
# Hannover Re: the somewhat different reinsurer

January 2024

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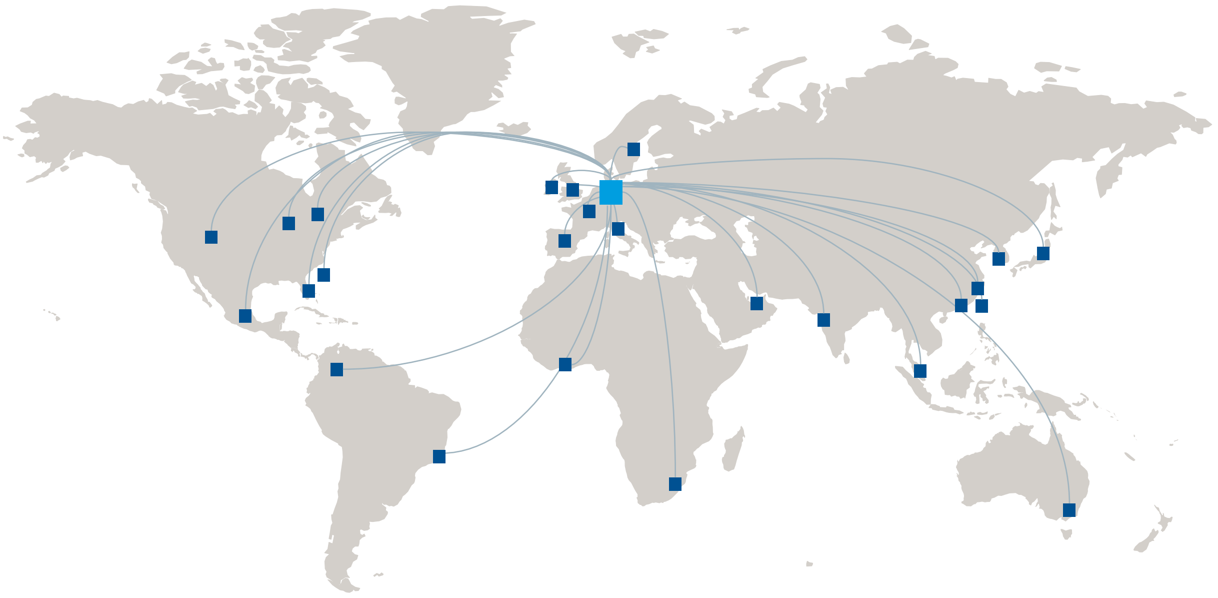
# Agenda

# Key facts about Hannover Re



**1966**

Founded by HDI (P&C reinsurance only)

**1990**

Start of L&H reinsurance as strategic growth segment

**1994**

Initial Public Offering of Hannover Re

HR share

**2004**

**50.2%**

Majority shareholder, held by Talanx AG

§

**2013**

Hannover Rück SE Societas Europaea

**2023: >170**

Subsidiaries, branches/ representative offices worldwide

**2023: >3,300**

Total number of employees

**3rd**

Largest reinsurer in the world



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# Growth and international expansion mainly organically driven

## M&A activity not accompanied by high integration cost and complexity

**Acquisitions**

**Foundations**

### 1970 - 1979

Foundations:
- *Inter Hannover* (P&C), *Insurance Corporation of Hannover* (US P&C)

### 1980 - 1989

Acquisitions:
- Hollandia South Africa

Foundations:
- Italy
- P&C: Australia, Canada

### 1990 - 1999

Acquisitions:
- Hamburger Internationale RV (L&H incl. US)
- E+S Rück (Germany)
- Skandia (portfolios, incl. L&H UK, P&C facultative, aviation)
- *Clarendon (US P&C)*

Foundations:
- France, Ireland, Japan, Sweden
- P&C: Malaysia, Spain, Mexico
- L&H: Australia, Hong Kong, Taiwan

### 2000 - 2009

Acquisitions:
- ING/Scottish Re portfolio (US L&H)

Foundations:
- Bahrain, Brazil, China
- P&C: Bermuda, Colombia, Taiwan
- L&H: Bermuda, Korea, Malaysia

### 2010 - 2023

Acquisitions:
- Argenta (Lloyd's P&C)

Foundations:
- India, L&H: Canada

**Limited appetite for larger M&A results in lean and efficient structure**

Overview of main/material transactions (and main parts of acquisitions) without e.g. minority shareholdings
All lines of business except those stated separately
*italic* = (at least in part) sold



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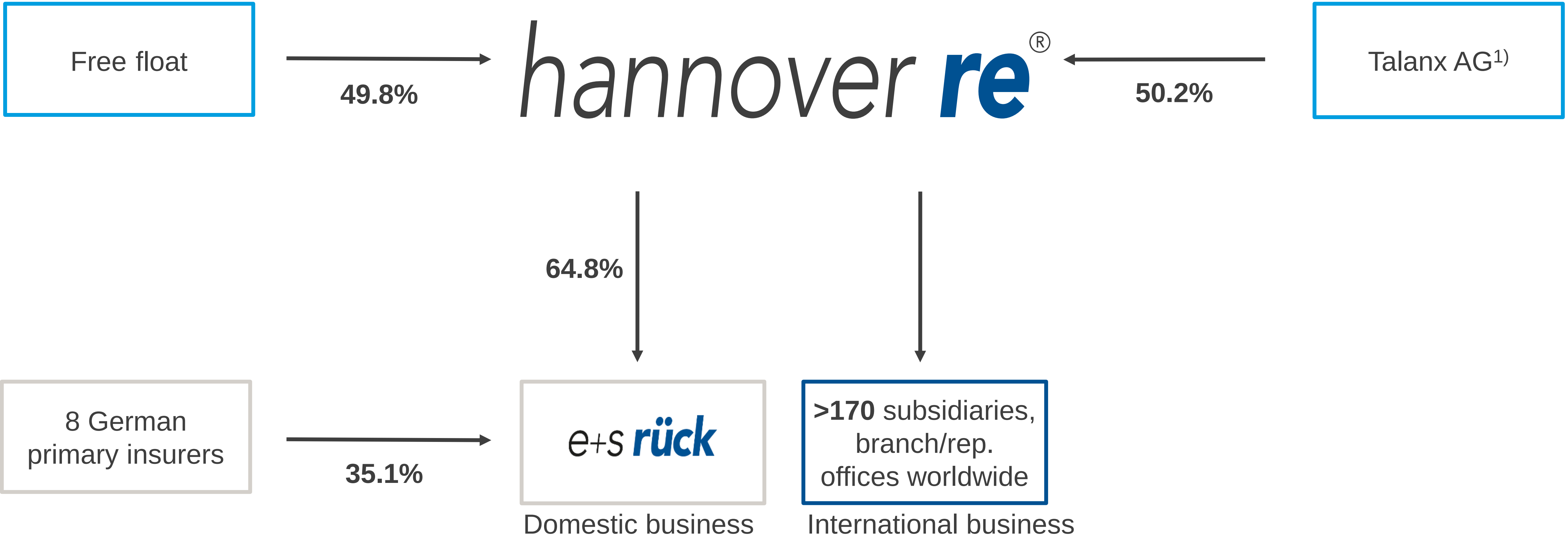
# Group structure supports our business model




1) Majority shareholder HDI V.a.G.



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# Executive Board of Hannover Rück SE

**Jean-Jacques Henchoz**
Chief Executive Officer

Group Operations and Strategy, Information Technology, Facility Management, Human Resources Management, Corporate Communications, Group Audit, Group Risk Management, Compliance

**Clemens Jungsthöfel**
Chief Financial Officer

Asset Management, Reinsurance Accounting and Valuation, Group Finance, Investor and Rating Agency Relations

## Life & Health R/I

**Claude Chèvre**
Life & Health Reinsurance

Africa, Middle East, Asia, Australia, Latin America, Western and Southern Europe, Longevity Solutions

**Dr. Klaus Miller**
Life & Health Reinsurance

North America, United Kingdom/Ireland, Northern, Eastern and Central Europe

## Property & Casualty R/I

**Sven Althoff**
Property & Casualty Reinsurance

North America, Aviation and Marine, Credit, Surety and Political Risks, UK, Ireland and London Market, Facultative R/I, Coordination of Property & Casualty Business Group, Quotations

**Silke Sehm**
Property & Casualty Reinsurance

Continental Europe and Africa, Catastrophe XL (Cat XL), Structured R/I and ILS, Retrocessions

**Sharon Ooi**
Property & Casualty Reinsurance

Asia-Pacific, South Africa

**Dr. Michael Pickel**
Property & Casualty Reinsurance

Middle East, Germany, Switzerland, Austria, Italy, Latin America, Iberian Peninsula and Agricultural Risks, Group Legal Services, Run Off Solutions

# We are among the top reinsurers in the world

**Premium ranking 2022** in m. USD

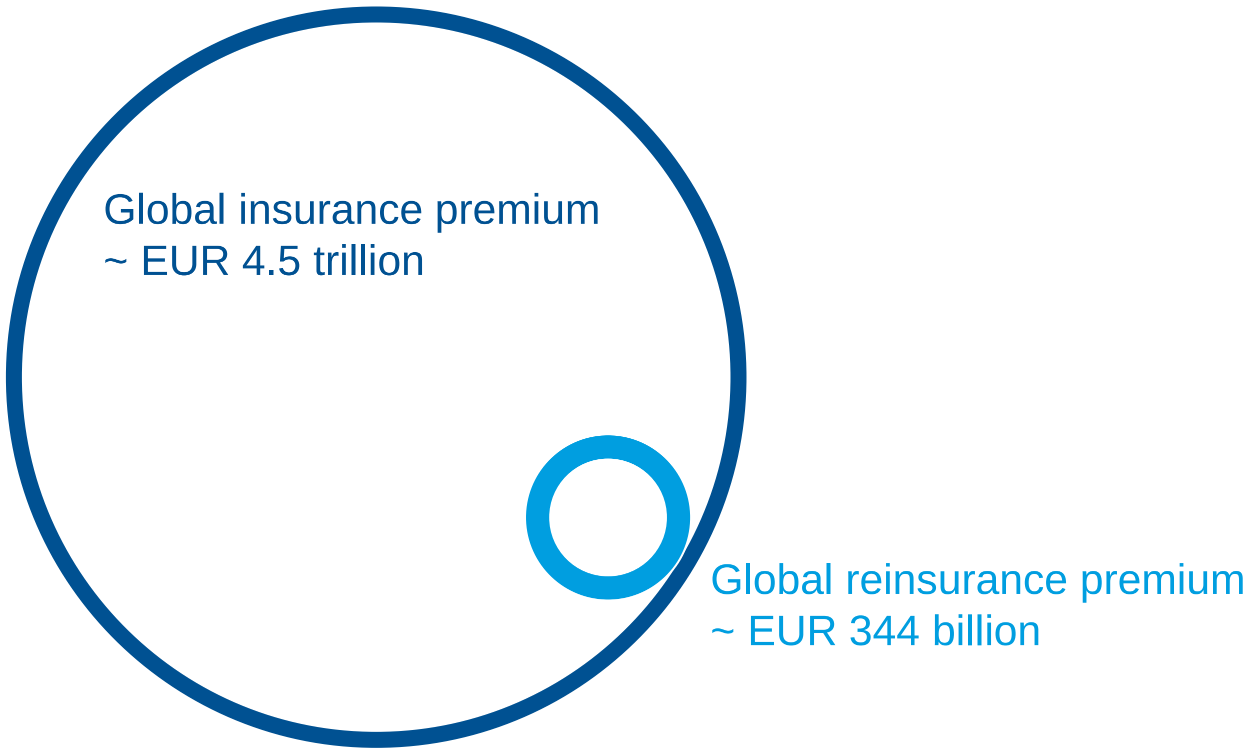
| Rank | Group | Country | GWP | NPW |
|---|---|---|---|---|
| 1 | Munich Re | DE | 51,331 | 48,550 |
| 2 | Swiss Re | CH | 39,749 | 37,302 |
| **3** | **Hannover Re[1)]** | **DE** | **35,528** | **29,672** |
| 4 | Canada Life Re | CA | 23,414 | 23,414 |
| 5 | Berkshire Hathaway Inc.[2)] | US | 22,147 | 22,147 |
| 6 | SCOR | FR | 21,068 | 17,055 |
| 7 | Lloyd's[3) 4)] | UK | 18,533 | 14,162 |
| 8 | China Re | CN | 16,865 | 15,395 |
| 9 | RGA | US | 13,823 | 13,052 |
| 10 | Everest Re | BM | 9,316 | 8,983 |
| 11 | RenaissanceRe | BM | 9,214 | 7,196 |
| 12 | PartnerRe | BM | 8,689 | 7,544 |
| 13 | Korean Re | KR | 7,804 | 5,797 |
| 14 | Arch Capital | BM | 6,948 | 4,924 |
| 15 | MS&AD Insurance Group[5) 6) 7)] | JP | 5,153 | n/a |

For further information please see A.M. Best “Market Segment Report” August 2023 (© A.M. Best Europe - Information Services Ltd. - used by permission)
1) Net premium written data not reported; net premium earned substituted
2) Berkshire Hathaway completed its acquisition of Alleghany Corp. on October 19, 2022, and, per US GAAP accounting rules, incurs premiums and expenses only after the acquisition
3) Lloyd’s premiums are for reinsurance only. Premiums for certain groups in the rankings also may include Lloyd’s Syndicate premiums when applicable
4) Shareholders’ funds includes Lloyd’s members’ assets and Lloyd’s central reserves
5) Fiscal year ended March 31, 2023
6) Net asset value used for shareholders’ funds
7) Ratios are based on the group’s operations

# Reinsurance has the character of a specialty market

## With a share of 8% of the overall insurance market

### Market size primary insurance vs. reinsurance

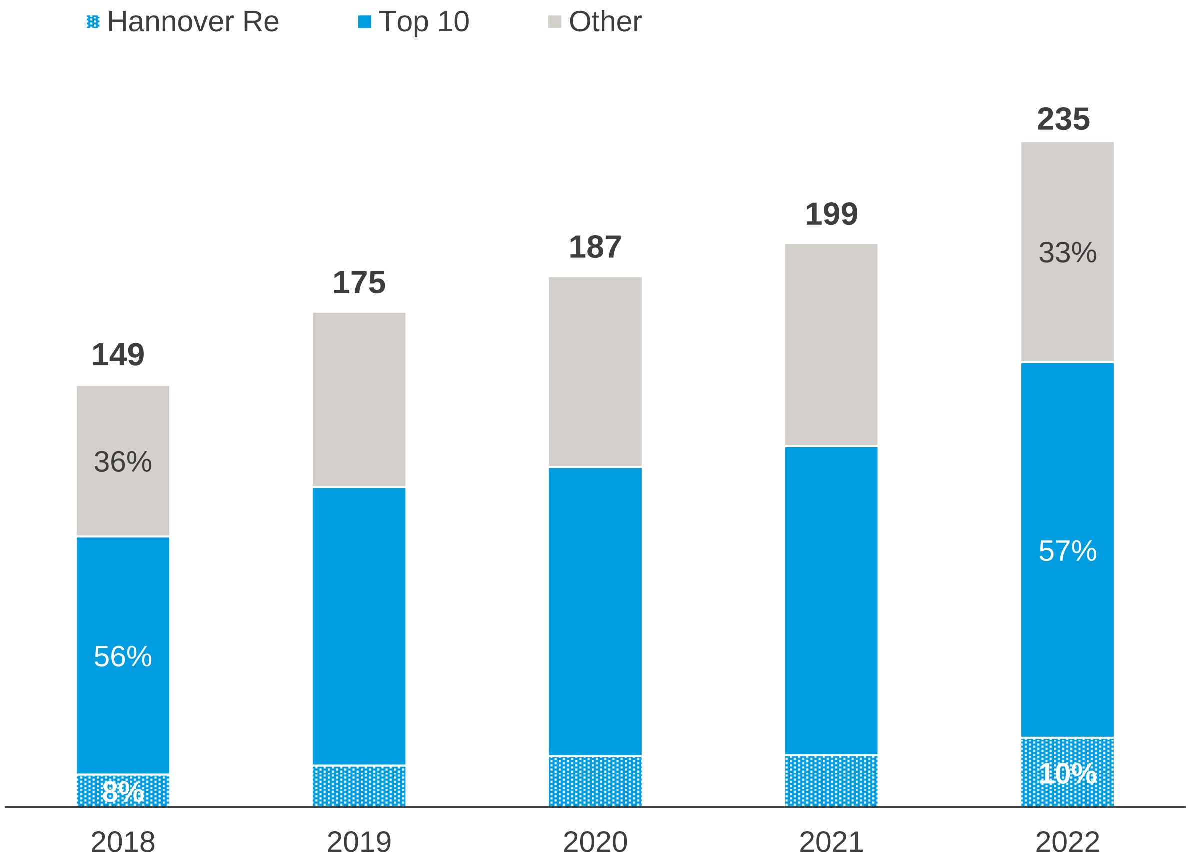



2022 or latest. Global reinsurance premium: gross written premium of the Top 50 Global Reinsurance Groups according to A.M. Best "Segment Report" (August 2023)
Source: © A.M. Best Europe - Information Services Ltd. - used by permission, own research

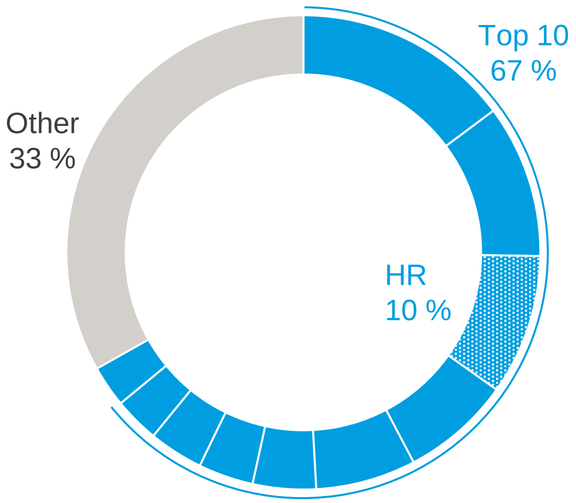
# Growing Property and Casualty reinsurance market

## Hannover Re outperforms the market

### Market size and concentration 2022 GWP in bn. EUR




### Market share 2022




- Low market entry barriers lead to high fragmentation

### 4-year CAGR

| | | | |
|---|---|---|---|
| Market | +12.1% | Top 10 | +13.2% |
| Other | +9.9% | **HR** | **+20.5%** |

Market: Sum of Non-life GWP of Top 50 Global Reinsurance Groups according to A.M. Best "Segment Report" (August 2023)
Top 10 in 2022: Munich Re, Hannover Re, Swiss Re, Lloyd’s, Berkshire Hathaway, SCOR, Everest Re, Renaissance Re, China Re, Partner Re
Source: © A.M. Best Europe - Information Services Ltd. - used by permission



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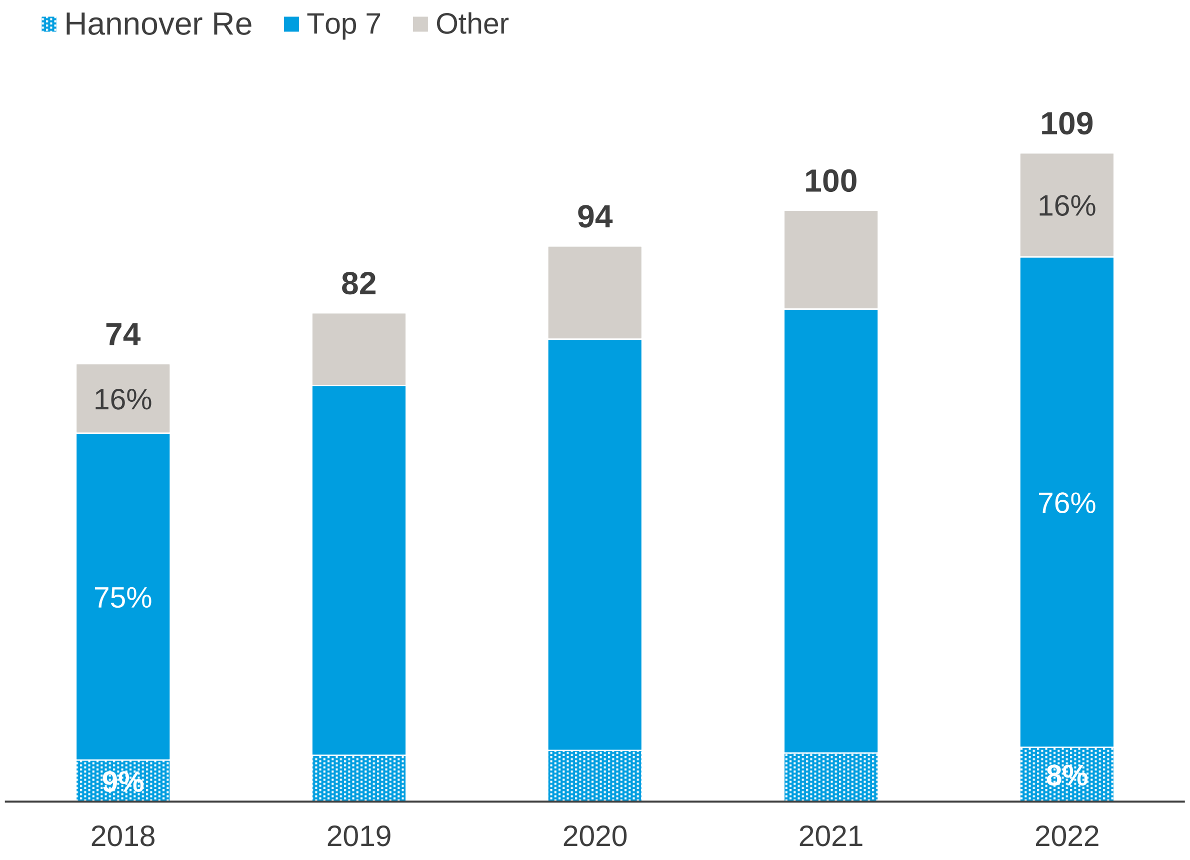
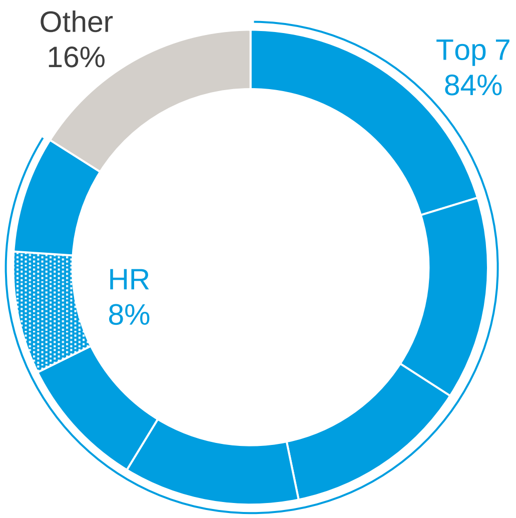
# Life and Health reinsurance in a global perspective

## Concentrated market due to high entry barriers

### Market size and concentration 2022 GWP in bn. EUR




### Market share 2022




- High market entry barriers lead to a highly concentrated market
- Hannover Re's Financial Solutions business not fully captured in premium

### 4-year CAGR

| | | | |
|---|---|---|---|
| Market | +10.3% | Top 7 | +10.3% |
| Other | +10.6% | **HR** | **+6.9%** |

Market: Sum of Life GWP of Top 50 Global Reinsurance Groups according to A.M. Best "Segment Report" (August 2023)
Top 7 in 2022: Canada Life Re, Swiss Re, Munich Re, RGA, SCOR, Hannover Re, China Re
Source: © A.M. Best Europe - Information Services Ltd. - used by permission

# Reinsurance is and will be an attractive product
## Drivers for reinsurance demand

### Trends, conditions and expectations

**Global trends**
Protection gap
Demographic change
Climate change

**New products/markets**
Emerging markets
Cyber
Emerging risks

**Capital requirement**
Regulatory changes
Capital models
Local GAAP, IFRS

**Volatile earnings**
Expectation of regulators, shareholders and rating agencies

**Impact on primary insurance …**

- Increasing demand for insurance of non-diversifying risk
- New risks lead to higher volatility and need for additional know-how
- High cost of capital/need for capital management

**… drives demand for reinsurance!**

### Value Proposition R/I

Strong capital base

Diversification

**Expertise/support in…**
…risk management
…product development and pricing
…distributing products in new markets

Reducing cost of capital

Managing earnings volatility



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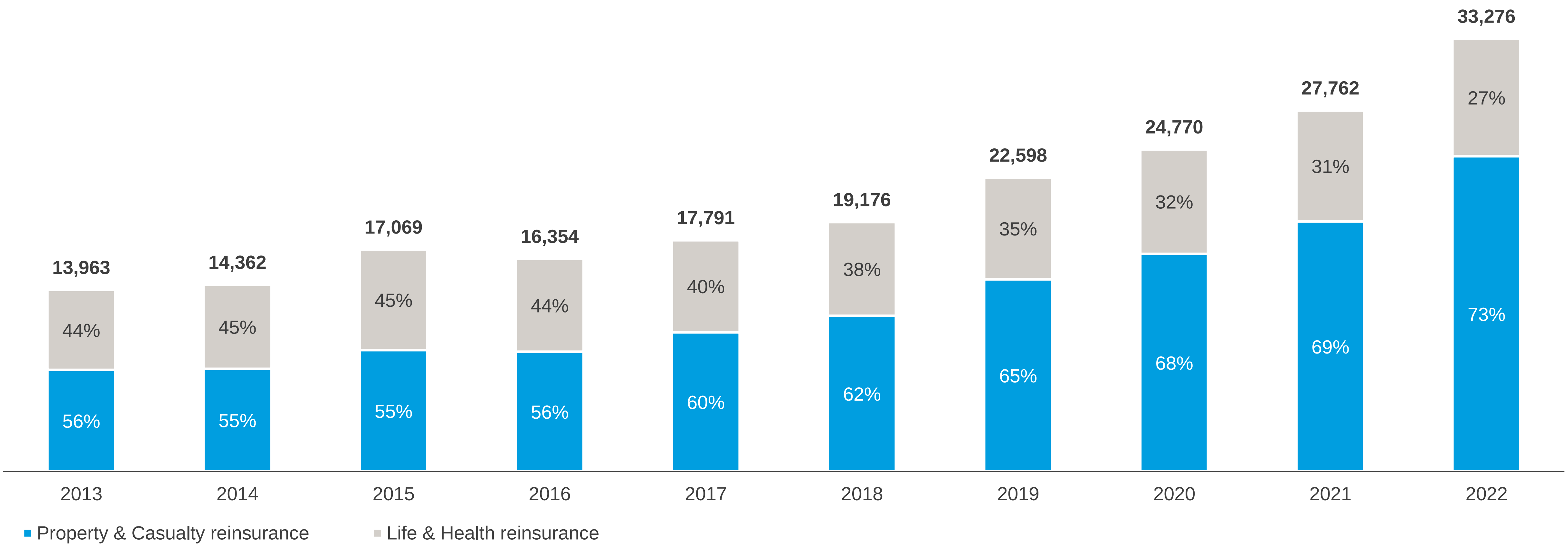
# Favourable premium growth accelerates in last 5 years

## 10-year CAGR: +9.2%

### Gross written premium

in m. EUR



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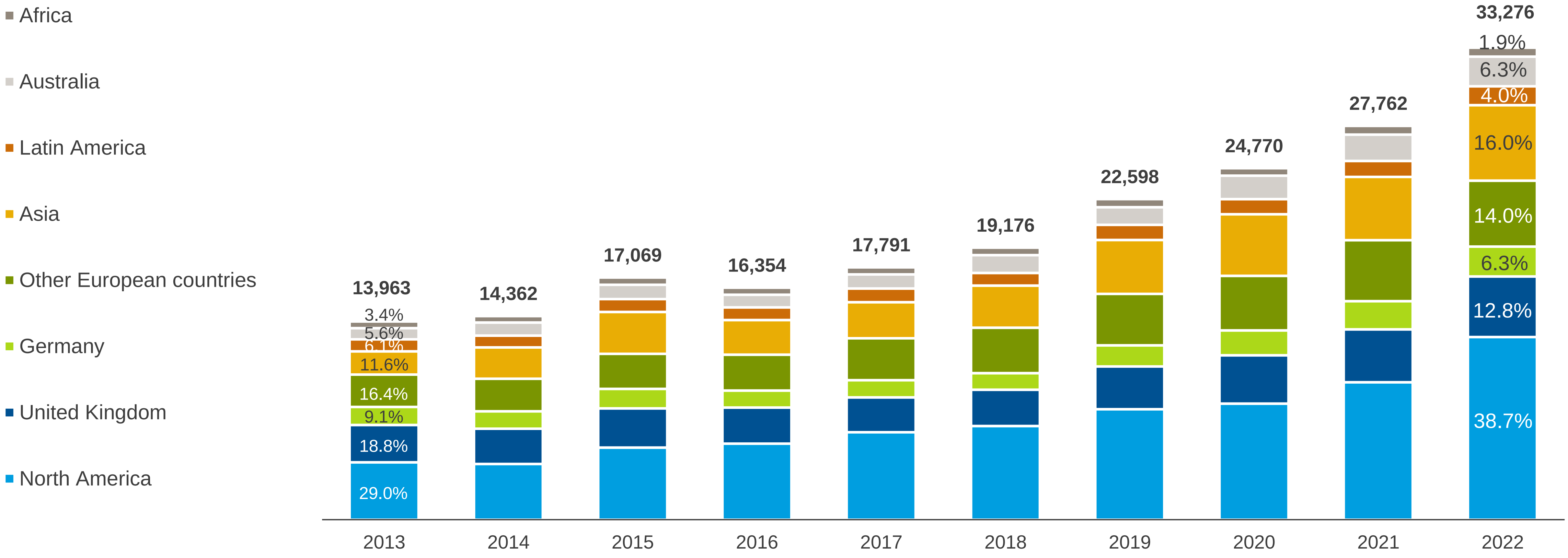
# Well-balanced international portfolio growth

## Gross written premium

in m. EUR



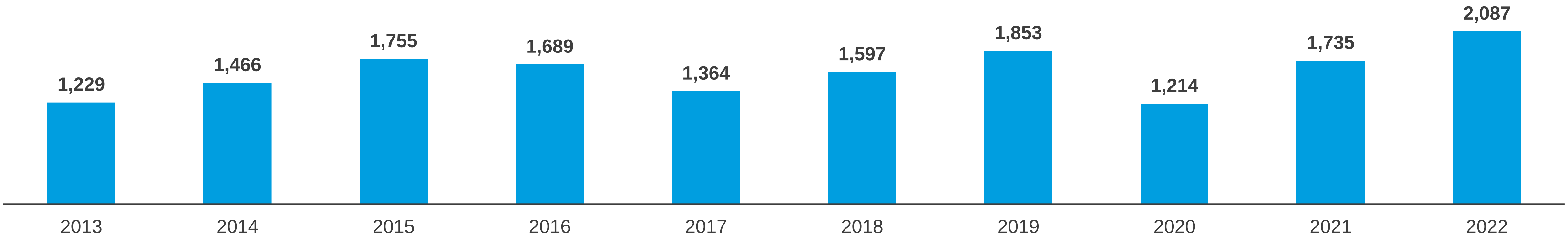

2020 restated pursuant to IAS 8

# Strong earnings track record

## 2022: net income target achieved in a challenging market environment

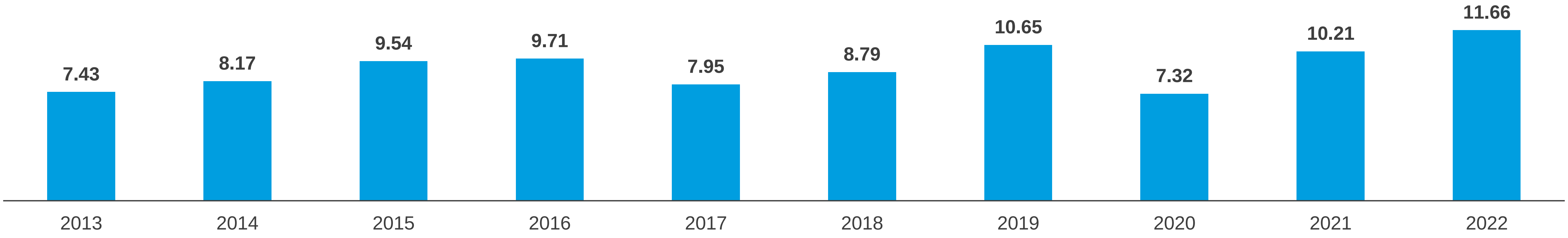
### Operating profit (EBIT)

in m. EUR




### Earnings per share (EPS)

in EUR



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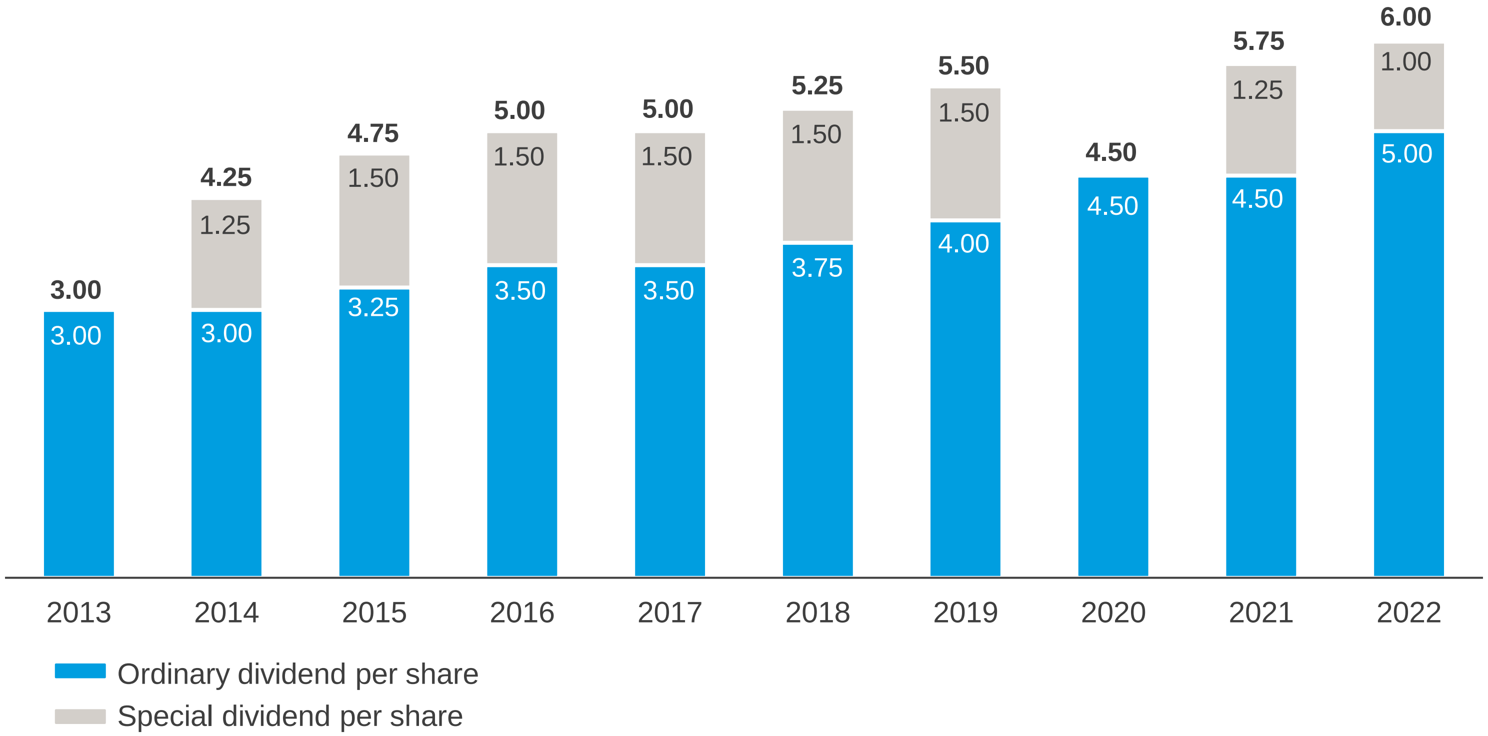
# Dividend strategy emphasizes continuity of ordinary dividend
## 2022: increased ordinary dividend reflects positive earnings trend

### Dividend per share

in EUR




### Dividend strategy

**Ordinary DPS > prior year**

**+**

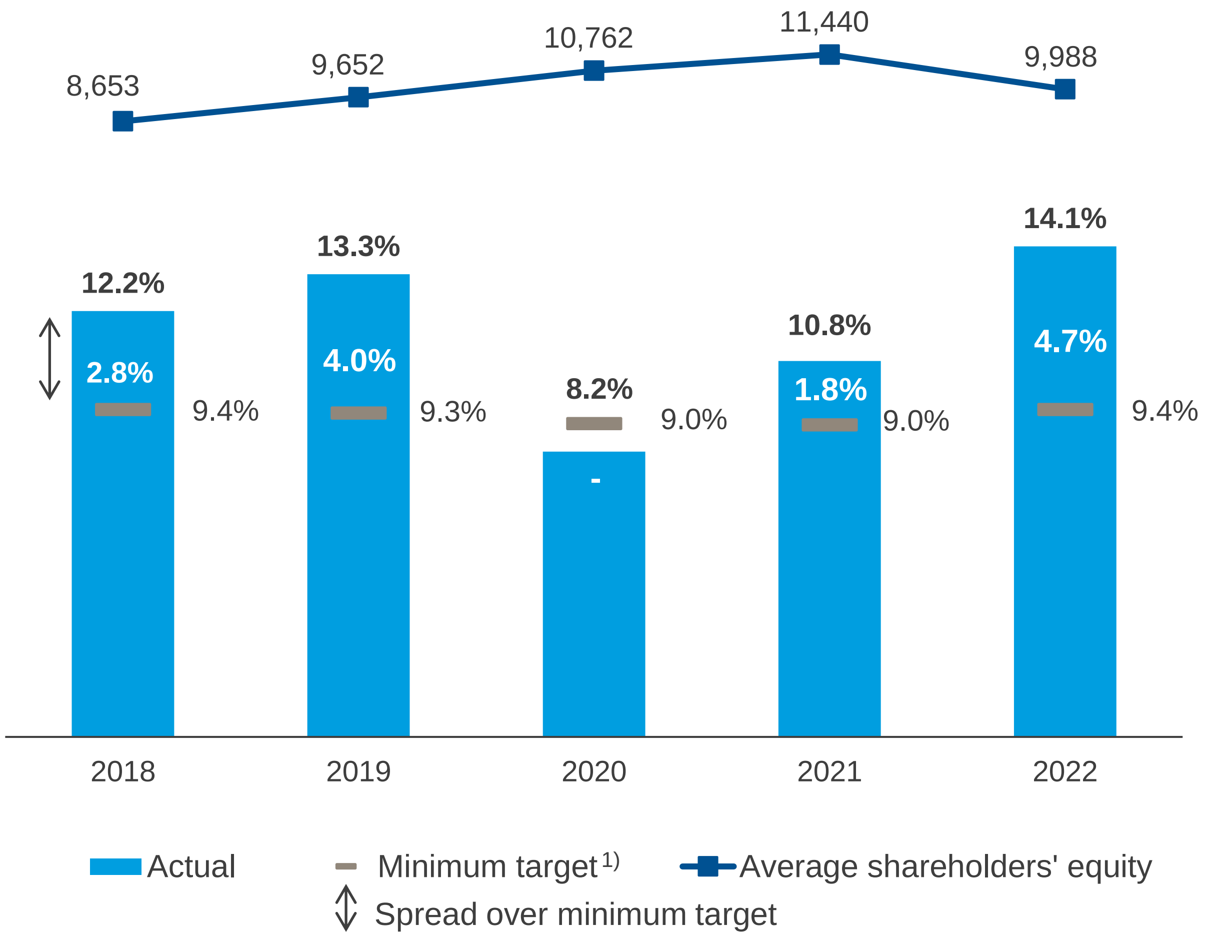
**Special dividend**

if capitalisation exceeds capital requirements for future growth and profit targets are achieved

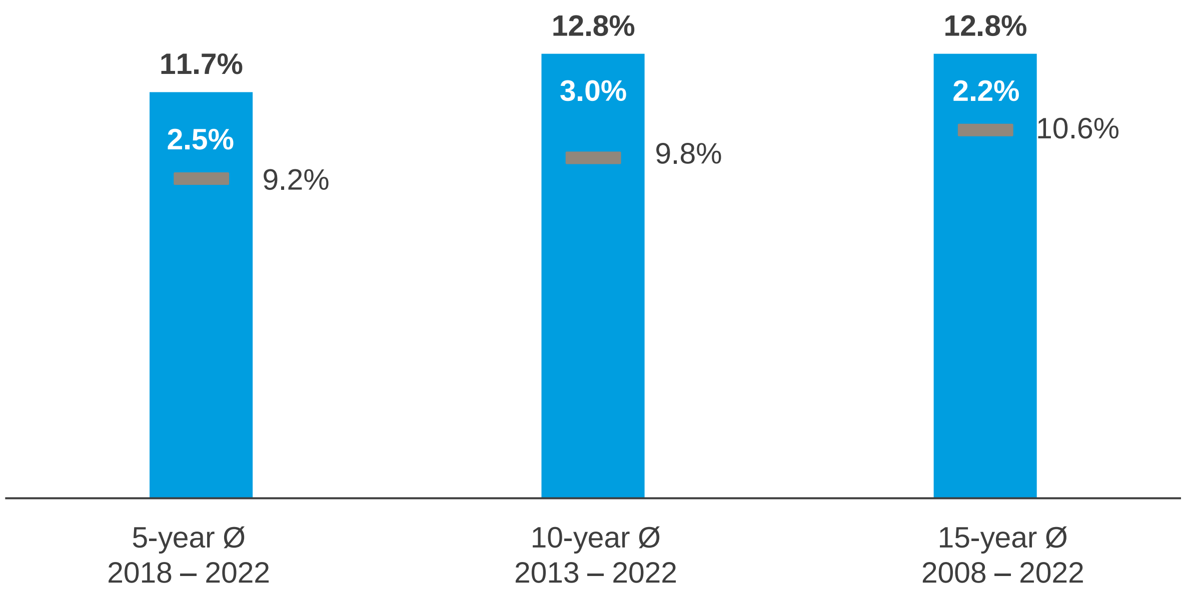
# RoE of 14.1% well above target for 2022

## 5-year average RoE of 11.7% is highly satisfactory despite exceptional loss burden

### Return on Equity: yearly




### Return on Equity: average




1) After tax; target: 900 bps above 5-year rolling average of 10-year German government bond rate ("risk free")

# Hannover Re remains one of the most profitable reinsurers

## No. 1 position on 5-year average RoE – significantly above peer average

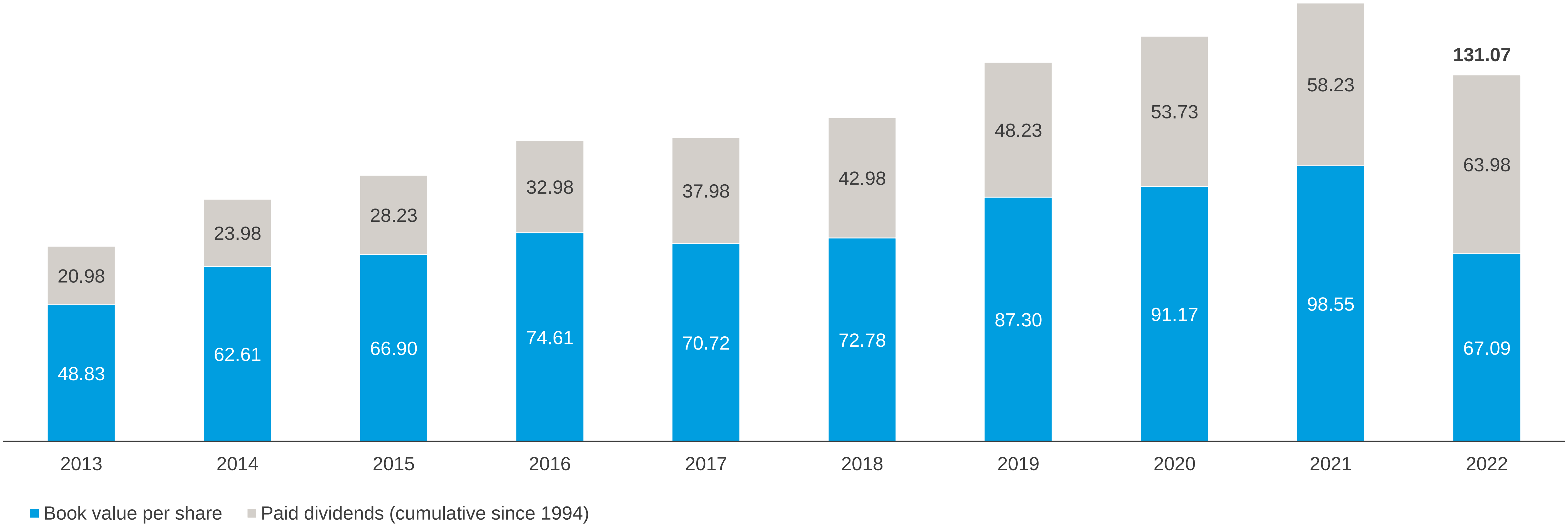
| | 2018 | | 2019 | | 2020 | | 2021 | | 2022 | | 2018 - 2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Company** | **RoE** | **Rank** | **RoE** | **Rank** | **RoE** | **Rank** | **RoE** | **Rank** | **RoE** | **Rank** | **avg. RoE** | **Rank** |
| **Hannover Re** | **12.2%** | **1** | **13.3%** | **1** | **8.2%** | **2** | **10.8%** | **2** | **14.1%** | **1** | **11.7%** | **1** |
| Peer | 7.9% | 3 | 8.7% | 5 | 3.2% | 8 | 4.5% | 8 | 7.3% | 3 | 5.3% | 6 |
| Peer | 1.3% | 9 | 11.9% | 3 | 5.5% | 5 | 13.9% | 1 | 6.4% | 4 | 6.5% | 3 |
| Peer | 8.5% | 2 | 9.6% | 4 | 4.0% | 6 | 9.7% | 3 | 13.2% | 2 | 9.0% | 2 |
| Peer | 4.7% | 6 | 8.0% | 6 | 5.8% | 4 | 6.2% | 6 | 5.9% | 5 | 6.1% | 4 |
| Peer | 5.4% | 4 | 6.9% | 8 | 3.7% | 7 | 7.3% | 4 | -5.3% | 8 | 3.6% | 7 |
| Peer | 4.2% | 7 | 12.9% | 2 | 10.8% | 1 | -1.0% | 9 | -18.4% | 9 | 1.7% | 9 |
| Peer | 1.4% | 8 | 2.5% | 9 | -3.1% | 9 | 5.7% | 7 | 2.6% | 6 | 1.8% | 8 |
| Peer | 4.9% | 5 | 7.3% | 7 | 6.3% | 3 | 6.4% | 5 | 2.1% | 7 | 5.4% | 5 |
| **Average** | **5.6%** | | **9.0%** | | **4.9%** | | **7.1%** | | **3.1%** | | **5.7%** | |

RoE based on company data, own calculation
Peers: China Re, Everest Re, Korean Re, Munich Re, Renaissance Re, RGA, SCOR, Swiss Re

# Long-term value creation for shareholders
## 2022: book value per share decreased mainly due to rising interest rates

### Book value and accumulated paid dividends

in EUR



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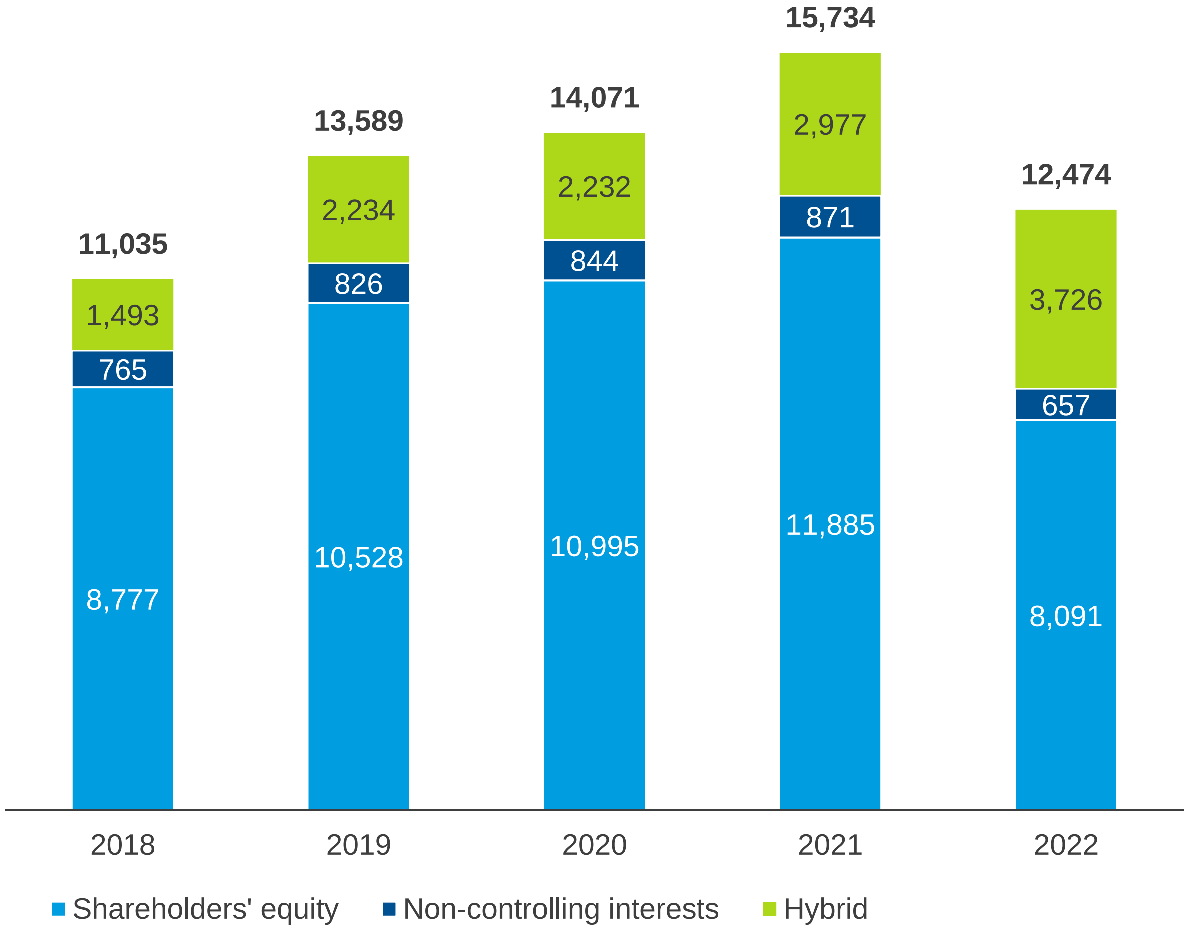
# Shareholders' equity decreased mainly due to rising interest rates

## From an economic view, impact on capitalisation is moderate due to strict ALM

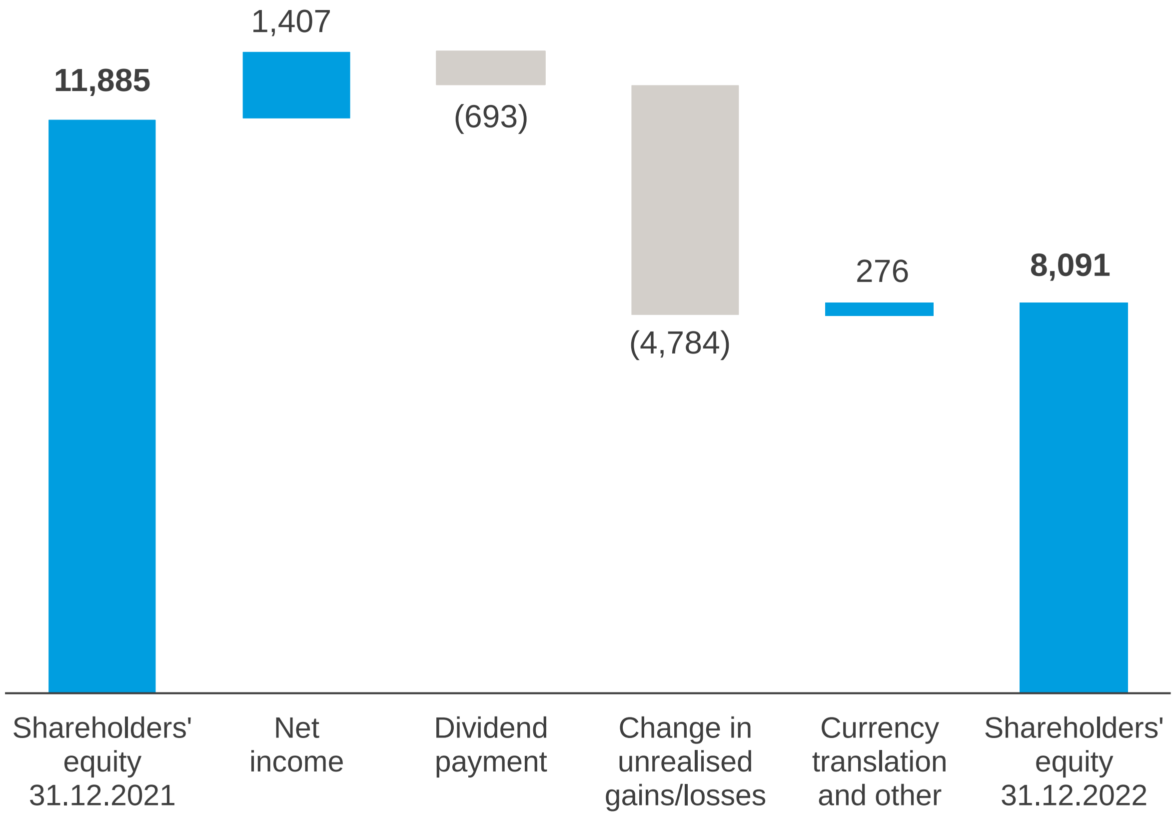
### Policyholders' surplus

in m. EUR



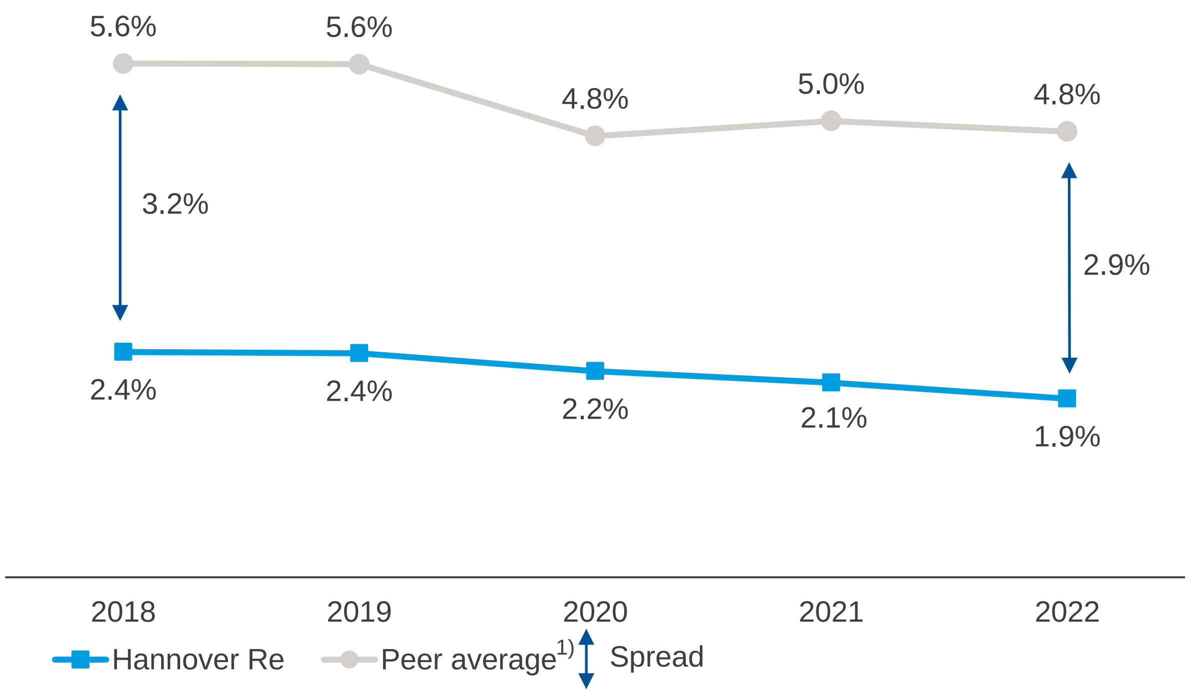

### Change in shareholders' equity

in m. EUR



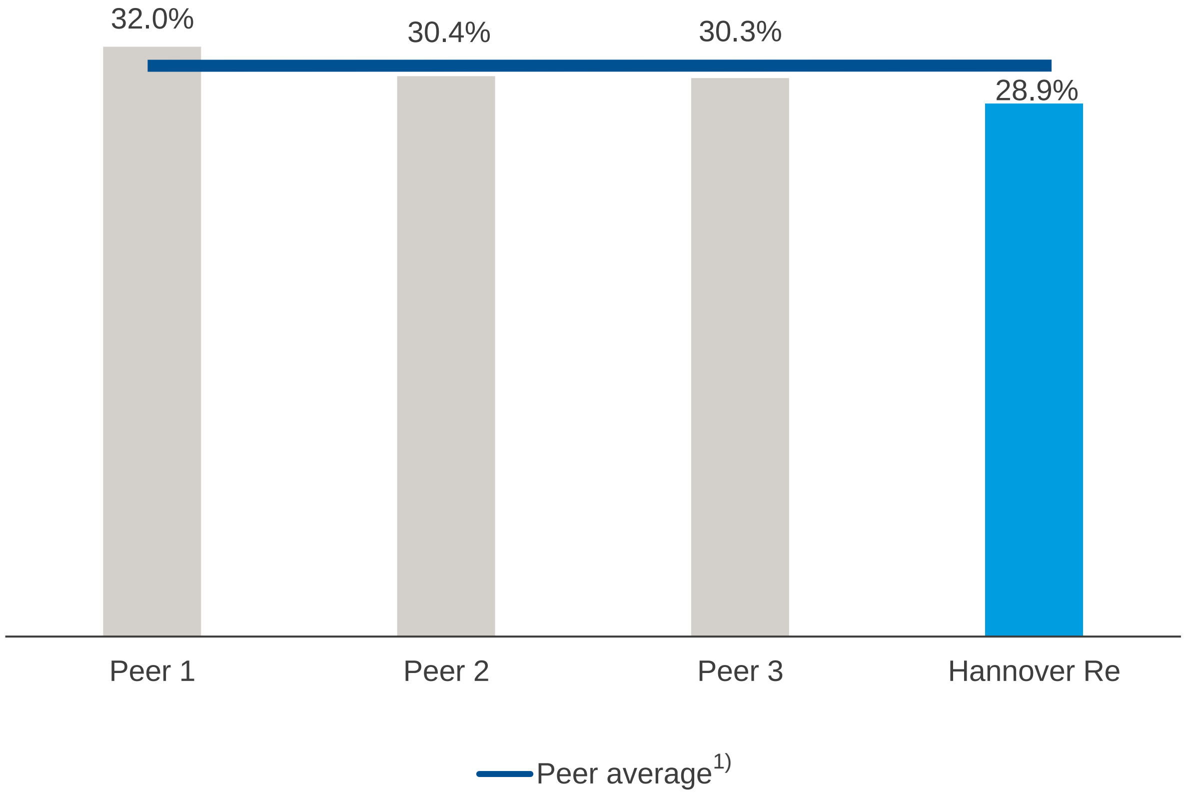
# Low expense ratio is an important competitive advantage

## Administrative expense ratio




## Expense ratio (P&C reinsurance)[2]

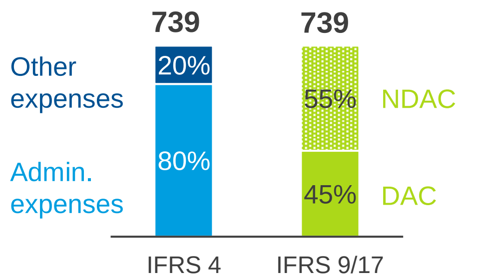
5-year average




1) Peers: Munich Re, Swiss Re, SCOR; own calculation
2) Source: A.M. Best “Market Segment Report” 2018 - 2022, (© A.M. Best Europe - Information Services Ltd. - used by permission); Peers: Munich Re, Swiss Re, SCOR

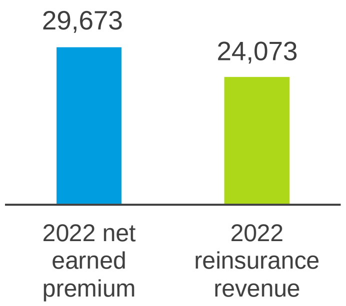
# Low cost ratio remains an important competitive advantage

- IFRS 17 directly attributable expenses are lower than IFRS 4 administrative expenses
- IFRS 17 cost ratio reflects NDAC and DAC
- Similar split DAC and NDAC between P&C and L&H




| Admin. expense ratio | Cost ratio |
|---|---|
| 1.9% | 3.2% |

- New reference base reinsurance revenue gross
- Reinsurance revenue is lower than IFRS 4 premium mainly due to exclusion of commissions and NDIC




## Lean operating model based on

Organisational **simplicity** and **fast decision-making**

+

Strong **cost culture**

+

**Pure play** reinsurance

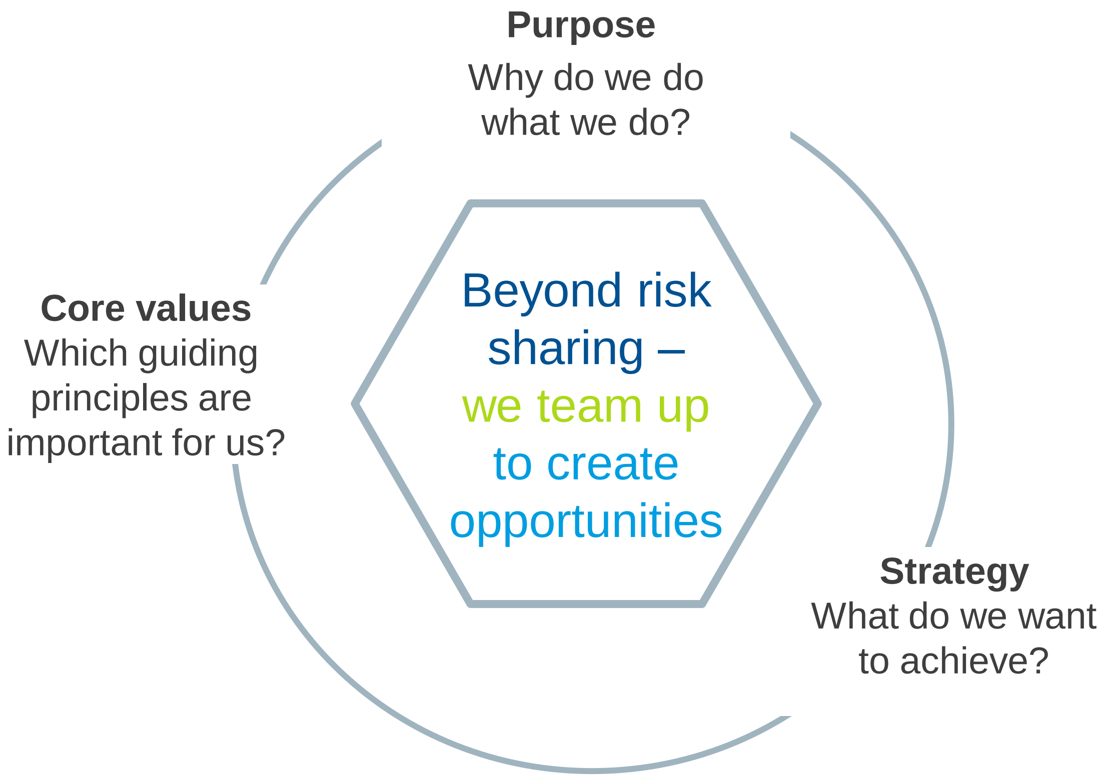
Numbers are FY2022; DA: Directly attributable costs; NDAC: Non-directly attributable costs

# Purpose & Values

## The "why" and the "how" articulate our distinctive corporate culture

Our self-conception

Our values







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Group Strategy 2024 - 2026

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# Staying Focused. Thinking Ahead.

**Focus**

## Staying focused on our "somewhat different" approach

- Act as a pure-play reinsurer
- Be the preferred business partner
- Build on our lean and capital-efficient operating model

**Grow**

## Securing profitable growth and outperformance

- Enable our clients to grow and succeed
- Enhance cycle management and portfolio steering
- Innovate and strengthen leadership in tailored solutions, longevity and ILS

**Accelerate**

## Thinking ahead to enable global industry leadership

- Expand data and analytics capabilities
- Drive operational efficiency and automation
- Invest in leadership and people development

**Our Ambition**

## Industry-leading performance

Profitability: RoE

Earnings growth: EBIT growth

## Delivery on

Economic value creation: CSM growth, xRoCA

Attractive dividends: Ordinary dividend growth

Cost leadership: Cost/Reinsurance rev (gross)

Capital strength: Solvency II ratio

Credit ratings: S&P, A.M. Best

Employee engagement: Engagement index

Environmental stewardship: CDP score

**Strong Foundations:** Sustainability and Embedded Governance

# Financial ambition 2024 - 2026

## Increasing earnings will support continued dividend growth

**Staying Focused.**
**Thinking Ahead.**

Focus

Grow

Accelerate

### Industry-leading performance

**> 14%**
Return on Equity

**> 5%**
EBIT growth

+

### Economic value creation, capital strength & attractive dividends

**> 2%**
CSM growth

**> 200%**
Solvency ratio

**> prior year**
Ordinary dividend

# Sustainability at Hannover Re

## How we evolved

### 2011
- Publication of first sustainability strategy
- Investor dialogues

### 2012
- Negative screening in asset management
- Publication of annual sustainability reports

### 2015
- Listed in FTSE4Good-Index

### 2016
- Offsetting of all corporate emissions from our headquarter

### 2017
- Listed in Global Challenges index

### 2018
- Publication of annual combined non-financial information statements
- Implementation of best-in-class approach in asset management

### 2019
- Phased exit for any coal based risks until 2038

### 2020
- Inclusion in DAX 50 ESG
- Participant in UNGC
- HR recognizes ILO core labour standards for all staff
- Signatory of PRI
- Compliance campaign

### 2021
- Signature of UN PSI
- Human rights policy statement
- Climate strategy in asset management
- Decision on net zero targets

### 2022
- First taxonomy report acc. §8
- P&C ESG position paper
- L&H ESG position paper
- Oil & gas exclusions in facultative business sharped

### 2023
- CSRD pre-study
- CSRD implementation project
- Development of sustainability strategy 2024-2026
- [...]

# Sustainability embedded into our Group Strategy 2024 - 2026

## Focussing on environmental stewardship

**Staying Focused.**
**Thinking Ahead.**

Focus

Grow

Accelerate

**Decarbonisation** + **Engagement** + **Opportunities**

Engage with cedants, investee companies and employees

Strengthen societal resilience and close protection gaps

Develop transition plan and set interim targets for 2030

Pursue attractive business opportunities supporting the transition

Define baseline according to Greenhouse Gas Protocol

**Selected activities**

Implement future-ready reporting processes e.g. CSRD

**Maintaining CDP score at 'Management Level' throughout our strategy cycle**

CSRD = Corporate Sustainability Reporting Directive, CDP = Carbon Disclosure Project



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# Net zero targets
## Comprehensive goal setting in core business and own business operations




### Asset Management

- Climate strategy:
  - Decarbonisation: -30% of $CO_2$ footprint by 2025[1)]
  - Active investment in sustainable assets
  - Engagement; via proxy voting
- Application of specific exclusion criteria – e.g. thermal coal, oil sands
- Negative screening / active divestment since 2012

### Underwriting

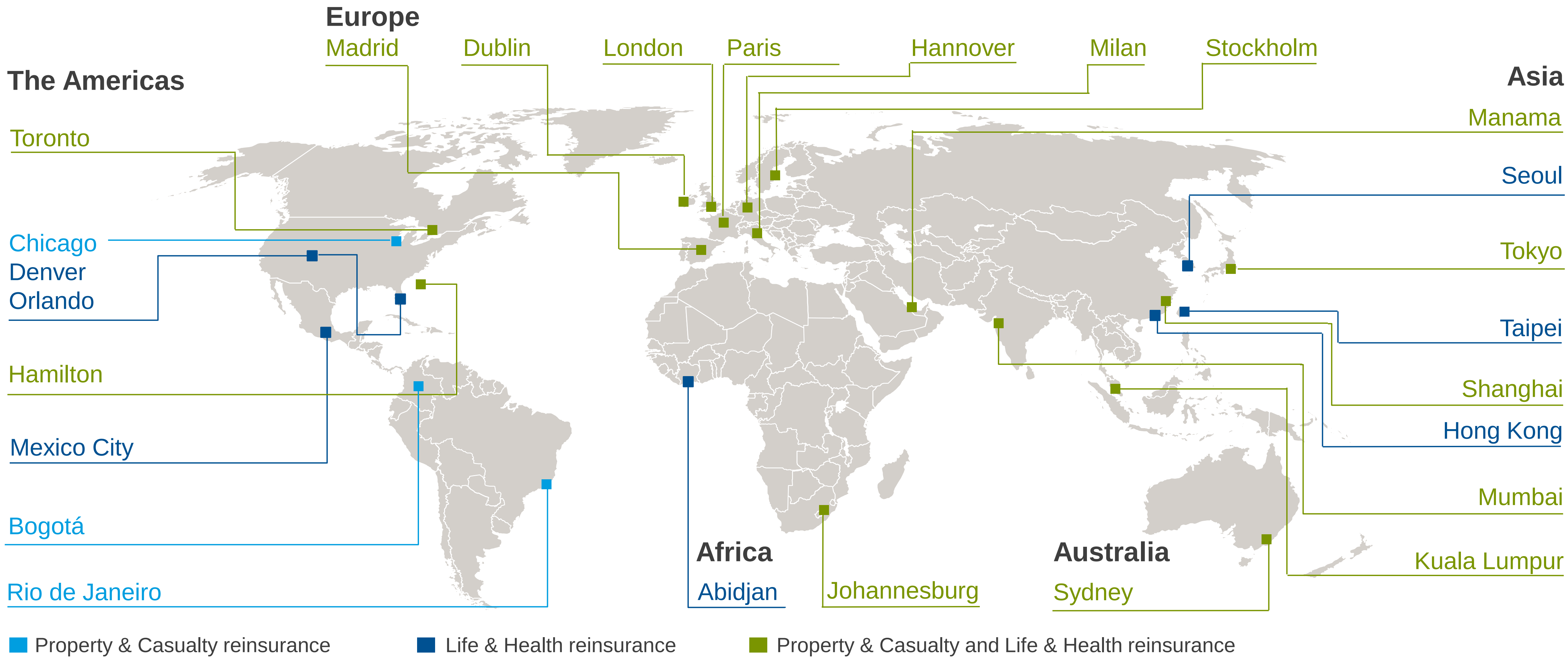
- Exit from all risks connected with thermal coal and related infrastructure by 2038 in the entire P&C portfolio
- Development of P&C ESG position paper
- Further exclusions are defined in accordance with the ESG Manual for the facultative division

### Own business operations

- Carbon neutral at Hannover Office since 2016
- Implementation of a process to collect carbon emissions data Group-wide

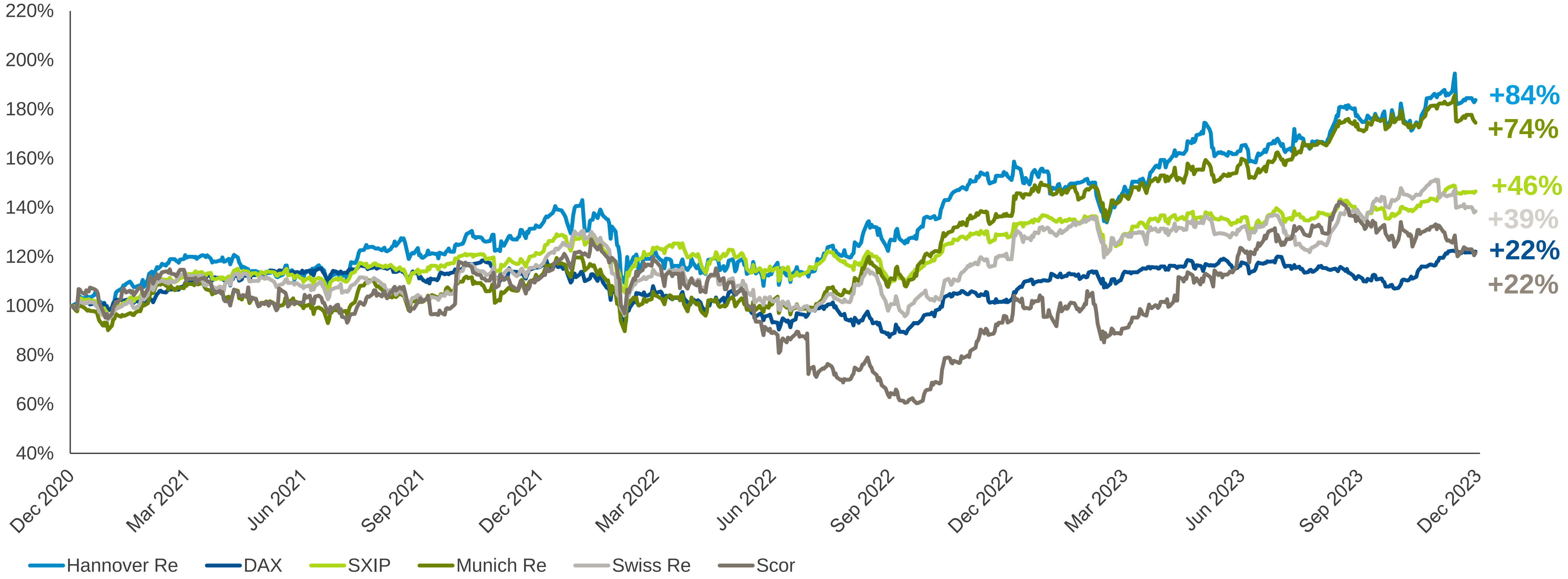
1) Corporates, covered bonds and equities; compared to base year 2019

# Present on all continents



# HR share price increased by +84% over the last 3 years

## Performance comparison (incl. reinvested dividends)



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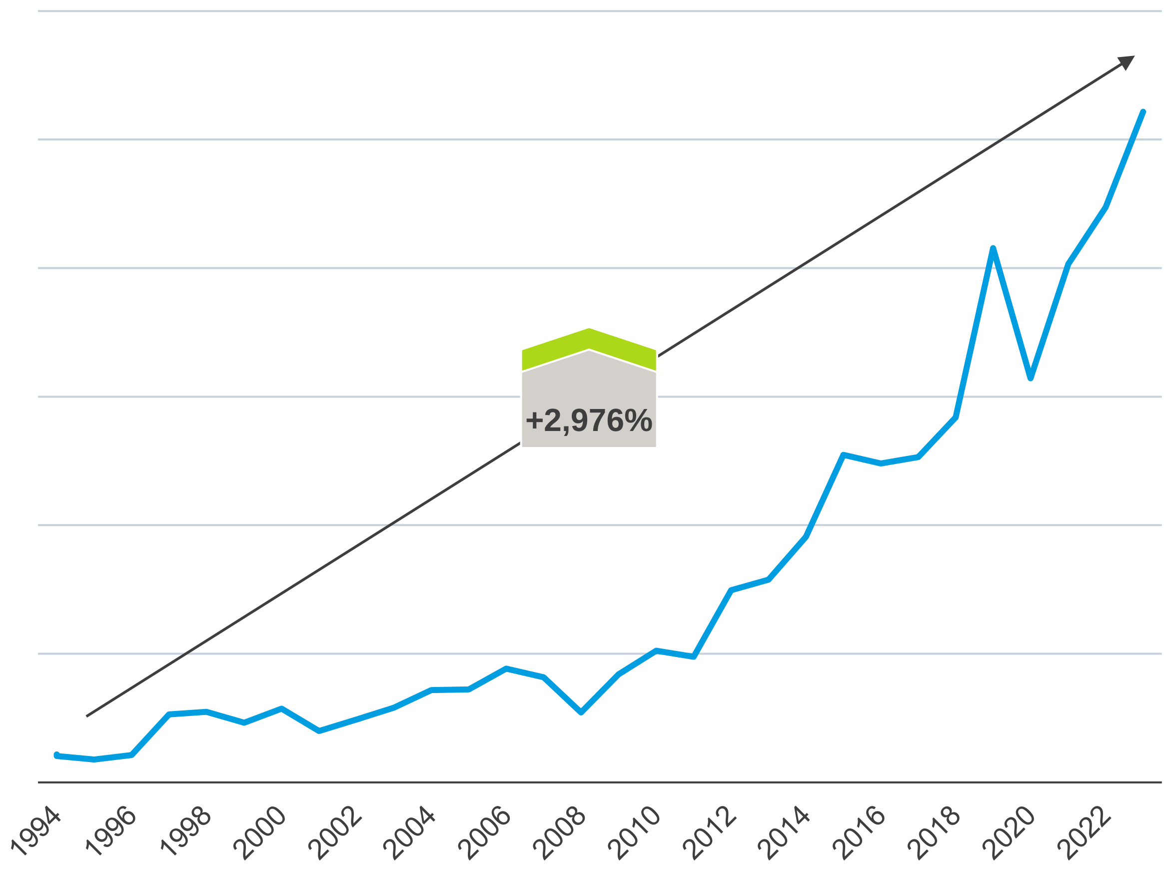
# Total Shareholder Return (TSR) of 16.6% in 2023

## Value creation since IPO




| in m. EUR | 2022 | 2023 |
|---|---|---|
| Market capitalisation as of date | 22,371 | 26,085 |
| - Market capitalisation at IPO (Nov 1994) | 1,084 | 1,084 |
| + Dividend payments (cumulative) | 8,197 | 9,157 |
| - Capital increases (1996, 1997, 2001, 2003) | 811 | 811 |
| **Value creation since IPO** | **28,673** | **33,347** |

# Agenda

# We are somewhat different

## Property & Casualty reinsurance

**somewhat different**

### Distribution

Distribution channels

- Flexible cost base due to relatively higher share of business written via brokers (~2/3)

### Reserving

Conservative reserve policy

- Reduction of P&C earnings volatility
- Protection against inflation risk

### Cycle management

Effective cycle management and focus on profitability

- Selective growth: increase market share in “hard” markets only
- No pressure to grow due to low administrative expense ratio
- Above-average profitability due to stringent underwriting approach with focus on bottom line

### Central U/W

Central underwriting with local talent is key to our success

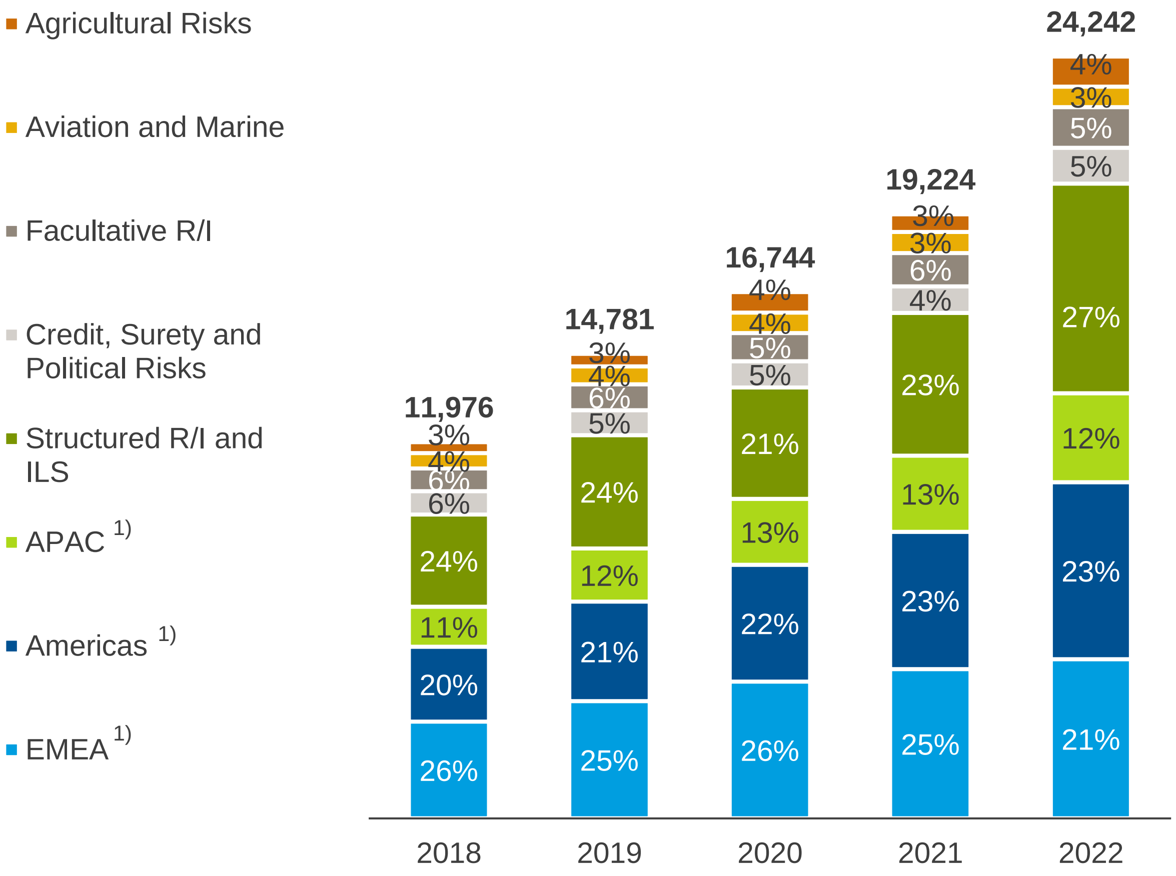
- Secures consistent underwriting decisions

# Property & Casualty reinsurance: strong and diversified growth

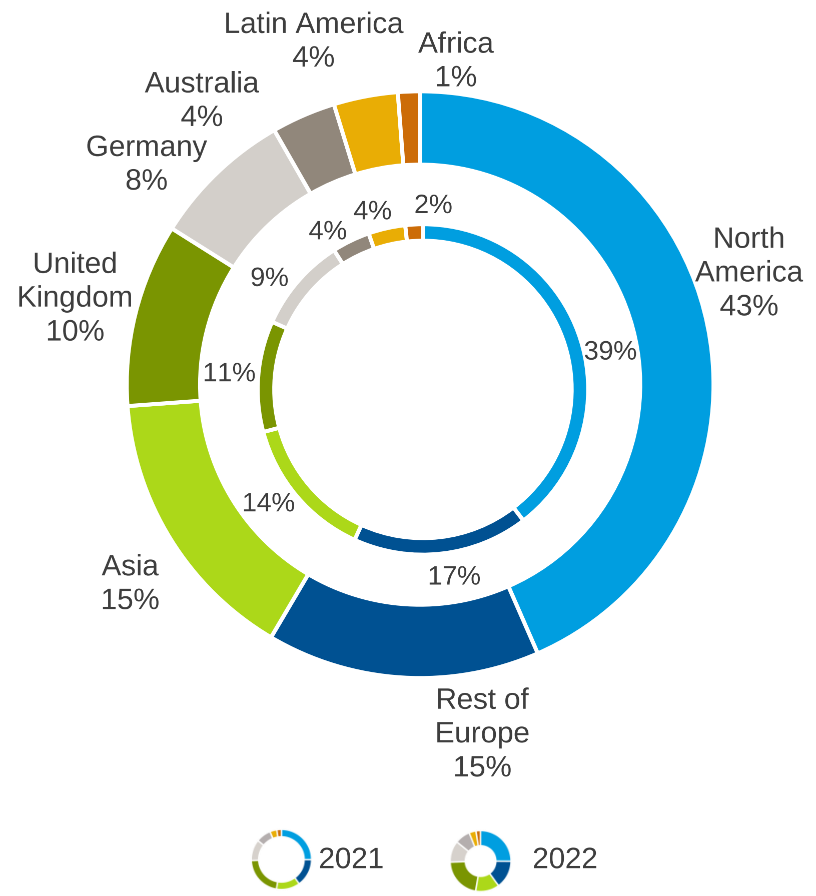
## 5-year CAGR +17.7%

### GWP split by reporting categories

in m. EUR




### Gross written premium split by regions

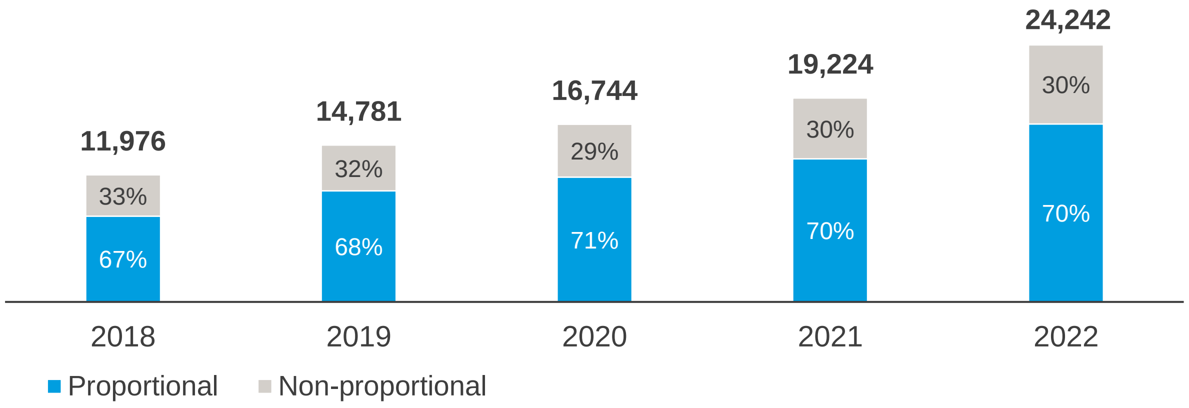



1) All lines of Property & Casualty reinsurance except those stated separately

# Around 2/3 of our business is written via brokers
## ~1/3 of our business is non-proportional

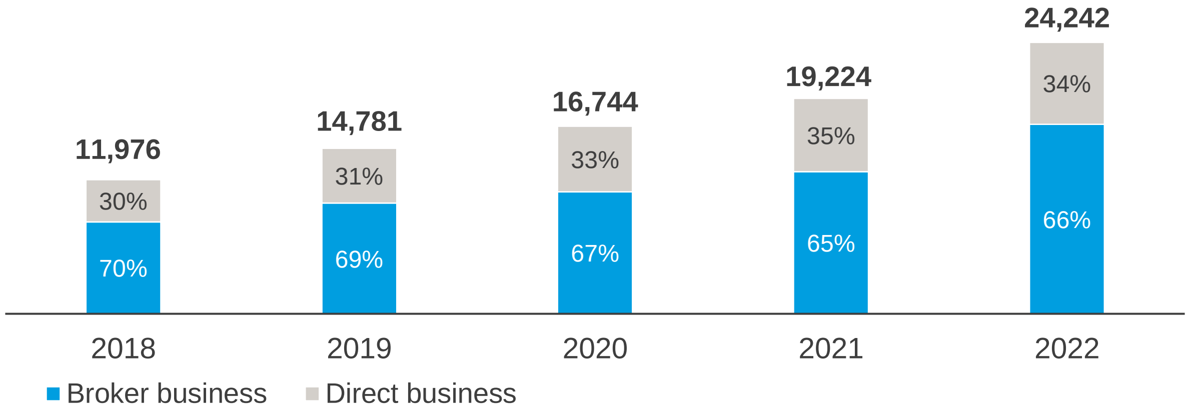
### Breakdown of treaties by volume

in % and m. EUR

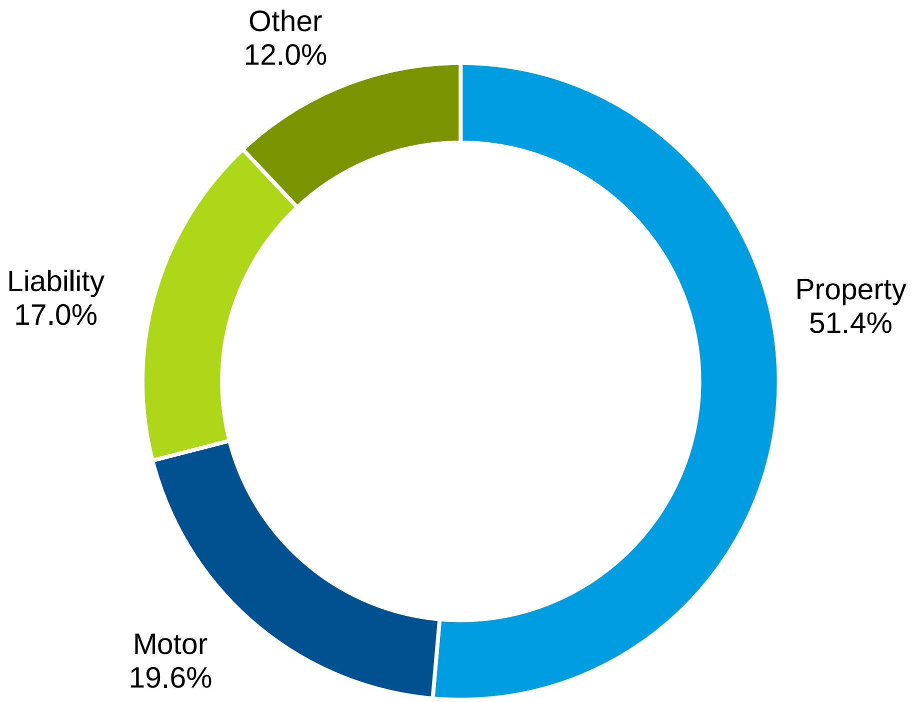



### Breakdown of business written

in % and m. EUR




### GWP by segment



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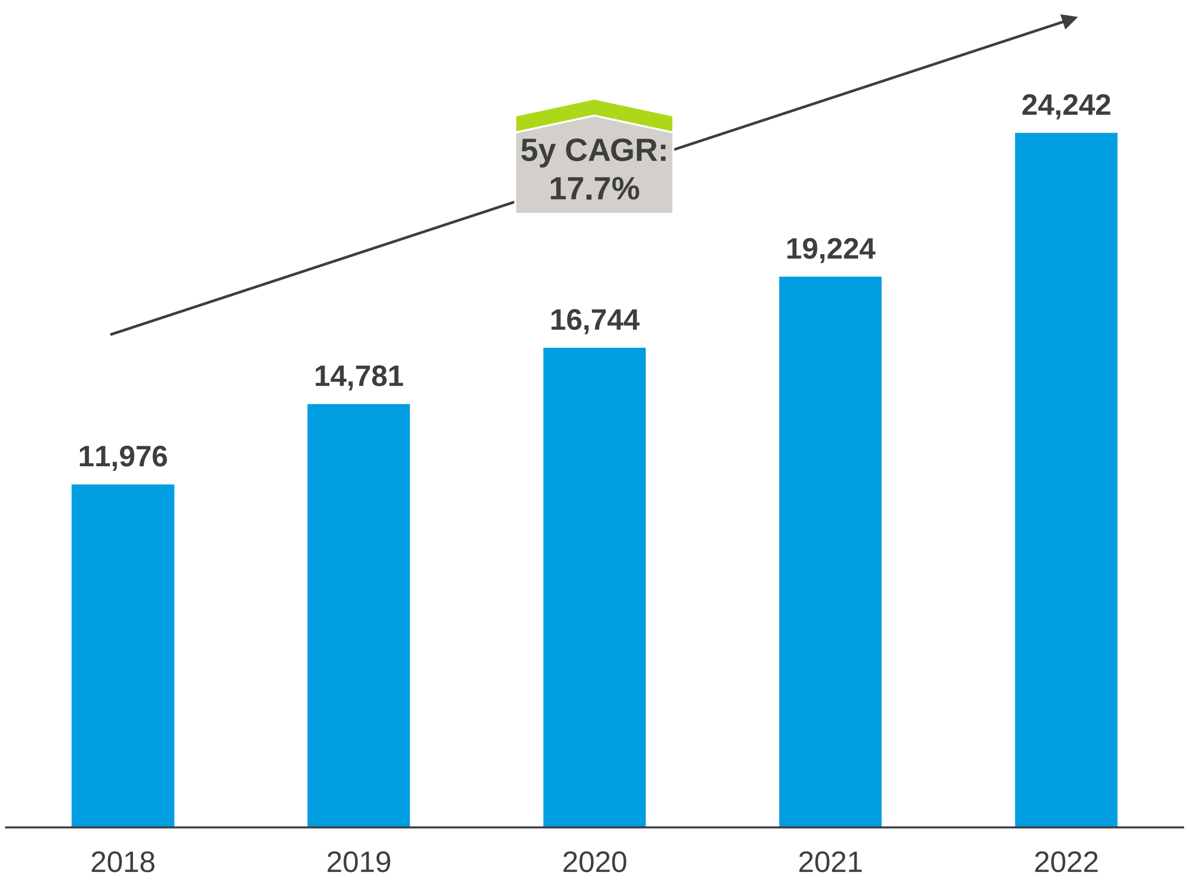
# Margin-oriented U/W approach leads to profitable growth

## 2022: strong premium growth – large losses exceed budget by EUR 306 m.

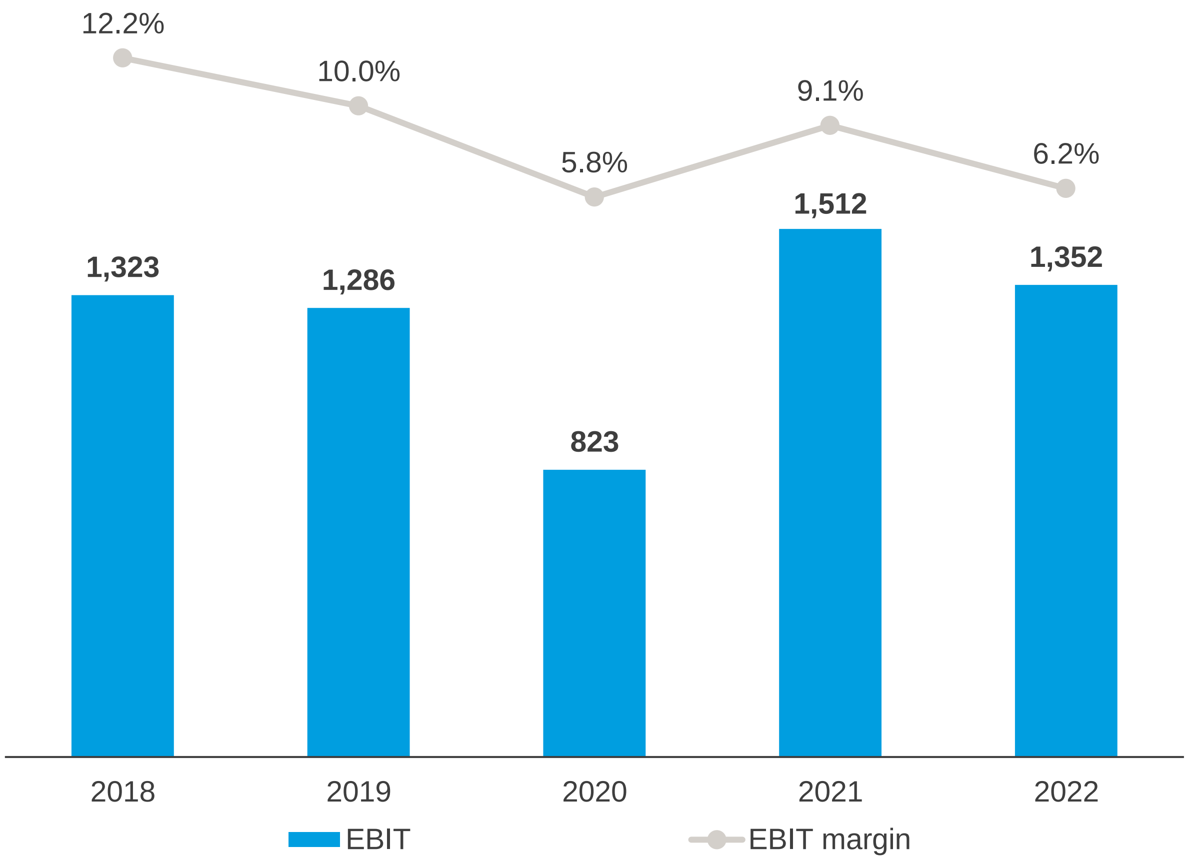
### Gross written premium

in m. EUR




### EBIT/EBIT margin

in m. EUR



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# Resiliency reserve decreased as expected to EUR 1,378 m.
## Level of additional IBNR is 51% of total reserves

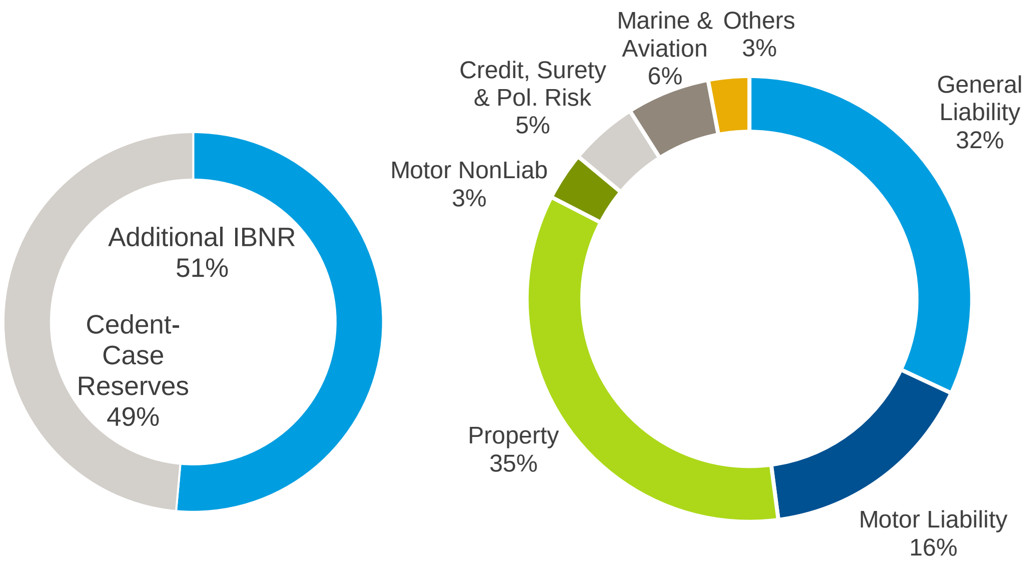
### Development of resiliency reserves reviewed by WTW

in m. EUR

| Year end[1] | Resiliency Reserve[2] | Change | Impact on loss ratio | P&C premium (net earned) |
|---|---|---|---|---|
| 2011 | 1,117 | 162 | 2.7% | 5,961 |
| 2012 | 1,308 | 190 | 2.8% | 6,854 |
| 2013 | 1,517 | 209 | 3.1% | 6,866 |
| 2014 | 1,546 | 29 | 0.4% | 7,011 |
| 2015 | 1,887 | 341 | 4.2% | 8,100 |
| 2016 | 1,865 | -22 | -0.3% | 7,985 |
| 2017 | 1,813 | -52 | -0.6% | 9,159 |
| 2018 | 1,694 | -118 | -1.1% | 10,804 |
| 2019 | 1,457 | -238 | -1.9% | 12,798 |
| 2020 | 1,536 | 80 | 0.6% | 14,205 |
| 2021 | 1,703 | 167 | 1.0% | 16,624 |
| **2022** | **1,378** | **-325** | **-1.5%** | **21,637** |

### P&C gross loss reserves[3]

EUR 41 bn.




1) Figures unadjusted for changes in foreign exchange rate, i.e. based on actual exchange rates at respective year end
2) Resiliency reserve of loss and loss adjustment expense reserve net of reinsurance for its non-life insurance business against held IFRS reserves, before tax and minority participations. WTW reviewed these estimates - see appendix
3) As at 31 December 2022, consolidated, IFRS, IBNR – Incurred but not reported

# The risk is manageable

## Stress tests for natural catastrophes after retrocessions

| **Effect on forecast net income** in m. EUR | | **2021** | **2022** |
|---|---|---|---|
| Hurricane US/Carribean | 100-year loss | (1,452) | (1,378) |
| | 250-year loss | (1,959) | (1,859) |
| Earthquake US West Coast | 100-year loss | (839) | (758) |
| | 250-year loss | (1,615) | (1,385) |
| Winter storm Europe | 100-year loss | (667) | (614) |
| | 250-year loss | (1,009) | (874) |
| Earthquake Japan | 100-year loss | (758) | (645) |
| | 250-year loss | (1,203) | (966) |
| Earthquake Chile | 100-year loss | (493) | (513) |
| | 250-year loss | (1,277) | (1,180) |



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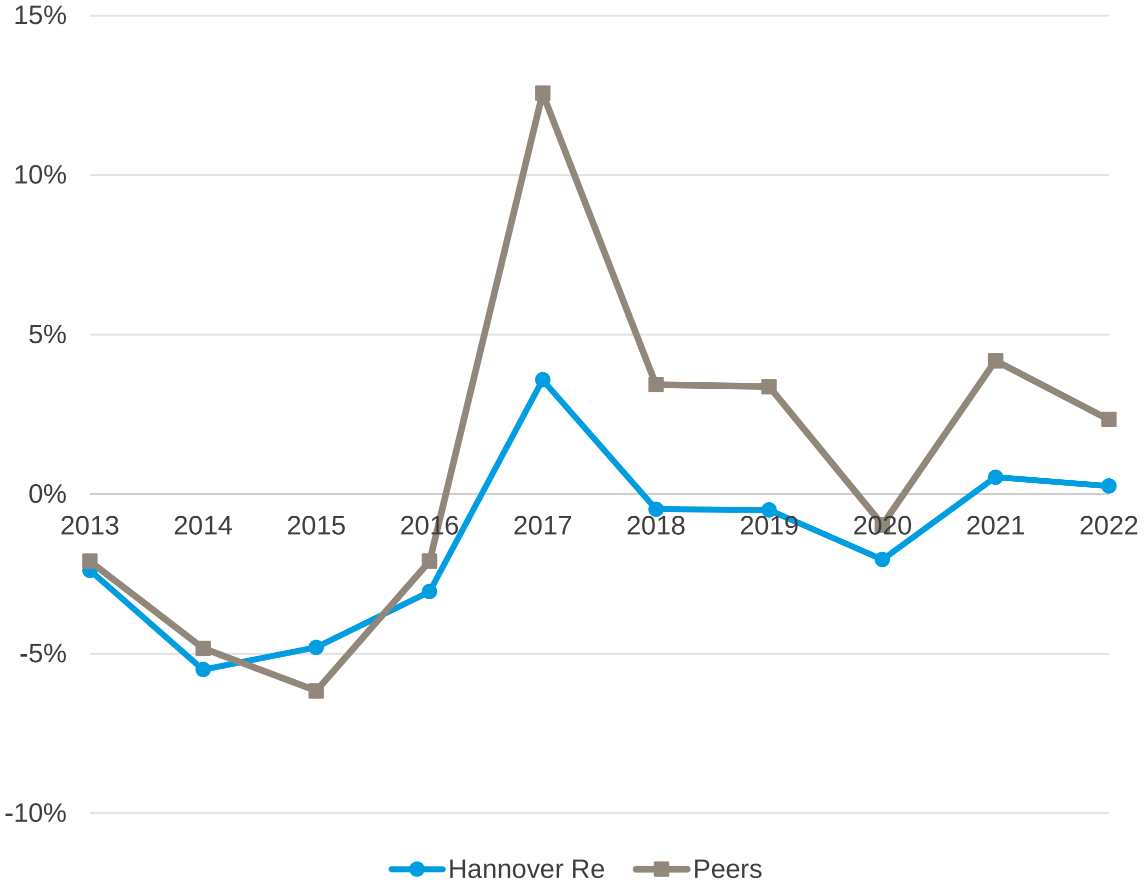
# Previous years confirm our reliable planning of NatCat budget

**Δ NatCat losses vs. budget** in % of NPE




| | Δ average NatCat losses vs. budget | Volatility[1)] |
|---|---|---|
| hannover re | (1.4%) | 2.7% |
| **Peers** | 1.0% | 5.6% |

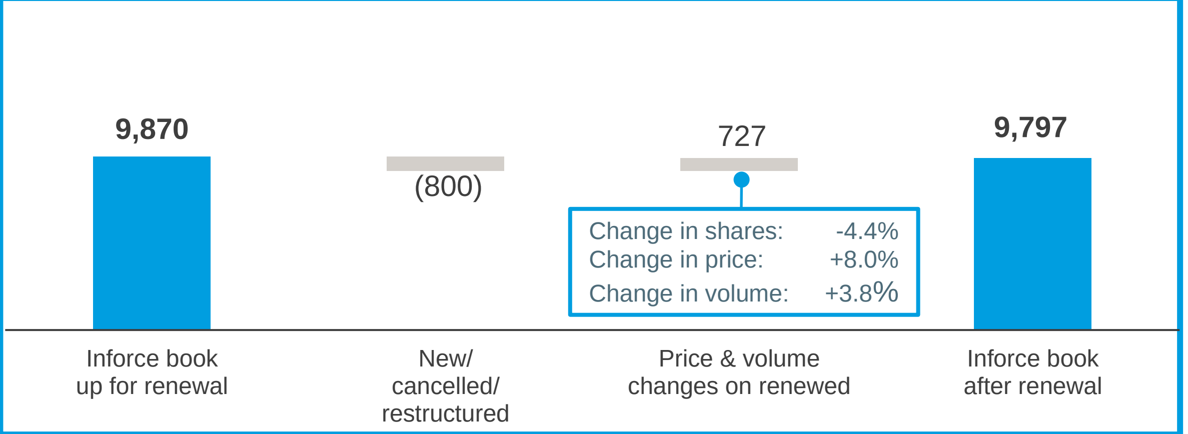
- On average, Hannover Re stays within NatCat budget
- Lower volatility of NatCat budget utilisation by Hannover Re compared to peers

All numbers as % of net premium earned and as reported; numbers do not include Covid-19 or Ukraine war impact; Peers: Munich Re, Swiss Re, SCOR
1) Standard deviation

# Overview Renewals 2023

## Market environment supports risk-adjusted price increases throughout the year

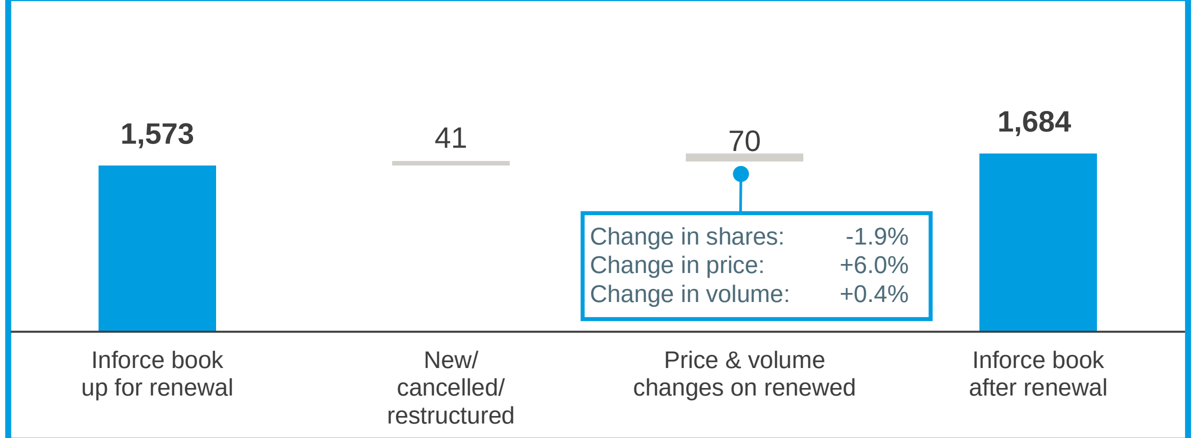
### 1/1 Renewals



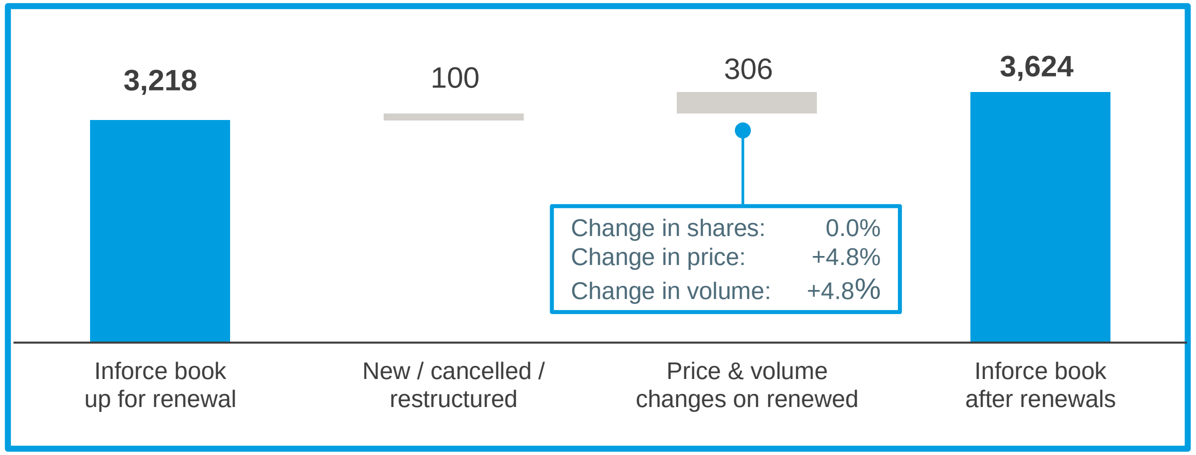

### Comments

- Positive pricing momentum continued throughout the year, driven by a shortage in reinsurance capacity, loss experience and inflation
- 1/1 to 1/6 Renewals contributed to a 1H/2023 new business CSM of 1.8 bn.

### 1/4 Renewals




### 1/7 Renewals




All figures in EUR m. unless otherwise stated

# Agenda

# We are somewhat different

## Life & Health reinsurance

somewhat different

### Undogmatic

We have an undogmatic approach

- Strong entrepreneurial spirit
- Appetite to innovate industry solutions

### Efficient

We foster an efficient organisational set-up

- >1,200 experts in 24 offices on all continents
- Highly empowered and qualified staff

### Flexible

We are a highly flexible business partner

- Tailor-made services and solutions
- Ability to anticipate market and client demands

### Responsive

We are committed to time to market & responsiveness

- Rapid decision-making processes
- In-depth knowledge of local markets



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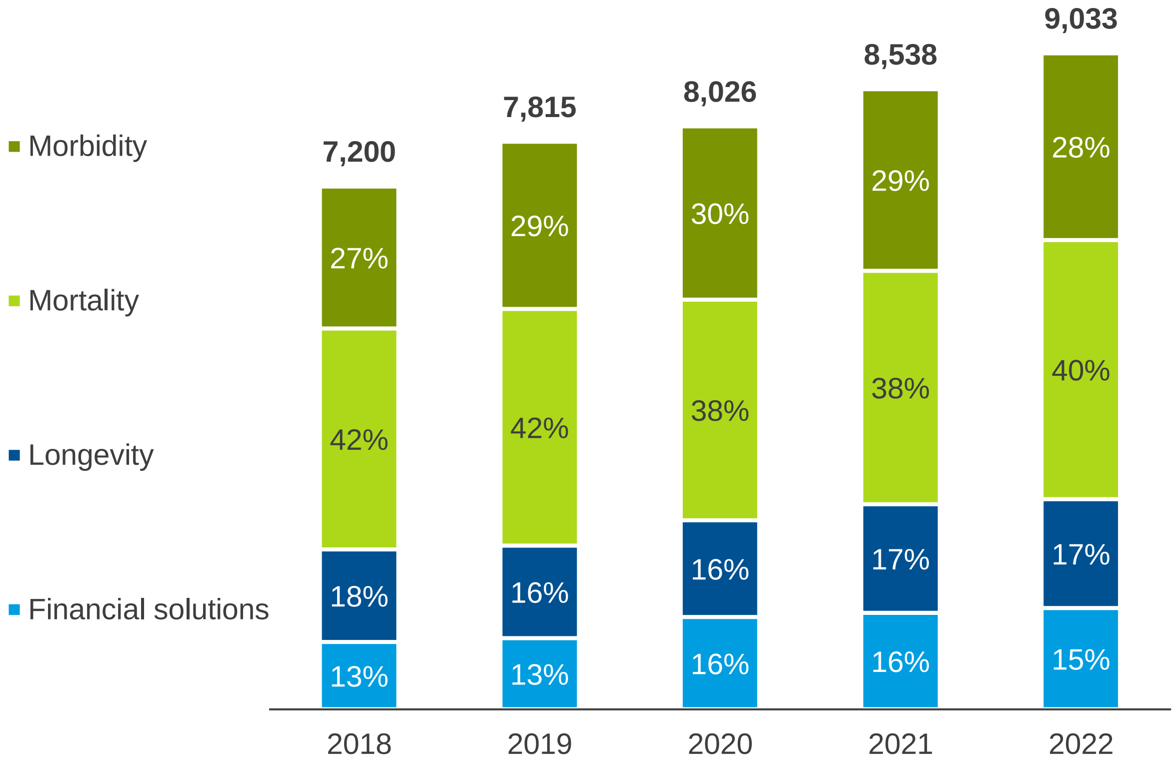
# Life & Health reinsurance: moderate and diversified growth

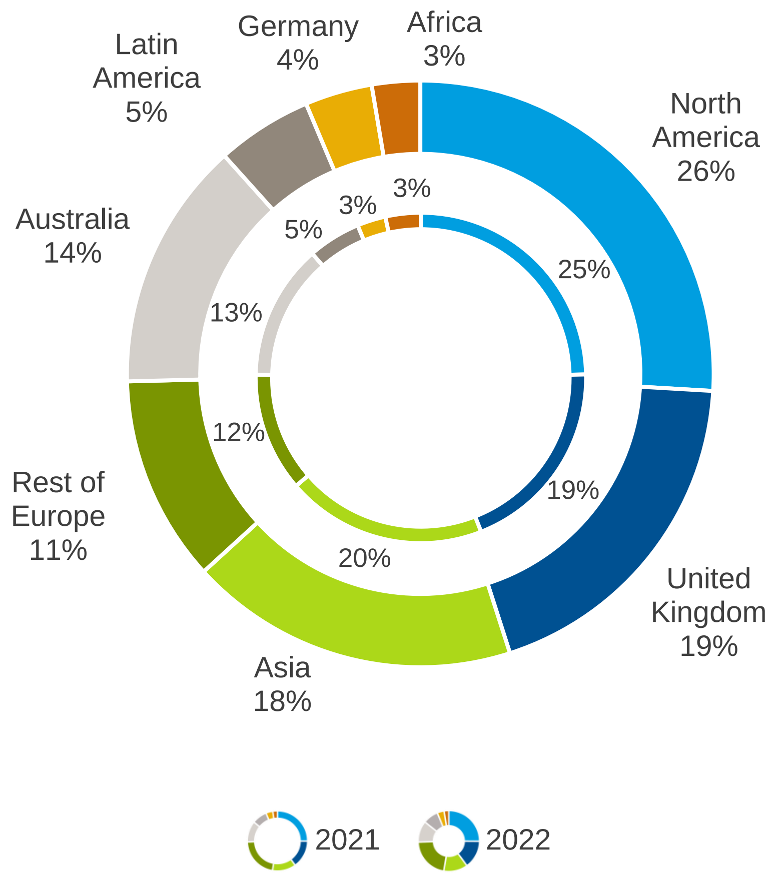
## 5-year CAGR +5.0%

### GWP split by reporting categories

in m. EUR




### Gross written premium split by regions

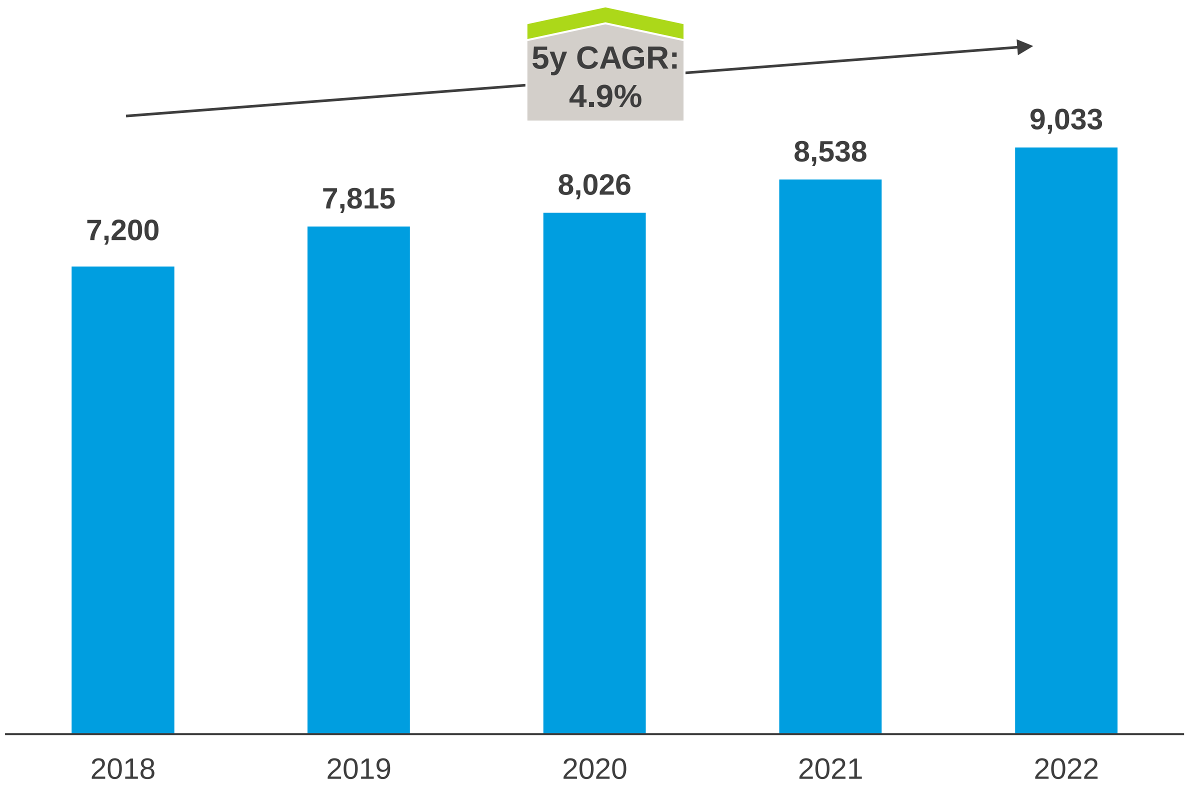


# Favourable premium growth

## 2022: significant increase in underwriting profitability

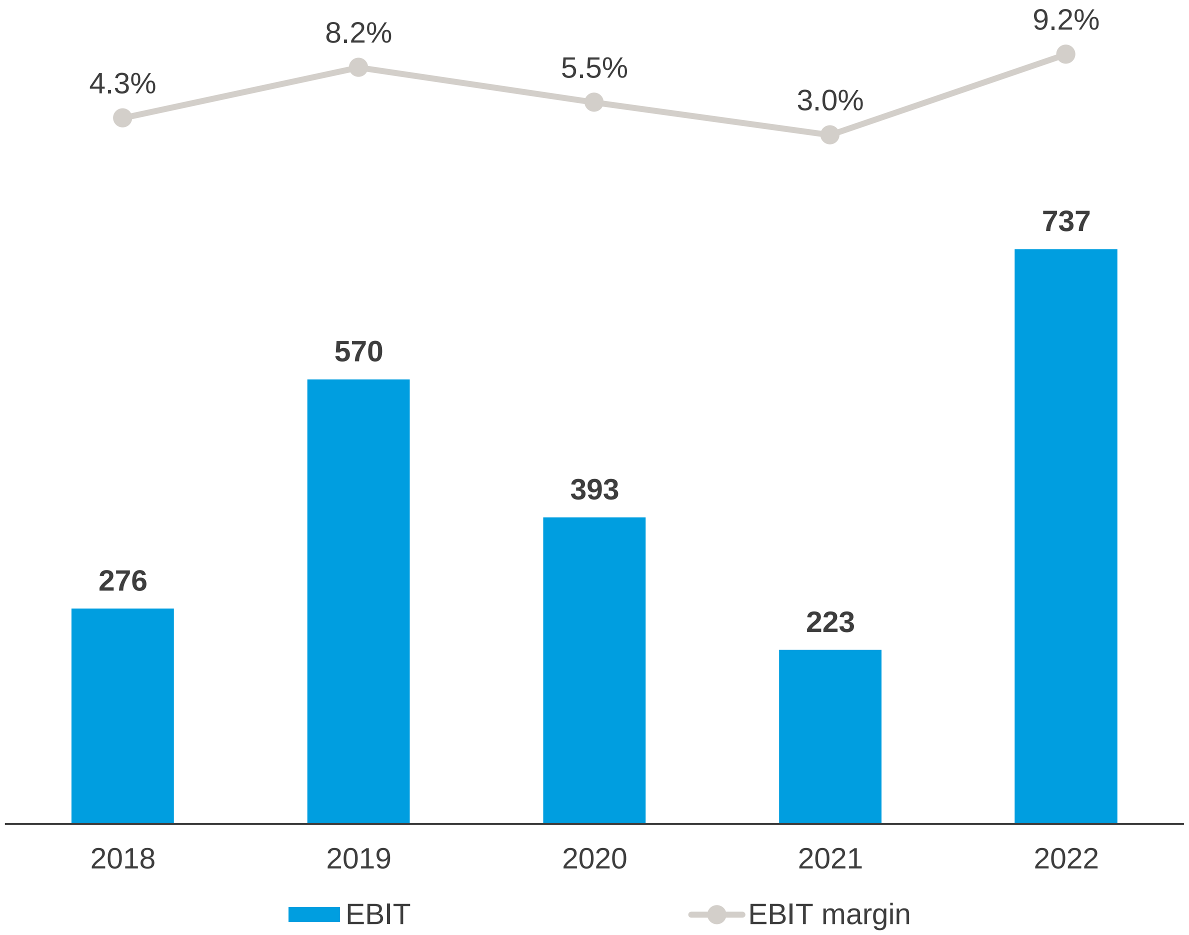
### Gross written premium

in m. EUR




### EBIT/EBIT margin

in m. EUR



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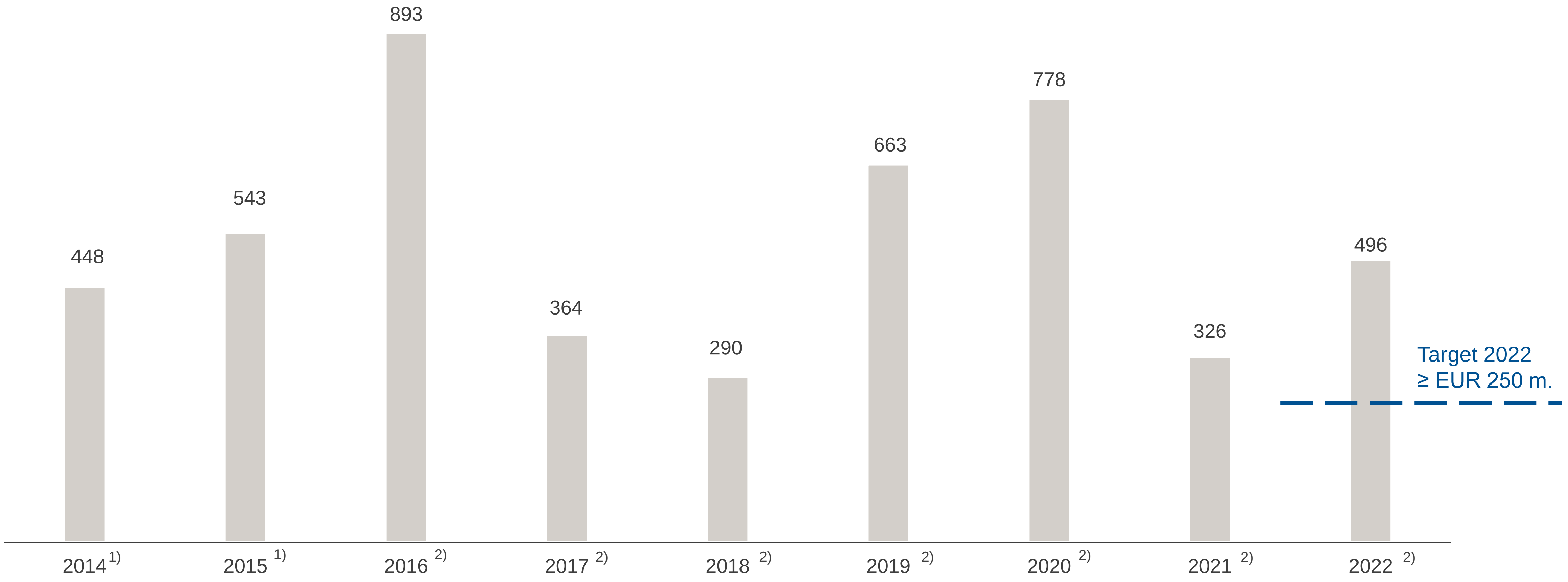
# Value of New Business well above target

## Mainly driven by Financial Solutions and Longevity business

### Value of New Business development

in m. EUR




1) Based on MCEV principles and post-tax reporting (in 2015 cost of capital already increased from 4.5% to 6% in line with Solvency II)
2) Based on Solvency II principles and pre-tax reporting



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# Writing attractive traditional life & health business

## Whilst positioning ourselves for sustainable growth with a clear strategic focus

**Risk Solutions**
Provide terms and capacity for all types of technical risks

**Financial Solutions**
Achieve financial objectives for our clients

**Reinsurance Services**
Meet the individual needs of our clients

## Our strategic focus

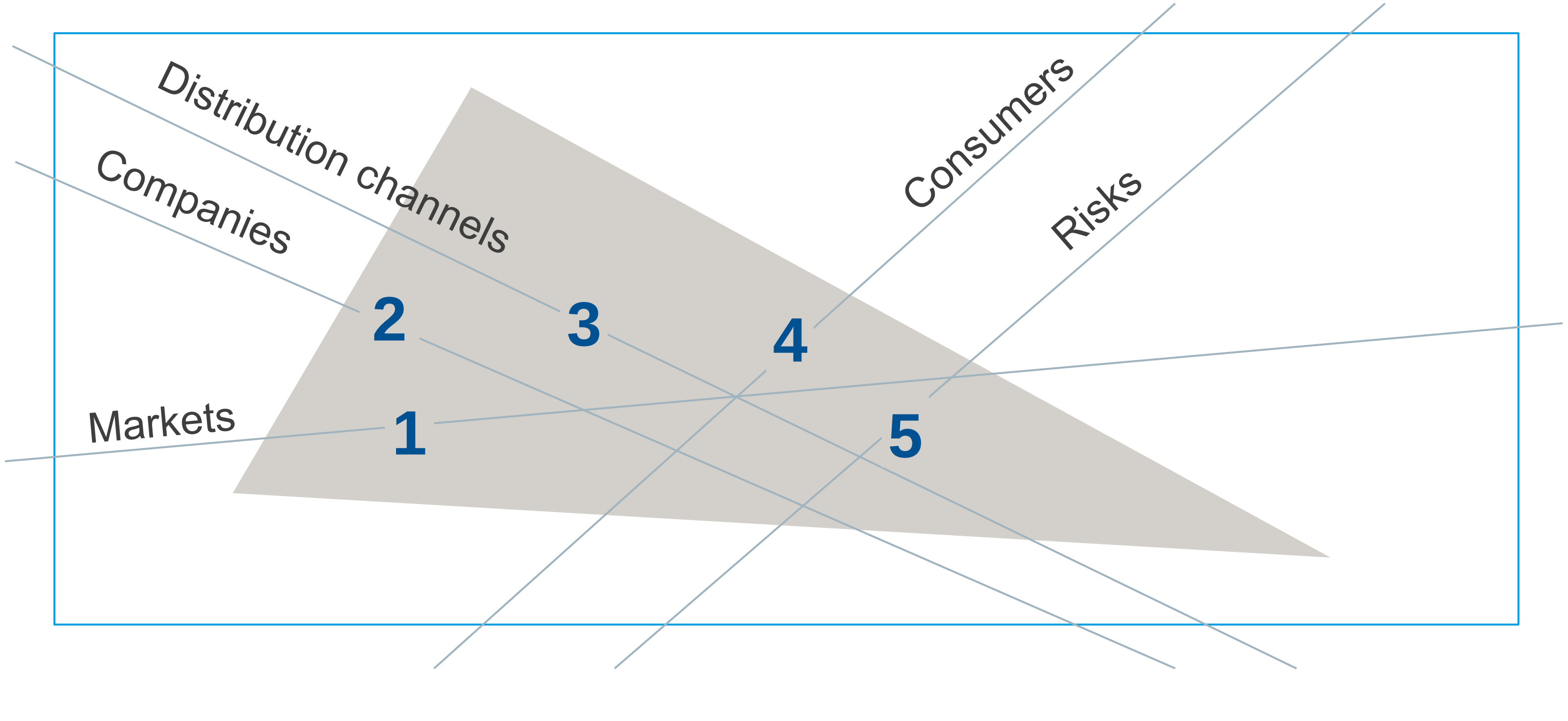
**1** High growth markets

**2** Companies in transition

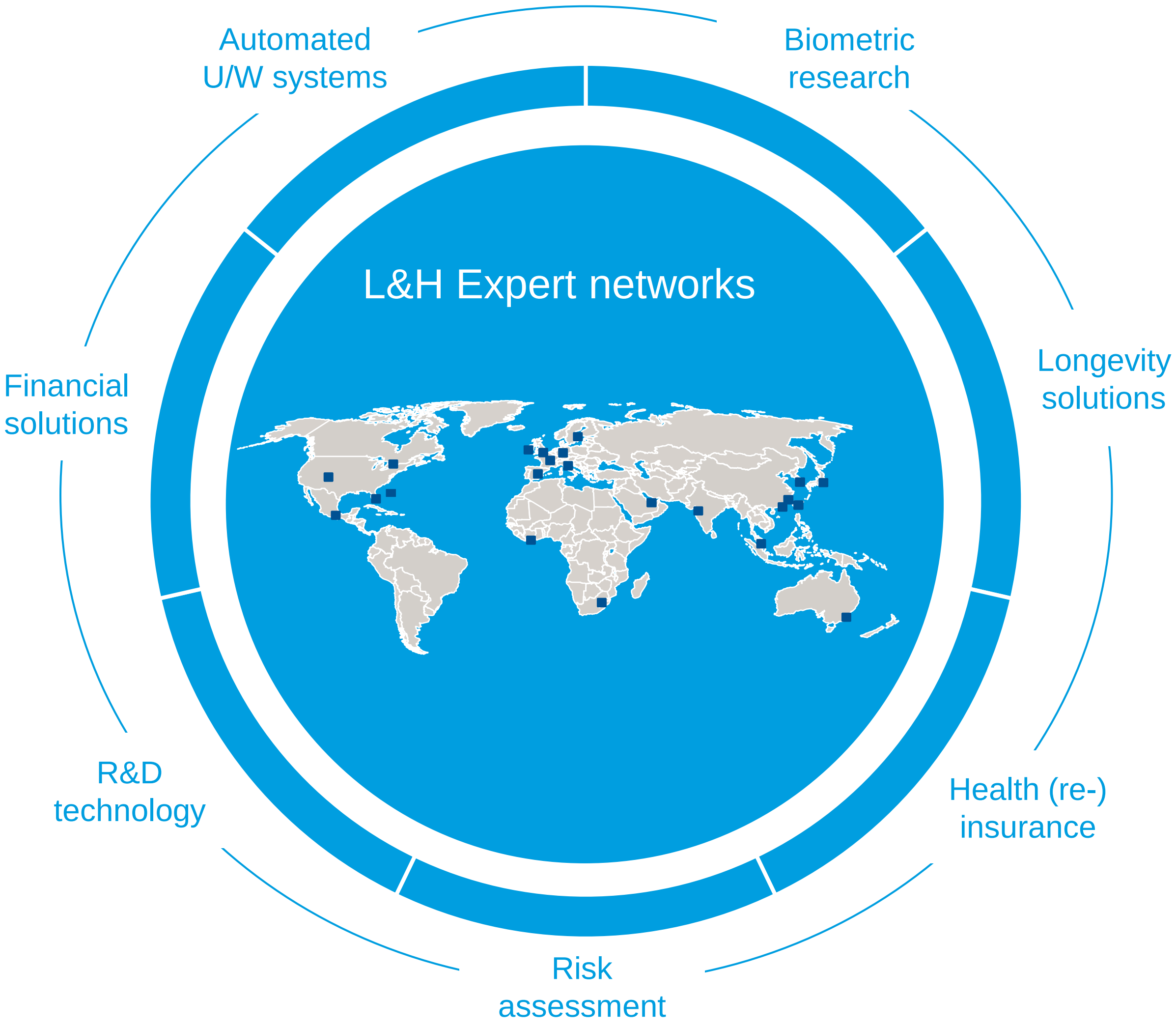
**3** Alternative distribution channels

**4** Underserved consumers

**5** Hard-to-quantify risks



# Our clients are served in the markets by our network of offices and by our solution-orientated expert networks



# Complete offerings
## Risk and financial solutions & services

| **Risk Solutions**<br>Competitive terms and appropriate capacity for technical risks | **Financial Solutions**<br>Structured agreements to achieve certain financial objectives | **Reinsurance Services**<br>Comprehensive range geared towards individual needs |
|---|---|---|
| Mortality · Longevity | New Business Financing | Products · Processes |
| Morbidity: Health · Disability · Long Term Care · Critical Illness | Reserve & Solvency Relief | Biometrics · Risk Assessment |
| | Embedded Value Transaction | Underwriting Systems |
| Profitability depends largely on the underlying biometric risks | Profitability is less likely to be affected by the underlying biometric risks | Only in combination with risk solutions and/ or financial solutions |



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# Example risk solution: mortality & longevity

## Risks

### Mortality

Risk of paying more death benefits than expected

### Longevity

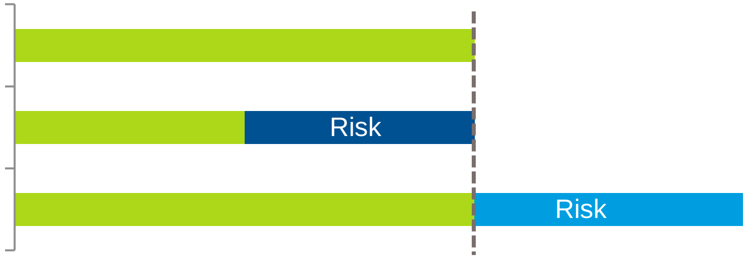
Risk of paying annuities longer than expected

## Trigger

Life expectancy

Mortality

Longevity




## Longevity: enhanced annuities[1)]

Illustration: 50k single premium; male 65; 3% interest

| Status of health → | Healthy | Obesity | Diabetes | Cancer |
|---|---|---|---|---|
| Annuity increase → | +0% (standard) | +9% | +23% | +85% |
| Monthly annuity → | 244 | 267 | 300 | 452 |

## Longevity: risk transfer

Lifelong annuity

no investment participation

Insurer

Actual annuity ←

Fixed premium + fee →

Reinsurer

1) Allows people in ill health to receive a higher regular income in recognition of the fact that they, on average, have a shorter life expectancy than a healthy person



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# Example risk solution: morbidity - critical illness

## Morbidity

Risk of experiencing a higher claims burden from traditional health, critical illness, long-term care, and disability covers

## Product: Critical illness insurance

Helps consumers to protect their life quality in case of a life-threatening disease

## Payment

Income protection/medical insurance
Payment of claim incurred

Critical Illness
Payment of lump sum insured

## Hannover Re's contribution

- Coverage of > than 160 diseases
- Design, pricing & claims assessment
- Advice & training in underwriting risks
- Track record as innovator in the market



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# Example: services offered with risk and/or financial solutions

**Products**

Innovative, e.g. products with little or no underwriting

**Processes**

Lean, e.g. distribution directly to individuals, without advisers

**Biometrics**

Cover of death, disease or disability risks at an appropriate cost

**Risk assessment**

Support for proper medical & claims assessment


**U/W systems**

hr | Quirc, hr | ReFlex or hr | Ascent



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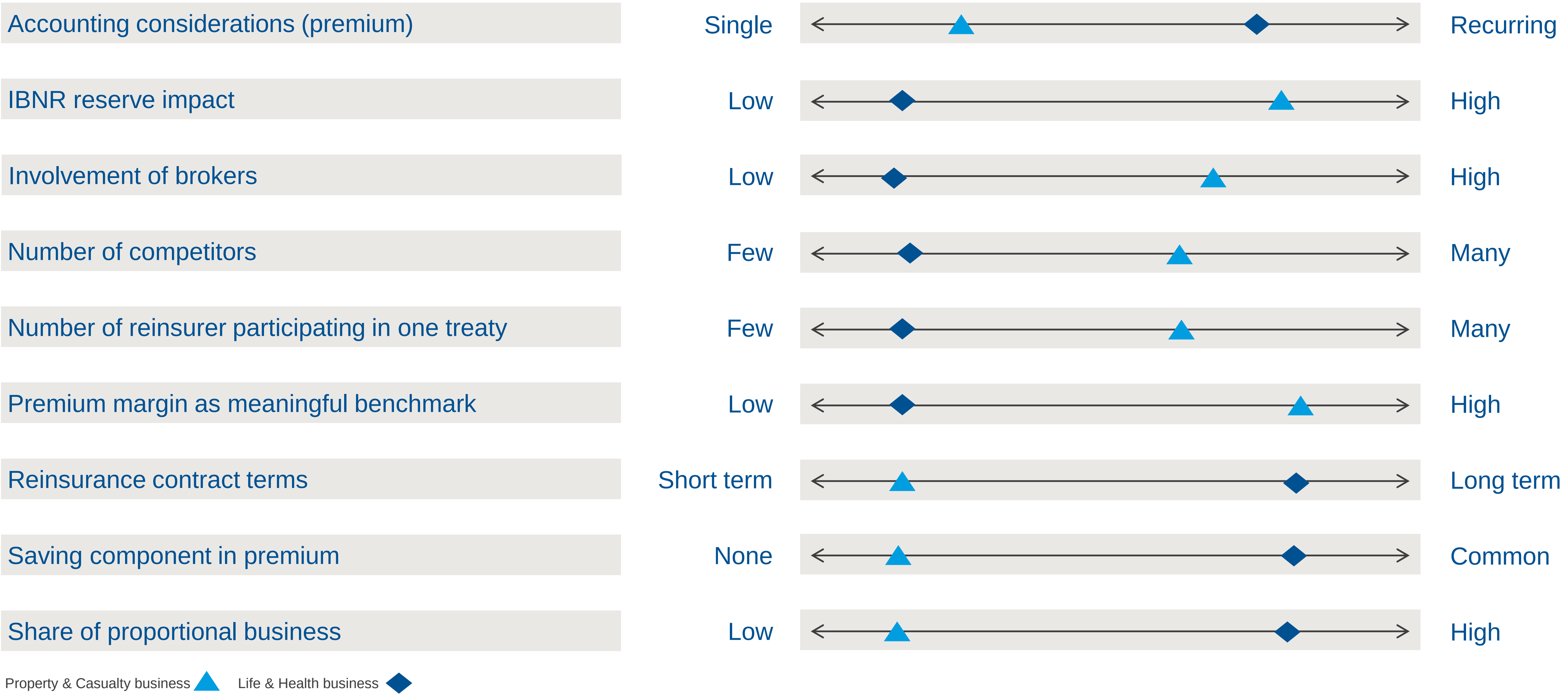
# Primary differences between L&H and P&C business

## Simplified illustration



# Takeaways for the Life & Health Business Group

1 **Business**
All lines of life, health & annuities

2 **Focus**
Biometric risks not asset risk

3 **Relationship**
Long term due to very long run-off

4 **Service**
An important component

5 **Premium**
Not the only meaningful benchmark → EBIT

6 **Financial solutions business**
Key driver of earnings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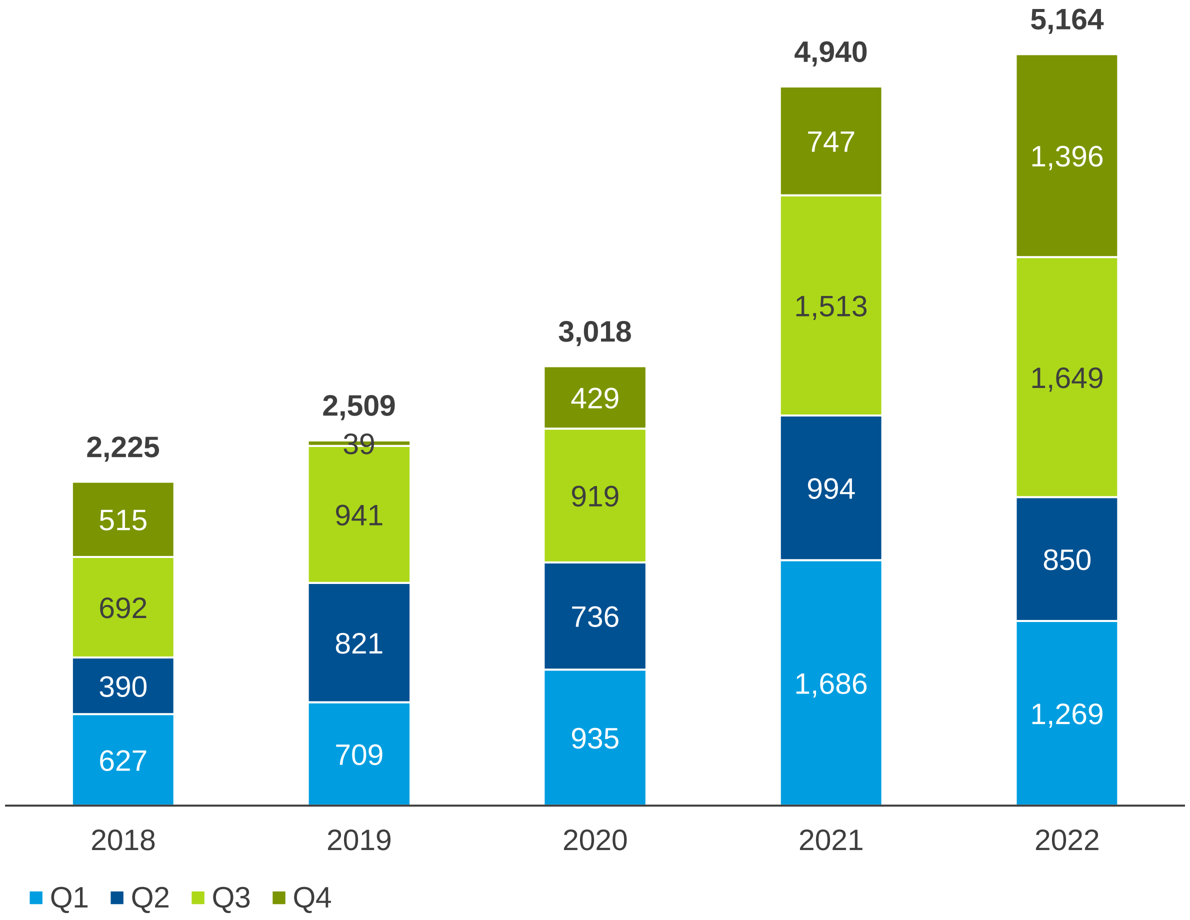
# Agenda

# Strong operating cash flow driven by premium growth

## AuM +1.3%, cash flow and stronger USD offset impact of rising interest rates

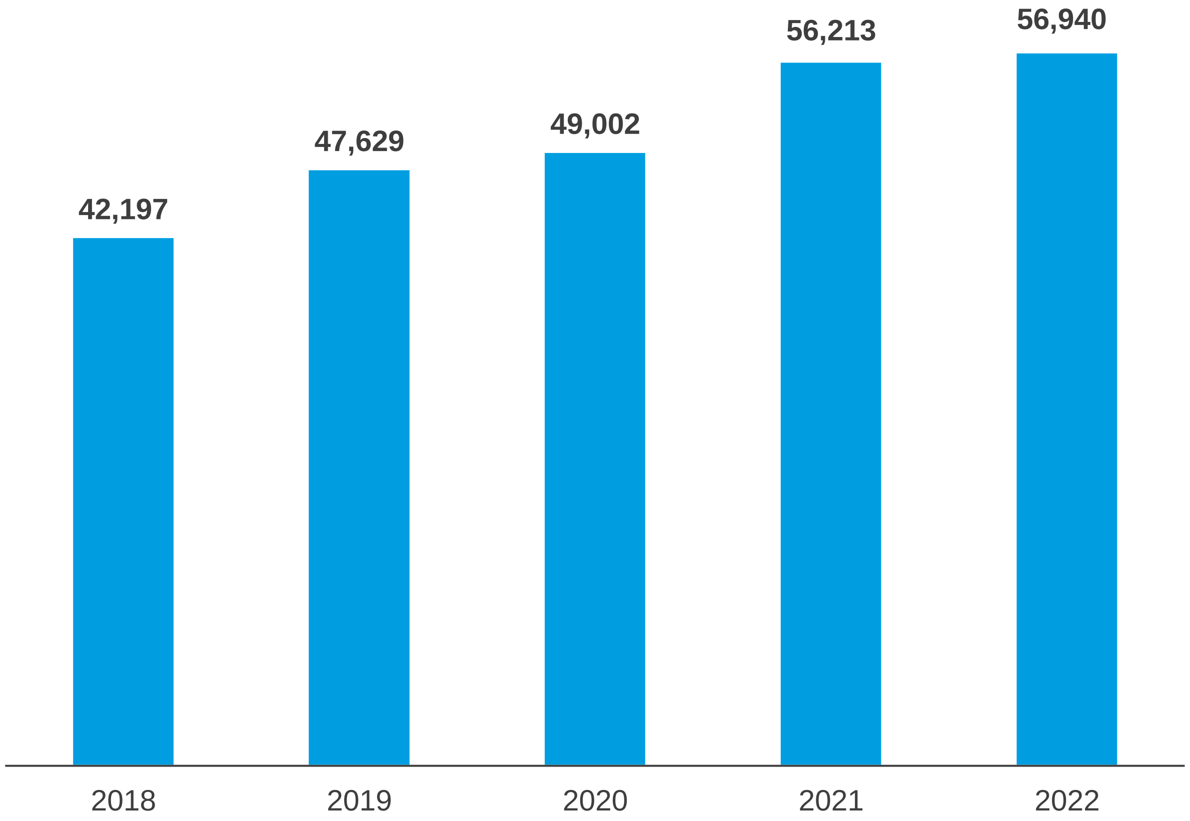
### Operating cash flow

in m. EUR




### Assets under own management (AuM)

in m. EUR



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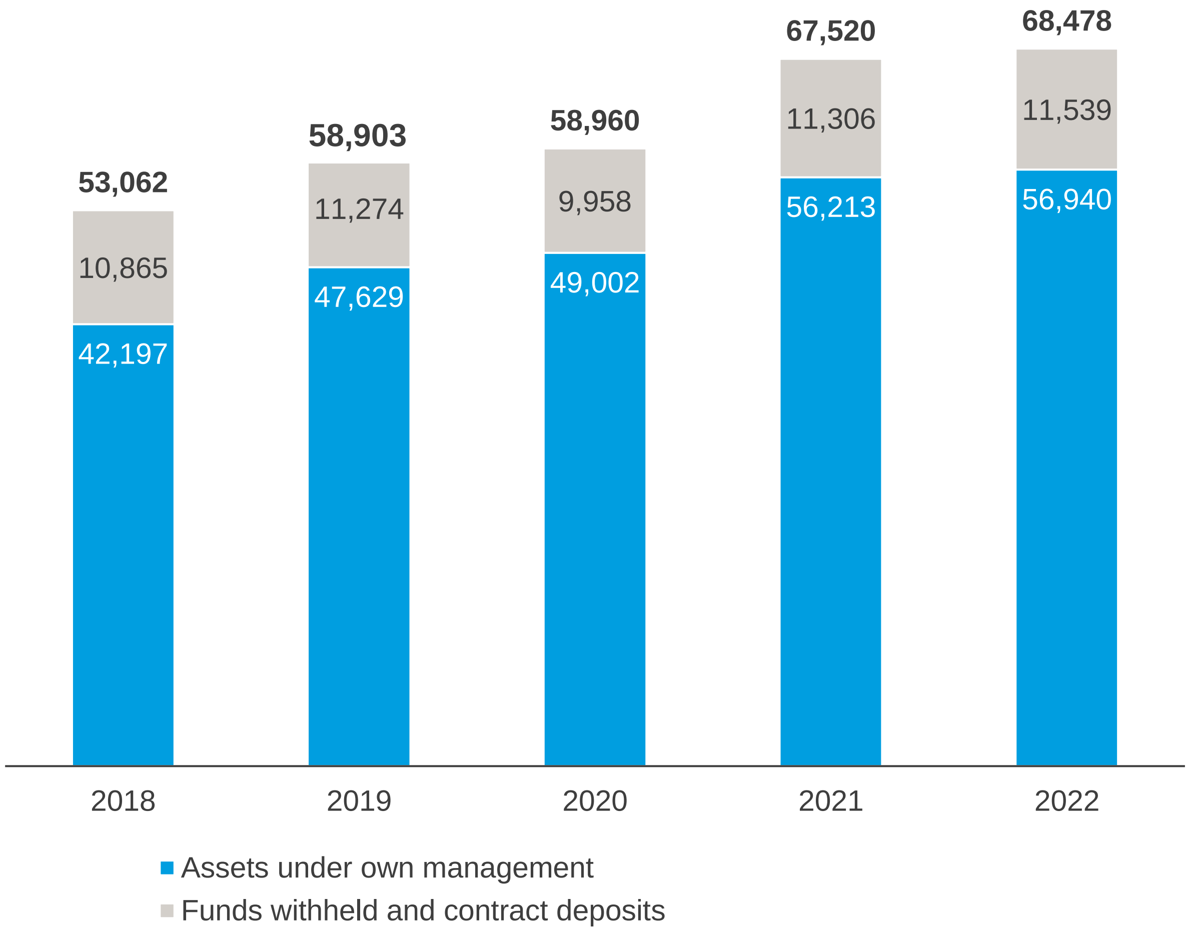
# Increasing assets under own management and net investment income

## Assets under own management at EUR 57 bn.

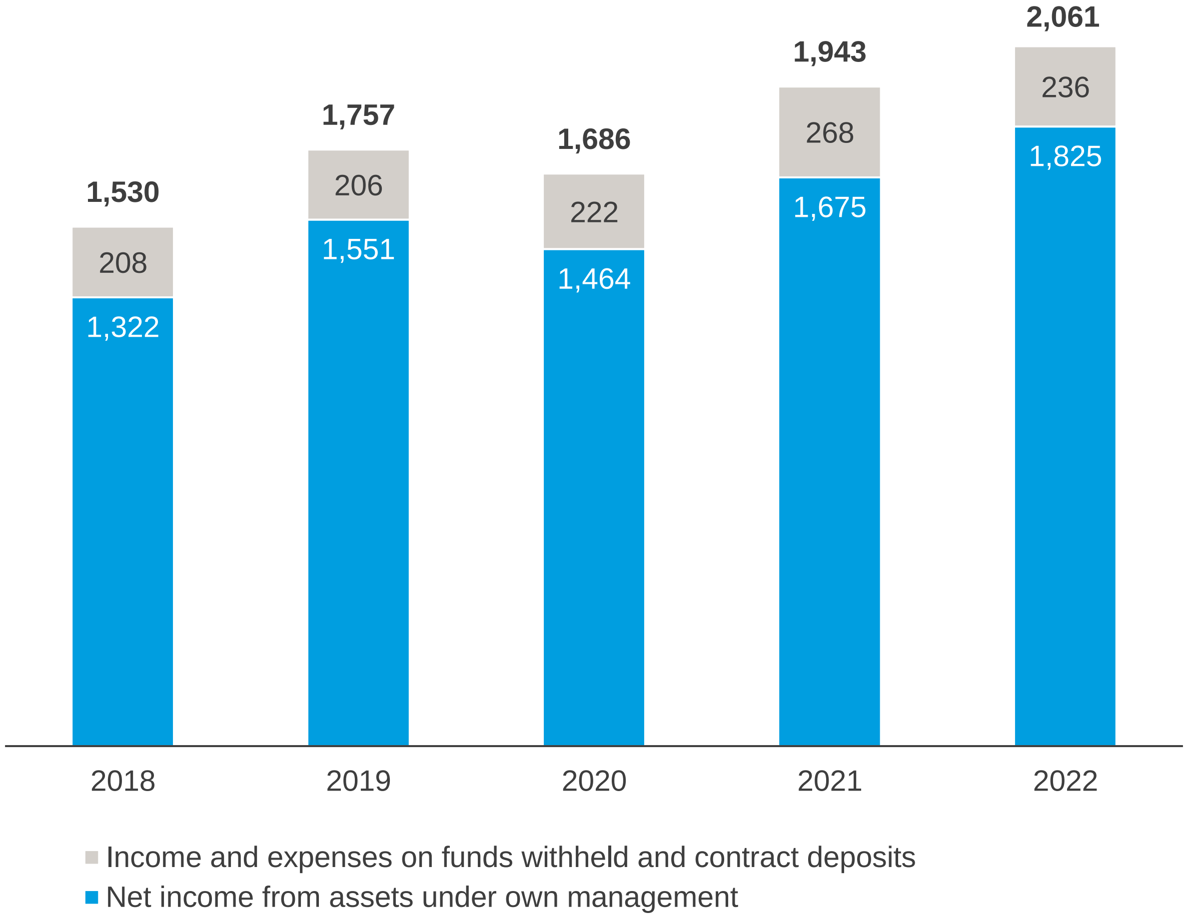
### Total investments

in m. EUR




### Investment income

in m. EUR



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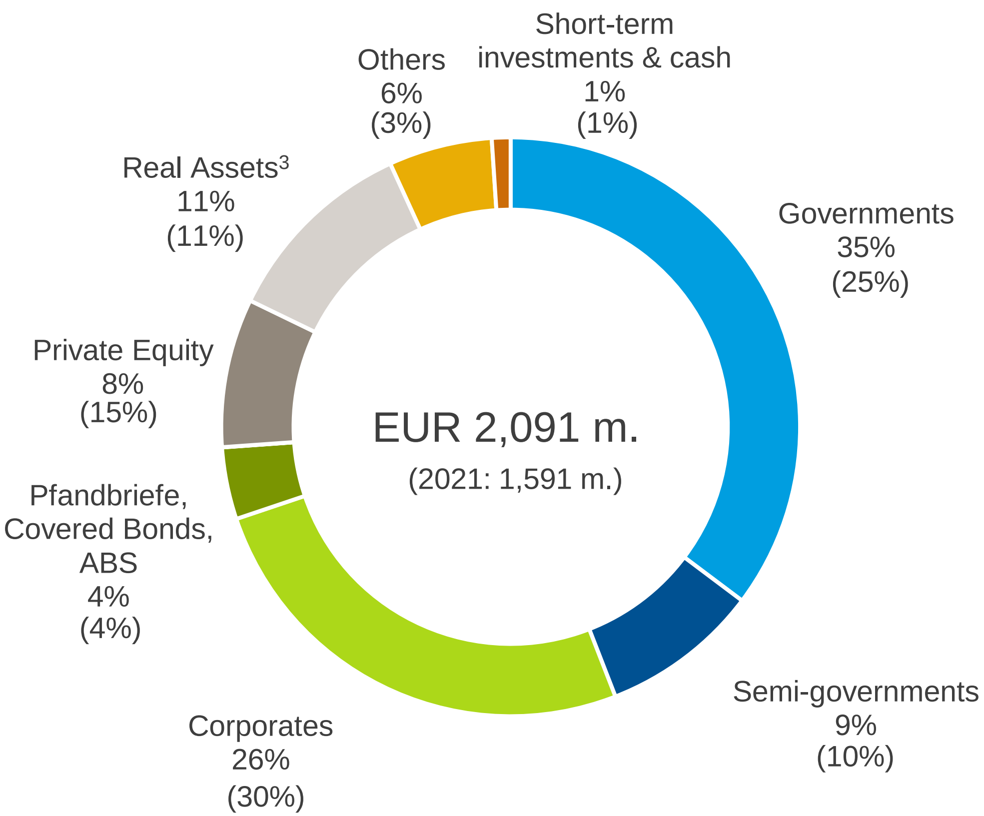
# Stable asset allocation with defensive credit risk taking since beginning 2022

## Listed equities sold; increased liquidity to seize market opportunities

| Asset class | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| **Fixed Income** | **87%** | **87%** | **85%** | **86%** | **83%** |
| Governments | 44% | 42% | 42% | 40% | 42% |
| Semi-governments | 7% | 8% | 7% | 8% | 8% |
| Corporates | 29% | 31% | 30% | 32% | 27% |
| Investment grade | 25% | 26% | 25% | 28% | 23% |
| Non-Investment grade | 4% | 4% | 4% | 4% | 4% |
| Covered Bonds | 5% | 4% | 4% | 4% | 4%[2)] |
| ABS/MBS/CDO | 2% | 2% | 2% | 2% | 3% |
| **Equities** | **2%** | **3%** | **3%** | **4%** | **3%** |
| Listed | <0.1% | <0.1% | 1% | 1% | 0% |
| Private Equities | 2% | 2% | 3% | 3% | 3% |
| **Real Assets** (without Infra-Debt) | **6%** | **5%** | **5%** | **5%** | **7%** |
| **Others** | **1%** | **2%** | **3%** | **2%** | **3%** |
| **Cash/STI** | **4%** | **3%** | **3%** | **3%** | **3%** |
| **MV AuM in EUR bn.** | **42.7** | **48.2** | **49.8** | **56.2** | **57.4** |

### Ordinary income split




1) Economic view based on market values without outstanding commitments for Private Equity and Alternative Real Estate as well as fixed-income investments of EUR 2,061.7 m. (EUR 1,588.2 m.) as at 31 December 2022
2) Of which Pfandbriefe and Covered Bonds = 59.0%
3) Before real estate-specific costs. Economic view based on market values as at 31 December 2022

# High-quality fixed-income book well balanced

## Geographical allocation mainly in accordance with our broad business diversification

| | Governments | Semi-governments | Corporates | Pfandbriefe, Covered bonds, ABS | Short-term investments, cash |
|---|---|---|---|---|---|
| AAA | 75% | 54% | 0% | 59% | - |
| AA | 10% | 23% | 9% | 13% | - |
| A | 10% | 8% | 35% | 13% | - |
| BBB | 4% | 1% | 44% | 13% | - |
| <BBB | 1% | 14% | 12% | 2% | - |
| **Total** | **100%** | **100%** | **100%** | **100%** | **-** |
| Germany | 15% | 22% | 3% | 18% | 22% |
| UK | 7% | 1% | 6% | 6% | 7% |
| France | 2% | 1% | 6% | 8% | 1% |
| GIIPS | 0% | 3% | 6% | 8% | 0% |
| Rest of Europe | 3% | 15% | 12% | 21% | 4% |
| USA | 53% | 13% | 32% | 19% | 15% |
| Australia | 2% | 17% | 6% | 5% | 7% |
| Asia | 17% | 26% | 20% | 10% | 39% |
| Rest of World | 2% | 1% | 9% | 5% | 7% |
| **Total** | **100%** | **100%** | **100%** | **100%** | **100%** |
| **Total b/s values in m. EUR** | **21,088** | **7,553** | **15,096** | **3,571** | **1,855** |

IFRS figures as at 31 December 2022



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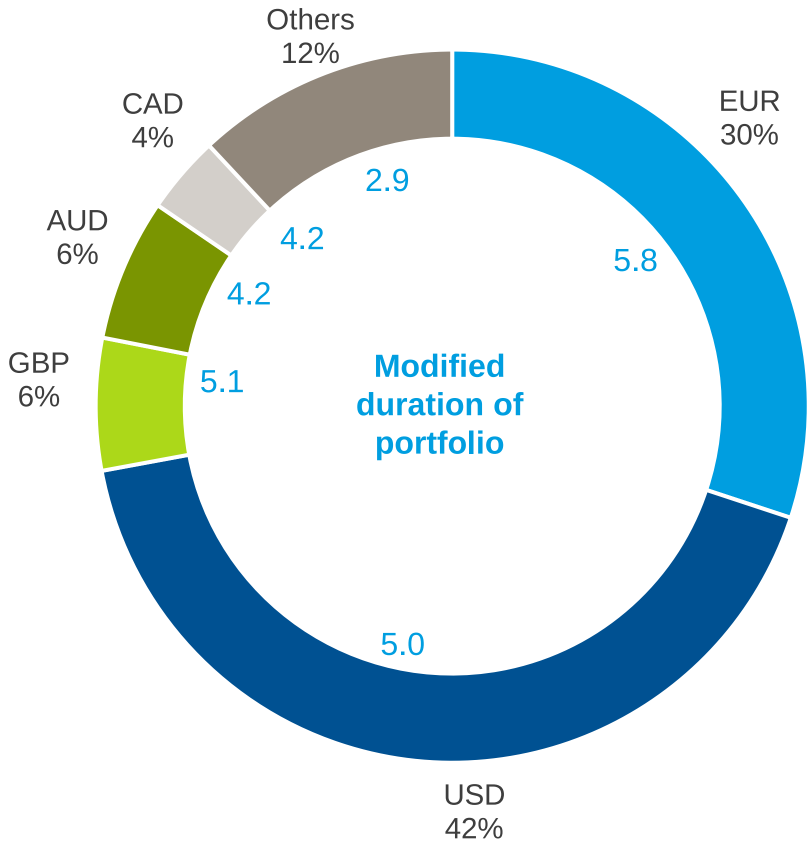
# Currency allocation and duration

## Duration-neutral strategy intact; lower modified duration as result of yield increases

### Currency split of investments




- Modified duration of fixed-income mainly congruent with liability- and capital-driven targets
- GBP's higher modified duration predominantly due to life business

| Modified duration | |
|---|---|
| 2022 | 4.9 |
| 2021 | 5.8 |
| 2020 | 5.8 |
| 2019 | 5.7 |
| 2018 | 4.8 |

# Agenda

# Our capital structure consists not only of equity

## Use of hybrids, securitisations etc. lowers cost of capital and levers RoE

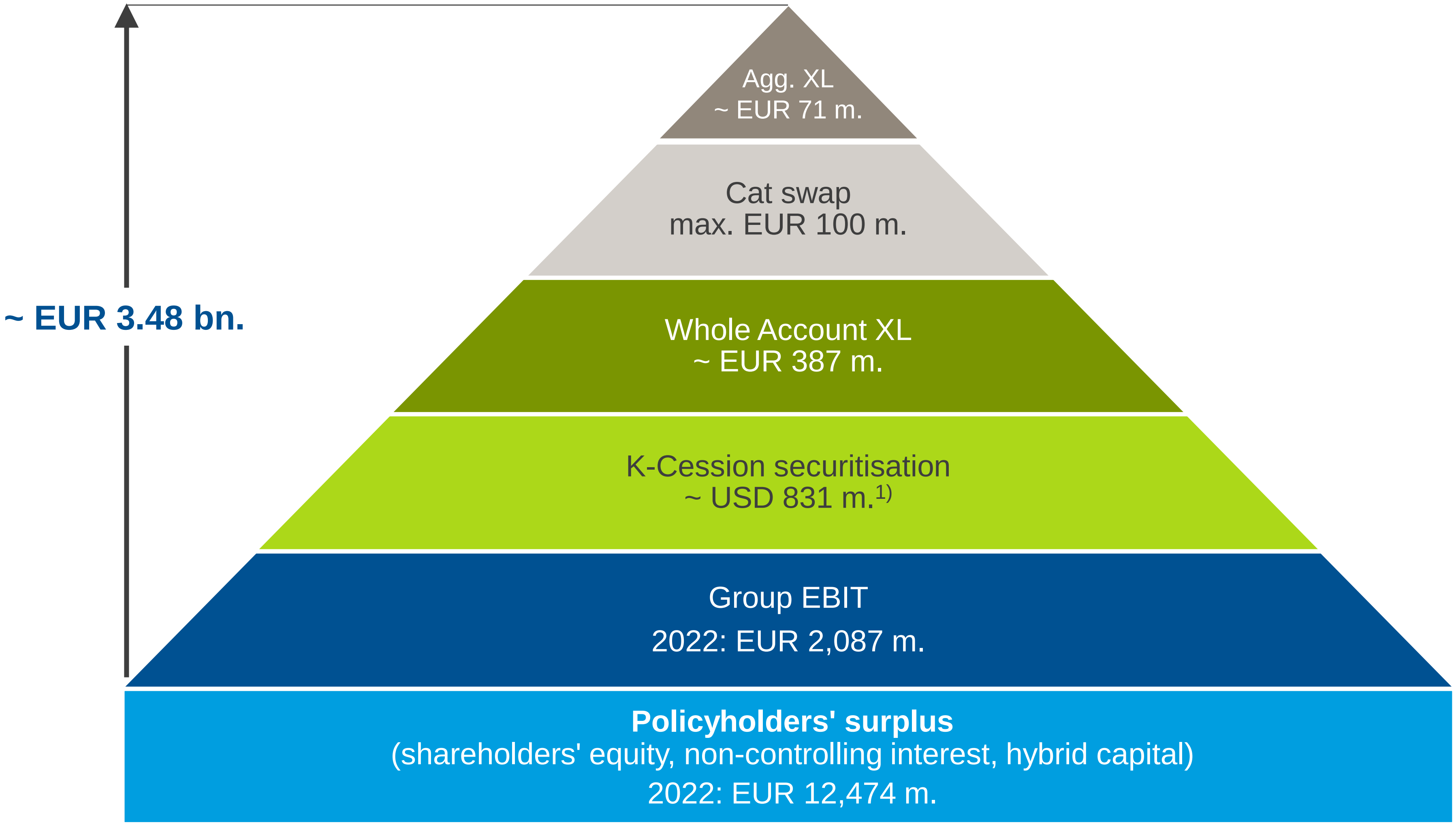
- Equity capital is by far the most expensive form of capital. Therefore, we make optimal use of equity substitutes:
  - Conventional reinsurance/retrocession on an opportunistic basis (i. e. use of other reinsurers' capital)
  - Alternative capital market transactions
  - Hybrid capital

| Type | Nominal amount | Issue date | Issue ratings S&P / A.M. Best | First call date | Maturity | Coupon rate |
|---|---|---|---|---|---|---|
| Dated subordinated bond ISIN: XS2549815913 | EUR 750 m. | 2022-11-14 | A / - | 2033-02-26 | 2043-08-26 | Until 2033-08-26: 5.875% p. a. and thereafter 3.75% p. a. above 3 months EURIBOR |
| Dated subordinated bond ISIN: XS2320745156 | EUR 750 m. | 2021-03-22 | A / - | 2031-12-30 | 2042-06-30 | Until 2032-06-30: 1.375% p. a. and thereafter 2.33% p. a. above 3 months EURIBOR |
| Dated subordinated bond ISIN: XS2198574209 | EUR 500 m. | 2020-07-08 | A / - | 2030-07-08 | 2040-10-08 | Until 2030-10-08: 1.75% p. a. and thereafter 3.00% p. a. above 3 months EURIBOR |
| Dated subordinated bond ISIN: XS2063350925 | EUR 750 m. | 2019-10-09 | A / - | 2029-07-09 | 2039-10-09 | Until 2029-10-09: 1.125% p. a. and thereafter 2.38% p. a. above 3 months EURIBOR |
| Undated subordinated bond ISIN: XS1109836038 | EUR 500 m. | 2014-09-15 | A / a+ | 2025-06-26 | Perpetual | Until first call date: 3.375% p. a. and thereafter 3.25% p. a. above 3 months EURIBOR |

**Competitive advantage through low cost of capital (WACC)**

Senior bond not recognised as regulatory capital

# Net risk appetite geared to the desired level with one of the largest retrocession programme in the market



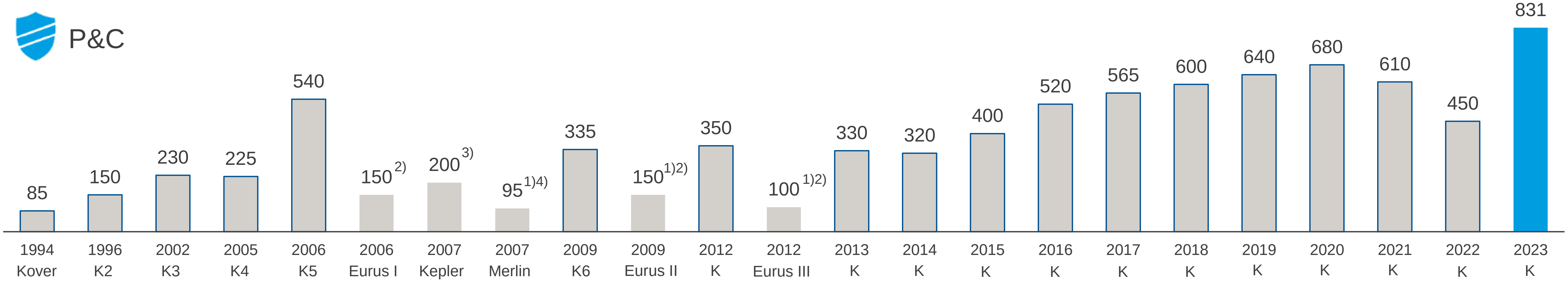

1) Plus expected premium
As at March 2023

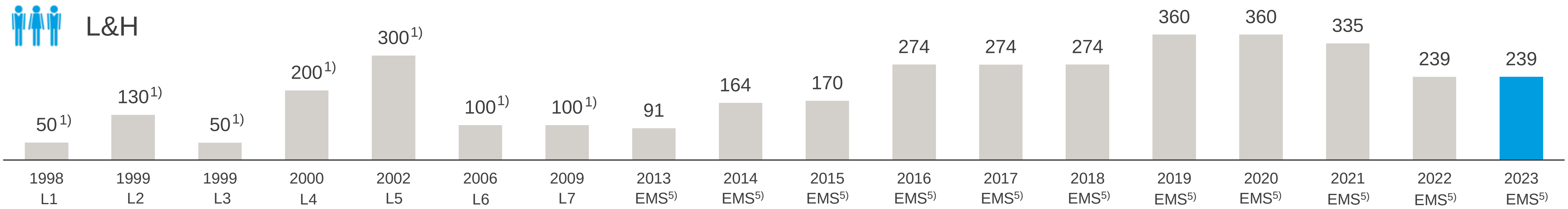
# We pioneered in transferring risks into capital markets via securitisations

## Equity Substitutes

### Transactions
(in m. USD if not otherwise stated)

Expired transactions | On-going transactions | Portfolio-linked securitisation (P&C), K-Cessions




1) In m. EUR
2) Index-linked securitisation
3) Aggregate XL cover (P&C)
4) Credit-linked floating rate note
5) EMS = Extreme Mortality Swap

- In **1994** Hannover Re pioneered the first securitisation of natural catastrophe risks (**Kover**) followed by further transactions (K2-K6 & K-Cessions)
- In **1998** we started with the first-ever transfer of acquisition costs from L&H business to the capital market ( **"L"** deals, L1-L7)



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# Financial strength ratings

| Group | S&P | A.M. Best |
|---|---|---|
| Berkshire Hathaway | AA+ | A++ |
| **Hannover Re** | **AA-** | **A+** |
| Munich Re | AA-[1)] | A+ |
| XL Bermuda | AA- | A+ |
| Swiss Re | AA- | A+ |
| Everest Re | A+ | A+ |
| Partner Re | A+ | A+ |
| SCOR | A+ | A |
| Lloyd's | AA- | A[1)] |

As at 2nd January 2024
1) Positive outlook



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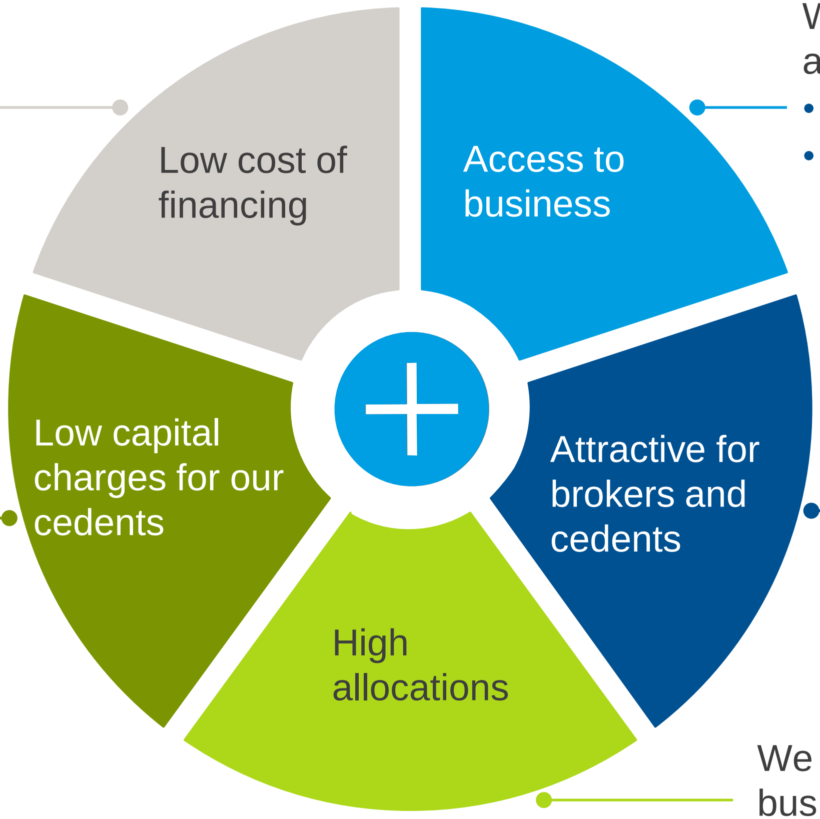
# Benefits of an above-average rating

Our cost of financing in the capital markets is lower

- Hybrid bonds trade at tighter spreads
- Better conditions for LoCs and credit lines

We create lower capital charges for our cedents

- "AA" range S&P capital charge on reinsurance recoverables = 0.8% ("A" = 1.4%, BBB = 3.1%)
- As an above-average rated R/I, we "minimise" our cedents' cost of capital




We have a better showing of business than the average player

- Access to all lines of business
- We enjoy a highly diversified, high quality book of business

We are on virtually all broker lists, with cedents often demanding specific R/Is

We get very high allocations when we quote for business

- >90% vs. some 50% for a Bermuda start-up



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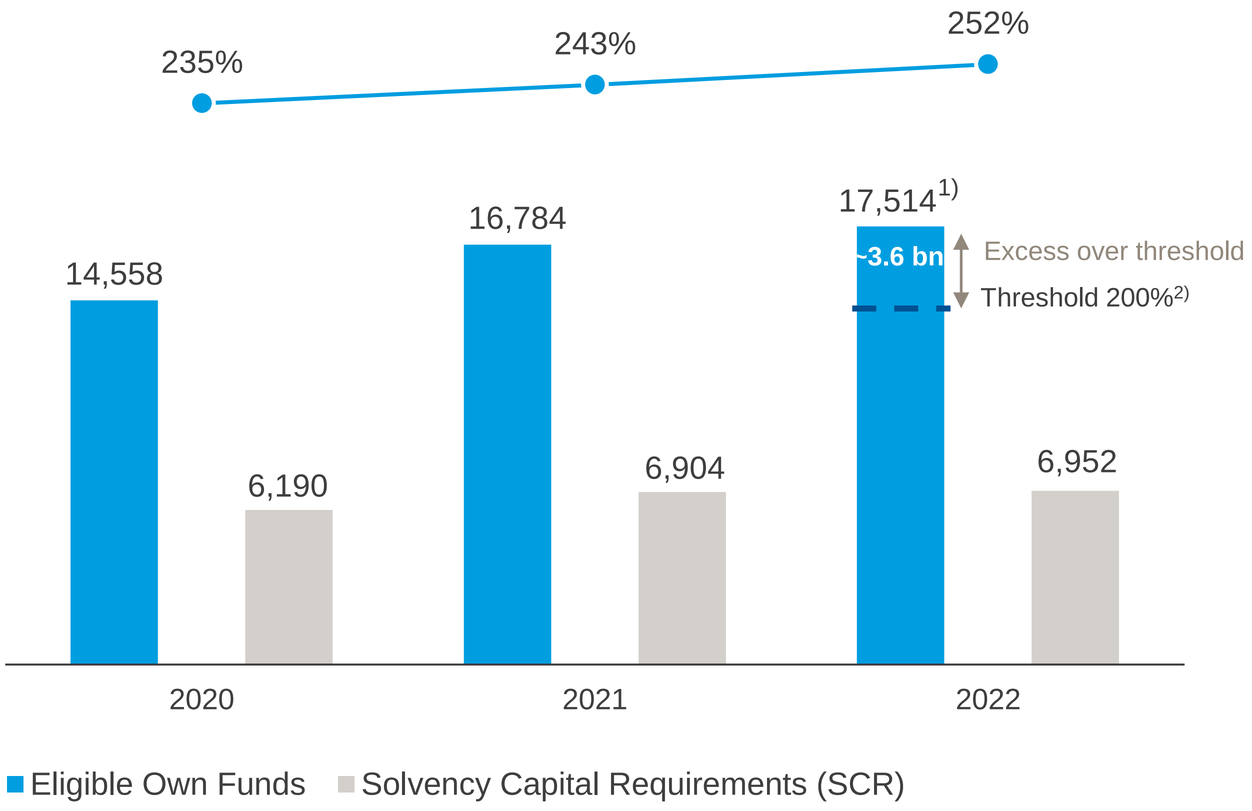
# Capital adequacy ratio remains well above target

## Own Funds increase supported by operating earnings and new hybrid bond

### Development of the Solvency II ratio




1) Excluding minority shareholdings of EUR 650 m.
2) Minimum Target Ratio Limit 180%

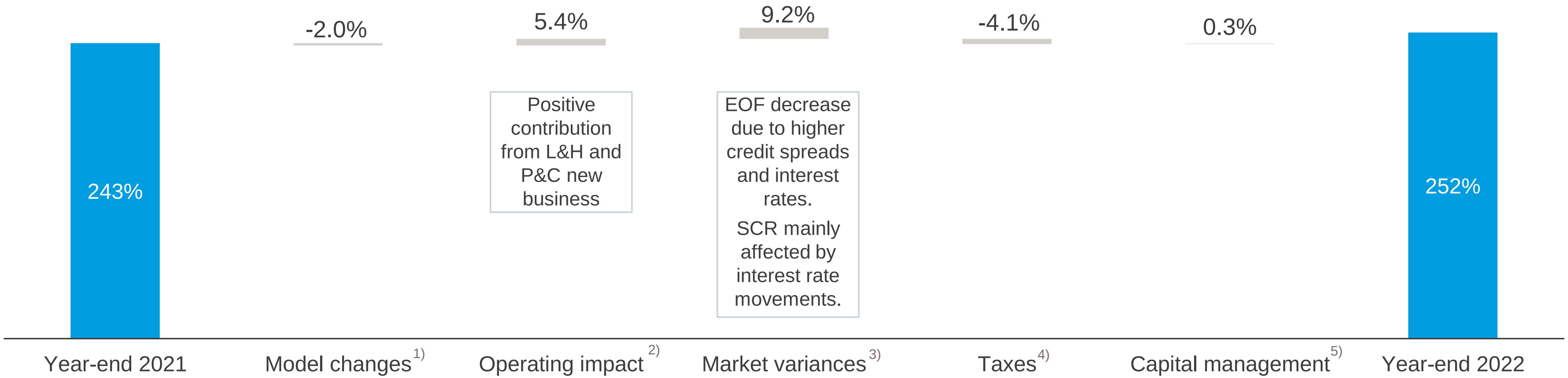
### Comments on 2022 development

- Increase in eligible own funds due to strong operating capital generation and issuance of new hybrid bond (EUR 750 m.)
- SCR increased mainly as a result of business growth and higher asset volumes as well as stronger f/x rates compared to EUR with offsetting effects from interest rate movements
- Increase in excess capital supports further business growth

# Strong capital generation driven by business growth

## Increase in solvency ratio supported by issuance of new hybrid bond

### Solvency II movement analysis



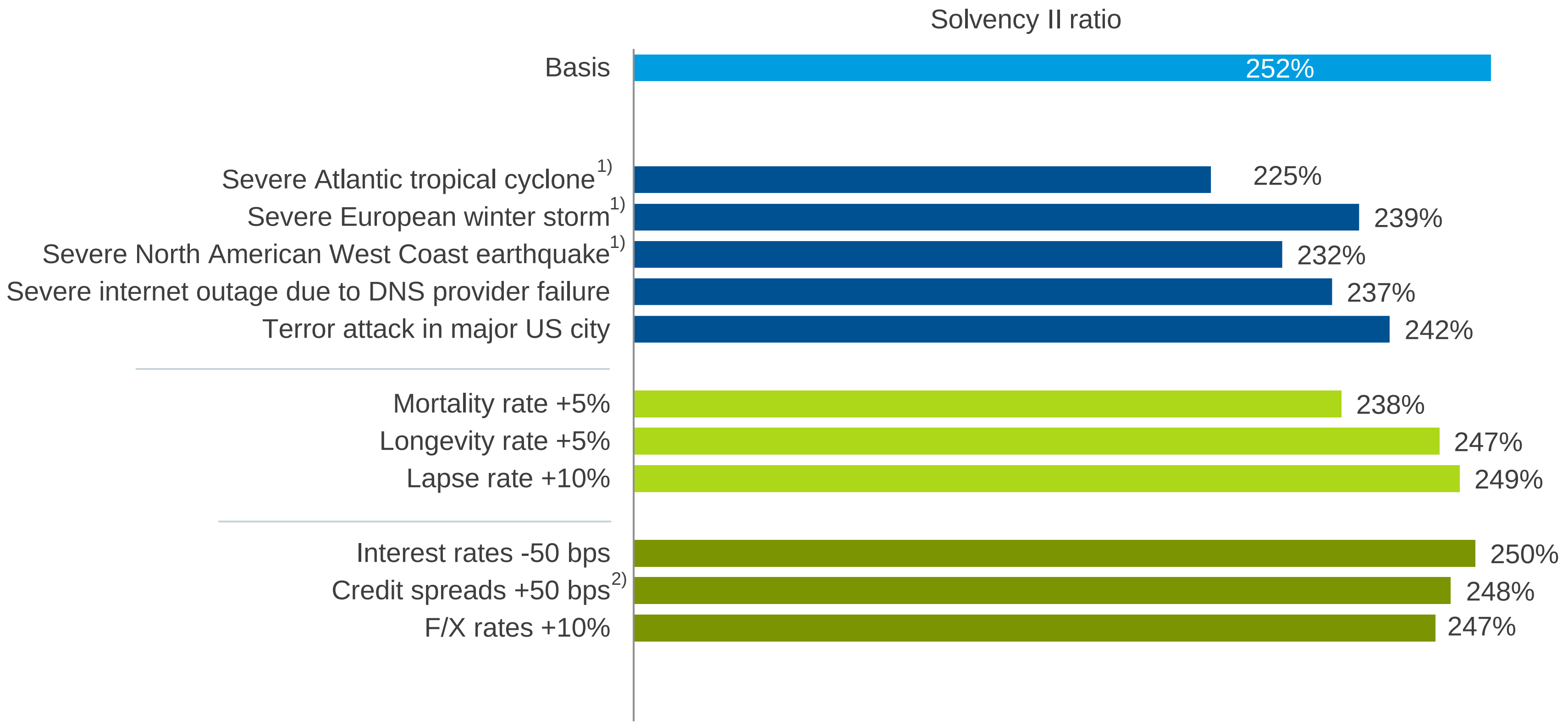

| | Year-end 2021 | Model changes[1] | Operating impact[2] | Market variances[3] | Taxes[4] | Capital management[5] | Year-end 2022 |
|---|---|---|---|---|---|---|---|
| Eligible own funds | 16,784 | -175 | 1,513 | -442 | -185 | 19 | 17,514 |
| Solvency capital requirements | 6,904 | -16 | 462 | -438 | 40 | 0 | 6,952 |

Figures in m. EUR.
1) Model changes (pre-tax) in terms of Eligible Own Funds (EOF) relate to the calculation of technical provisions, mainly L&H. Changes in terms of Solvency Capital Requirements (SCR) relate to the regulatory approved internal capital model.
2) Operating earnings and assumption changes (pre-tax). EOF increase includes the L&H new business value of EUR 496 m.
3) Changes (pre-tax) due to movements in foreign exchange rates, interest rates, credit spreads, inflation (mainly investments) and other financial market indicators.
4) Tax payments and changes in deferred taxes.
5) Incl. dividend payments and changes in foreseeable dividends and the issuance of a hybrid bond of EUR 750 m.

# Individual events with limited impact on Solvency ratio

## Solvency ratio robust under stressed conditions

### Sensitivities and stress tests




1) 250 year return period acc. to our internal model which is equivalent to an occurrence probability of 0.4%.
2) Average stress level of +50 bps, differing by corporate bond issuer rating. Excl. government bonds and incl. impact of changes in dynamic volatility adjustment.



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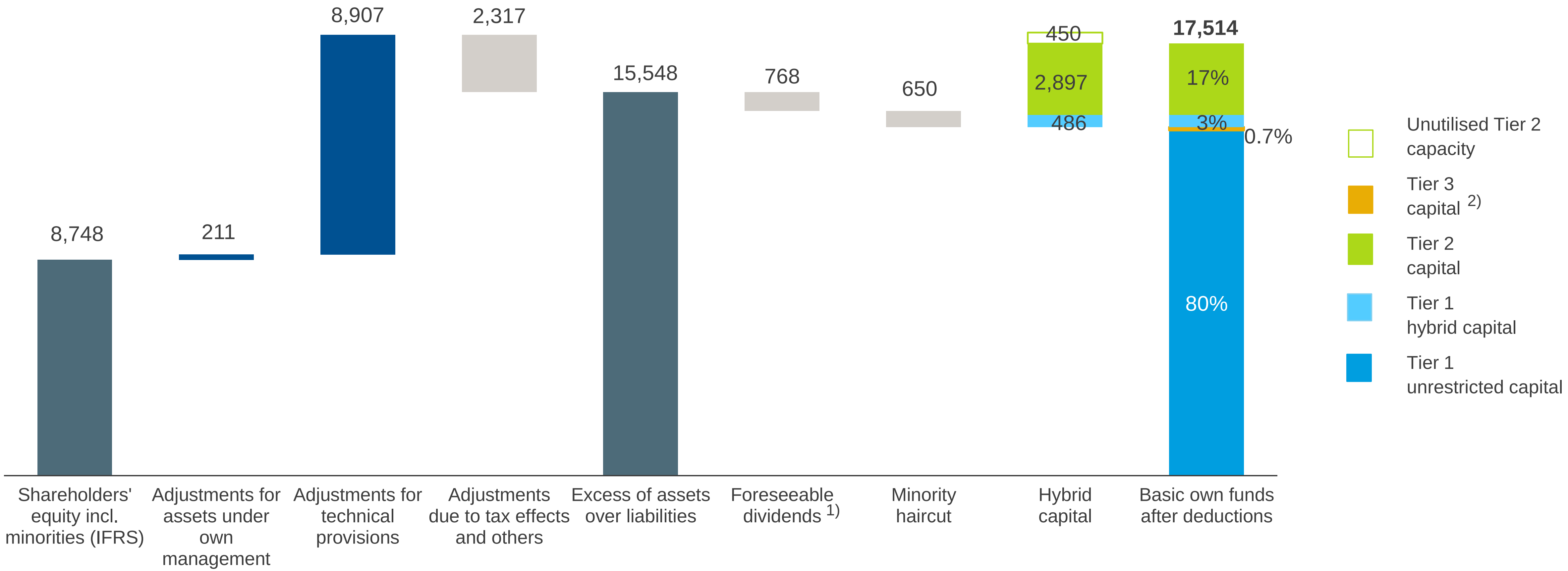
# High-quality capital base with 83% Tier 1
## Unutilised Tier 2 provides additional flexibility

### Reconciliation of IFRS Shareholders' equity vs. Solvency II own funds

in m. EUR



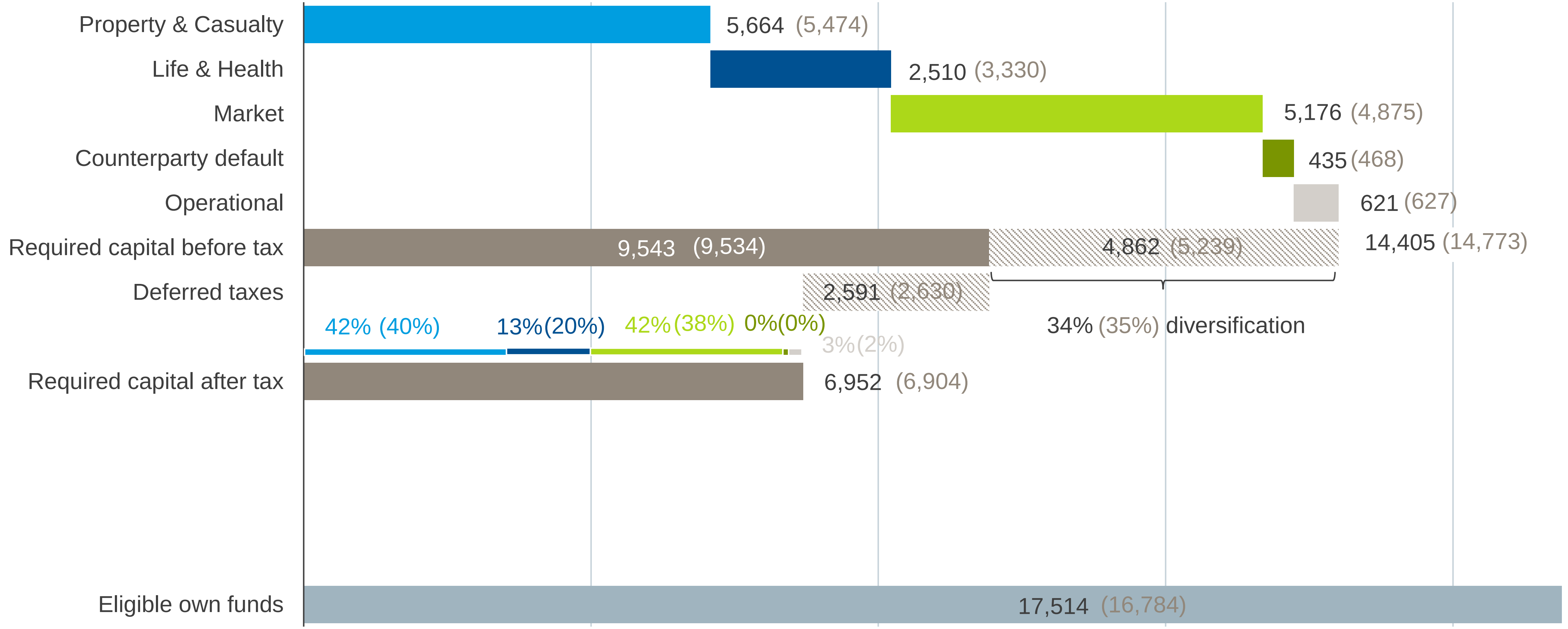

As at 31 December 2022
1) Foreseeable dividends and distributions incl. non-controlling interests
2) Net deferred tax assets

# Efficient capital deployment supported by significant diversification

## Increase in own funds and capital requirements in line with business growth

### Solvency Capital Requirements

in m. EUR




As at 31 December 2022 (2021)
Solvency capital requirements based on the internal model
Capital allocation based on Tail Value-at-Risk taking account of the dependencies between risk categories

# Agenda

# IFRS 17 significantly changes the structure of the balance sheet IFRS 9 changes the classification and measurement of financial instruments

## IAS 39 / IFRS 4 (US GAAP)

**Assets**

Retro share in technical provisions

Deferred Acquisition Costs

Receivables from reinsurance business

Investments IAS 39
Amortised Cost
- Held to Maturity
- Loans, Receivables

Fair Value
- Available for Sale
- Fair Value Option/ Trading

**Liabilities**

Equity

Technical provisions for insurance liabilities
- Provisions for unearned premiums
- Premium reserve
- Provisions for premium refund
- Other technical provisions

Provision for outstanding claims

Other liabilities

## IFRS 9 / 17

**Assets**

Retro-LRC
Retro-LIC

Investments IFRS 9
- Amortised Cost
- Fair Value OCI
- Fair Value PL

**Liabilities**

Equity

"Insurance Contract Liability"

LRC without Loss Component
- Cash flows
- Discounting
- Risk adjustment
- CSM

LRC Loss Component

LIC
- Cash flows
- Discounting
- Risk adjustment

Other liabilities



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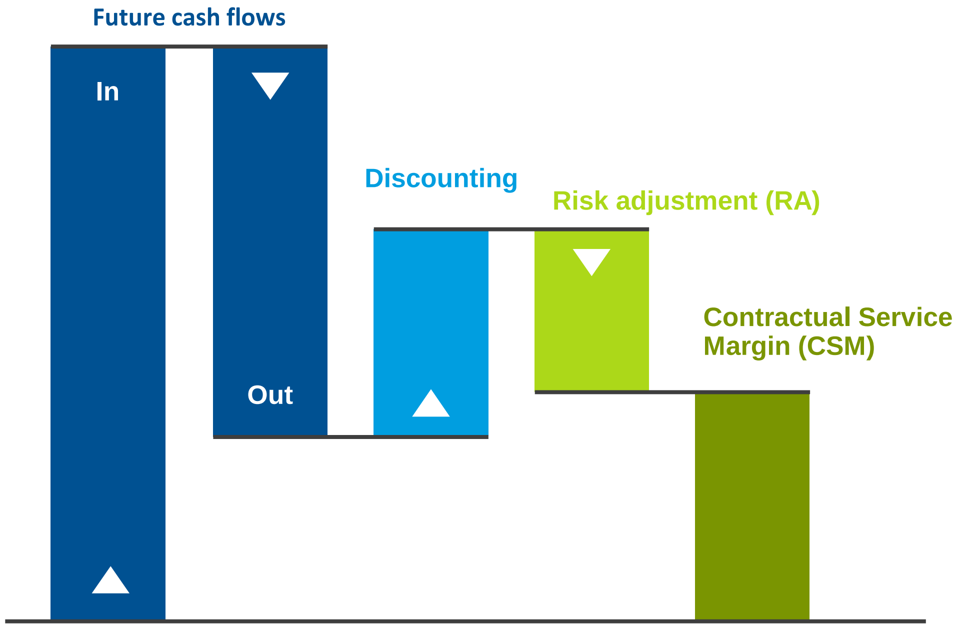
# IFRS 17 - Full adoption of GMM allows to steer business on a consistent basis

## Ensuring transparency and bridging the GA(A)P to economic view

### Full adoption of General Measurement Model (GMM) for entire business (P&C and L&H)




### Valuation methods and rationale

- Cash flows and economics of reinsurance business will remain unchanged
- IFRS 17, in particular **GMM** as default model, is complex with significantly increased data and other requirements
- However, we have taken a broader, long-term view and aim to use the change in accounting as **transformational** in order to
  - increase transparency on **earning patterns** and **value creation**, incl. comparability between lines of business
  - improve alignment with both Solvency II and internal performance measures (IVC: Intrinsic Value Creation)
  - review our data and IT infrastructure, streamline processes and increase automation
  - solve systematic IFRS4 accounting mismatches and reward asset-liability management efforts
  - improve steering and managing of our portfolios
- Adoption of **OCI option** for large parts of our portfolio to match investment valuation will reduce volatility from interest rate movements
- **Prudent reserving approach** will be maintained and – together with CSM and RA at transition – help to manage potential increased volatility

# IFRS 9 - Fundamental revision of accounting rules for financial instruments

## Higher share of assets at Fair Value through P&L

### Classification and valuation

- Majority of investments in **scope of IFRS 9** (direct real estates out of scope)
- IAS 39 **categories** HtM, L&R, AfS, FVPL will change to
  - Amortised Costs (AC)
  - Fair Value through P&L (FVPL)
  - Fair Value through OCI (FVOCI)
  - Fair Value through OCI w/o recycling (FVOCI non-recycling)
- Reduced flexibility in assigning financial instruments to valuation categories (**"SPPI"** criteria)
- Business model **„Hold & Sell"** has been applied, i.e. most financial instruments **continue to be classified as FVOCI** (~ 93%)
- **FVPL** volume rises significantly
- **Expected Credit Loss** (ECL) becomes new P&L component
- Existing **currency accounting mismatch** (monetary vs. non-monetary items) will be mitigated with changes in FV of investment funds (incl. Private-Equity, Real-Estate, fixed-income funds and the respective f/x effects) now being recognised in P&L (previously OCI)
- Minor effect on **equity** at transition (amortised costs instruments)

SPPI = Solely payment of principle interest

### Assets categorised Fair Value P&L

- Main asset classes: Private-Equity, Real-Estate, fixed-income funds

**IAS 39**
<1%

**IFRS 9**
~7.5%

### Introduction of Expected Credit Loss (ECL)

- ECL is measured at acquisition for all fixed-income instruments categorised Amortised Cost or Fair Value OCI
- In case of a significant change in credit quality, probability of default changes from 1 year to remaining maturity

**Stage 1**
Expected loss within one year

**Stage 2**
Expected loss until maturity

**Stage 3**
Impairment (based on market value)

# Transition to IFRS 17 moderately increases earnings level

## Impact of IFRS 17/9 accounting change


### Property & Casualty reinsurance

- Prudent Reserving approach and Retro Strategy continue to mitigate overall volatility
- OCI option limits volatility of technical result and equity

### Life & Health reinsurance

- CSM release with stabilising effect on overall result
- OCI option limits volatility of technical result and equity

### Investments

- Volatility likely to increase due to higher share of assets FVPL, but due to "hold & sell" >90% FVOCI
- Minor impact from introduction of Expected Credit Loss
- Insurance related derivatives reflected in technical result


**Property & Casualty reinsurance**

- Minor impact from accounting change

**Life & Health reinsurance**

- Minor impact for large parts of L&H business
- Uplift from unlocking effect for mortality business with long durations

**Investments**

- Minor impact from accounting change



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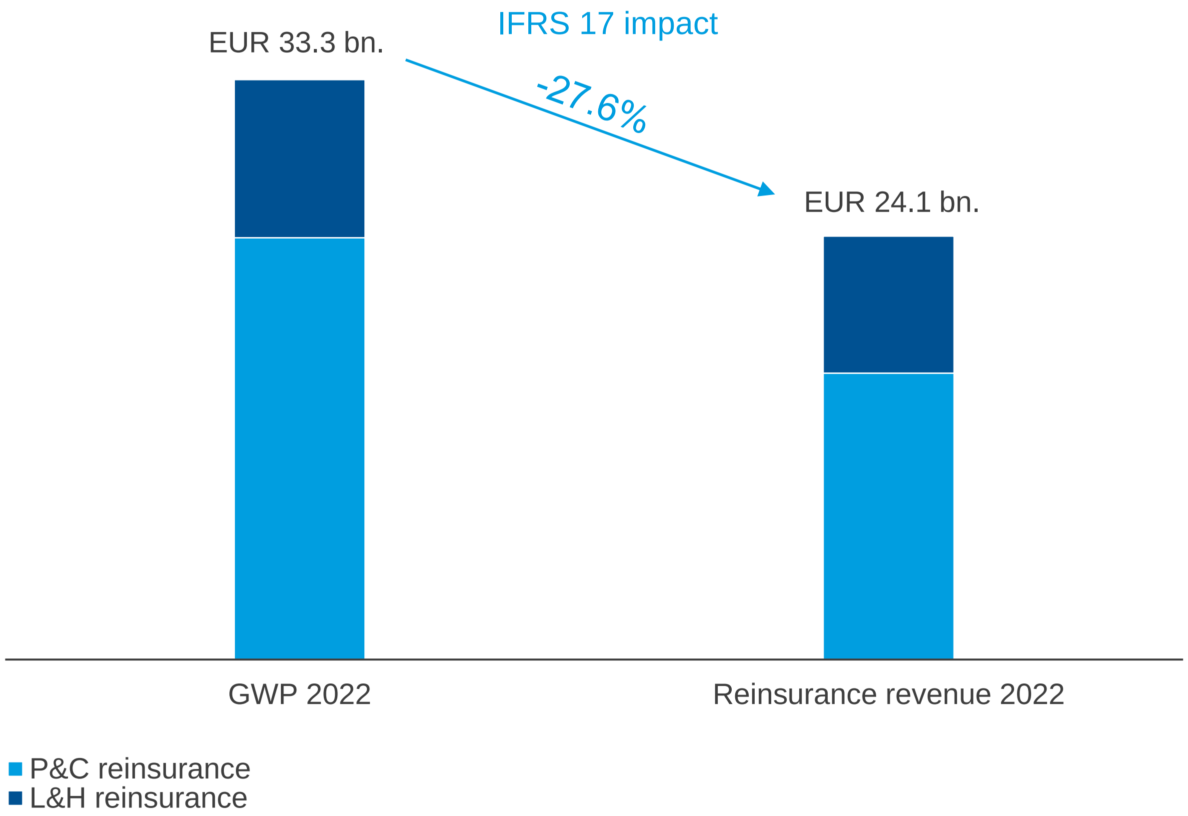
# Reinsurance revenue will be lower than gross written premium

## Reinsurance revenue




## Accounting impact IFRS 17

- Exclusion of commissions and non-distinct investment components (NDIC)
- Exclusion of unearned premiums (mainly impacting P&C)
- Inclusion of result from deposit-accounted Financial Solutions business



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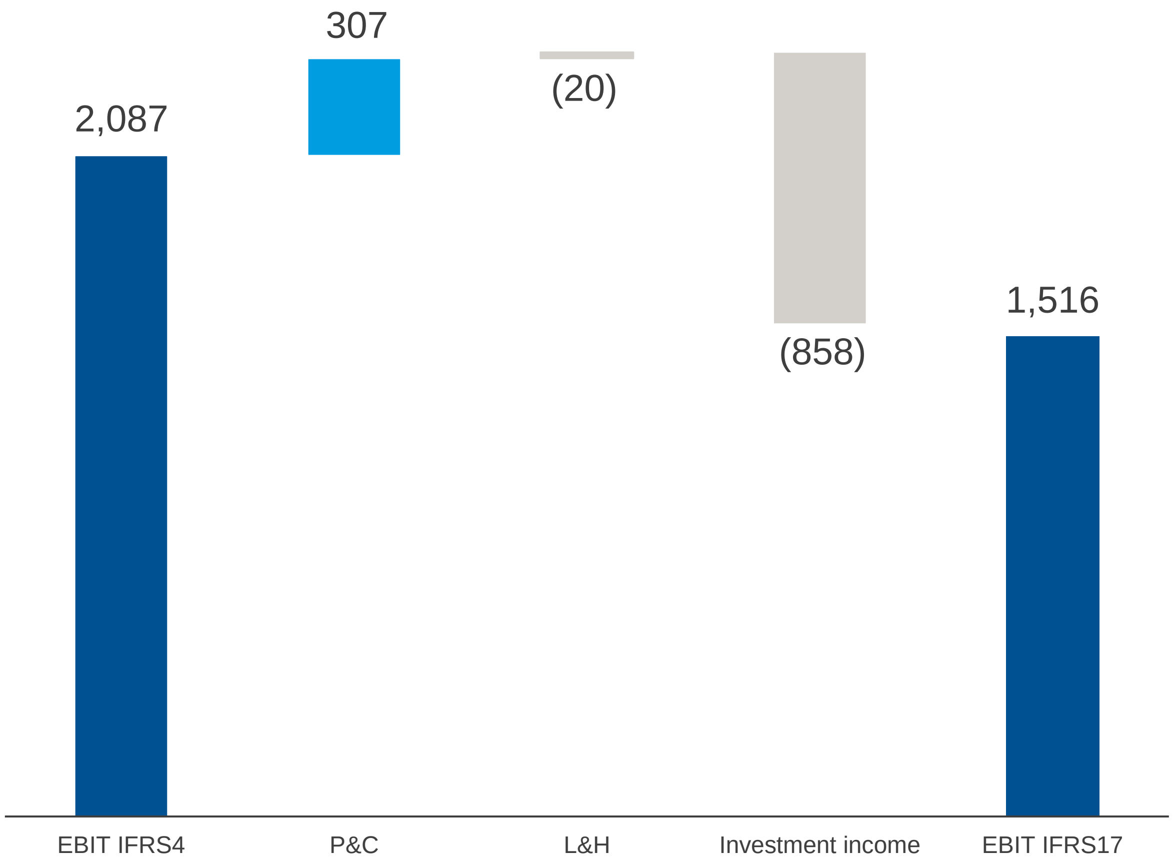
# FY2022 IFRS 17/9
## EBIT IFRS17 vs IFRS4




All figures in m. EUR unless otherwise stated

**P&C**

- Discounted presentation of technical results, including interest accretion, resulting in a net effect of about 150 m.
- Volume-driven change in currency result 116 m.

**L&H**

- IFRS4 contains +183 m. Covid-19 claims, which were already included at transition under IFRS17
- Unlocking of best estimate liabilities at transition +57
- Loss component (new business and change) -263 m.

**Investment income**

- Lower realised gains -714m (thereof transfer of private equity into joint venture -558m)
- Lower result from at-equity participations -174 m.
- Impact from valuation (of higher share) of assets at FVTPL -134 m.
- Allocation of embedded derivatives to liabilities +147m

# P&C: IFRS 17 with limited impact on earnings level

## Prudent reserving approach

### Underlying development

- Positive impact from margin improvements expected in 2023 renewals provides flexibility to strengthen resilience reserve
- Prudent reserving approach
- Large loss budget increased to EUR 1,725 m.

### Accounting impact IFRS 17

**Discounting**

- Lower Combined ratio due to discounting of cash flows, offsetting impact from interest accretion in insurance finance expenses
- OCI option limits volatility of technical result and equity

**Reserving**

- Prudent best estimate reflected in LIC; expectation of positive run-off result (A/E experience)
- As a result of prudent initial reserving parts of the loss component might ultimately not be loss making
- Risk adjustment (RA) provides additional layer of prudency



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# P&C: translation to IFRS 17 metrics results in lower combined ratio

## Outlook 2023: Expected margin improvements enable strengthening of resiliency

### IFRS 17 combined ratio (net / net calculation)

$$\textit{Combined ratio} = \frac{\textit{Reinsurance service expenses (net)}}{\textit{Reinsurance revenue (net)}^{1)}}$$

*- illustrative -*


### Accounting impact IFRS 17

**Discounting**

- Positive impact on combined ratio (magnitude depending on interest rate level)

**Change in disclosure**

- Deduction of commissions and NDIC[2)] from both numerator and denominator

**Admin expenses**

- Directly attributable expenses are lower than IFRS 4 admin expenses
- Moderate positive impact of ~0.6%p reflects overall low expense ratio

**Risk adjustment**

- Business growth with negative impact on combined ratio

**Other**

- Other methodological changes (e.g. seasonality of loss component)

Illustrative translation to IFRS 17 assuming a combined ratio <100 %. 1) Reinsurance revenue (gross) – Reinsurance expenses (ceded) 2) Non-distinct investment component

# L&H: IFRS 17 transition effects will lead to moderately higher earnings level

## Outlook 2023: further growth mainly from Longevity and Financial Solutions

### Underlying development

- Supported by further growth mainly in Longevity and Financial Solutions
- Further decreasing impact from Covid-19

### Insurance service result

- Insurance service result will include full profitability of underwriting activity
  - Includes result from currently deposit accounted treaties in Financial Solutions
  - Includes planned income from funds withheld

### Accounting impact IFRS 17

- Focus of transition approach on sustainability of future earnings
- Better reflection of value and earnings of L&H business
- Increasing transparency in particular in connection to CSM development
- Overall similar earnings pattern (largely unchanged for Financial Solutions and Longevity business)
- Transition to IFRS 17 results in unlocking of best estimate liability and unlocking of discount rates to current interest rates

**EBIT level up by mid to high double-digit million**



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# Investments: IFRS 9 has limited impact on underlying earnings level

## P&L volatility likely to increase due to higher share of assets FVPL

### Underlying development

- Ordinary investment income
  - Increasing contribution from fixed income securities (excl. inflation-linked bonds),
  - Decreasing contribution from inflation-linked bonds based on currently embedded inflation expectation
  - Planned contribution from alternative investments in line with 2022
- No realised gains / losses planned
- Current economic environment bears risk of decreasing valuation of private equity and real estate

### Accounting impact IFRS 9

- Volatility likely to increase (more pronounced in P&C) due to higher share of assets FVPL
  - Increase from <1% to ~7.5%, main asset classes: Private-Equity, Real-Estate, fixed-income funds
- Minor impact from introduction of Expected Credit Loss
- Insurance related derivatives reflected in technical result



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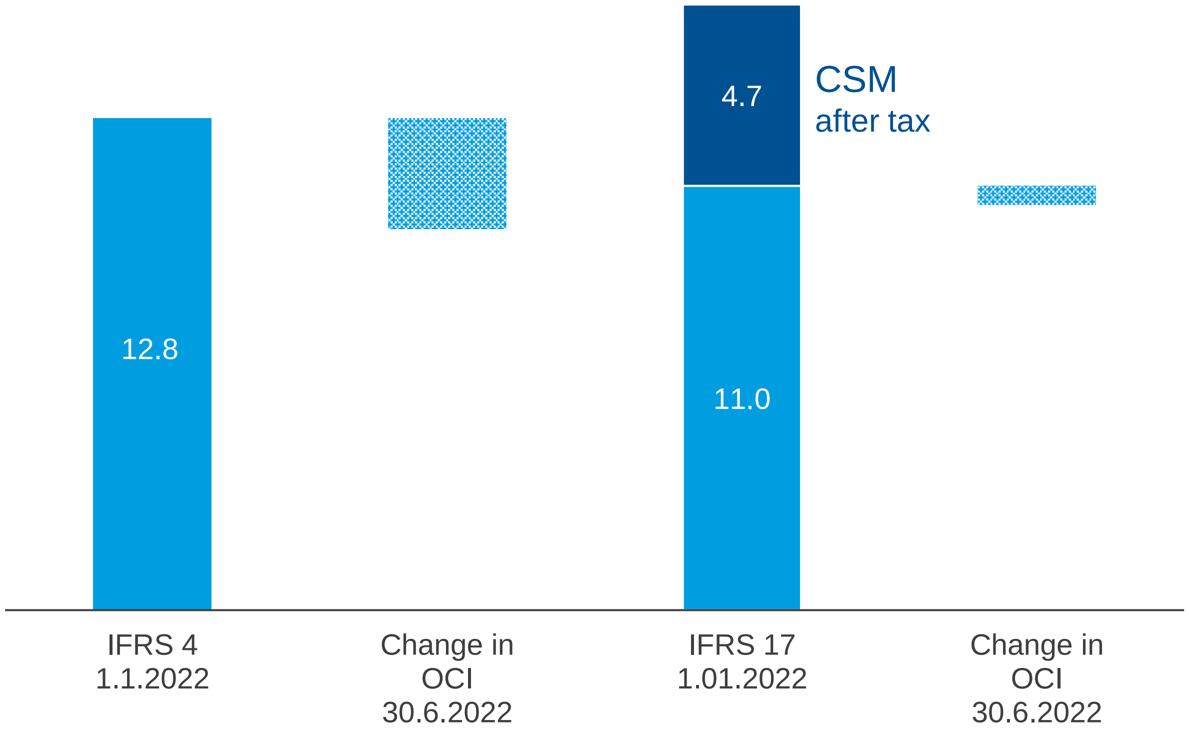
# Strategic RoE target increased to 1000 bps above risk free…

## …reflecting transition to IFRS 17/9

**Total equity** in bn. EUR




### Accounting impact IFRS 17

$$RoE = \frac{\textit{Group net income} \nearrow}{\textit{Average equity} \searrow}$$

- Unlocking of best-estimate liabilities in L&H results in decrease of shareholders' equity and increase in EBIT (mid to high double-digit millions)

**Shareholders' equity will be more stable due to improved matching of assets and liabilities**

**RoE uplift of 100bps**

All figures as of 1.1.2022, preliminary unaudited figures



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# Risk-adjustment methodology based on internal view on price for insurance risks

## Interest rates

- Bottom-up approach (risk-free rates + illiquidity premium (ILP))
- Interest rates based on SII, adjusted to better reflect economic reality and Hannover Re portfolio

IFRS 17 risk-free rates

- largely aligned with SII methodology, differences in extrapolation

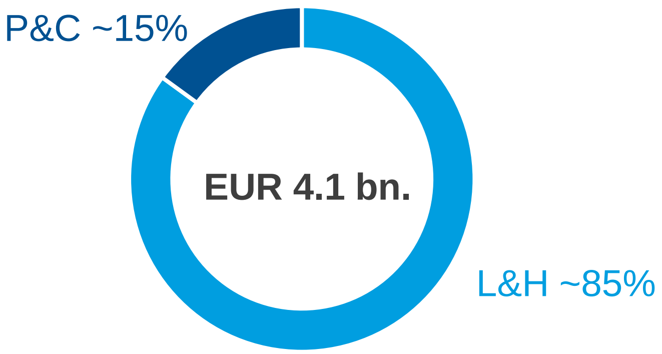
IFRS 17 ILP

- based on SII methodology with use of individual asset portfolio
- Duration-dependent ILP for EUR and USD to reflect the dependency between spread levels and duration

**Changes in interest rates will largely be reflected in OCI**

## Risk adjustment

- Margin approach aligned with pricing metrics for insurance risks calculated with available capital as base
- Consideration of group diversification
- Confidence level of risk adjustment ~80%
- Risk adjustment (RA) is sensitive to interest rate movements
- Risk adjustment (at transition) at similar level to Solvency II risk margin



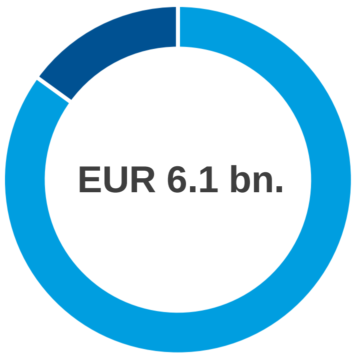

All figures as of 1.1.2022, preliminary unaudited figures

# CSM reflects future profits of L&H reinsurance business and stabilises profit emergence over time

## Contractual service margin

P&C ~15%

- (Low) level of CSM reflects short duration of business and conservative reserving
- Well diversified by line of business and region
- Release of CSM largely within two years

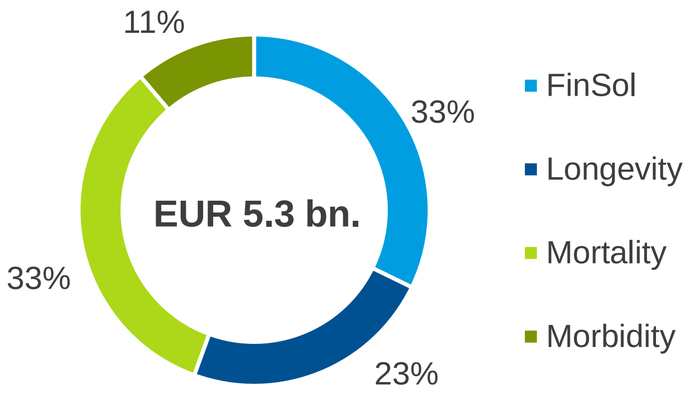



L&H: ~85%

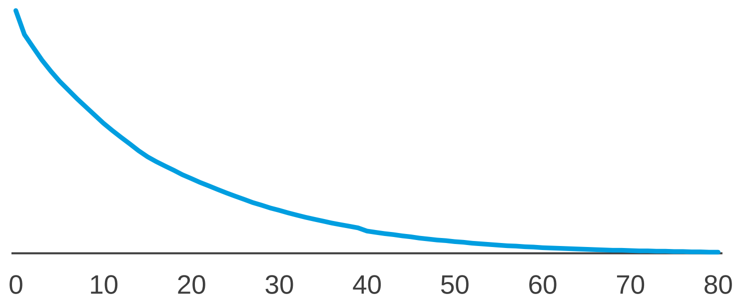
- New business contribution expected to be higher than CSM release (~10% p.a., on average/multi-year view)
- Volatility will mainly come from new or discontinued individual large transactions or assumption changes for business with long durations
- Interest-rate movements impact valuation of new business, overall CSM not materially affected due to locked-in interest rates

## L&H CSM

- New business CSM + Loss Component on similar level to SII VNB
  - Only directly attributable costs included in IFRS 17 vs. full internal costs in SII
  - Differences in new business definition between IFRS 17 and SII




**Release of L&H CSM (in-force business)**




All figures as of 1.1.2022, preliminary unaudited figures



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# Key take-aways: Greater transparency on future results

## Increasing earnings in the medium term


- **Economic view:** More realistic and aligned presentation of market and interest rate developments
- **Increasing Transparency:** Additional items will help to estimate current financial status
- **Increased comparability:** Common set of valuation principles across the industry
- **Better visibility:** Better disclosure of information to anticipate future profits

**Outlook for Hannover Re:**

**Property & Casualty reinsurance:**

- Very favourable underlying market conditions
  - improved net risk return and underlying earnings profile provide increased flexibility to increase confidence level of reserves

**Life & Health reinsurance:**

- Positive underlying business development
  - profitable business growth mainly driven by Longevity and Financial Solutions
  - additional uplift from transition to IFRS17
- Further decrease of Covid-19-impact expected

**Investments:**

- Ordinary investments will benefit from higher interest rates
- Contribution from inflation-linked bonds is expected to decline (materially)
- Some allowance for negative FVPL impact from Private Equity and real estate

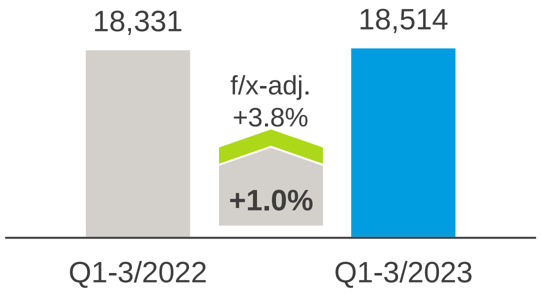
# Agenda

# Q1-3/2023 performance fully supports targets for the full year

## L&H with strong operating performance, margin and resiliency improvement in P&C

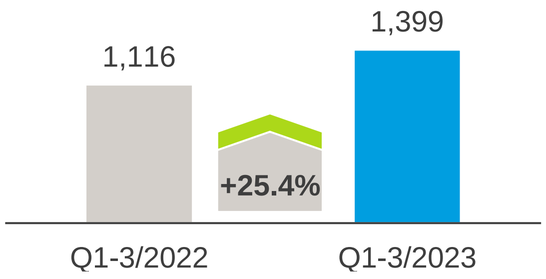
### Group

**Reinsurance revenue**




Target 2023: ≥ 5% growth[1)]

**Group net income**




Target 2023: ≥ 1.7 bn.[2)]

| AuM | RoI | RoE |
|---|---|---|
| **57.6 bn.** | **3.0%** | **20.0%** |
| +4.1% | Target 2023: ≥ 2.4% | Target 2023: 10.8% |

| CSM (net) | Shareholders' equity | Solvency ratio |
|---|---|---|
| **8.3 bn.** | **9.6 bn.** | **270%** |
| +26.1% | +5.7% | 30.09.2023 |

### P&C reinsurance

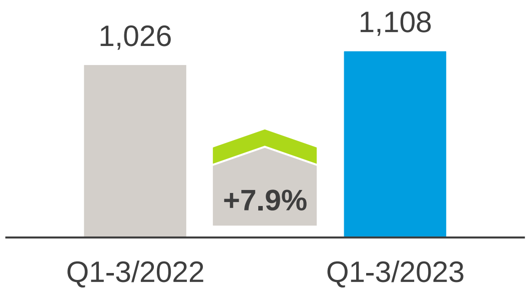
**Reinsurance revenue (gross)**

**12.7 bn.**
+2.8% (f/x-adj. +5.5%)

**New business CSM & LC (net)**

**2.1 bn.**
+55.2%

**EBIT**




### L&H reinsurance

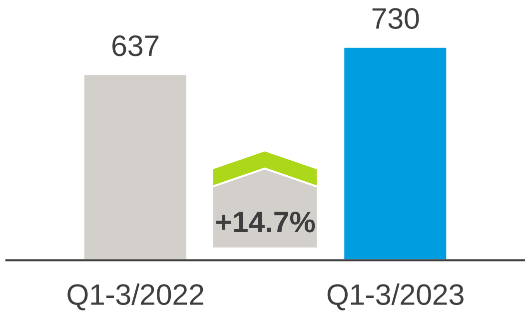
**Reinsurance revenue (gross)**

**5.8 bn.**
-2.8% (f/x-adj. +0.3%)

**New business CSM & LC (net)**

**219 m.**
-36.5%

**EBIT**




All figures in m. EUR unless otherwise stated
1) At unchanged f/x rates
2) Subject to no major distortions in capital markets and/or major losses not exceeding the large loss budget of EUR 1.725 bn. in 2023 and no further significant impact from Covid-19 on L&H result



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# Continued margin improvement in favourable market environment
## Combined ratio reflects increase in reserve resiliency

| Property & Casualty R/I | Q3/2022 | Q3/2023 | Q1-3/2022 | Q1-3/2023 |
|---|---|---|---|---|
| Reinsurance revenue (gross) | 4,539 | 4,371 | 12,389 | 12,736 |
| Reinsurance revenue (net) | 4,154 | 3,701 | 11,259 | 10,885 |
| Reinsurance service result | 209 | 287 | 606 | 885 |
| Reinsurance finance result | (80) | (188) | (229) | (473) |
| Investment result | 285 | 324 | 833 | 949 |
| Other result | (36) | (145) | (184) | (253) |
| **Operating profit/loss (EBIT)** | **378** | **279** | **1,026** | **1,108** |
| | | | | |
| Combined ratio (net) | 95.0% | 92.2% | 94.6% | 91.9% |
| New business CSM (net) | 380 | 335 | 1,641 | 2,164 |
| New business LC (net) | (37) | (4) | (273) | (39) |

All figures in m. EUR unless otherwise stated
LC = Loss component

### YTD

- **Reinsurance Revenue (RR) / New business CSM & LC (net)**
  - Reinsurance revenue (gross) growth +2.8% (f/x-adjusted +5.5%) reflects cycle management with shift towards non-proportional business and disciplined underwriting
  - Lower revenue in Q3/2023 reflects negative currency effects and increasing weight of 2023 underwriting year; however, overall growth clearly in line with full-year expectation
  - Strong growth in New business CSM & LC (net) of 2,125 m. (+55.2%); mainly from EMEA, Americas and Structured Reinsurance/ILS
- **Reinsurance service result (RSR)**
  - RSR supported by strong margin increase, reflected in higher New business CSM and lower New business LC
  - Large losses of 1,204 m. within Q1-3 budget of 1,328 m., however booked to budget
  - Increase in reserve resiliency in line with planning
  - Higher discount effect (5.6%) vs. interest accretion reflected in prudent reserving
- **Investment result**
  - Strong ordinary income supported by higher fixed-income yields, including 109 m. contribution from inflation-linked bonds
- **Other result**
  - Decrease mainly driven by negative currency effects



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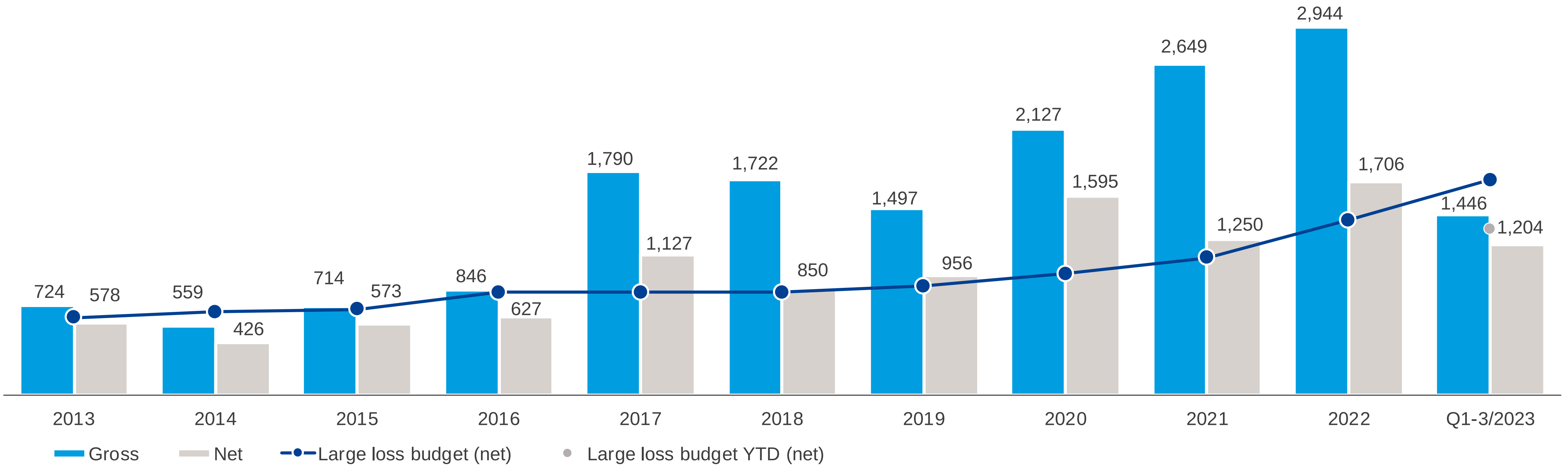
# Q1-3/2023 large losses 124 m. below budget of 1,328 m.

## 521 m. budget available for Q4

### Natural and man-made catastrophe losses[1)]

in m. EUR




| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Q1-3/2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Large loss budget (net) in m. EUR | 625 | 670 | 690 | 825 | 825 | 825 | 875 | 975 | 1,100 | 1,400 | 1,725 |
| ILS share of gross loss in m. EUR | 22 | 21 | 7 | 34 | 358 | 378 | 244 | 88 | 439 | 1,002 | 14 |

All figures in m. EUR unless otherwise stated
1) Natural catastrophes and other major losses in excess of EUR 10 m. gross, undiscounted view

# Large losses within Q1-3/2023 budget of EUR 1,328 m.

| Catastrophe losses[1)] in m. EUR | Date | Gross | Net |
|---|---|---|---|
| Floods, New Zealand | 26 Jan - 6 Feb | 90.4 | 45.7 |
| Wildfires, Chile | 21 Feb - 31 Mar | 22.9 | 22.9 |
| Earthquake, Türkiye | 6 Feb | 279.2 | 273.1 |
| Cyclone "Gabrielle", New Zealand | 10 - 17 Feb | 122.3 | 66.0 |
| Hail / Storm, USA | 01 - 03 Mar | 25.0 | 7.3 |
| Tornadoes / Storm, USA | 24 - 27 Mar | 13.8 | 13.8 |
| Tornadoes / Storm, USA | 30 Mar - 02 April | 51.8 | 40.7 |
| Hail / Storm, USA | 14 - 20 April | 10.1 | 7.5 |
| Rain / Flood, Italy | 16 - 22 May | 37.5 | 37.5 |
| Hail / Storm, Italy | 28 Jul - 25 Aug | 131.7 | 131.7 |
| Typhoon "Doksuri", China | 26 - 28 Jul | 15.0 | 15.0 |
| Floods, Europe | 03 - 07 Aug | 31.8 | 31.8 |
| Wildfires, Hawaii | 08 - 10 Aug | 168.0 | 87.2 |
| Wildfires, Canada | 15 - 31 Aug | 23.4 | 21.4 |
| Hurricane "Idalia", USA | 28 - 31 Aug | 64.5 | 55.0 |

1) Natural catastrophes and other major losses in excess of EUR 10 m. gross
Large loss budget 2023: EUR 1,725 m., thereof EUR 250 m. man-made and EUR 1,475 m. NatCat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# Large losses within Q1-3/2023 budget of EUR 1,328 m.

| **Catastrophe losses**[1] in m. EUR | **Date** | **Gross** | **Net** |
|---|---|---|---|
| Earthquake, Morocco | 08 Sep | 70.0 | 70.0 |
| Typhoon "Haikui", China | 08 Sep | 18.0 | 18.0 |
| Storm "Ophelia", USA | 28 Sep - 03 Oct | 23.6 | 23.6 |
| **18 Natural catastrophes** | | **1,199.0** | **968.1** |
| | | | |
| 11 Property losses | | 202.3 | 191.1 |
| 2 Credit losses | | 29.7 | 29.7 |
| 1 Aviation loss | | 14.7 | 14.7 |
| **14 Man-made losses** | | **246.8** | **235.6** |
| | | | |
| **32 Major losses** | | **1,445.8** | **1,203.6** |

1) Natural catastrophes and other major losses in excess of EUR 10 m. gross
Large loss budget 2023: EUR 1,725 m., thereof EUR 250 m. man-made and EUR 1,475 m. NatCat

# Strong operating performance in L&H reinsurance

| Life & Health R/I | Q3/2022 | Q3/2023 | Q1-3/2022 | Q1-3/2023 |
|---|---|---|---|---|
| Reinsurance revenue (gross) | 1,977 | 1,870 | 5,943 | 5,778 |
| Reinsurance revenue (net) | 1,836 | 1,690 | 5,533 | 5,233 |
| Reinsurance service result | 161 | 196 | 458 | 677 |
| Reinsurance finance result | (33) | (72) | (90) | (130) |
| Investment result | 83 | 91 | 359 | 315 |
| Other result | (45) | (8) | (90) | (132) |
| **Operating profit/loss (EBIT)** | **166** | **206** | **637** | **730** |
| | | | | |
| New business CSM (net) | 117 | 77 | 347 | 228 |
| New business LC (net) | (1) | (4) | (2) | (9) |

**YTD**

- **Reinsurance Revenue (RR) / New Business CSM & LC (net)**
  - Reinsurance revenue (gross) stable: -2.8% (f/x-adjusted +0.3%)
  - Financial Solutions business increasing and fully captured in revenue, Longevity stable
  - Decreasing contribution from Mortality and Morbidity due to in-force management actions
- **Reinsurance service result (RSR)**
  - Improvement in RSR largely driven by Mortality, favourable claims experiences and rate improvements after significant Covid losses in 2022; one-off from retro recaptures (+30 m.)
  - Financial Solutions with continued strong contribution
  - Continued business growth combined with very strong CSM of 6.0 bn. and RA of 2.7 bn. support sustainable future earnings
- **Investment result**
  - Increase in ordinary income; extraordinary contribution from extreme mortality cover in 2022
- **Other result**
  - Decrease mainly driven by one-off termination fee in 2022 (+40 m.)

All figures in m. EUR unless otherwise stated



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# RoI well above target, driven by favourable ordinary income

## Resilient portfolio with minor impact from credits and FVTPL

| Investments | Q3/2022 | Q3/2023 | Q1-3/2022 | Q1-3/2023 | RoI |
|---|---|---|---|---|---|
| Ordinary investment income [1)] | 523 | 517 | 1,399 | 1,458 | 3.4% |
| Realised gains/losses | (15) | (14) | (71) | (58) | -0.1% |
| Depreciations Real Assets, Impairments | (12) | (20) | (35) | (47) | -0.1% |
| Change in ECL | -33 | -6 | -53 | -14 | 0.0% |
| FVTPL[2)]- Valuation | (50) | 1 | 73 | 58 | 0.1% |
| Investment expenses | (45) | (46) | (119) | (131) | -0.3% |
| **Investment result** | **368** | **432** | **1,193** | **1,266** | **3.0%** |

| Unrealised gains/losses on investments (OCI) | 31 Dec 22 | 30 Sep 23 |
|---|---|---|
| Fixed Income | (4,863) | (5,318) |
| Equities (non-recycling) | (0.1) | (0.1) |
| Real Assets | 546 | 589 |
| Others (Participations etc.) | 275 | 287 |
| **Total** | **(4,042)** | **(4,444)** |

All figures in m. EUR unless otherwise stated
1) Incl. results from associated companies
2) Fair Value Through P/L of financial instruments

### YTD

- Increase in ordinary income predominantly due to higher locked-in yields, contribution from inflation-linked bonds (109 m.)
- Realised gains/losses driven by regular portfolio maintenance with minor changes on asset allocation
- Result from change in fair value of financial instruments driven by insurance-related derivatives
- Slight increase in asset volume driven by strong operating cash flow
- Increase in unrealised losses due to further rise in interest rate levels



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# Our business groups at a glance
## Q3/2023 vs. Q3/2022

| | Property & Casualty R/I | | | Life & Health R/I | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| in m. EUR | Q3/2022 | Q3/2023 | Δ-% | Q3/2022 | Q3/2023 | Δ-% | Q3/2022 | Q3/2023 | Δ-% |
| Reinsurance revenue (gross) | 4,539 | 4,371 | -3.7% | 1,977 | 1,870 | -5.4% | 6,515 | 6,242 | -4.2% |
| Reinsurance service expenses | 4,411 | 3,555 | -19.4% | 1,822 | 1,654 | -9.2% | 6,232 | 5,209 | -16.4% |
| Reinsurance service result (gross) | 128 | 816 | - | 155 | 217 | 39.6% | 283 | 1,033 | - |
| Reinsurance result (ceded) | 81 | (529) | - | 6 | (21) | - | 87 | (550) | - |
| **Reinsurance service result** | **209** | **287** | **37.3%** | **161** | **196** | **21.5%** | **370** | **483** | **+30.5%** |
| Reinsurance finance result | (80) | (188) | 134.5% | (33) | (72) | 115.2% | (113) | (260) | +128.8% |
| Investment result | 285 | 324 | 13.8% | 83 | 91 | 8.8% | 368 | 415 | +12.6% |
| Currency result | 54 | (73) | - | (33) | 30 | - | 21 | (42) | - |
| Other income and expenses | (90) | (72) | -19.7% | (12) | (39) | - | (102) | (111) | +9.3% |
| **Operating profit/loss (EBIT)** | **378** | **279** | **-26.4%** | **166** | **206** | **24.1%** | **544** | **484** | **-11.0%** |
| | | | | | | | | | |
| **Net income before taxes** | | | | | | | **523** | **458** | **-12.4%** |
| Taxes | | | | | | | (164) | (20) | -88.0% |
| **Net income** | | | | | | | **359** | **438** | **+22.0%** |
| Non-controlling interest | | | | | | | 58 | (1) | - |
| **Group net income** | | | | | | | **301** | **439** | **+45.8%** |

Tax ratio Q3/2023 below expected level, mainly driven by geographic income split



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# Our business groups at a glance
## Q1-3/2023 vs. Q1-3/2022

| in m. EUR | Property & Casualty R/I | | | Life & Health R/I | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Q1-3/2022 | Q1-3/2023 | Δ-% | Q1-3/2022 | Q1-3/2023 | Δ-% | Q1-3/2022 | Q1-3/2023 | Δ-% |
| Reinsurance revenue (gross) | 12,389 | 12,736 | +2.8% | 5,943 | 5,778 | -2.8% | 18,331 | 18,514 | +1.0% |
| Reinsurance service expenses | 11,694 | 10,451 | -10.6% | 5,458 | 5,049 | -7.5% | 17,152 | 15,499 | -9.6% |
| Reinsurance service result (gross) | 695 | 2,286 | - | 484 | 729 | +50.6% | 1,179 | 3,015 | +155.7% |
| Reinsurance result (ceded) | (89) | (1,401) | - | (26) | (53) | +100.6% | (116) | (1,453) | - |
| **Reinsurance service result** | **606** | **885** | **+46.1%** | **458** | **677** | **+47.8%** | **1,064** | **1,561** | **+46.8%** |
| Reinsurance finance result | (229) | (473) | +106.6% | (90) | (130) | +43.6% | (319) | (602) | +88.8% |
| Investment result | 833 | 949 | +13.8% | 359 | 315 | -12.1% | 1,193 | 1,266 | +6.1% |
| Currency result | 30 | (13) | - | (36) | 5 | - | (6) | (8) | +33.8% |
| Other income and expenses | (214) | (240) | +12.0% | (53) | (137) | +157.4% | (270) | (380) | +40.8% |
| **Operating profit/loss (EBIT)** | **1,026** | **1,108** | **+7.9%** | **637** | **730** | **+14.7%** | **1,662** | **1,837** | **+10.5%** |
| **Net income before taxes** | | | | | | | **1,598** | **1,746** | **+9.3%** |
| Taxes | | | | | | | (369) | (318) | -13.8% |
| **Net income** | | | | | | | **1,229** | **1,428** | **+16.2%** |
| Non-controlling interest | | | | | | | 113 | 28 | -75.0% |
| **Group net income** | | | | | | | **1,116** | **1,399** | **+25.4%** |



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# Agenda

# Outlook for 2023

## Hannover Re Group

- Reinsurance revenue[1) ] ≥ 5% growth
- Return on investment [2)] ≥ 2.4%
- Group net income [2)] ≥ EUR 1.7 bn.
- Ordinary dividend ≥ prior year
- Special dividend if capitalisation exceeds capital requirements for future growth and profit targets are achieved

1) At unchanged f/x rates
2) Subject to no major distortions in capital markets and/or major losses not exceeding the large loss budget (undiscounted) of EUR 1.725 bn. in 2023 and no further significant impact from Covid-19 on L&H result



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# 2023 assumptions
## Expectations for business groups

| | P&C | L&H |
|---|---|---|
| Reinsurance service result | 91% - 92% Combined ratio | EUR 750 - 800 m. |
| Interest accretion (within reinsurance finance result) | ~ EUR 650 m. | ~ EUR 170 m. |
| EBIT | ≥ EUR 1,600 m. | ≥ EUR 750 m. |

# Significant increase in group net income guidance for 2024

## Increasing earnings contribution from all three profit engines

**Expected contribution** from our business groups

**Property & Casualty**

Combined ratio **< 89%**

**Life & Health**

Reinsurance service result **> 850 m.**

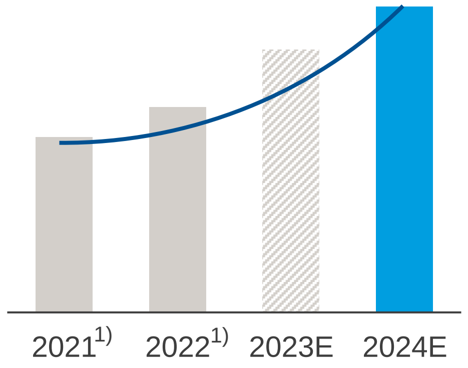
**Investments**

Return on investment **≥ 2.8%**

**Group financial guidance 2024**

Revenue growth **> 5%**

Group net income **EUR ≥ 2.1 bn.**




1) IFRS4



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# Agenda

# Financial calendar and our Investor Relations contacts

**7 February 2024**
1 January P&C Treaty Renewals

**18 March 2024**
Annual Press Conference and Analysts' Conference

**6 May 2024**
Annual General Meeting

**14 May 2024**
Quarterly Statement as at 31 March 2024

**12 August 2024**
Half-yearly Financial Report 2024

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# Basic information on the Hannover Re share

## Basic information

| | |
|---|---|
| International Securities Identification Number (ISIN) | DE 000 840 221 5 |
| Ticker symbols | |
| -Bloomberg | HNR1 |
| -Thomson Reuters | HNRGn |
| -ADR | HVRRY |
| **Exchange listings** | |
| -Germany | Xetra, Frankfurt, Munich, Stuttgart, Hamburg, Berlin, Düsseldorf, Hannover (official trading: Xetra, Frankfurt and Hannover) |
| -USA | American Depositary Receipts (Level 1 ADR programme; 2 ADR = 1 share) |
| Market segment | Prime Standard |
| Index inclusion | DAX |
| First listed | 30 November 1994 |
| Number of issued shares1) | 120,597,134 |
| Common shares1) | EUR 120,597,134 |
| Share class | No-par-value registered shares |

1) As at 31 December 2022



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# Details on reserve review by WTW

• The scope of WTW's work was to review certain parts of the held loss and loss adjustment expense reserve, net of outwards reinsurance, from Hannover Re Group's consolidated IFRS financial statements and the implicit resiliency reserve margin, for the non-life business of Hannover Re Group annually as at each 31 December, most recently as at 31 December 2022. WTW concludes that the reviewed loss and loss adjustment expense reserve, net of reinsurance, less the resiliency reserve margin is reasonable in that it falls within WTW's range of reasonable estimates.
• Life reinsurance and health reinsurance business are excluded from the scope of this review.
• WTW's review of non-life reserves as at 31 December 2022 covered 97.2% / 100.0% of the gross and net held non-life reserves of €41.0 billion and €37.8 billion respectively. Together with life reserves of gross €5.9 billion and net €5.7 billion, the total balance sheet reserves amount to €46.9 billion gross and €43.6 billion net.
• The results shown in WTW's reports are not intended to represent an opinion of market value and should not be interpreted in that manner. The reports do not purport to encompass all of the many factors that may bear upon a market value.
• WTW's analysis was carried out based on data as at evaluation dates for each 31 December. WTW's analysis may not reflect claim development or all information that became available after the valuation dates and WTW's results, opinions and conclusions presented herein may be rendered inaccurate by developments after the valuation dates.
• The results shown in this presentation are based on a series of assumptions as to the future. It should be recognised that actual future claim experience is likely to deviate, perhaps materially, from WTW's estimates. This is because the ultimate liability for claims will be affected by future external events; for example, the likelihood of claimants bringing suit, the size of judicial awards, changes in standards of liability, and the attitudes of claimants towards the settlement of their claims.
• As is typical for insurance and reinsurance companies, claims reporting can be delayed due to late notifications by some claimants and cedants. This increases the uncertainty in the WTW results.
• Hannover Rück SE has asbestos, environmental and other health hazard (APH) exposures which are subject to greater uncertainty than other general liability exposures. WTW's analysis of the APH exposures assumes that the reporting and handling of APH claims is consistent with industry benchmarks. However, there is scope for wide variation in actual experience relative to these benchmarks. Thus, although Hannover Re Group's held reserves show resiliency reserve compared to WTW's indications, the actual fully developed losses could prove to be significantly different to both the held and indicated amounts.
• WTW has not anticipated any extraordinary changes to the legal, social, inflationary or economic environment, or to the interpretation of policy language, that might affect the cost, frequency, or future reporting of claims. In addition, WTW's estimates make no provision for potential future claims arising from causes not substantially recognised in the historical data (such as new types of mass torts or latent injuries, terrorist acts), except in so far as claims of these types are included incidentally in the reported claims and are implicitly developed.
• Sharp increases in inflation in many economies worldwide have resulted from recent rises in energy, food, component and raw material prices driven by wider economic effects of the Russia-Ukraine conflict combined with factors such as supply chain disruptions caused by the COVID-19 pandemic and labour shortages. Generally, inflation is expected to remain elevated in the near term despite mitigating policy responses by central banks and governments. Over time reductions in inflation rates to more normative levels, barring future shocks to the global economy are expected. However, prospective inflationary risks remain high due to the continuing Russia-Ukraine conflict and heightened geopolitical tensions with increased possibilities of hitherto unexpected conflict escalation. Longer term implications for inflation from current conflicts, heightened geopolitical tensions, increased energy prices, potential reductions in food supplies, disruption in global trading and their impacts on insurance exposures remain highly uncertain. The WTW analysis makes no explicit allowance for extraordinary future effects that may result from the above factors or other emerging shocks on the projection results.
• In accordance with its scope WTW's estimates are on the basis that all of Hannover Re Group's reinsurance protection will be valid and collectable. Further liability may exist for any reinsurance that proves to be irrecoverable.
• WTW's estimates are in Euros based on the exchange rates provided by Hannover Re Group as at each 31 December evaluation date. However, a substantial proportion of the liabilities is denominated in foreign currencies. To the extent that the assets backing the reserves are not held in matching currencies, future changes in exchange rates may lead to significant exchange gains or losses.
• WTW has not attempted to determine the quality of Hannover Re Group's current asset portfolio, nor has WTW reviewed the adequacy of the balance sheet provisions except as otherwise disclosed herein.
• In its review, WTW has relied on audited and unaudited data and financial information supplied by Hannover Rück SE and its subsidiaries, including information provided orally. WTW relied on the accuracy and completeness of this information without independent verification.
• Except for any agreed responsibilities WTW may have to Hannover Re Group, WTW does not assume any responsibility and will not accept any liability to any person for any damages suffered by such person arising out of this commentary or references to WTW in this document.

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