

2016 P&C triangles



P&C loss development triangles and reserves as of December 2016

Group Actuarial Department

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A robust Governance coupled with a prudent reserving philosophy

SCOR overall reserving philosophy can be summarized as follows:



A robust governance insuring independent opinion and free from influence environment



Top of the class actuarial methods coupled with an holistic “four axis approach”



Instant reactivity to indications of potential negative developments



Conservative opening ultimate loss ratios applied on more recent underwriting years where statistical data is scarce



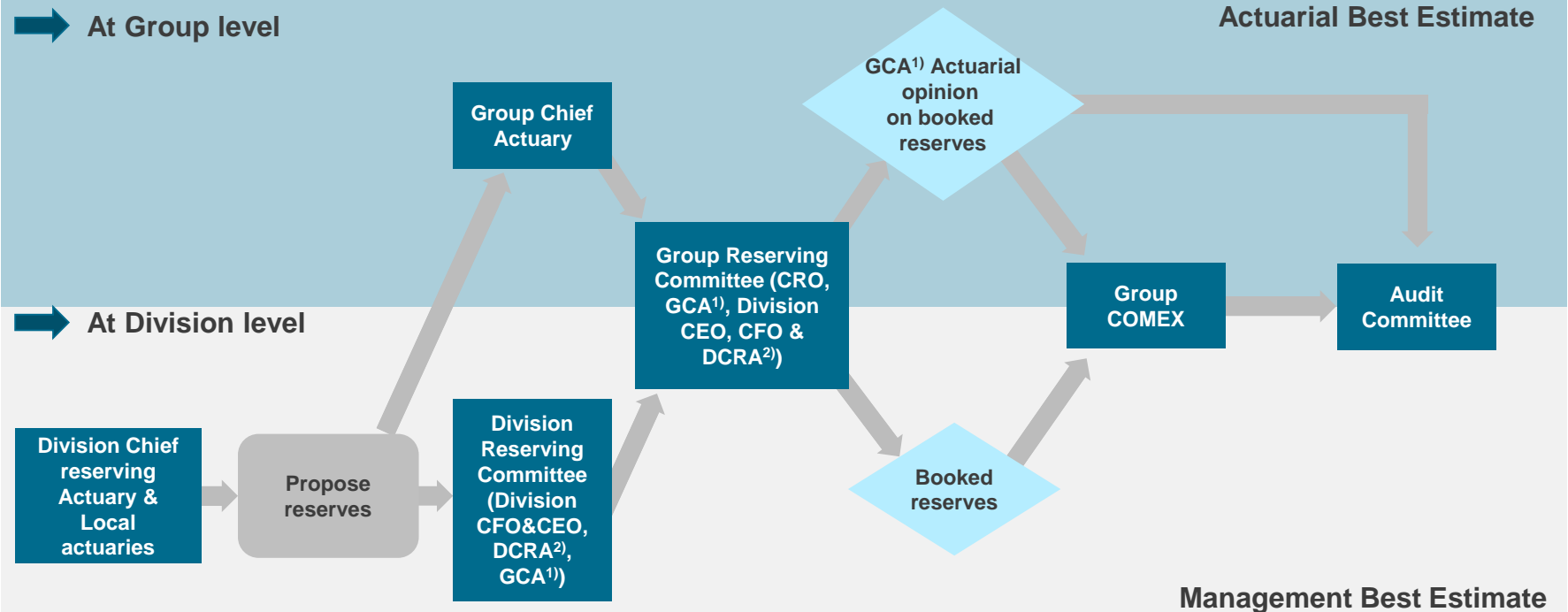
Hypothesis used in pricing systematically challenged and stress tests impact on pricing expected loss ratios taken into account



Extra time allowed to recognise positive run-offs, especially for mid and long tail classes of business

The quarterly reserving process

- As presented in the following chart, an initial booked reserves position is proposed by the division based on Division Chief Reserving Actuary's opinion. A first opinion on IFRS Best estimate position is formed by the Group Chief Actuary based on Division and Group Actuarial analyses
- Both are compared during the Group P&C Reserving Committee. The different views on claims and the main assumptions and approaches are compared and can result in a review of the different positions
- The final Group Chief Actuary actuarial best estimate position is then presented to the Group Executive Committee who validates the booked reserves
- Actuarial Best Estimate position and reserving adequacy is then shared by the Group Chief Actuary with Board Audit Committee as detailed in the following chart:



1) GCA : Group Chief Actuary
2) DCRA: Division Chief reserving Actuary

A free from influence environment

Division CEO


Group Chief Actuary

- ✓ Group corporate communication (rating agencies, Reference Document, ORSA report, Investors' day, Triangles disclosure, communication to the Board)
- ✓ Quarterly reserving adequacy opinion
- ✓ Implementation of the Solvency 2 Actuarial function throughout the Group
- ✓ Referral required at pre-defined thresholds on methodology / parameters
- ✓ Actuarial Function Holder for SCOR Group

Double reporting line Governance ensuring independence

Division Chief Reserving Actuary

- ✓ Reserving tools, method and parameters: warrant of consistency, standardization and compliance with guidelines and best market standards
- ✓ Produce best estimate liabilities
- ✓ Provide support to their Division and to the Group Chief Actuary (e.g. Solvency 2 Actuarial Function)
- ✓ Enhance governance and controls at Division level (e.g. cross reviews, reserving committee)

 **The governance provides strong reviewing process and controls resulting in a high level of confidence**

Top of the class Actuarial methods

Assessment of IBNR reserves and the variability of the overall reserves

- To assess IBNR reserves and the variability of the overall reserves, SCOR generally uses actuarial techniques which take into account quantitative loss experience data, together with qualitative factors, where appropriate
- This exercise is performed on homogenous groups of contracts, called actuarial segments having similar development pattern and a required statistical mass
- The reserves are also adjusted to reflect reinsurance treaty terms and conditions, and the variety of claims processing which may potentially affect SCOR's commitment over time

Methods used by SCOR

- SCOR uses among others:
 - Deterministic methods (e.g. Chain Ladder, Bornhuetter-Ferguson, Average cost per claim or Loss ratio methods) for Best Estimate assessment
 - Stochastic approaches (e.g. Mack model, Bootstrap) for reserves' volatility estimates.
 - Experts judgments (e.g. exogenous a priori loss ratios based on P&C pricing or underwriters' departments, market benchmark)
 - Tailor made solutions like annuity projection by victim for non-standard segments (e.g. Motor and Medical Malpractice segments)

Top of the class Actuarial methods

Example of actuarial method Chain-Ladder

- Chain-Ladder is a deterministic method which consists in the analysis of the behavior of losses using historical data in order to estimate a development pattern
- The estimated pattern is applied to the latest diagonal of the triangle in order to project the ultimate loss

UWY	Dvpt					Ultimate
	1	2	3	4	5	
1	$C_{1,1}$	$C_{1,2}$	$C_{1,3}$	$C_{1,4}$	$C_{1,5}$	$\hat{C}_{1,I}$
2	$C_{2,1}$	$C_{2,2}$	$C_{2,3}$	$C_{2,4}$		$\hat{C}_{2,I}$
3	$C_{3,1}$	$C_{3,2}$	$C_{3,3}$			$\hat{C}_{3,I}$
4	$C_{4,1}$	$C_{4,2}$				$\hat{C}_{4,I}$
5	$C_{5,1}$					$\hat{C}_{5,I}$

$$\hat{f}_k = \frac{\sum_{j=1}^{I-k} C_{j,k+1}}{\sum_{j=1}^{I-k} C_{j,k}}, 1 \leq k \leq I-1$$

$$\hat{\sigma}_k^2 = \frac{1}{I-k-1} \sum_{i=1}^{I-k} C_{i,k} \left(\frac{C_{i,k+1}}{C_{i,k}} - \hat{f}_k \right)^2 \text{ for } 1 \leq k \leq I-2$$

Example of actuarial method Mack model

- Mack is a stochastic model whose structure is based on the Chain-Ladder method
- It is distribution free and provides a measure of variability of the reserves

Reserves

$$\hat{R}_j = \hat{C}_{j,I} - C_{j,I-j+1}$$

Best Estimate

$$\sum_{j=1}^I \hat{C}_{j,I} = \sum_{j=1}^I C_{j,I-j+1} \prod_{k=I-j+1}^I \hat{f}_k$$

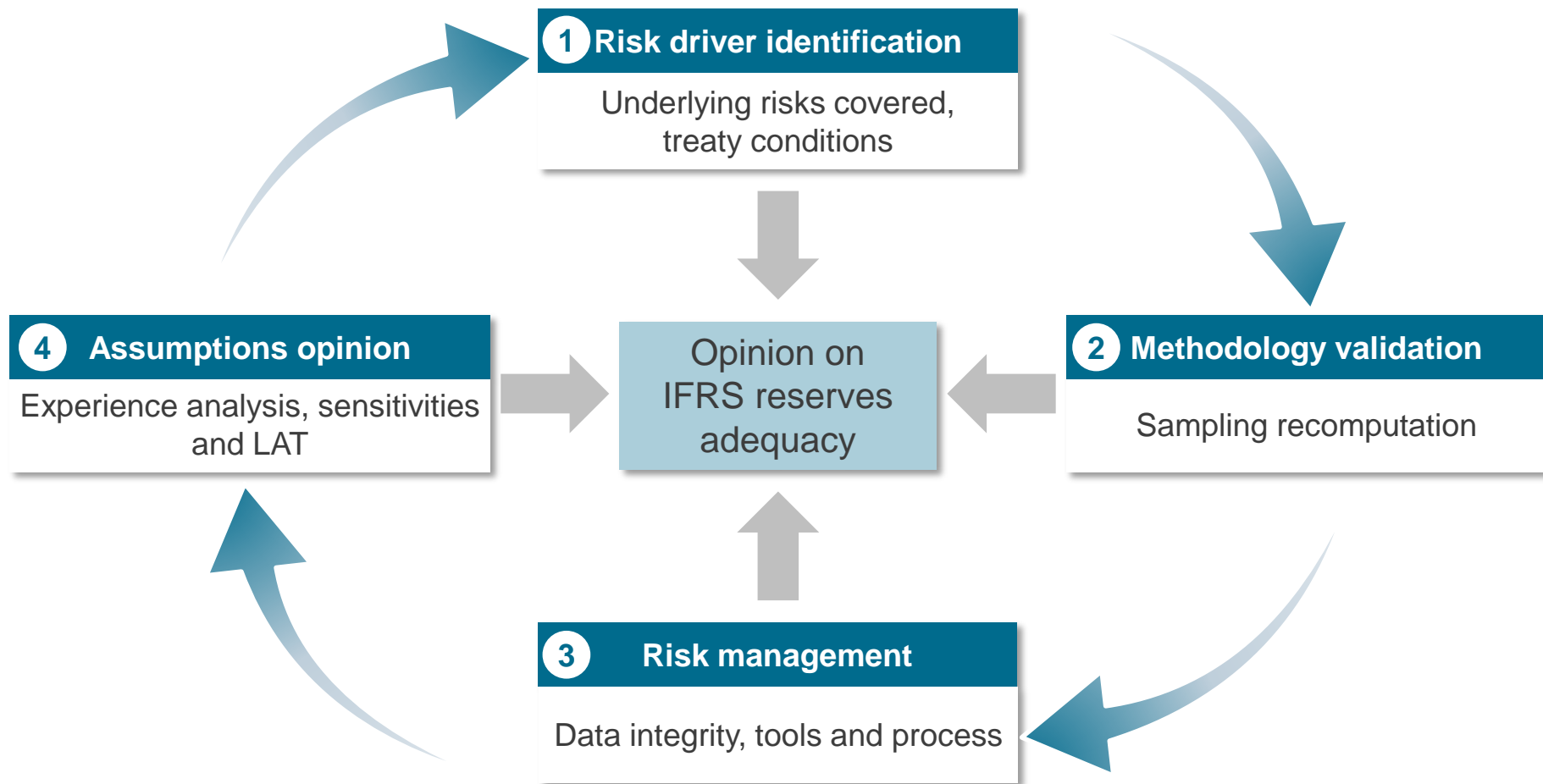
Mean square error

$$mse\left(\sum_{i=2}^I \hat{R}_i\right) = \sum_{i=2}^I \left(mse(\hat{R}_i) + \hat{C}_{i,I} \left(\sum_{j=i+1}^I \hat{C}_{j,I} \right) \sum_{k=I+1-i}^{I-1} \frac{2\hat{\sigma}_k^2 / \hat{f}_k^2}{\sum_{n=1}^{I-k} C_{nk}} \right)$$

with

$$mse(\hat{R}_i) = \hat{C}_{i,I}^2 \sum_{k=I+1-i}^{I-1} \frac{\hat{\sigma}_k^2}{\hat{f}_k^2} \left(\frac{1}{\hat{C}_{i,k}} + \frac{1}{\sum_{n=1}^{I-k} C_{nk}} \right)$$

A holistic “four axis approach”



An approach where recommendations are subject to follow up

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Scope



- In SCOR, the actuarial analysis axis is the actuarial segment which groups together homogeneous contracts based on a variety of criteria (proportional basis or not, underlying risks typology, geography...). At group level, there are almost 434 active reserving segments (still carrying reserves) at 2016 year end
- The eight reserving classes disclosed are aggregations of these actuarial segments



- Data which is not included in the triangles:
 - Lloyd's portfolio as the RITC scheme (Reinsurance To Close – Lloyd's accounting scheme) does not allow displaying entire triangles
 - Run-off portfolios are not disclosed as their claims development profile does not match the actual development of the ongoing portfolio
 - Direct business segments are also excluded from triangles as this is pure primary insurance
 - Fronting contracts from a major French aviation insurer
 - Proportional business in South America due to incomplete diagonals for older years and
 - Significant quota-shares in China because of their specificities (large sliding scales)



- These triangles and reserves disclosure covers 83% of gross P&C IFRS booked reserves



- Triangles data are reconciled with financial statements which have been audited by the external auditors

Total loss development triangle

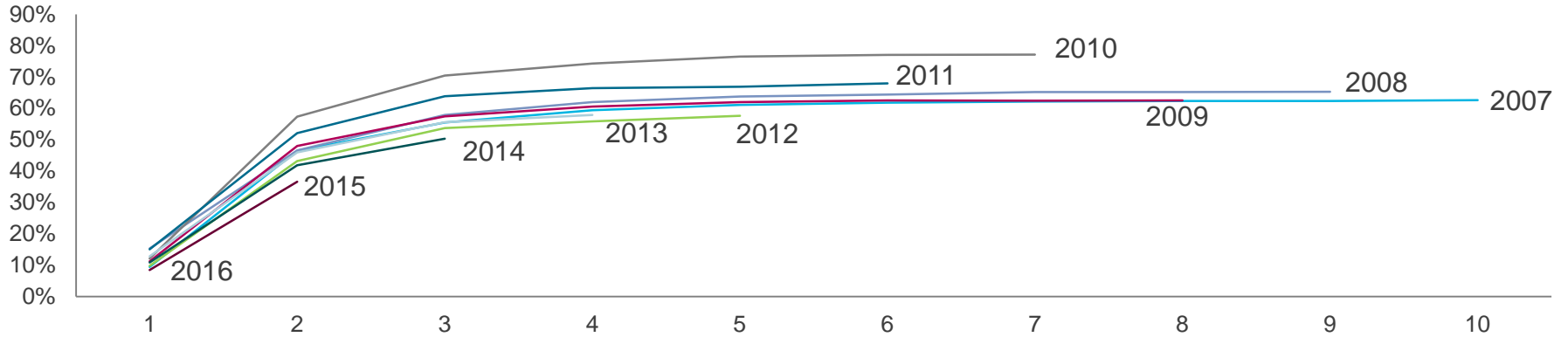
Total Triangle

Under writing Year	Ultimate Premium (€m)	Development Year										Ultimate Loss Ratio	Ultimate Loss Ratio 2015 - as if 2016	Paid Loss Ratio	Case Reserves Ratio	IBNR Ratio
		1	2	3	4	5	6	7	8	9	10					
2007	2 454	9.5%	46.5%	55.5%	59.4%	61.1%	61.9%	62.2%	62.4%	62.4%	62.7%	67.0%	68.3%	56.3%	6.3%	4.4%
2008	2 524	15.4%	46.6%	57.9%	62.0%	63.8%	64.4%	65.2%	65.2%	65.3%		70.1%	71.2%	58.4%	6.9%	4.8%
2009	2 661	11.2%	48.0%	57.5%	60.6%	62.1%	62.6%	62.5%	62.5%			67.0%	68.4%	55.6%	6.9%	4.5%
2010	3 063	12.1%	57.4%	70.5%	74.3%	76.6%	77.1%	77.2%				82.4%	83.1%	68.0%	9.2%	5.2%
2011	3 381	15.1%	52.1%	63.9%	66.5%	66.9%	68.0%					73.5%	74.2%	59.1%	8.8%	5.6%
2012	3 778	9.8%	43.3%	53.7%	55.8%	57.6%						65.4%	65.9%	46.7%	10.9%	7.7%
2013	3 804	12.8%	46.0%	55.6%	57.9%							68.1%	69.6%	46.6%	11.4%	10.2%
2014	4 051	10.8%	41.9%	50.4%								64.4%	66.0%	34.9%	15.5%	14.0%
2015	4 395	8.5%	36.6%									62.2%	64.6%	16.2%	20.4%	25.6%
2016	4 564	11.0%										67.9%		1.5%	9.5%	57.0%

Total loss development triangle

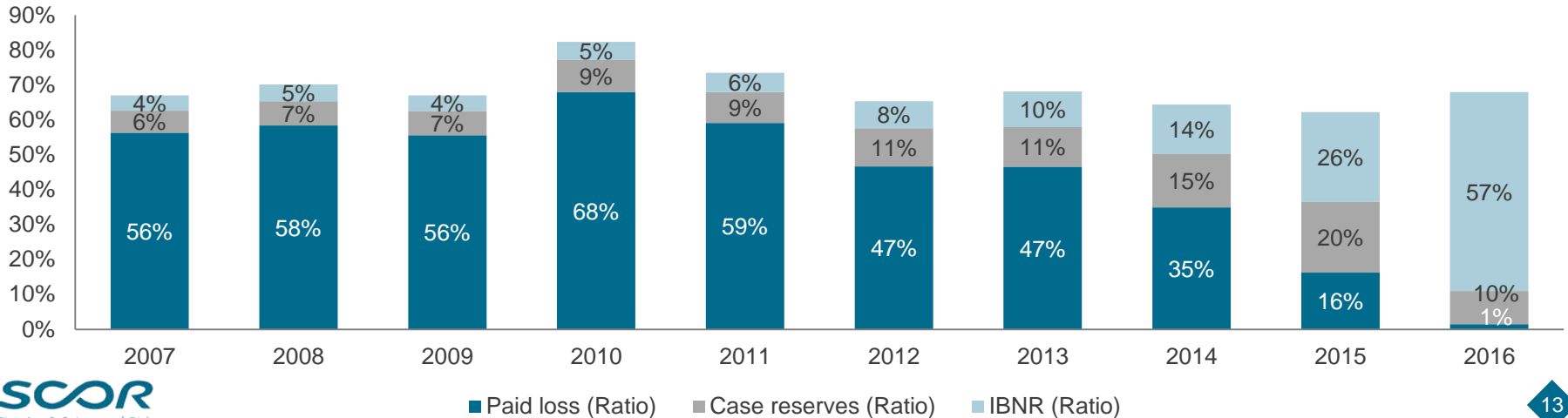
Incurring loss development in loss ratios

Development year



Paid loss, case reserves and IBNR ratios

Underwriting year



Reserves higher than Best Estimate and consistent ultimate loss ratios

P&C's IFRS reserves are higher than Best Estimate

- IFRS Reserves level as at 2016 year-end are **higher** than **SCOR Best estimate**
- The prudent reserving approach leads to high confidence in P&C reserving adequacy

SCOR's strong reserving process reveals high level of confidence

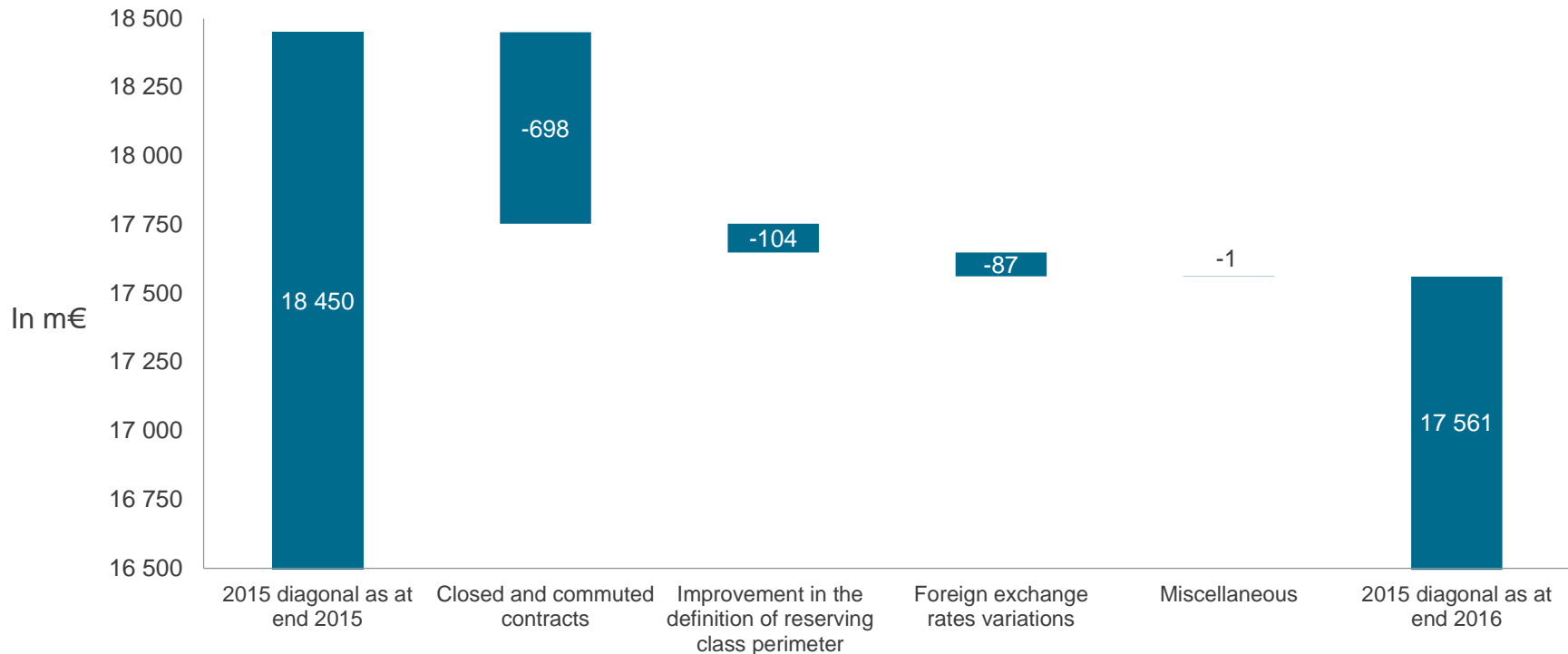
Underwriting Year	Ultimate Premium € billion	1 Ultimate Loss Ratio 2015 as if 2016	2 Ultimate Loss Ratio 2016	Difference
2007	2.5	68.3%	67.0%	-1.3%
2008	2.5	71.2%	70.1%	-1.1%
2009	2.7	68.4%	67.0%	-1.4%
2010	3.1	83.1%	82.4%	-0.8%
2011	3.4	74.2%	73.5%	-0.7%
2012	3.8	65.9%	65.4%	-0.6%
2013	3.8	69.6%	68.1%	-1.5%
2014	4.1	66.0%	64.4%	-1.6%
2015	4.4	64.6%	62.2%	-2.3%
2016	4.6		67.9%	

- The table reads as:
 - 1 Ultimate Loss Ratios (ULRs) 2015 on 2016 perimeter and Exchange rates
 - 2 2016 ULRs on 2016 perimeter
- ULRs develop positively from 2015 to 2016 calendar year
- The ULR for UWY 2015 is lower than average thanks to low Cat losses.

Reconciliation to prior triangles

Reconciliation between 2015 diagonal as at end of 2015 and 2016

- The following graph provides reconciliation between the amount of incurred claims disclosed at year-end 2015 and year-end 2016 taking into account all available information at reserving class level. The main changes come from the closed and commuted contracts during 2016



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Types of reinsurance

Facultative reinsurance

- The ceding company cedes and the reinsurer assumes all or part of the risks covered by a single specific insurance policy
- Facultative reinsurance is negotiated separately for each insurance contract that is reinsured
- Facultative reinsurance normally is purchased by ceding companies for individual risks not covered by their reinsurance treaties, for amounts in excess of the monetary limits of their reinsurance treaties or for unusual risks

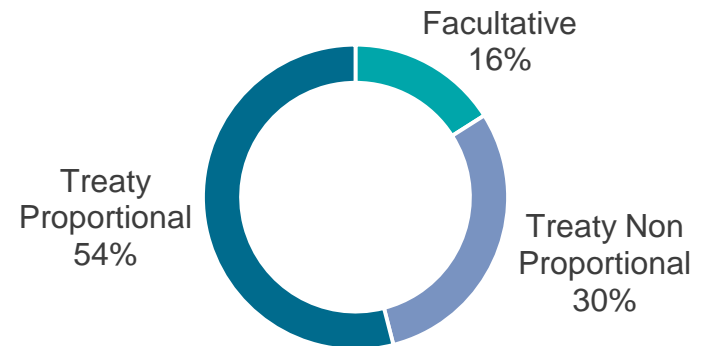
Proportional or quota share reinsurance

- The reinsurer, in return for a predetermined share of the insurance premium charged by the ceding company, indemnifies the ceding company against the same predetermined share of the losses of the ceding company under the covered insurance contracts

Non-proportional, or excess of loss or stop loss reinsurance

- The reinsurer indemnifies the ceding company against all or a specified portion of losses, on a claim by claim basis or with respect to a specific event or a line of business, in excess of a specified amount, known as the ceding company's retention or reinsurer's attachment point, and up to a negotiated reinsurance treaty limit

2007-2016 Reserves split by type of reinsurance



Lines of business description

Engineering

- It provides coverage for the risks inherent in the construction projects (from inception to completion). It covers all types of civil construction risks, plant and machinery breakdown risks as well as delay in start up coverage

Property

- The risks covered are classically fire, agriculture, machinery breakdown, and theft for private individuals, commercial or industrial risks

Proportional casualty

- The premium and reserves of this class are predominantly derived from our UK medical malpractice portfolio (long-term risks). A significant part of this class is also IDI business (Inherent Defect Insurance) in France and Spain. IDI provides coverage for inherent defects that are detected during a period starting at the completion of a construction/installation and expiring up to 10 years after completion of the works. This class also includes professional and personal liabilities but also D&O (Directors and Officers, in run-off) and WC (Workers Compensation mainly in the US)

Non-proportional casualty

- This class contains IDI (France and Spain mainly), medical malpractice (mainly France) and professional and manufacturing liabilities (heavy industry, food producers). Workers compensation business is also included (mainly in the US)

Marine, transport, aviation

- This class is dominated by the aviation risks. Aviation risks include products liability, hull and liabilities for airlines, general aviation and satellite risks. Marine and transport are basically insurance of hull and liabilities for merchant ships

Credit and surety

- This class mainly contains proportional business. The surety business is mainly performance bonds. The rest of the portfolio is credit insurance

Lines of business description

Motor non-proportional

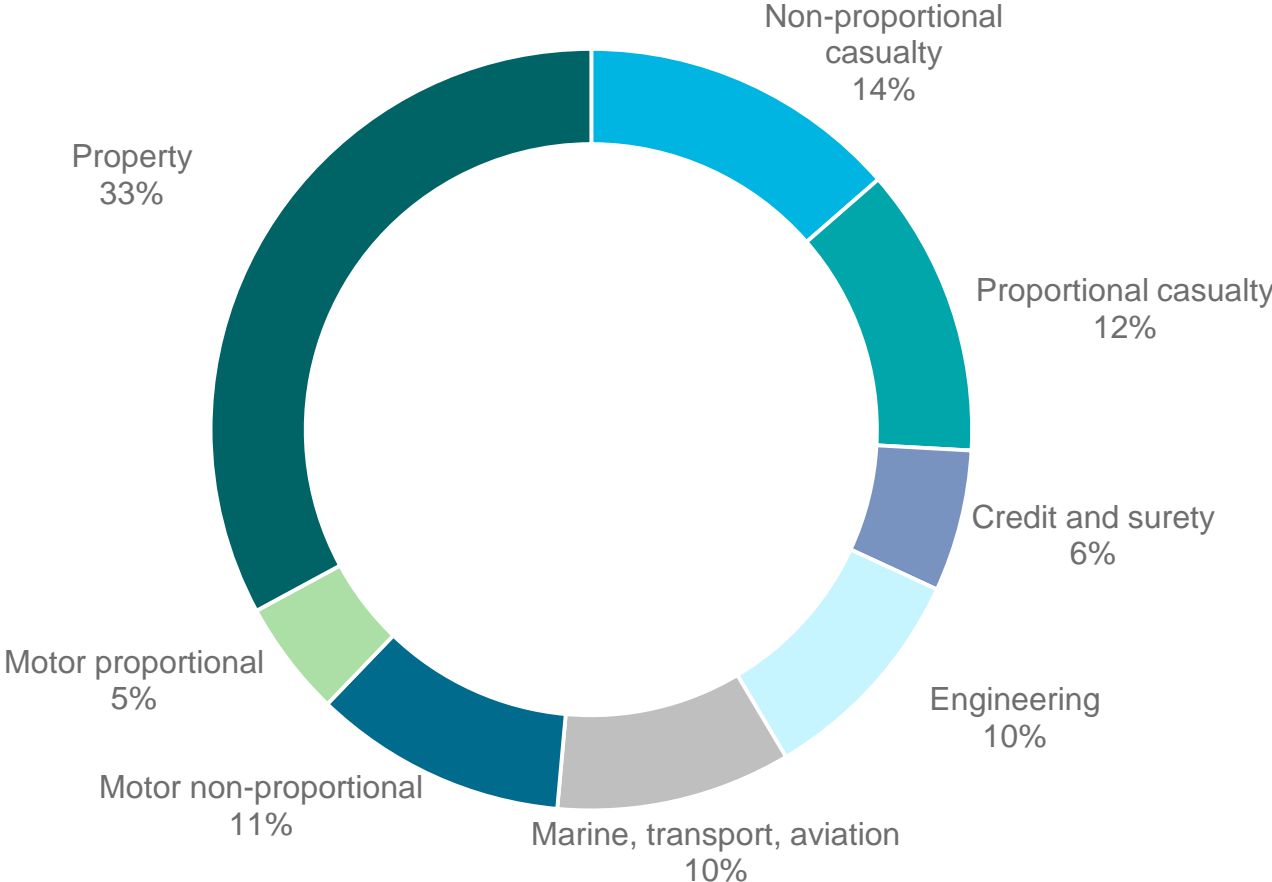
- The main risk covered is auto liability
- The most important part of this class is motor third party liability on French market. The second largest part is motor third party liability on UK market
- Both premium and reserves are mainly related to bodily injury covers
- From a reinsurance point of view, this class is expected to have a longer development length than the motor proportional class, as only claims that overcome the threshold (as defined in the reinsurance contract) are concerned

Motor proportional

- This class contains property damage covers as well as bodily injury covers
- Compared to the motor non-proportional class, this motor proportional class has a shorter development length
- This is explained by the more important weight of damages to property (short term risks) and the nature itself of this class (the claims reporting to the reinsurer is faster for proportional businesses)

Lines of business description

2007-2016 Reserves split by line of business



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Appendix 1: Large losses

- Depending upon which actuarial reserving method is used, the presence or absence of large natural catastrophe and man-made losses and how they are treated may have a significant impact on the estimated ultimate loss amount
- Only loss amounts exceeding €40m by underwriting year for Property and €15m for the other classes of business (on the disclosed perimeter) are shown in the table below

Underwriting year	Paid claims	Incurred claims	Main events by UWY
Worldwide Property fire all natures including Nat Cat			
2007	74 362	74 383	Windstorm Kyrill
2008	125 975	131 171	Hurricane Ike
2009	147 647	148 274	2010 Chile earthquake, Windstorm Klaus
2010	381 026	414 598	New Zealand earthquake, Great East Japan earthquake
2011	362 316	365 755	Thailand floods, New Zealand Earthquake, Heavy rainfall in Denmark
2012	115 658	124 125	Hurricane Sandy
2013	306 381	323 273	Central European Flood, Hailstorm Andreas, Saint-Jude Storm, Fire in a China Semiconductor Company, Japan Snowstorm
2014	83 489	88 843	European hail (Ela)
2016	11 311	52 928	Fort McMurray Wildfire
Worldwide marine, transport , aviation all natures			
2007	17 548	17 548	Satellite loss
2013	4 942	31 768	Disappearance of Malaysian Airline, Mexican Petrol Company Surface Blowout
2014	323	61 280	Mexican Petrol Company - Abkatun Platform Fire
2015	1 466	18 074	Tianjin port explosion
Worldwide Credit & Surety all natures			
2015	6 074	15 727	Abengoa
Worldwide Casualty non proportional and facultative - including PA, WC, IDI and Medical Malpractice			
2002 / 2003	55 666	55 741	Pharmaceutical loss
2005	17 667	17 667	US Homebuilders loss
2010	16 616	16 616	Pharmaceutical company (Herbicide)

In 000's €

Appendix 2: Positive development vs Reserve release

Positive development

- In the case where the new estimation of an incurred following e.g. claims review/new information is lower than expected, the reserves related to this incurred can be lowered
- Such movement does not have any impact on the margin as it is just a reflection of the actual estimation
- This movement is called a positive development

Reserve release

- Contrary to the positive development, in this case, the reserve reduction movement is not related to any new information or claims review but, usually, to a management decision
- Therefore, such movement has an impact on the margin
- In this event, this movement is called a reserve release

Appendix 3: External auditors (EY and Mazars) statement

- On our request, procedures have been performed in 2017 by SCOR external auditors which has led to a “Report of the findings of the statutory auditors of SCOR SE resulting from the agreed-upon procedures relating to the Loss Development Triangles for the year ended 2016”. The objective was to provide SCOR with their findings regarding the quality and the completeness of the loss development triangles disclosed. These procedures as defined by us covered quality and completeness of data disclosed, correct consolidation of the triangles and controls of process leading to the production of the Ultimate Loss Ratios as well as the “As-if” figures.
- As part of the procedure, SCOR external auditors have found that the disclosed triangles reconcile with the underlying data; the triangles have been consolidated with no exception found, the process leading to the production of the Ultimate Loss Ratios as well as the “As-if” figures did not raise any exception and the document accompanying the triangles is a fair reflection of the way in which the triangles are actually built.