets, for example, we are recording stronger demand for risk-oriented products and customised financial solutions arrangements. Rising demand for reinsurance solutions in longevity business is also evident. In view of changes in framework conditions we are engaged in promising talks in this area with several Australian business partners, for example.

In life and health reinsurance it is our expectation that gross premium income – adjusted for exchange rate effects – will come in higher than in the previous reporting year. In addition, the value of new business is expected to exceed our target of EUR 220 million.

The expected positive cash flow that we generate from the technical account and our investments should – subject to stable exchange rates and yield levels – lead to further growth in our asset portfolio. In the area of fixed-income securities we continue to emphasise the high quality and diversification of the portfolio. For 2018 we anticipate a return on investment of at least 2.7%.

Bearing in mind the development of business to date, we expect to generate Group net income of more than EUR 1 billion in 2018 despite strains that will be incurred in the second half of the year from our portfolio management actions in connection with our US mortality business. This is subject to the premise that the burden of major losses does not significantly exceed the budgeted level of EUR 825 million and that there are no exceptional distortions on capital markets. It should also be borne in mind that this target will be more difficult to achieve in the event of a very heavy strain from treaty recaptures in US mortality business.

In view of our healthy capital base, we have expanded the target range of our payout ratio for the basic dividend to 35% to 45% of IFRS Group net income. Until recently, the range had been set at 35% to 40%. The reason for this move is that it gives us more scope to increase the basic dividend. In light of capital management considerations we shall, however, also continue to pay special dividends if the comfortable level of capitalisation remains unchanged. Irrespective of the level of strains incurred from the aforementioned treaty recaptures, it is our expectation – based on the information currently available to us – that we shall be able to distribute a total dividend at least on a par with the previous year.

Events after the reporting date

Matters of special significance occurring after the balance sheet date are described in section 8.6 of the notes “Events after the end of the reporting period” on page 67.