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# **Report on the use of insurance market data in the valuation of technical provisions**

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# Introduction

## Purpose of this study

- 1.1 The market-consistent valuation of technical provisions envisaged under Solvency II will require insurers to consider the full range of possible outcomes of future cash flows arising from their insurance obligations in order to determine their expected present value (the 'best estimate') as well as the corresponding risk margin.
- 1.2 In non-life insurance, the actuarial methods used to determine best estimates and risk margins can be expected to range in complexity but will usually require granular company-specific internal data, particularly for lines of business with payout periods of several years (so-called "long-tailed" lines of business).
- 1.3 During the early QIS exercises it became apparent that for a significant number of insurers unavailability of data was indeed a hampering factor in calculating the best estimate in an appropriate manner based on the valuation principles set out in the Solvency II Level 1 text.<sup>1</sup>
- 1.4 In view of this, for the QIS4 exercise a number of simplified valuation techniques (termed "proxies") were included in the technical specification to address situations where there would be a lack of own historical data for the determination of technical provisions in non-life insurance. In such circumstances undertakings would typically use other sources of information from outside their company. In this paper, we refer to these sources of external information as "insurance market data" or simply as "market data"<sup>2</sup>. In QIS4, several proxies were tested which used such market data as input.
- 1.5 The purpose of this study is mainly to illustrate the role of insurance market data and to broadly consider the interconnection of this issue with the Level 1 text and the future work on Level 3. Therefore an overview from QIS4 on required market data is given, which were necessary for the tested proxies and simplifications. In addition to this an overview of the market parameters actually provided in QIS4 by the individual markets is attached.
- 1.6 It is not the intention of this paper to set out any recommendations or positions on the use of insurance market data in the valuation of technical provisions. Rather, it shall inform the further technical work on this issue in

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<sup>1</sup> All references to the Solvency II Level 1 text made in this paper are with respect to the text adopted by the European Parliament on 22 April 2009 (see <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+20090422+SIT-03+DOC+WORD+V0//EN&language=EN>), hereafter referred to as "Level 1 text".

<sup>2</sup> Note this is distinct from quote and trade related data from the financial markets (sometimes also referred to as "market data"), which is not considered in this paper.

the Solvency II process by providing an overview on the status of the use of such data in the quantitative impact studies conducted so far.

1.7 This report focuses on the valuation of technical provisions in non-life insurance. However, it is noted that some of the issues considered in this report may also be relevant in the fields of life and health insurance.

1.8 The report is divided into four sections:

- **Section 1 Introduction;**
- **Section 2 Approach to market data;**
- **Section 3 Market data requirements specified in QIS4;**
- **Section 4 Overview of market data provided in QIS4**

## Role of insurance market data

### Use of insurance market data in valuation process

- 2.1 This sub-section explores a number of general issues in relation to the use of insurance market data for the calculation of technical provisions.
- 2.2 Under the Solvency II framework, technical provisions shall be calculated as the sum of two explicit components: a best estimate and a risk margin. The best estimate should reflect all related cash flows based on current assumptions (Article 76).<sup>3</sup>
- 2.3 Assumptions used to determine the best estimate technical provisions will in general be based on own historical data which are available within the undertaking. In some situations, however, it will be unavoidable for the undertaking to have only insufficient internal data of appropriate quality. For example, the quantity of data may be limited because the volume of the business is small, or the claims data may not be sufficiently homogeneous to determine claims patterns on the basis of which a reliable estimate could be derived. In such cases, the undertaking will need to rely on additional external information such as insurance market data.
- 2.4 It should be noted that, under Solvency II, there is the obligation for undertakings to establish internal processes to ensure that the data used for the determination of technical provisions is appropriate, accurate and complete.<sup>4</sup> The assessment of the quality of data should take into account the set of available data which is necessary and relevant to carry out the intended analysis, including both internal and external information.<sup>5</sup> Therefore, if external data is retrieved from either private or public sources, it is the responsibility of the undertaking to assess the appropriateness and accuracy of the data.
- 2.5 Hence under the new framework it would be expected that insurance market data is published with a comprehensive documentation which describes the methods and main assumptions used for deriving the data, as well as the scope of the data, any known limitations or deficiencies and other information relevant to its use. This seems necessary to ensure that the user of market data is able to fully assess the results by applying such

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<sup>3</sup> Note that according to Article 76 a separate calculation of the best estimate and the risk margin shall not be required in cases where future cash-flows associated with (re)insurance obligations can be replicated reliably using financial instruments for which a reliable market value is observable. This report is not concerned with such cases.

<sup>4</sup> Cf. Article 81 of the Level 1 text, and the related implementing measure referred to in Article 85 f. Note that in its consultation paper CP 43 CEIOPS has set out advice on Standards for Data Quality with respect to Article 85 f.

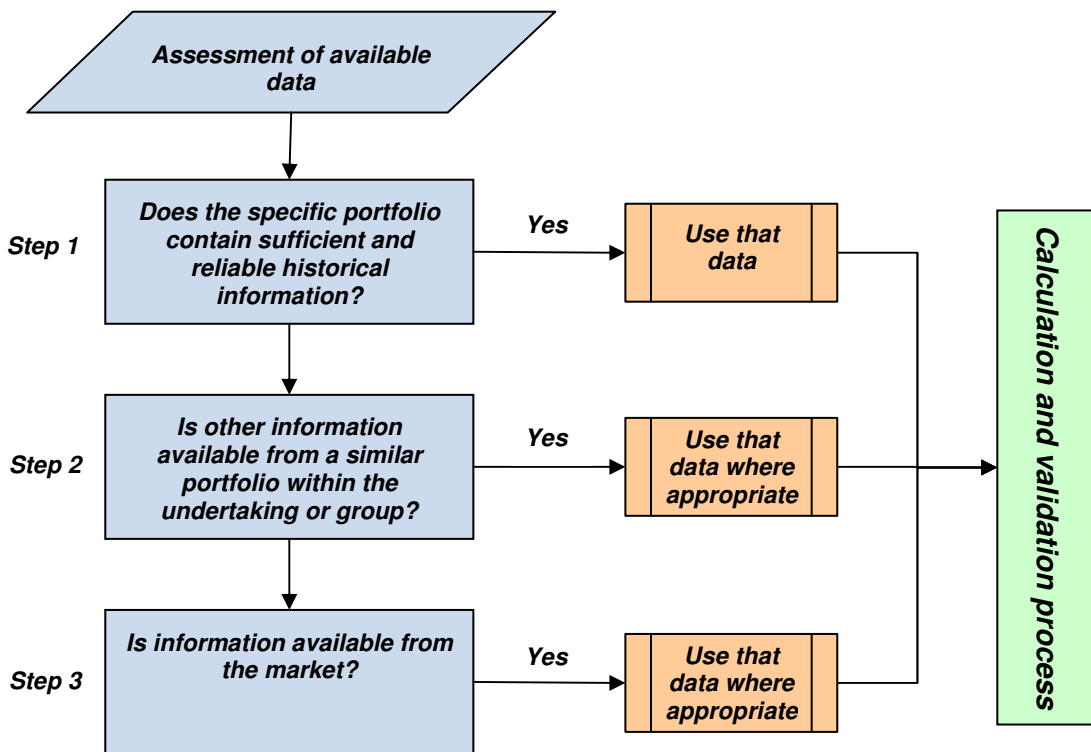
<sup>5</sup> Cf. CEIOPS CP 43, para. 3.5

data, and would help to avoid situations where market data is being used as a “black box”.

2.6 Another important use of market data is for the validation of results calculated on undertakings own historical data. This can be accomplished as a kind of benchmark comparison or to check plausibility of undertakings own results. Often undertakings results will differ from market data. The step of validation should then be used to get aware of these differences and to understand them.

2.7 A possible way in which external data may be used is summarised in the following figure:

**Figure 1: Use of market data in the valuation of technical provisions**



2.8 Steps 1 to step 3 may be performed as follows:

- *Step1*: The undertaking assesses whether appropriate, complete and accurate data<sup>6</sup> within the specific insurance portfolio (or homogeneous risk group) is available to calculate the best estimate of (re)insurance assets and liabilities. This will not always be the case.
- *Step 2*: The next step to be taken by the undertaking is to assess whether within the undertaking or group other information is available

<sup>6</sup> Reference to CP43

which may usefully supplement the information for the specific insurance portfolio (or homogeneous risk group). For example, this could be data from another portfolio with a similar risk profile. As with every data source that is used, the undertaking should assess whether the data is appropriate for its purpose.

- *Step3*: In case of insufficient relevant own data, the undertaking has to consider using relevant external data sources such as insurance market data. These data could either be from private or from public sources. . It could supply useful benchmark information even in cases where the undertaking has sufficient own data to determine the best estimate.

## **Level 1 text**

2.9 The level 1 text does not specifically mention the necessity of market data to be made available by the different Member States so this could be used as statistical information for the valuation of technical provisions and the SCR. However, as also recognised in the QIS4 specifications market data might be very desirable for specific insurance companies for the valuation of technical provisions and the SCR.

2.10 The level 1 text contains several articles referring to data that could be made available by Member States as part of the regulatory framework. We mention some key elements.

### **Article 35 Information to be provided for supervisory purposes**

*1. Member States shall require insurance and reinsurance undertakings to submit to the supervisory authorities the information which is necessary for the purposes of supervision.*

### **Article 50 Report on solvency and financial condition: content**

*1. Member States shall, taking into account the principles set out in paragraphs 3 and 4 of Article 35, require insurance and reinsurance undertakings to publicly disclose, on an annual basis, a report on their solvency and financial condition. That report shall contain the following information, either in full or by way of references to equivalent information, both in nature and scope, disclosed publicly under other legal or regulatory requirements:*

.....

*(c) a description, separately for each category of risk, of the risk exposure, concentration, mitigation and sensitivity;*

*(d) a description, separately for assets, technical provisions, and other liabilities, of the bases and methods used for their valuation, together with an explanation of any major differences in the bases and methods used for their valuation in financial statements;*

2.11 These articles are all subject to implementing measures addressed in CEIOPS' CP 58 "Supervisory reporting and disclosure".

## **Approaches to make market data available**

- 2.12 Insurance-related market data could be made available in several ways, for example through supervisory authorities, through national or European associations of (re)insurers, through actuarial associations or through other bodies or courses. The chosen approach may be different in different member states.
- 2.13 Market data could be collected from the information that individual undertakings provide to their local supervisors. Relevant undertaking specific information could either be disclosed on an aggregated (and thus an anonymised) bases or be made available entirely (not anonymised). It is therefore important that the templates, referred to in CP 58 "Supervisory reporting and disclosure", to be defined in Level 3 contain the necessary data.

## Market data requirements specified in QIS4

- 3.1 The SCR calculations as presented in QIS4 will require the use of market data at several different parts of the framework. This will be information available from financial markets (such as stock prices, yield curves, reinsurance ratings, etc) but also more general market statistics (such as mortality rates, flood and storm statistics and claims payment patterns).
- 3.2 For the more general market statistics several sources are available. To what extent this kind of information is available to each undertaking will differ by type of information but also by market. The market data requirements as presented in the proxies and simplifications for the valuation of technical provisions for non-life insurance are not readily available yet in most markets. For market data used in these proxies and simplifications regulation to harmonise disclosure of this information could be desirable.
- 3.3 In the QIS4 study references were made to market data for the following proxies and simplifications:
- Market development pattern proxy
  - Frequency-Severity proxy
  - Bornhuetter-Ferguson-based proxy
  - Discounting proxy
  - Risk margin proxy
  - Factor-based claims-handling-costs proxy
- 3.4 In this section an overview is given which data should be collected to ensure the use of these methods.
- 3.5 Required market data for the presented proxies and simplifications in QIS4 can be listed as follows:
- Market development pattern on paid claims
  - Market development pattern on number of claims
  - Expected average cost of claims
  - Market based ultimate loss ratio
  - Average modified duration of claims liabilities
  - Risk margin as percentage of Best Estimate
  - Claims handling as percentage of claims provisions

## 3.6

In the following table these items are linked to the specific proxies and simplifications as presented in QIS4.

	Market development pattern proxy	Frequency-Severity proxy	Bornhuetter-Ferguson based proxy	Discounting proxy	Risk margin proxy	Factor based claims-handling-costs proxy
Market development pattern on paid claims	X		X	X		
Market development pattern on number of claims		X				
Expected average cost of claims		X				
Market based ultimate loss ratio			X			
Average modified duration of claims liabilities				X		
Risk margin as percentage of BE					X	
Claims handling as percentage of claims provisions						X

## 3.7

All market data requirements as proposed in QIS4 were based at a minimum on a line of business level per market (i.e. member state). Additional granularity was provided in some countries.

## 3.8

The type of information as mentioned in the proxies and simplifications under QIS4 will in practise not only be very useful for these undertakings applying proxies or simplifications under Solvency II but would also be very useful for undertakings applying sound actuarial techniques. Market data could in these circumstances be used as benchmarks or reference material.

# Overview of market data provided in QIS4

## Market Development Pattern Proxies

- 4.1 Proxies based on market development patterns have been suggested by almost all of the national expert groups. By combining the use of statistical loss reserving techniques with market data, they would allow undertakings a gradual transition to more sophisticated modelling techniques when more undertaking-specific claims data becomes available over time.
- 4.2 Ten member states (Belgium, Bulgaria, Germany, Denmark, Spain, France, Poland, Portugal, Sweden and Slovenia) have provided market development patterns for selected LOBs for QIS4. The following table gives an overview about the respective LOBs:<sup>7</sup>

Markets/ LOBs	AH/ WC	AH/ H	AH/ oth.	M/ 3rd	M/ oth.	MAT	Fire	L	Cr.	Legal exp.	Ass.	Misc.
BE		X	X	X	X	X	X	X	X	X	X	
BG		X	X	X	X	X	X	X	X		X	
DE			X	X	*		*	X		*		
DK	X	X	X	X	X	X	X	X	X	X	X	
ES		x	X	X	X	X	X	X	X	X	X	
FR	X		X	X	X			X				
PL		X	X	X	X	X	X	X	X	X	X	X
PT	X			X	X							
SE			X	X	X							
SI				X								

\*) Will be made available for the next QIS study

- 4.3 In Belgium, France and Germany finer segmentations have been proposed. For Denmark also patterns for the three non-proportional reinsurance Lobs (Property, Casualty and MAT) were provided. Overview of patterns contained in annex 1.
- 4.4 For the determination of market development patterns, supervisory authorities have encountered a number of important questions:

<sup>7</sup> This does not include the three reinsurance classes considered for QIS4. Only Denmark has provided market data for these Lobs.

- To what extent does the determination reflect the degree to which claims pattern from individual undertakings will differ from the market average?
- Should the determination aim to reflect the risk profile of small and medium sized undertakings (rather than an overall market average)?
- How can market data be provided with sufficient information on variations, trends, handling of large claims, smoothing?
- Should the development factors be derived from an aggregated “market” triangle or as the weighted/unweighted mean of undertaking’s individual factors together with a measure for the variability of the factors?
- Which level of granularity should be chosen in the determination of patterns?

## Frequency-severity based Proxies

- 4.5 The following table gives an overview about the respective LOBs by market for which frequency-severity proxy market data were provided in QIS4:

<i>Markets/ LOBs</i>	<i>AH/ WC</i>	<i>AH/ H</i>	<i>AH/ oth.</i>	<i>M/ 3<sup>rd</sup></i>	<i>M/ oth.</i>	<i>MAT</i>	<i>Fire</i>	<i>L</i>	<i>Cr.</i>	<i>Legal exp.</i>	<i>Ass.</i>	<i>Misc.</i>
<i>BG</i>		X	X	X	X	X	X	X	X		X	
<i>PL</i>		X	X	X	X	X	X	X	X	X	X	X
<i>PT</i>				X								

- 4.6 An overview of information regarding market development patterns on number of claims and expected average cost of claims for the use of this proxy is given in annex 1.

## Bornhuetter-Ferguson based Proxies

- 4.7 The following table gives an overview about the respective LOBs and markets for which market based ultimate loss ratios are provided in QIS4. Only France has provided such information to the market:

<i>Markets/ LOBs</i>	<i>AH/ WC</i>	<i>AH/ H</i>	<i>AH/ oth.</i>	<i>M/ 3<sup>rd</sup></i>	<i>M/ oth.</i>	<i>MAT</i>	<i>Fire</i>	<i>L</i>	<i>Cr.</i>	<i>Legal exp.</i>	<i>Ass.</i>	<i>Misc.</i>
<i>FR</i>	X		X	X	X			X				

- 4.8 An overview of information regarding market development patterns on paid claims and market based ultimate loss ratio’s for the use of this proxy is given in annex 1.

## Discounting Proxies

- 4.9 Discounting proxies are used to convert undiscounted best estimates of claims provisions into discounted estimates, in cases where there is not

enough data to apply the full term structure of risk-free interest rates (e.g. when case-by-case proxies are used).

4.10 The Coordination Group has suggested a simple discounting proxy which applies a single percentage value per LOB (and market) to the undiscounted best estimate. The calibration of these factors could be based on the determination of average modified duration of undertaking's liabilities in the respective LOB/market or could be based on the market development pattern.

4.11 It should be noted that the average modified duration may also be used in the context of the risk margin proxy (see below).

4.12 The following table gives an overview about the respective LOBs and markets for which market based average modified durations are provided in QIS4:

<i>Markets/ LOBs</i>	<i>AH/ WC</i>	<i>AH/ H</i>	<i>AH/ oth.</i>	<i>M/ 3rd</i>	<i>M/ oth.</i>	<i>MAT</i>	<i>Fire</i>	<i>L</i>	<i>Cr.</i>	<i>Legal exp.</i>	<i>Ass.</i>	<i>Misc.</i>
<i>BE</i>		X	X	X	X	X	X	X	X	X	X	
<i>BG</i>		X	X	X	X	X	X	X	X		X	X
<i>DK</i>	X	X	X	X	X	X	X	X	X	X	X	
<i>DE</i>			X	X	X	X	X	X	X	X	X	X
<i>FR</i>	X		X	X	X	X	X	X	X			
<i>PT</i>	X	X	X	X	X		X	X				

4.13 For Denmark also the modified durations for the three non-proportional reinsurance Lobs (Property, Casualty and MAT) were provided. An overview of the figures can be found in annex 1.

## Proxies for the risk margin

4.14 The following table gives an overview about the respective LOBs and markets for which risk margin standard factors are provided under QIS4:

<i>Markets/ LOBs</i>	<i>AH/ WC</i>	<i>AH/ H</i>	<i>AH/ oth.</i>	<i>M/ 3rd</i>	<i>M/ oth.</i>	<i>MAT</i>	<i>Fire</i>	<i>L</i>	<i>Cr.</i>	<i>Legal exp.</i>	<i>Ass.</i>	<i>Misc.</i>
<i>ES</i>		X	X	X	X	X	X	X	X	X	X	X
<i>PL</i>		X	X	X	X	X	X	X	X	X	X	X

4.15 An overview of parameters for this proxy can be found in annex 1.

## Proxies for claims handling provisions

4.16 The following table gives an overview about the respective LOBs and Markets for which market factors for claims handling costs were provided under QIS4:

<i>Markets/ LOBs</i>	<i>AH/ WC</i>	<i>AH/ H</i>	<i>AH/ oth.</i>	<i>M/ 3rd</i>	<i>M/ oth.</i>	<i>MAT</i>	<i>Fire</i>	<i>L</i>	<i>Cr.</i>	<i>Legal exp.</i>	<i>Ass.</i>	<i>Misc.</i>
<i>PL</i>		X	X	X	X	X	X	X	X		X	X

4.17 An overview of parameters for this proxy can be found in annex 1.

# Annex 1

A1 This annex lists markets parameters used in QIS4 with regard to:

- Market development pattern on paid claims
- Market development pattern on number of claims
- Expected average cost of claims
- Market based ultimate loss ratio
- Average modified duration of claims liabilities
- Risk margin as percentage of Best Estimate
- Claims handling as percentage of claims provisions

For this annex feedback was received from the following countries. Some of them indicated that they had not provided any specific parameters for their markets.

- Belgium (BE)
- Bulgaria (BG)
- Czech Republic (CZ)
- Germany (DE)
- Denmark (DK)
- Spain (ES)
- Finland (FI)
- France (FR)
- Netherlands (NL)
- Poland (PO)
- Portugal (PT)
- Slovak Republic (SK)
- Sweden (SE)
- Slovenia (SI)



## Market Development Patterns - Accident and health – workers' compensation

Market development pattern on paid claims<sup>8</sup>

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>DK</i>	2.53	1.94	1.55	1.32	1.22	1.13	1.10	1.07	1.05	1.02					
<i>FR-1<sup>9</sup></i>	1.27	1.14	1.07	1.05	1.08										
<i>FR-2<sup>10</sup></i>	1.46	1.22	1.21	1.11	1.13										
<i>PT</i>	1.60	1.06	1.02	1.01	1.01	1.01	1.01	1.00	1.01	1.06					

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<sup>8</sup> The factors shown in the following tables refer to the development of accumulated paid claims over the respective development years. In some cases, the last figure displayed in a given column contains a tail factor adjustment.

<sup>9</sup> For the French market, market development patterns are provided based on a split between Personal (FR-1) and Collective (FR-2) business. The factors for year 5 are in fact a tail factor for the remaining period including a correction for the tail period. See also the following link for the provided information for the French market: [http://www.ceiops.eu/media/docman/public\\_files/consultations/QIS/QIS4%20National%20Guidance%20France.doc](http://www.ceiops.eu/media/docman/public_files/consultations/QIS/QIS4%20National%20Guidance%20France.doc).

## Market Development Patterns - Accident and health – health insurance

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE (total)</i>	1.48	1.04	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.09
<i>BE (guaranteed income)</i>	1.61	1.20	1.15	1.12	1.10	1.08	1.07	1.06	1.06	1.00	1.00	1.00	1.00	1.00	1.25
<i>BE (medical expenses)</i>	1.48	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>BG</i>	1.50	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>DK</i>	1.77	1.17	1.12	1.03	1.02	1.01	1.00	1.00	1.00	1.00					
<i>ES</i>	1.02	1.01	1.00												
<i>PL</i>	1.34	1.03	1.01	1.00	1.00	1.00									

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BG</i>	1.41	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>PL</i>	1.48	1.04	1.01	1.00	1.00	1.00									

## Market Development Patterns - Accident and health – default

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE</i>	2.08	1.23	1.09	1.05	1.03	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.05
<i>BG</i>	1.70	1.06	1.02	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>DE</i>	3.29	1.45	1.13	1.04	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>DK</i>	1.57	1.18	1.06	1.03	1.01	1.01	1.00	1.00	1.00	1.00					
<i>ES</i>	2.33	1.21	1.07	1.04	1.02	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.01	1.00	1.00
<i>FR-1<sup>1</sup></i>	1.19	1.02	1.00	1.01	1.01										
<i>FR-2<sup>1</sup></i>	1.33	1.00	1.01	0.99	1.01										
<i>PL</i>	1.52	1.03	1.01	1.00	1.00	1.00									
<i>SE<sup>2</sup></i>	3.61	2.05	1.44	1.19	1.06	1.05	0.98	1.02	1.02						

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BG</i>	1.43	1.02	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>PL</i>	1.79	1.03	1.01	1.00	1.00	1.00									

<sup>1)</sup> For the French market. market development patterns are provided based on a split between Personal (FR-1) and Collective (FR-2) business. The last factor includes a correction for the tail.

<sup>2)</sup> For the Swedish market. market development patterns are provided through triangles. The factors shown in this overview are based on applying a chain ladder method on the provided factors per accident year.

## Market Development Patterns - Motor. third-party liability

Market development pattern on paid claims

Factor/ dev. year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
BE	1.70	1.13	1.08	1.06	1.05	1.03	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.07
BG	2.29	1.34	1.16	1.12	1.07	1.03	1.03	1.01	1.01	1.12	1.87	1.00	1.00	1.00	1.00
DE	1.28	1.07	1.03	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00	1.00
DK	1.67	1.18	1.15	1.09	1.05	1.02	1.01	1.01	1.00						
ES	1.69	1.17	1.10	1.05	1.02	1.02	1.01	1.00	1.01	1.01	1.01	1.00	1.00	1.00	1.00
FR-1 <sup>1</sup>	2.77	1.38	1.18	1.11	1.11	1.51									
FR-2 <sup>1</sup>	1.54	1.03	1.02	1.02	1.02	1.02									
PL	1.41	1.06	1.03	1.02	1.01	1.01									
PT	1.47	1.10	1.07	1.05	1.04	1.04	1.03	1.02	1.02	1.15					
SE <sup>2</sup>	1.97	1.11	1.06	1.05	1.03	1.04	1.04	1.06	1.07						
SI	1.48	1.19	1.10	1.05	1.03	1.02	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00

Market development pattern on number of claims

Factor/ dev. year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
BG	1.48	1.11	1.04	1.02	1.02	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PL	1.51	1.05	1.03	1.01	1.01	1.01									
PT	1.08	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00						

<sup>1</sup>) For the French market. market development patterns are provided based on a split between Motor Bodily Injury and Motor Damages. The last factor includes a correction for the tail.

<sup>2</sup>) For the Swedish market. market development patterns are provided through triangles. The factors shown in this overview are based on applying a chain ladder method on the provided factors per accident year.

## Market Development Patterns - Motor. other classes

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE</i>	1.18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>BG</i>	1.43	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00						
<i>DK</i>	1.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
<i>ES</i>	1.05	1.00													
<i>FR</i>	1.22	1.00	1.01	1.00	1.01										
<i>PL</i>	1.20	1.00	1.00	1.00	1.00	1.00									
<i>PT</i>	1.30	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02					
<i>SE<sup>1</sup></i>	1.21	0.99													

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BG</i>	1.25	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00						
<i>PL</i>	1.33	1.01	1.01	1.00	1.00	1.00									

<sup>1</sup>) For the Swedish market. market development patterns are provided through triangles. The factors shown in this overview are based on applying a chain ladder method on the provided factors per accident year.

# Market Development Patterns - Marine. aviation and transport

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE</i>	2.20	1.16	1.03	1.01	1.00	1.00	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.00	1.00
<i>BG</i>	1.78	1.08	1.01	1.01	1.00	1.20	1.00	1.00	1.00						
<i>DK</i>	1.65	1.13	1.05	1.02	1.01	1.01	1.00	1.00	1.00	1.00					
<i>ES</i>	2.56	1.19	1.07	1.03	1.00										
<i>PL</i>	1.90	1.11	1.03	1.08	1.03	0.99									

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BG</i>	1.72	1.07	1.02	1.02	1.01	1.01	1.00	1.00	1.00						
<i>PL</i>	1.61	1.04	1.01	1.00	1.00	1.00									

# Market Development Patterns - Fire and other property damage

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE</i>	1.50	1.05	1.02	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>BG</i>	1.30	1.02	1.01	1.01	1.00	1.00	1.00	1.00	1.00						
<i>DK</i>	1.48	1.06	1.02	1.01	1.00	1.00	1.00	1.00	1.00	1.00					
<i>ES</i>	1.38	1.03	1.02	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>PL</i>	1.36	1.04	1.02	1.01	1.01	1.00									

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BG</i>	1.18	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00						
<i>PL</i>	1.38	1.02	1.02	1.00	1.00	1.00									

## Market Development Patterns - Third-party liability

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE (Total)</i>	2.06	1.20	1.12	1.09	1.07	1.06	1.05	1.05	1.04	1.03	1.02	1.02	1.02	1.02	1.25
<i>BE (Private life)</i>	1.91	1.19	1.11	1.08	1.06	1.05	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.01	1.12
<i>BE (Professional)</i>	2.45	1.40	1.23	1.20	1.15	1.11	1.09	1.11	1.08	1.00	1.00	1.00	1.00	1.00	1.55
<i>BE (Undertaking)</i>	2.10	1.18	1.11	1.07	1.06	1.05	1.04	1.04	1.04	1.03	1.02	1.02	1.02	1.01	1.13
<i>BG</i>	1.61	1.07	1.07	1.05	1.04	1.06	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>DE-1<sup>1</sup></i>	1.34	1.09	1.03	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>DE-2<sup>1</sup></i>	1.54	1.20	1.11	1.07	1.05	1.04	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01
<i>DK</i>	2.34	1.34	1.22	1.13	1.10	1.07	1.05	1.02	1.01	1.01					
<i>ES</i>	2.13	1.24	1.11	1.16	1.10	1.04	1.02	1.01	1.13	1.05	1.04	1.02	1.02	1.01	1.01
<i>FR</i>	2.57	1.42	1.23	1.16	2.26										
<i>PL</i>	1.66	1.12	1.08	1.08	1.07	1.08									

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BG</i>	1.52	1.04	1.02	1.01	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>PL</i>	1.59	1.06	1.03	1.02	1.02	1.02									

<sup>1)</sup> For the German market. market development patterns are provided based on a split between Private (GE-1) and Non-Private (GE-2) business.

# Market Development Patterns - Credit and suretyship

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE</i>	3.76	1.14	0.98	0.95	0.95	0.96	0.98	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99
<i>BG</i>	1.75	1.09	1.04	1.03	1.03	1.01	1.07	1.02	1.00						
<i>DK</i>	1.44	1.04	1.02	1.01	1.00	1.00	1.00	1.00	1.00	1.00					
<i>ES</i>	2.56	1.19	1.07	1.03	1.00										
<i>PL</i>	1.66	1.05	1.04	0.99	1.01	0.99									

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BG</i>	1.94	1.09	1.02	1.07	1.01	1.01	1.01	1.01	1.00						
<i>PL</i>	1.94	1.21	1.07	1.01	1.02	1.00									

# Market Development Patterns - Legal expenses

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE</i>	3.18	1.61	1.29	1.18	1.12	1.08	1.06	1.04	1.03	1.01	1.01	1.01	1.01	1.01	1.08
<i>DK</i>	3.12	1.68	1.17	1.07	1.05	1.02	1.00	1.00	1.00	1.00					
<i>ES</i>	1.71	1.14	1.06	1.03	1.02	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>PL</i>	2.10	1.16	1.08	1.01	1.00	1.00									

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>PL</i>	2.19	1.25	1.10	1.04	1.00	1.00									

## Market Development Patterns – Assistance

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE</i>	1.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>BG</i>	1.77	1.06	1.01	1.01	1.00	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>DK</i>	1.36	1.05	1.02	1.01	1.01	1.00	1.00	1.00	1.00	1.00					
<i>ES</i>	1.50	1.11	1.00												
<i>PL</i>	1.18	1.01	1.00	1.00	1.00	1.00									

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BG</i>	1.41	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<i>PL</i>	1.36	1.02	1.00	1.00	1.00	1.00									

# Market Development Patterns – Miscellaneous

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>BE<sup>10</sup></i>	1.49	1.04	1.01	1.00	1.01										
<i>PL</i>	2.13	1.20	1.04	1.08	1.04	1.00									

Market development pattern on number of claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>PL</i>	1.26	1.02	1.01	1.00	1.01	1.03									

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<sup>10</sup> For the Belgian factors this refers to financial losses which is a coverage included in fire insurance contracts

## Market Development Patterns - Non-proportional reinsurance – property

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DK	1.78	1.09	1.03	1.01	1.00	1.00	1.00	1.00	1.00	1.00					

## Market Development Patterns - Non-proportional reinsurance – casualty

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DK	4.98	1.69	1.20	1.08	1.05	1.03	1.02	1.01	1.01	1.00					

## Market Development Patterns - Non-proportional reinsurance – MAT

Market development pattern on paid claims

<i>Factor/ dev. year</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DK	1.71	1.20	1.07	1.05	1.03	1.02	1.01	1.01	1.01	1.00					

## Expected average cost per claim

Markets/ LOBs	AH/WC	AH/ H	AH/ oth.	M/ 3rd	M/ oth.	MAT	Fire	L	Cr.	Legal exp.	Ass.	Misc.	NP Re Prop	NP Re CAS	NP Re MAT
BG		165	252	629	397	52 947	1057	5990	1017		312	2593			
DK		2675		3508	1266	9924	3028	3375		1793	760				
PL		1428	930	8958	11732	9146	7957	4535	25086	1271	891	10224			
PT <sup>2</sup>				1275/11 678											

## Market based ultimate loss ratio

Markets/ LOBs	AH/WC	AH/ H	AH/ oth.	M/ 3rd	M/ oth.	MAT	Fire	L	Cr.	Legal exp.	Ass.	Misc.	NP Re Prop	NP Re CAS	NP Re MAT
FR <sup>1</sup>	54%/78%		77%/84%	104%	77%			99%							

<sup>1</sup>) For the French market. market based ultimate loss ratio's are provided separately for respectively the Personal and Collective business.

<sup>2</sup>) For the Portuguese market. average expected costs per claim are split between Material damage and Bodily injury. Estimates refer to incurred claims in 2006.

## Average modified duration of claims liabilities

Markets/ LOBs	AH/WC	AH/ H	AH/ oth.	M/ 3 <sup>rd</sup>	M/ oth.	MAT	Fire	L	Cr.	Legal exp.	Ass.	Misc.	NP Re Prop	NP Re CAS	NP Re MAT
BE		2.96	2.89	3.16	1.07	1.94	1.54	5.08	0.57	4.55	1.09	1.35			
BG		1.34	2.84	6.65	1.39	2.37	1.35	2.23	4.23		1.63	2.11			
DK	4.4	1.5	1.4	2.0	1.0	1.3	1.1	2.8	1.1	2.0	1.1		1.1	2.4	1.7
DE <sup>2</sup>			1.4	4	0.8	1.5	1.1	2.6/4.2	2	2.5	0.7	1.7			
FR <sup>1</sup>	1.82/ 2.46		0.77/ 0.79	2.88	0.76	2.75	1.47/ 1.88	7.99	5.36						
PT <sup>4</sup>	1.457	0.375	1.434	2.521	0.861		1.650/ 1.254	3.126							

<sup>1)</sup> For the French market the information provided are average durations. These are provided separately for respectively the Personal and Collective business of AH/WC and AH/Other. Further more Fire is split in Personal lines and Commercial lines.

<sup>2)</sup> For the German market the values for accident insurance, motor third party liability and general liability insurance are more accurate since these are based on market development patterns; values for other LOB's based on preliminary findings. For Liability a split is made between Private and Non-private (commercial and industrial) cover.

<sup>3)</sup> For the German market also percentages were provided (factor to discount the reserves with) to be used in the discounting proxy.

<sup>4)</sup> For the Portuguese market the modified durations are based on the claims occurred in 2006. Further more for Fire a split is made between "all-purpose" property insurance (residential, industrial, commercial...) and "other property damages".

## Risk margin as percentage of best estimate

Markets/ LOBs	AH/WC	AH/ H	AH/ oth.	M/ 3rd	M/ oth.	MAT	Fire	L	Cr.	Legal exp.	Ass.	Misc.	NP Re Prop	NP Re CAS	NP Re MAT
ES		6.4%	4.9%	4.2%	1.7%	3.3%	3.2%	8.1%	3.7%	8.1%	2.1%	9.5%	9.4%	16.8%	
PL		3.74%	6.66%	5.89%	1.61%	9.82%	2.39%	8.59%	3.66%	3.54%	1.66%	14.69%			

## Claimshandling as a percentage of claims provisions

Markets/ LOBs	AH/WC	AH/ H	AH/ oth.	M/ 3rd	M/ oth.	MAT	Fire	L	Cr.	Legal exp.	Ass.	Misc.	NP Re Prop	NP Re CAS	NP Re MAT
PL		13.68%	13.60%	9.35%	7.49%	16.51%	8.25%	15.10%	10.81%		30.15%	10.67%			
SE <sup>11</sup>			1.5%	4.3%	7.9%										

<sup>11</sup> In the QIS4, for the Swedish market further factors were specified on basis of a more granular segmentation than for the lines of business shown above.