2016

REPORT

n°1

NON-LIFE
RESERVING PRACTICES

ASTIN

EDITORIAL

NON LIFE RESERVING PRACTICES

I n its constant care to follow insurers practices and serve as the link between academic searchers and practitioners, the ASTIN (Actuarial STudies in Non-Life Insurance), the Non-Life section of the International Actuarial Association, launched on Q4 2015 a survey aiming at gathering the reserving practices of insurers around the world.

42 PARTICIPATING COUNTRIES, ACCOUNTING FOR 87% OF WORLDWIDE NON-LIFE PREMIUMS

535 insurance companies participated to the survey, from 42 different countries, these countries accounting for 87% of Worldwide Non-Life premiums.

We would like to express our deepest thanks to the reserving actuaries from the participating companies, and to all the people who assisted them.

Congratulations to the 42 country nominates who did a great job managing the surveys in each participating country, and writing the country reports.

We would also like to thank the marketing head of this project, Mrs Judith Lutz, and the communication firm accroche-com, who kindly volunteered to help us.

GLOBAL REPORT AND 39 DETAILED COUNTRY REPORTS

This report contains a summary of the findings, as well as a detailed report for each of the 39 countries where the coverage was estimated as sufficient.

Although we have tried to be quite extensive while building the questionnaire, we are conscious that some questions are not adapted to some countries, and many reserving methods are not represented in the survey.

3 SPECIFIC SECTIONS

We have also added to this report the following 3 sections which we hope will be useful for the readers:

- A specific section about Reserving under the European Solvency II project;
- A specific section about Reserving under US Gaap/RBC;
- And a section about the future of reserving.

We hope you will enjoy the reading this report, and we would be very happy to receive any comments or suggestions at the following address: wpnlreserving@actuaries.org

With our kind regards,

Eric DAL MORO
ASTIN Chair

Frank CUYPERS
ASTIN Committee member

Pierre MIEHE
ASTIN Committee member

Prepared by the ASTIN Working Party on Non-Life Reserving

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ASTIN WPNLReserving Country Nominates (Detail page 98)

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NON LIFE RESERVING PRACTICES

MODUS OPERANDI / DISCLAIMER

This survey presents some insurance companies' non-life reserving practices for some selected countries. It does not intend to be exhaustive nor fully representative of each market.

It is the result of the project "WPNLReserving" (Working Party Non-Life Reserving) launched by ASTIN on Q4 2015, with a call for volunteers in each of the target markets.

Following the candidatures received 1 to 2 persons (called the "Nominates") have been nominated per target market, as the project manager for his/her country.
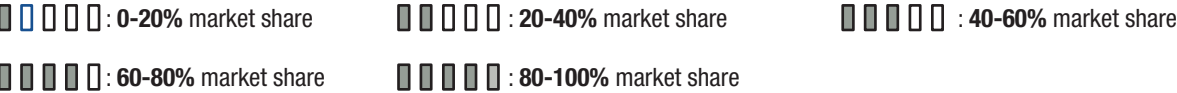
Data sources
The results are based on 4 sources:
- 535 surveys ("ASTIN WPNLReserving surveys") filled by insurance companies from 42 countries, for main data;
- The Swiss Re SIGMA 2015 report, gathering insurance premiums and population of the selected countries in 2014, available on the following website: http://media.swissre.com/documents/sigma4_2015_en.pdf;
- Information on discounting and signing actuaries provided by the Nominates;
- Country text reports written by the Nominates.

The ASTIN WPNLReserving survey
The Survey has been prepared by the ASTIN Committee members, with the help of Dr Mario Wüthrich, to which the ASTIN would like to express its deepest thanks. It has then been shared with the Nominates to take into account their suggestions, and finalized on 1st January 2016.
This final survey can be downloaded on the ASTIN website: http://www.actuaries.org/index.cfm?DSP=ASTIN&ACT=INDEX&LANG=EN.
2 specific questions have later been added specifically for USA and Canada.
The surveys have then been filled by people responsible for the reserves in the insurance companies which accepted to answer, on an anonymous basis to minimize distortion, during Q1 2016. The answers were on a voluntary basis, which may induce a bias. The data entered by insurance companies has not been checked.
The data treatment has been performed by members of the WPNLReserving project, using Excel Add'ins. For world consolidation a weighted average have been used, using countries non-life premiums as weigths.
Countries where representation was considered as insufficient do not have a specific country report.

Representativeness
A rank of representativeness has been evaluated for each market, from 1/5 to 5/5, on the basis of the estimated written premiums share of participating companies:

▓░░░░ : **0-20%** market share   ▓▓░░░ : **20-40%** market share   ▓▓▓░░ : **40-60%** market share

▓▓▓▓░ : **60-80%** market share   ▓▓▓▓▓ : **80-100%** market share

Specific case of UK
For UK the data does not come from the survey filled by insurers, but from a 2014 survey run by the UK, the results of which are available on the survey's report: https://www.actuaries.org.uk/documents/giroc-uk-reserving-survey-2014.
As the questions and the protocol were not the same, it could induce a bias in the results, compared to other countries.

Comments/Suggestions
If you have any comments or suggestions, please do not hesitate to send an e-mail to wpnlreserving@actuaries.org.

CONTENTS

Global results
PROJECT COVERAGE

ASTIN collected surveys from 535 insurers from 42 countries over the world. The map and grids below detail the size of each market represented in this project, and the level of representation, with a ladder from 1 to 5.

MARKET COVERAGE
- VERY HIGH (80 to 100 %)
- HIGH (60 to 80 %)
- MEDIUM (40 to 60 %)
- LOW (20 to 40 %)
- VERY LOW (0 to 20%)

Zone	Country	NL Premiums (2014 MUSD)	Population (2014 millions)	NL Prm/pop (2014 USD)	Received Questionnaires	Market share (1/5 to 5/5)
World		**2 123 703**	**7 217,8**	**294**	**535**	
North America	Canada	73 235	35,5	2 063	24	4/5
North America	USA	752 222	318,7	2 360	6	1/5
Europa	Austria	13 820	8,5	1 626	7	3/5
Europa	Belgium	16 549	11,3	1 465	15	4/5
Europa	Denmark	11 378	5,6	2 032	10	4/5
Europa	Finland	5 569	5,5	1 013	26	5/5
Europa	France	97 759	66,1	1 479	10	3/5
Europa	Germany	136 170	82,3	1 655	41	4/5
Europa	Italy	49 443	60,0	824	18	5/5
Europa	Netherlands	74 100	16,9	4 385	17	3/5
Europa	Norway	10 443	5,1	2 048	11	4/5
Europa	Poland	9 798	38,6	254	12	3/5
Europa	Portugal	5 189	10,4	499	8	2/5
Europa	Spain	38 462	46,6	825	2	1/5
Europa	Sweden	10 556	9,7	1 088	4	2/5
Europa	Switzerland	29 117	8,2	3 551	7	2/5
Europa	Turkey	10 119	75,9	133	36	5/5
Europa	Ukraine	2 068	44,9	46	12	3/5
Europa	United Kingdom	115 945	64,7	1 792	24	3/5
Asia	Hong Kong	4 182	7,3	573	4	2/5
Asia	Japan	108 174	127,0	852	16	5/5
Asia	Malaysia	5 633	30,2	187	13	3/5
Asia	Philippines	1 369	100,3	14	6	1/5
Asia	Singapore	11 458	5,5	2 083	8	3/5
Asia	South Korea	57 943	50,4	1 150	8	4/5
Asia	Taiwan	16 466	23,5	701	16	5/5
Asia	Thailand	8 400	67,3	125	11	5/5
Asia	Vietnam	1 293	92,5	14	27	5/5
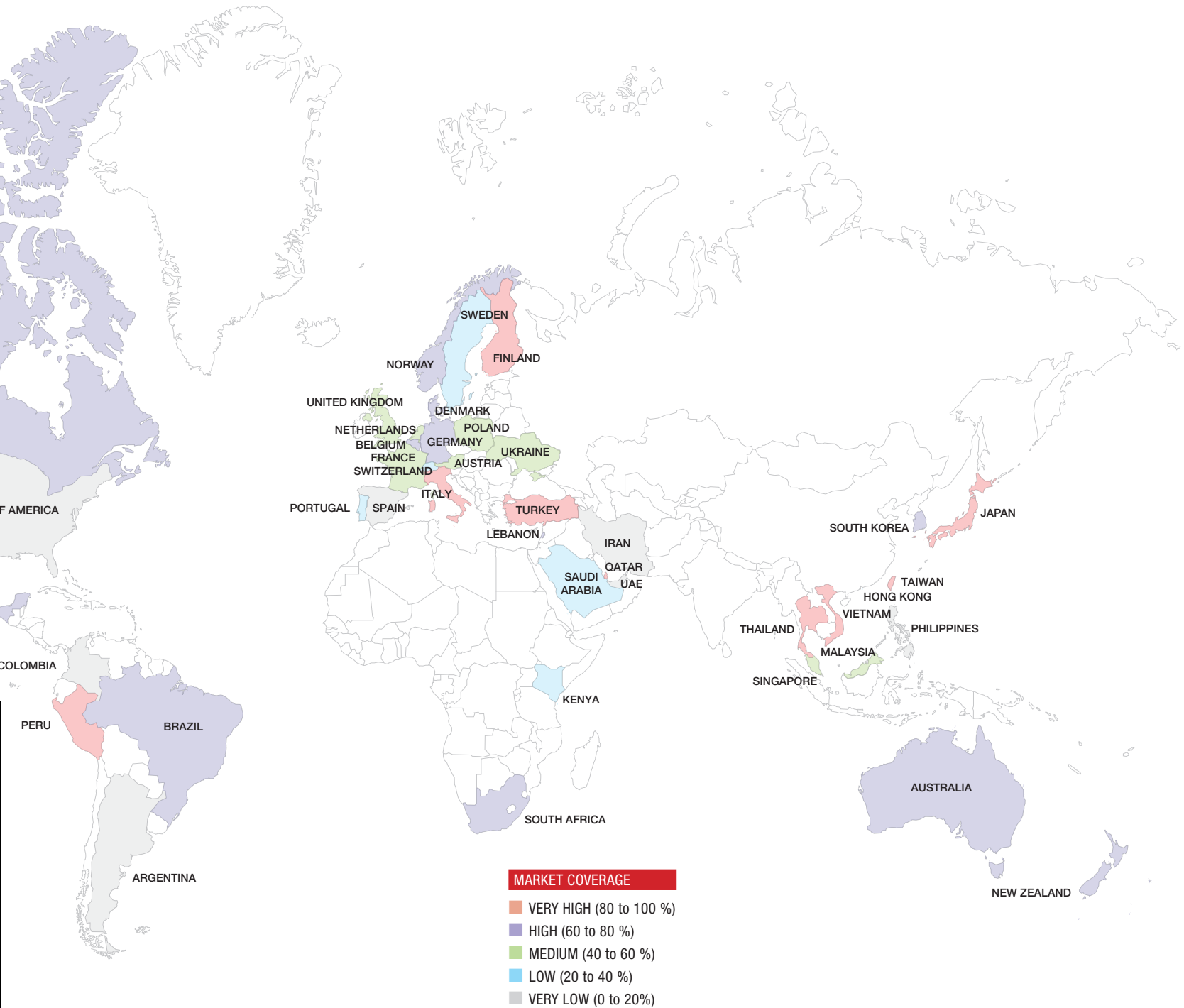
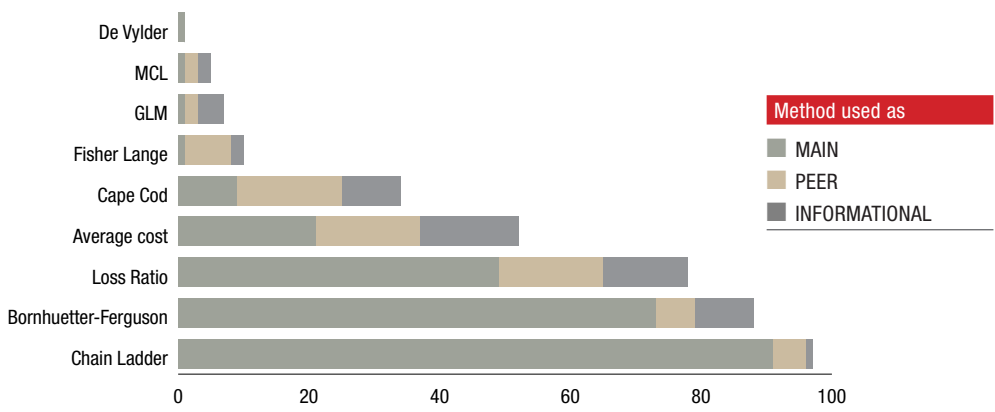| Zone	Country	NL Premiums (2014 MUSD)	Population (2014 millions)	NL Prm/pop (2014 USD)	Received Questionnaires	Market share (1/5 to 5/5)
World		**2 123 703**	**7 217,8**	**294**	**535**	
Latin America	Argentina	12 847	41,8	307	2	1/5
Latin America	Brazil	40 464	202,2	200	34	4/5
Latin America	Colombia	6 649	48,9	136	2	1/5
Latin America	Mexico	21 937	124,0	177	20	4/5
Latin America	Peru	1 841	30,8	60	7	5/5
Oceania	Australia	31 924	23,6	1 353	19	4/5
Oceania	New Zealand	9 808	4,6	2 132	4	4/5
Middle East	Iran	6 737	78,5	86	1	1/5
Middle East	Lebanon	1 078	4,9	220	9	4/5
Middle East	Qatar	2 118	2,2	963	2	5/5
Middle East	Saudi Arabia	7 887	29,4	268	3	2/5
Middle East	UAE	6 905	9,4	735	3	1/5
Africa	Kenya	1 152	45,6	25	7	2/5
Africa	South Africa	9 375	53,2	176	23	4/5

Global results
MOST USED METHODS

Main deterministic methods used

Method used as
MAIN
PEER
INFORMATIONAL

De Vylder
MCL
GLM
Fisher Lange
Cape Cod
Average cost
Loss Ratio
Bornhuetter-Ferguson
Chain Ladder

0   20   40   60   80   100
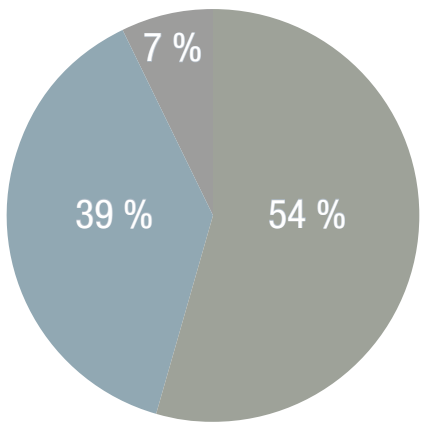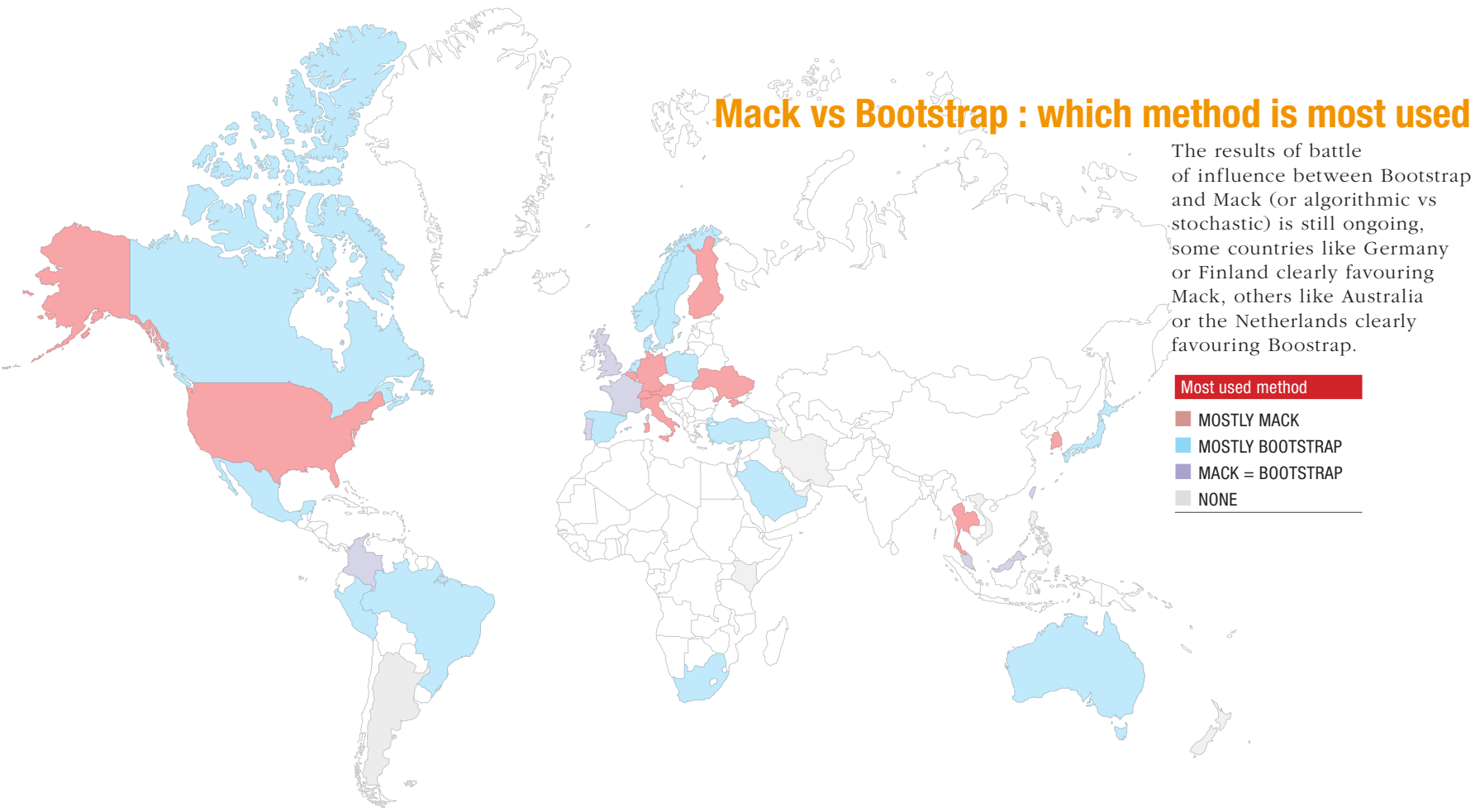
Chain Ladder is the clear winner, with Bornhuetter Ferguson following closely. Loss Ratio is still used a lot for its robustness, and some countries use quite intensively the Average Cost and Cape Cod methods.

Main stochastic methods used

Method used as
MAIN
PEER
INFORMATIONAL

RJMCMC
GLM
Bootstrap/BF
Bootstrap/CL
Merz & Wüthrich
Mack

0   10   20   30   40   50   60   70   80   90   100
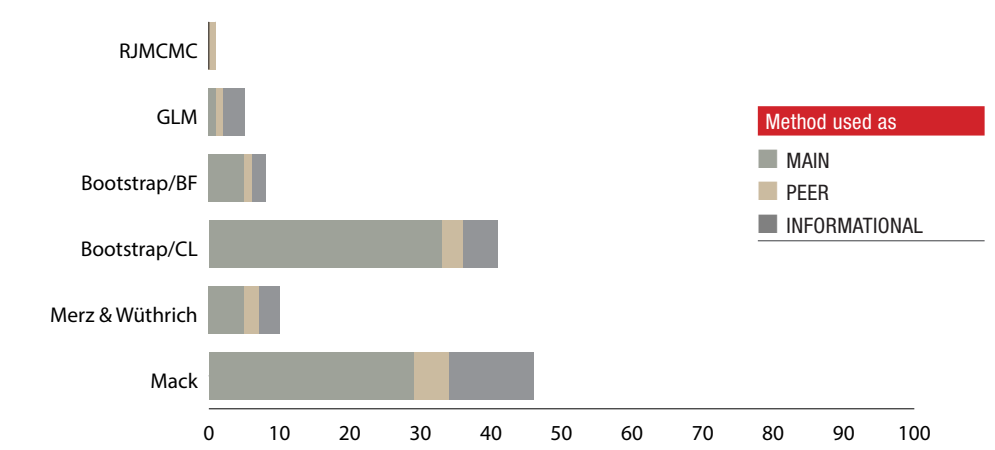
Mack-derived analytical methods are slightly behind the algorithmic Bootstrap methods, the other methods following far behind. On average a little more than one out of two insurers on two use a stochastic method (either being Bootstrap or Mack-derived).

Mack vs Bootstrap : which method is most used

The results of battle of influence between Bootstrap and Mack (or algorithmic vs stochastic) is still ongoing, some countries like Germany or Finland clearly favouring Mack, others like Australia or the Netherlands clearly favouring Boostrap.

Most used method
MOSTLY MACK
MOSTLY BOOTSTRAP
MACK = BOOTSTRAP
NONE

Large claims treatment

Over 50% of participating insurers tend to make a special treatment for large claims.

7 %
39 %
54 %

Methodology
TREATED SEPARATELY
TREATED JOINTLY
EXCLUDED

Reinsurance and subrogations

Type of treatment	Proportional	Claim per claim	Net triangles	Other
Reinsurance	31%	16%	24%	29%
Subrogations	3%	5%	41%	50%

A lot of companies are still not making a special treatment

Global results
RESERVING PROCESS

Reserving exercise periodicity

- 10%
- 68%
- 12%
- 10%

Over 2/3 of insurance companies calculate their reserves quarterly.

Periodicity
- MONTHLY
- QUARTERLY
- HALF-YEARLY
- YEARLY

Respondent companies size

| 13 | 111 | 228 | 182 |

Most repondents are medium-big size companies, with premiums over 50MUSD.

Written premiums
- < USD 5M
- USD 5-50M
- USD 50-500M
- USD > 500M

Resources split

- 40%
- 32%
- 28%
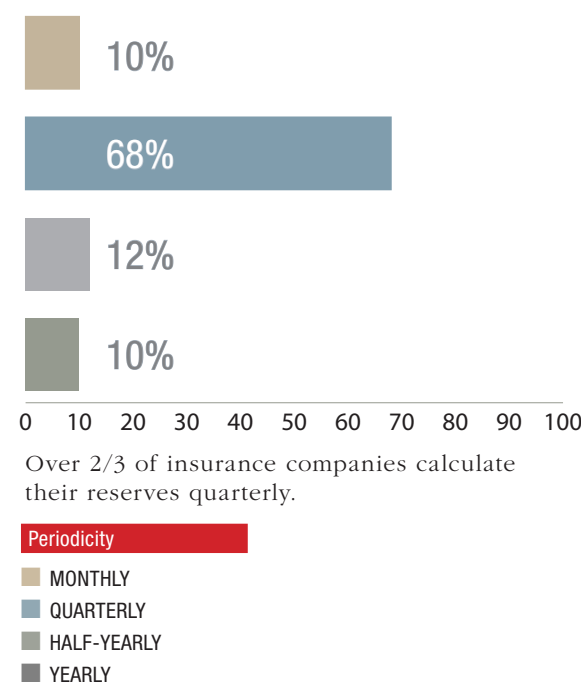
Task
- REPORTING
- RUNNING MODELS
- DATA PREPARATION
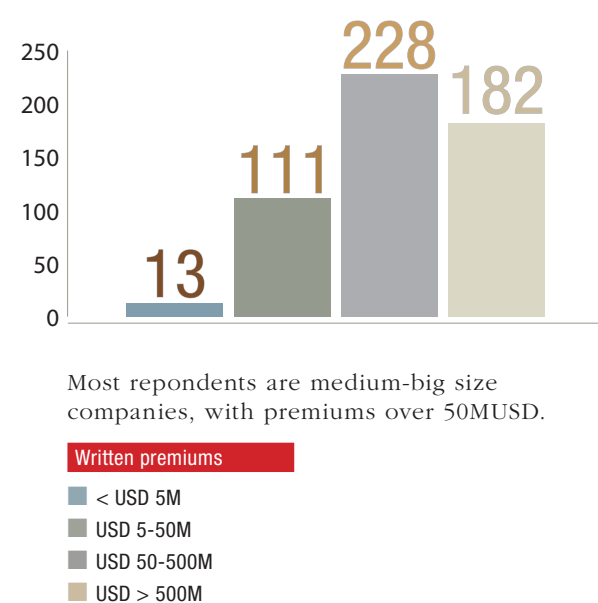
Running model is the main task for actuaries for most insurers (40%). Then comes data preparation (32%), and reporting (28%).

Average number of actuaries vs companies size

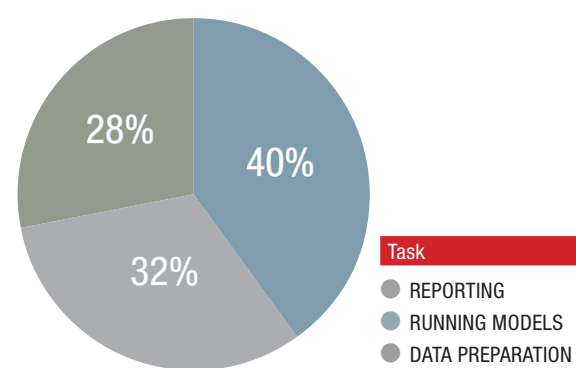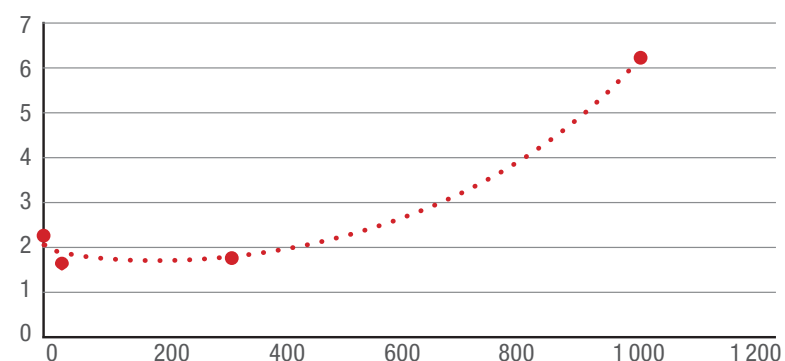The number of actuaries required to make a reserving exercise seems to be constant around 2, until the company size exceeds USD 500M.

Detailed reserving calculations information per country

Zone	Country	Nb reserving process/year	IBNR alloc. contract/cont.	Software used				
				Excel	R	Specialized	In-house	Other
World		**4**	**24%**	**39%**	**0%**	**27%**	**25%**	**9%**
North America	Canada	3	46%	29%	0%	54%	17%	0%
North America	USA	4	17%	33%	0%	0%	50%	17%
Europa	Austria	5	14%	43%	0%	29%	29%	0%
Europa	Belgium	5	40%	27%	0%	53%	20%	0%
Europa	Denmark	7	60%	40%	10%	20%	10%	20%
Europa	Finland	5	12%	8%	0%	92%	0%	0%
Europa	France	4	30%	30%	0%	60%	10%	0%
Europa	Germany	3	22%	39%	0%	51%	7%	2%
Europa	Italy	4	56%	28%	0%	61%	11%	0%
Europa	Netherlands	5	18%	24%	0%	71%	6%	0%
Europa	Norway	8	55%	45%	9%	9%	9%	27%
Europa	Poland	9	33%	42%	0%	42%	8%	8%
Europa	Portugal	5	63%	25%	0%	63%	0%	13%
Europa	Spain	3	0%	0%	0%	100%	0%	0%
Europa	Sweden	7	0%	25%	0%	25%	25%	25%
Europa	Switzerland	5	57%	29%	0%	29%	43%	0%
Europa	Turkey	5	33%	19%	3%	33%	3%	42%
Europa	Ukraine	5	17%	25%	42%	0%	17%	17%
Europa	United Kingdom	6	0%	13%	0%	88%	0%	0%
Asia	Hong Kong	4	50%	50%	0%	50%	0%	0%
Asia	Japan	4	0%	88%	0%	13%	0%	0%
Asia	Malaysia	6	31%	67%	0%	25%	0%	8%
Asia	Philippines	4	0%	100%	0%	0%	0%	0%
Asia	Singapore	5	50%	100%	0%	0%	0%	0%
Asia	South Korea	4	63%	88%	0%	0%	0%	13%
Asia	Taiwan	8	50%	81%	6%	6%	0%	6%
Asia	Thailand	7	82%	73%	9%	9%	9%	0%
Asia	Vietnam	6	56%	100%	0%	0%	0%	0%
Latin America	Argentina	4	0%	50%	0%	50%	0%	0%
Latin America	Brazil	11	50%	56%	0%	41%	0%	3%
Latin America	Colombia	4	50%	0%	0%	100%	0%	0%
Latin America	Mexico	11	55%	25%	5%	25%	30%	15%
Latin America	Peru	9	57%	29%	0%	43%	14%	14%
Oceania	Australia	5	37%	89%	0%	5%	0%	5%
Oceania	New Zealand	7	50%	100%	0%	0%	0%	0%
Middle East	Iran	1	0%	100%	0%	0%	0%	0%
Middle East	Lebanon	4	100%	33%	0%	11%	56%	0%
Middle East	Qatar	8	100%	50%	0%	0%	50%	0%
Middle East	Saudi Arabia	4	33%	67%	0%	0%	33%	0%
Middle East	UAE	9	33%	100%	0%	0%	0%	0%
Africa	Kenya	6	29%	100%	0%	0%	0%	0%
Africa	South Africa	4	35%	26%	0%	74%	0%	0%

& Non-Life Reserving under Solvency II:
THE MAIN CONCEPTS

Solvency II is the new supervisory framework for the insurance sector which came into effect on 1st January 2016. This legislation concerns all EU Member States and introduces a harmonized EU-wide insurance regulatory regime.

By FABRICE TAILLIEU
fabrice.taillieu@milliman.com

A basic principle of Solvency II is that Assets and Liabilities are valued on the basis of their economic value. The value of Technical Provisions should correspond to the amount an (re)insurance company would have to pay if it transferred its contractual rights and obligations immediately to another company.
The value of Technical Provisions therefore corresponds to the amount another (re)insurance company would require to fulfil the underlying (re)insurance obligations.

GENERAL RULES
The value of Technical Provisions shall be equal to the sum of a Best Estimate and a Risk Margin.

For non-life insurance obligations, the Best Estimate shall be calculated separately for the premium provision and for the provision for claims outstanding, relating respectively to future claim events and claim events that have already occurred.
The Best Estimate shall correspond to the probability-weighted average of future cash-flows, taking into account the time value of money and using the relevant risk-free interest rate term structure, provided by currency.
The calculation of the Best Estimate shall be based upon up-to-date and credible information and realistic assumptions and be performed using adequate,

applicable and relevant actuarial and statistical methods.
The Best Estimate shall be calculated gross, without deduction of the amounts recoverable from reinsurance contracts and SPV. Those amounts shall be calculated separately and the calculation shall be adjusted to take into account expected losses due to the default of the counterparty.

The Risk Margin shall be calculated in order to ensure that the value of the Technical Provisions is equivalent to the amount that (re)insurance companies would be expected to require in order to take fulfil the (re)insurance obligations. The Risk Margin shall be calculated by determining the cost of providing an amount of eligible own funds equal to the Solvency Capital Requirement ("SCR") necessary to support the (re)insurance obligations over their lifetime.

CASH-FLOW APPROACH
The calculation implies the use of cash-flow projections for the calculation of the different components of the Best Estimate, which shall include benefits, expenses and premiums relating to these events.
The cash-flow projections shall take into account all the cash in- and out-flows required to settle the (re)insurance obligations over their lifetime, and in particular:
all expenses that will be incurred in servicing (re)insurance obligations;
inflation, including expenses and claims inflation;
all payments to policyholders and beneficiaries which (re)insurance companies expect to make.

RANGE OF METHODS
The choice of the method to calculate the Best Estimate should be proportionate to the nature, scale and complexity of the risks supported by the (re)insurance company.
The range of methods to calculate the Best Estimate includes simulation, deterministic and analytical techniques.
The Solvency II regime therefore does not require a specific method to be used.

SEGMENTATION
(Re)Insurance companies shall segment their (re)insurance obligations into homogeneous risk groups, and as a minimum by Solvency 2 Lines of Business, when calculating their Technical Provisions.
The assignment of an (re)insurance obligation to a Line of Business shall reflect the nature of the risks relating to the obligation, rather than its legal form (substance over form principle).
Where an (re)insurance contract covers risks across life and non-life insurance, the (re)insurance obligations shall be unbundled into their life and non-life parts. Where an (re)insurance contract covers risks across the Solvency II Lines of Business, the (re)insurance obligations shall, where possible, be unbundled into the appropriate Lines of Business.

RECOGNITION AND DERECOGNITION OF (RE)INSURANCE OBLIGATIONS
For the calculation of the Best Estimate and the Risk Margin of Technical Provisions, (re)insurance companies shall recognise an (re)insurance obligation at the date the company becomes a party to the contract that gives rise to the obligation or the date the (re)insurance cover begins, whichever date occurs earlier. (Re)Insurance companies shall only recognise the obligations within the boundary of the contract.

BOUNDARY OF AN (RE)INSURANCE CONTRACT
All obligations relating to the contract, including obligations relating to unilateral rights of the (re)insurance company to renew or extend the scope of the contract and obligations that relate to paid premiums, shall belong to the contract.
Obligations which relate to (re)insurance cover provided by the company after any of the following dates do not belong to the contract, unless the company can compel the policyholder to pay the premium for those obligations:
● the future date where the (re)insurance company has a unilateral right to terminate the contract;
● the future date where the (re)insurance company has a unilateral right to reject premiums payable under the contract;
● the future date where the (re)insurance company has a unilateral right to amend the premiums or the benefits payable under the contract in such a way that the premiums fully reflect the risks.

DATA USED IN THE CALCULATION OF TECHNICAL PROVISIONS
Data used in the calculation of the Technical Provisions shall be complete (sufficient historical information, availability for each of the relevant homogeneous risk group), accurate (no material error) and appropriate for the purpose of the calculation.

APPROXIMATIONS TO CALCULATE THE BEST ESTIMATE
Where (re)insurance companies have insufficient data of appropriate quality to apply a reliable actuarial method, they may use appropriate approximations to calculate the Best Estimate provided that all of the following requirements are met:
● the insufficiency of data is not due to inadequate internal processes and procedures of collecting, storing or validating data used for the valuation of Technical Provisions;
● the insufficiency of data cannot be remedied by the use of external data;
● it would not be practicable for the company to adjust the data to remedy the insufficiency.

ACTUARIAL FUNCTION REPORT
(Re)Insurance companies shall provide for an effective Actuarial Function to:
● coordinate the calculation of Technical Provisions;
● ensure the appropriateness of the methodologies and underlying models used as well as the assumptions made in the calculation of Technical Provisions;
● assess the sufficiency and quality of the data used in the calculation of Technical Provisions;
● compare Best Estimates against experience;
● inform the administrative, management or supervisory body of the reliability and adequacy of the calculation of Technical Provisions.

The Actuarial Function shall produce a written report to be submitted to the administrative, management or supervisory body, at least annually. The report shall document all tasks that have been undertaken by the Actuarial Function and their results, and shall clearly identify any deficiencies and give recommendations as to how such deficiencies should be remedied.

US GAAP/RBC
A LOCAL REGULATION STILL OF REFERENCE OUTSIDE USA

Many international standards have been released recently, or are in the process of being released:
- Solvency standards: like Solvency II, issued by EIOPA in Europe or ICS (International Capital Standard), issued by IAIS;
- Accounting standards: IFRS, issued by IASB internationally.
But US-GAAP and RBC remain the reference standards for many countries, and are very influential worldwide.
The ASTIN USA Nominate, Chandu Patel, gives us lights about these standards, for Non-Life reserves.

US-GAAP and RBC as international standards:
interview of Mr. Chandu Patel, USA Nominate

ASTIN:
Hello Chandu, and thank you again in the name of ASTIN for having accepted to take over the project for the world biggest insurance market.

CHANDU PATEL:
It was my pleasure. ASTIN is embarking on a very important project and I am happy to participate on behalf of the US.

ASTIN:
You are known as a specialist of the question of reserves valuation under US-GAAP and in the context of RBC. Could you give us the background and principles of these standards?

CHANDU PATEL:
The standards for evaluating non-life reserves are published by the American Academy of Actuaries and principles are also published by the Casualty Actuarial Society. A primary requirement is that the actuary performing the work must be qualified to perform the work. The qualifications relate to both education and relevant experience. In addition, both the standards and the principles focus on data accuracy and reconciliation, making reasonable assumptions, evaluating the estimates using several standard actuarial methodologies, taking into account important changes in operations/conditions that may impact the evaluation and providing good documentation to support the estimates.

ASTIN:
What are the main methods used in the US for reserves valuation?
Do you see a switch to big data methods in the years to come in your market?

CHANDU PATEL:
In most cases the US actuaries use paid and reported chain ladder methodologies along with the corresponding Bornhuetter-Ferguson methodologies. Additional methodologies such the Berquist- Sherman methodologies are introduced if there are significant changes

in operations. Many actuaries will also use reasonability checks such as the resulting loss ratio and implied average claim size to test the reasonability of their final estimate.
I believe big data and better data in general will lead to a better understanding of the underlying trends and therefore assist the actuary in his/her analysis. However, I don't believe the fundamental approach to reserving will change.

ASTIN:
What are according to you the main differences of RBC with the Solvency II reserves valuation in Europe?

CHANDU PATEL:
My response is based on my limited knowledge of both regimes. I believe the main differences are as follows:
For computing capital requirements, RBC adds a provision to the financial statement reserves based on risk factors that are derived from industry experience applied to Company data. Solvency II also requires additional risk margin to be added to the financial statement reserves; however, the additional margin is computed based on the Company's own modeling.
For computing the risk margins, Solvency II has a fixed time horizon for measuring the variability. There is no such concept in RBC.
For Solvency II reserves are evaluated on an economic basis, which would consider the time value of money. RBC does not allow for discounting of reserves, except for a narrow band of tabular reserves with a fixed and pre-determined amount of future payments.
On an overall basis, the RBC framework is more uniform and easier to implement in a consistent manner across all companies. On the other hand, Solvency II framework is more nuanced but allows a Company to estimate its own risk margins. Hence I believe the Solvency II regime leads to more individual regulatory scrutiny.

ASTIN:
And US-GAAP vs IFRS?

CHANDU PATEL:
My response is based on my limited knowledge of both regimes.
I believe the main difference is the concept of fair/economic value within the IFRS framework, which includes a risk margin as well as allowance for time value of money (discounting). US GAAP does not allow for inclusion of explicit risk margins and does not allow for time value of money, except in very narrow circumstances.

ASTIN:
How would reinsurance typically be taken into account?

CHANDU PATEL:
In both US Statutory as well as US GAAP frameworks, financial statement reserves are on a basis that is net of all valid and collectible reinsurance. If there are delays or issues with collectability of reinsurance, a separate provision is calculated.

ASTIN:
What is the role of the appointed actuary? How is it legally bounded?

CHANDU PATEL:
The role of the appointed actuary is to provide an opinion regarding the reasonability of the financial statement reserves as of the date of the opinion, which are considered to be managements' best estimate of reserves. The appointed actuary is expected to comply with the standards promulgated by the American Academy of Actuaries. Legally or professionally, I believe this is the yardstick he/she is measured by.

ASTIN:
Thank you very much for your answers Chandu.

& Future of reserving
SOME THOUGHTS BY WPNL RESERVING MEMBERS

« Computers are magnificent tools for the realisation of our dreams, but no machine can replace the human spark of spirit, compassion, love and understanding. »
Louis V Gerstner, Jnr, Chairman and CEO of IBM 1993 -2002.

As Insurance is being impacted by new and disruptive technology, what role will actuaries and actuarial reserving techniques play? Whilst traditionally actuaries have been seen as the key advisor in the reserving area, this may be challenged in future by more complex expectations, improving technology, modelling capabilities and rise of new professions.
This short note sets out some thoughts of some of the participants in the ASTIN reserving survey.

Our survey across various jurisdictions had common themes of changes over the last 10 years:

- Increase both in number of stakeholders and their level of engagement – including regulators, boards, auditors, management, claims, finance, underwriters, portfolio managers, pricing actuaries, and analytics.
- An increase in interest to understand the performance of the business and levers of profitability, with the expectation of greater understanding and questioning of actuarial models and assumptions.
- An increase in understanding the range of possible outcomes.
- An increase of the need to move toward individual claims reserving and big data, to better link the reserving process with the pricing process and to be able to better value non-proportional reinsurance.
- An expectation of regular reporting, including enhanced management information and greater measurement of actual vs expected measures of models across a number of parameters.
- Increase in complexity of bases – such as moving toward stochastic (bootstrapping, Mack) compared to deterministic, local GAAP, Solvency II and IFRS 4 requirements such as technical provisions, risk margins, discounting.
- Hindsight testing of models required by some legislation.
- Increase in technology and expectation of models with an ability to manage and analyse larger data sets.
- Increase in market information available – such as benchmarks, trends in market.
- Increase in governance – peer reviews, documentation, data quality, model governance, model running, model validation and model usage. Regulators are also requesting a full comprehensive overview on the process.
- A shift from a historical «pragmatic» approach based on actuarial models providing an «orientation» of the range of reasonable estimates and final ultimates set by expert judgment. Some movement towards a more model-oriented approach, where model selection and assumptions need to follow a specified framework.

What factors could determine or influence the sustainability of current actuarial reserving practices?

- Understanding that models rely on the continuance of past historical patterns/assumptions into the future. Judgement is required to understand if this is reasonable for future projections and overlay the context, such as financial implications. Actuaries deal with uncertainty, and need to be able to convey the implications of models, and the judgement required.

- The right frameworks and models that are flexible to meet changing needs and at the same time have the right governance and stability to ensure results are meaningful. Do companies have the right technology capabilities and resources to support Actuarial and modelling demands? There is a risk these are built piecemeal rather than strategically. Stochastic reserving methods require a different environment than traditional triangle methods such as full distribution of outcomes, rather than point estimates.

- Meeting the demands of increased reporting in a time pressured environment, where the expectation is for immediacy and deep understanding. This is in an environment where higher level of scrutiny and increased documentation requirements may make the analysis process slower.

- Development of actuarial skills and resources to meet demands. Are the actuarial teams sufficiently trained in computer science to handle the latest technology, and for example switch to individual claims reserving? Po-

tentially other professions may be seen as alternatives and less expensive than actuaries. Actuaries need to be able to be seen as valuable contributors to understanding performance, through being able to communicate model limitations and the basis for judgement.

How can Actuaries utilise new developments to improve reserving practices?

Technology is obviously a key driver. There is a need for new tools to be able to deliver on new requirements such as IFRS 4 and Solvency 2. Tools which can deliver proper process and governance controls will also be important.

Development of new modelling techniques through improved technology, which may become more complex, will be required. Data mining skills and techniques may become more important to the reserving process. Examples include being able to utilise increased data and combined datasets, more refined modelling, and statistical techniques to reflect underlying characteristics. However there is a risk that increased complexity may be seen as superior to judgement to understand and interpret the model outcomes.

The reserving function could utilise other professionals – computer scientists, data scientists, and mathematicians – in order to embrace new technology and methods.

Actuaries have to show they are able to effectively communicate and set expectations of the uncertainty and build collaborative networks with the users of the models. This may include using (and justify the use of) risk-based metrics to target resources for some modelling.

Are Actuaries best placed to lead this? What skills will be required to led this area, and what areas are needed to be developed?

Actuaries have a diverse tool set and a deep understanding of the key drivers, materiality of assumptions and experience communicating results. Understanding how the interactions across the company can impact models and data such Claims, Risk, Finance, Planning, Pricing and Capital is key.

Actuaries will need to collaborate with both stakeholders of the outcomes of the modelling, with other professions as part of the process, and also influence in terms of what can be produced and relied on.
Actuaries need to develop technology skills or at least

appreciate their potential, including data mining. Actuaries are likely to be more involved in the discussion of data processes and selection of technology.

Actuaries' understanding of models, with good mathematical and statistical skills will continue to be important., just like the ability to handle interactions of various reporting bases, to identify key aims and pitfalls of the reserving process and function, to understand the historical reserving methods available and their strengths and weaknesses, and how these methods can be used to populate various reporting bases.

Actuaries can also take the advantage of their skills in documentation and housekeeping: identifying alternative ways of approaching reporting, setting and monitoring operating standards.

Data governance and validation, appreciation of the significance and reliability of data, will become increasingly important over the coming years.

Conclusion

Reserving practices are expected to continue to change, as the influences of technology, big data and regulatory requirements continue to evolve. Actuaries can have significant role, although it requires collaboration with other professions and being aware of technology and new techniques. Technology developments should be embraced but core actuarial skills and insight are a key actuarial strength.

There remains a need to understand the uncertainty in models, be able to provide insights, and design of data and models. There is likely to be opportunities for actuaries to focus more on the application of expert judgement than mechanics and potentially work with more diverse teams. Actuaries, with professional and ongoing training are well placed to be key advisers to the many stakeholders.

The view across our global professional is these represent exciting times for our profession, the opportunity to broaden our roles, and continue to evolve the reserving techniques and support to our industry.

SUZANNE PATTEN,
Country nominate for Australia,
With the help of the WPNLReserving team

Country reports

FINLAND 30-31
SWEDEN 48-49
NORWAY 40-41
UK 56-57
DENMARK 28-29
NETHERLANDS 38-39
GERMANY 34-35
BELGIUM 26-27
UKRAINE 54-55
FRANCE 32-33
AUSTRIA 24-25
SWITZERLAND 50-51
ITALY 36-37
SPAIN 46-47
PORTUGAL 44-45
TURKET 52-53

CANADA 20-21
USA 22-23
MEXICO 78-79
PERU 80-81
BRAZIL 78-79

JAPAN 60-61
SOUTH KOREA 68-69
TAIWAN 70-71
HONG KONG 58-59
VIETNAM 74-75
PHILIPPINES 64-65
THAILAND 72-73
SINGAPORE 66-67
MALAYSIA 62-63

LEBANON 86-87
SAUDI ARABIA 90-91
QUATAR 88-89
UAE 92-93

KENYA 94-95
SOUTH AFRICA 96-97

AUSTRALIA 82-83
NEW ZEALAND 84-85

CANADA

Full member association

Population: 35.5 million
Insurance premiums: MUSD 125,373
Non Life premiums: MUSD 73,235
NL premium/capita: USD 2,063

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▮▮▮▮▯

Country report by
Jacqueline FRIEDLAND
jacqueline.friedland@rsagroup.ca

CANADA
UNITED STATES OF AMERICA   OTTAWA

Respondent companies size

	1	4	4	15
Million $	< 5	5-50	50-500	> 500

There are more than 210 private Property and Casualty (P&C) insurers actively competing in Canada, but the top 20 private P&C insurers account for more than 80% of the market. Survey invitations were sent out directly to actuaries at 35 insurers and reinsurers (hereafter referred to simply as "insurers"), including the provincial public automobile insurers, as well as to nine consulting firms whose actuaries frequently serve as Appointed Actuaries (AAs). Respondents included nine multinational and six Can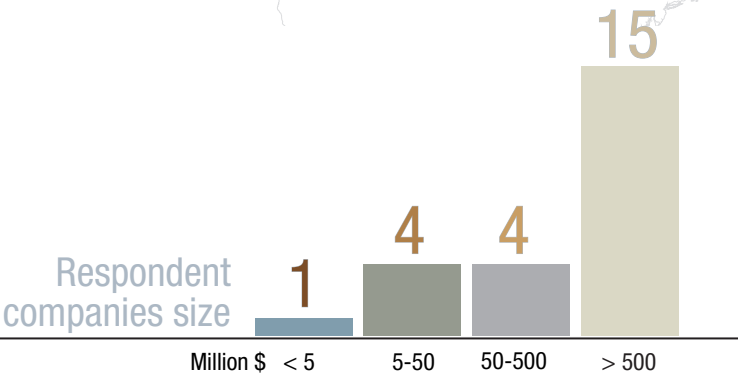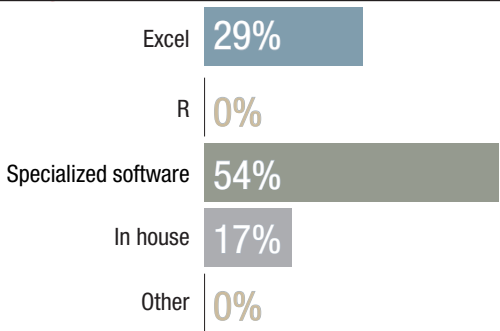adian insurers. In addition, responses were received from four consultants serving as AA (though type of insurer was not identified), the largest automobile residual market mechanism in Canada, and the largest provincial automobile insurer. In total, the insurers responding represent more than 72% of the total market on both a direct and net written premium basis.
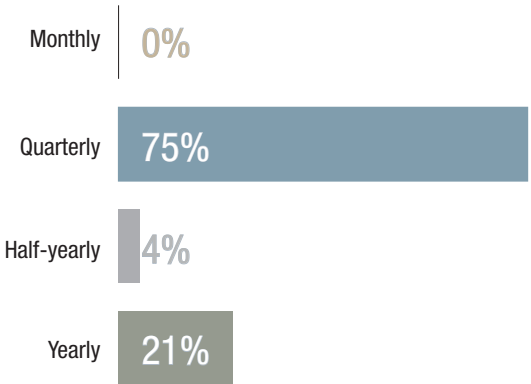
In 2015, automobile insurance represented 48% of the P&C direct written premiums. In the provinces without provincial automobile insurers, there is a long history of ongoing reforms in the automobile insurance product, most notably in Ontario, which accounts for roughly 50% of the country-wide automobile insurance market (excluding the provincial auto insurers). The most recent major reforms in Ontario were in the fall of 2010; another wave of Ontario reforms will be effective on June 1, 2016.

The past two years 2014 and 2015 have witnessed improved return on equity as most insurers strengthened their capital, mainly due to positive underwriting income. Across the industry, mild weather and favourable prior year development, particularly in Ontario automobile insurance, were two key drivers resulting in improved combined ratios for 2015 compared to 2014. Low investment returns continue to be a factor faced by Canadian insurers
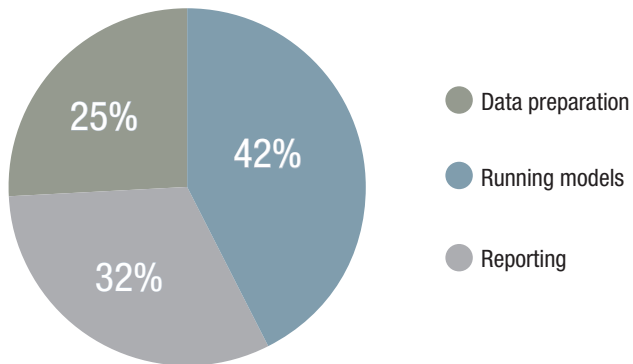
Reserving tool

Excel	29%
R	0%
Specialized software	54%
In house	17%
Other	0%

Reserving exercise periodicity

Monthly	0%
Quarterly	75%
Half-yearly	4%
Yearly	21%

Resources split

- Data preparation 25%
- Running models 42%
- Reporting 32%

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	4%	4%	21%	71%
Loss ratio	58%	8%	17%	17%
Chain ladder	79%	17%	0%	4%
Bornhuetter-Ferguson	88%	8%	0%	4%
Cape Cod	8%	4%	13%	75%
Average cost	21%	8%	29%	42%
De Vylder	0%	0%	0%	100%
Fisher-Lange	4%	0%	0%	96%
GLM	0%	0%	4%	96%
Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC				
Market-based std dev	4%	0%	4%	91%
Internal calibration	5%	0%	5%	91%
Mack	0%	9%	13%	78%
Merz & Wüthrich	0%	0%	0%	100%
GLM	0%	0%	4%	96%
Bootstrap / CL	17%	0%	9%	74%
Bootstrap / BF	13%	0%	4%	83%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	13%	0%	0%	87%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	4%	96%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	78%	Deterministic math. reserves	9%	Other modalities	13%
Asbestos	N/A	70%	IBNR vs OSL benchmark	13%	Other modalities	17%
Disability/workers comp.	N/A	70%	Experience tables	17%	Other modalities	13%
Decennal/contruction liab.	N/A	83%	Proxy	9%	Other modalities	9%
Credit	N/A	78%	Other	17%	Other modalities	4%

4. Adjustments / misc.

|						
Past inflation	Not treated	50%	Flat assumption	36%	Other modalities	14%
Future inflation	Not treated	55%	Flat assumption	32%	Other modalities	14%
Discounting	Dvt patterns-based	67%	Duration-based	33%	Other modalities	0%
Discount type	Flat rate	71%	Yield curve	29%	Other modalities	0%
Development patterns	Chain ladder/paid	83%	Other	17%	Other modalities	0%
Diversification effect	Not calculated	83%	Correlation matrix	13%	Other modalities	4%
Large claims	Treated separately	54%	Treated jointly	42%	Other modalities	4%
Reinsurance / retrocession	Projection of net triangles	46%	N/A	17%	Other modalities	38%
Subrogations	Projection of net triangles	48%	Not calculated	17%	Other modalities	35%
Ibnr contract allocation	Not allocated	52%	Split using weights	43%	Other modalities	4%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Percentage	96%	Projected	4%	Other modalities	0%
Ibnyr and Ibner differenciate	No	75%	Yes	25%	Other modalities	0%
Reserves ranges (R.R.)	No range, only Actuarial BE	88%	Actuarial BE+reserves range	8%	Only reserves range	4%
Booked Reserves	Actuarial BE	61%	Seldom Actuarial BE	30%	Mostly Actuarial BE	9%
Methods used for R.R.	Only Actuarial BE	87%	Stochastic method	9%	Changes in assumptions	4%

USA

Full member association
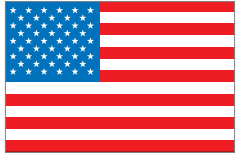
Population: **318.7 million**
Insurance premiums: **MUSD 1,280,443**
Non Life premiums: **MUSD 752,222**
NL premium/capita: **USD 2,360**

Local GAAP: ☐ Discounting ▨ Appointed/signing actuary
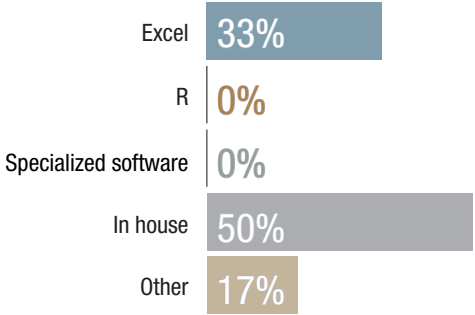Respondents market share: ▪▪▪▪▪

Country report by
Chandu PATEL
chandu.patel@hugginsactuarial.com
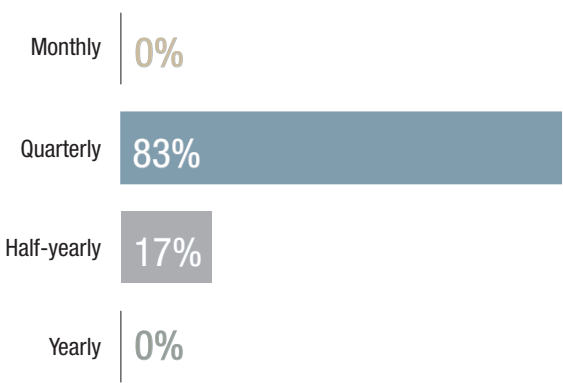
UNITED STATES OF AMERICA

WASHINGTON
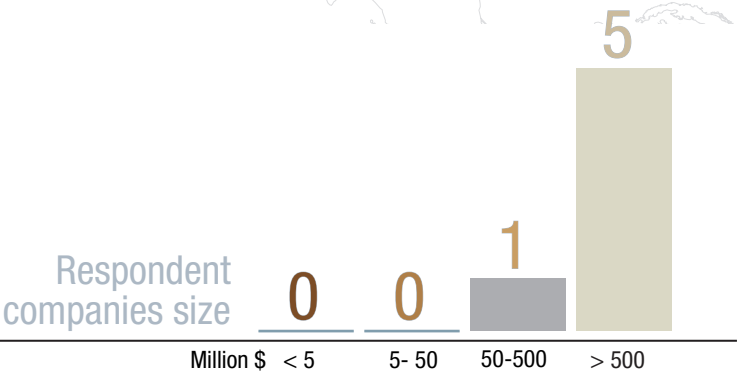
The US Non-life or Property/Casualty market is the largest market in the world, with many varied and sophisticated exposures subject to review by Property/Casualty actuaries. Due to the specialized nature of the market, actuaries who review these exposures are Members of Casualty Actuarial Society. In order to review and provide a formal opinion on property/casualty reserves, specific educational and experience requirements are in place. Actuaries are required to follow certain Actuarial Standards of Practice and a Code of Professional Conduct in their professional work and these are promulgated by the American Academy of Actuaries. The range of exposures analyzed by Property/Casualty actuaries varies from motor/automobile liability and physical damage, workers' compensation to professional liability such as medical malpractice. The legal framework in place in the US makes the actuary's task more challenging.

In the US, Company management is responsible for the amount of booked reserves and the actuary evaluates the reasonability of the booked reserve in the context of his/her estimates, which typically includes a range of estimates. Although the market share of the Companies that participated in the survey is small given the large market, the Companies represent a good cross-section of the US/Bermuda industry since they include insurance/reinsurance and small/large companies.
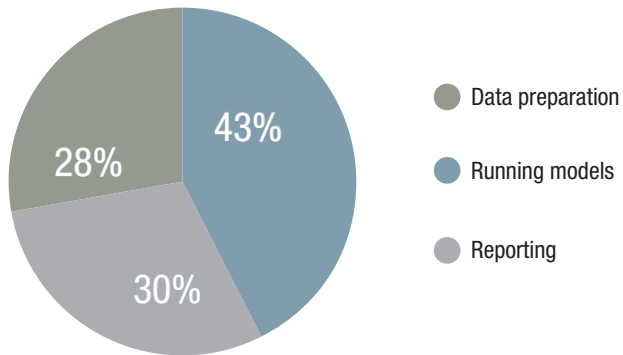
Respondent companies size

	0	0	1	5
Million $	< 5	5- 50	50-500	> 500

Reserving tool

Excel	33%
R	0%
Specialized software	0%
In house	50%
Other	17%

Reserving exercise periodicity

Monthly	0%
Quarterly	83%
Half-yearly	17%
Yearly	0%

Resources split

- 43% Running models
- 30% Reporting
- 28% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	0%	0%	33%	67%
	Loss ratio	83%	17%	0%	0%
	Chain ladder	100%	0%	0%	0%
	Bornhuetter-Ferguson	100%	0%	0%	0%
	Cape Cod	0%	33%	17%	50%
	Average cost	17%	17%	17%	50%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	17%	0%	83%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	20%	0%	0%	80%
	Internal calibration	20%	0%	0%	80%
	Mack	33%	0%	17%	50%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	40%	0%	0%	60%
	Bootstrap / BF	0%	0%	0%	100%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	0%	100%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	50%	Survival Ratio	25%	Other modalities	25%
Disability/workers comp.	Experience tables	50%	N/A	50%	Other modalities	0%
Decennal/contruction liab.	Other	50%	N/A	50%	Other modalities	0%
Credit	N/A	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	67%	Flat assumption	33%	Other modalities	0%
Future inflation	Not treated	50%	Flat assumption	50%	Other modalities	0%
Discounting	Duration-based	40%	Dvt patterns-based	40%	Other modalities	20%
Discount type	Yield curve	60%	Flat rate	40%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Correlation matrix	50%	Not calculated	33%	Other modalities	17%
Large claims	Treated separately	50%	Treated jointly	50%	Other modalities	0%
Reinsurance / retrocession	Proportional assumption	33%	Other	33%	Other modalities	33%
Subrogations	Not calculated	50%	Projection of net triangles	50%	Other modalities	0%
Ibnr contract allocation	Not allocated	80%	Split using weights	20%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Projected	40%	Not calculated	40%	Other modalities	20%
Ibnyr and Ibner differenciate	No	83%	Yes	17%	Other modalities	0%
Reserves ranges (R.R.)	No range, only Actuarial BE	50%	Actuarial BE+reserves range	50%	Only reserves range	0%
Booked Reserves	Mostly Actuarial BE	50%	Actuarial BE	33%	Seldom Actuarial BE	17%
Methods used for R.R.	Alternative methods	40%	Only Actuarial BE	20%	Changes in assumptions	20%

AUSTRIA

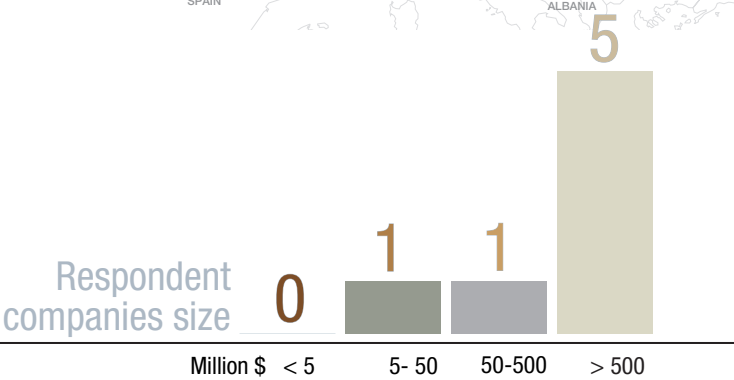**Full member association**

Population: **8.5 million**
Insurance premiums: **MUSD 22,794**
Non Life premiums: **MUSD 13,820**
NL premium/capita: **USD 1,626**

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
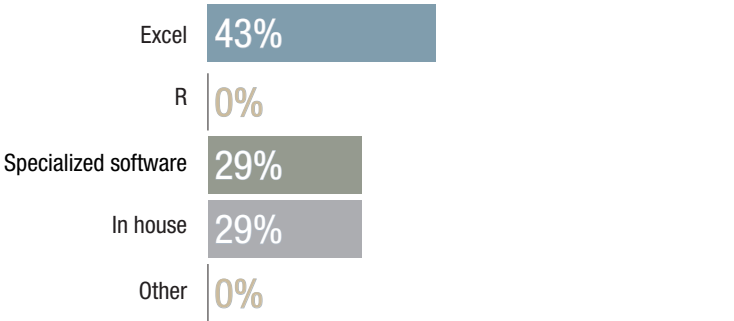Respondents market share: ▮▮▮▮▯

Country report by
Andreas MAGENSCHAB
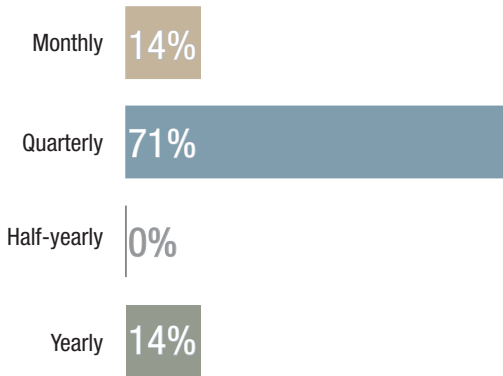andreas.magenschab@uniqa.at

By the end of 2014 there were 38 companies operating on the Austrian market running Property & Casualty business. In the last 4 years the P&C business in Austria was showing a steady premium growth in the range of 2-4% annually. There are 3 insurance Groups with a headquarter in Austria, operating regionally with a focus on Central and Eastern Europe. Furthermore there are several subsidiaries from international insurance Groups (HQ mainly in Germany and Switzerland). The rest are small national companies. Out of 12 questioned companies, 7 were responding to the questionnaire. As this was including the two largest Groups, a total market coverage of 56% by means of premiums could be reached.

By the moment the local regulation does not require an appointed actuary for P&C business. The study showed, that on the Austrian market the "traditional" reserving methods based on claims triangles are still dominating. Therefore still more than 2/3 of the respondents are performing the reserve calculations in Excel or in some in-house developed solution. Nevertheless stochastic techniques are developing, also from the background of the final implementation of Solvency 2 as at January 1st 2016. This framework requires the implementation of the so called "Actuarial Function" that has several duties, especially related to Best-estimate calculation and validation.
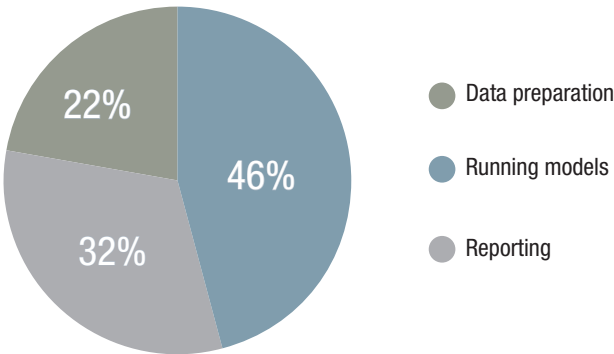
Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	0	1	1	5

Reserving tool

Excel	43%
R	0%
Specialized software	29%
In house	29%
Other	0%

Reserving exercise periodicity

Monthly	14%
Quarterly	71%
Half-yearly	0%
Yearly	14%

Resources split

- 46% Running models
- 32% Reporting
- 22% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	29%	0%	14%	57%
	Loss ratio	57%	29%	0%	14%
	Chain ladder	100%	0%	0%	0%
	Bornhuetter-Ferguson	57%	0%	14%	29%
	Cape Cod	43%	29%	0%	29%
	Average cost	29%	43%	0%	29%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	14%	86%
	Munich Chain Ladder	29%	43%	0%	29%
STOCHASTIC	Market-based std dev	14%	0%	29%	57%
	Internal calibration	29%	14%	0%	57%
	Mack	14%	29%	0%	57%
	Merz & Wüthrich	43%	14%	0%	43%
	GLM	0%	0%	14%	86%
	Bootstrap / CL	14%	29%	0%	57%
	Bootstrap / BF	0%	0%	0%	100%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	14%	0%	0%	86%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Deterministic math. reserves	67%	Stochastic math. reserves	17%	Other modalities	17%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	Other	50%	N/A	50%	Other modalities	0%
Decennal/contruction liab.	N/A	80%	Other	20%	Other modalities	0%
Credit	N/A	83%	Other	17%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	57%	Flat assumption	29%	Other modalities	14%
Future inflation	Not treated	57%	Flat assumption	29%	Other modalities	14%
Discounting	Dvt patterns-based	57%	Not treated	14%	Other modalities	29%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	50%	Correlation matrix	33%	Other modalities	17%
Large claims	Treated separately	71%	Excluded	14%	Other modalities	14%
Reinsurance / retrocession	Proportional assumption	43%	Proxy	14%	Other modalities	43%
Subrogations	Not calculated	43%	Projection of net triangles	29%	Other modalities	29%
Ibnr contract allocation	Not allocated	86%	Individual claims reserving	14%	Other modalities	0%
Equalization reserve (local)	Calculated	86%	Percentage	14%	Other modalities	0%
Risk Margin	Projected	71%	Proxy	14%	Other modalities	14%
Ibnyr and Ibner diff.?	No	71%	Yes	29%	Other modalities	0%

EUROPA
BELGIUM

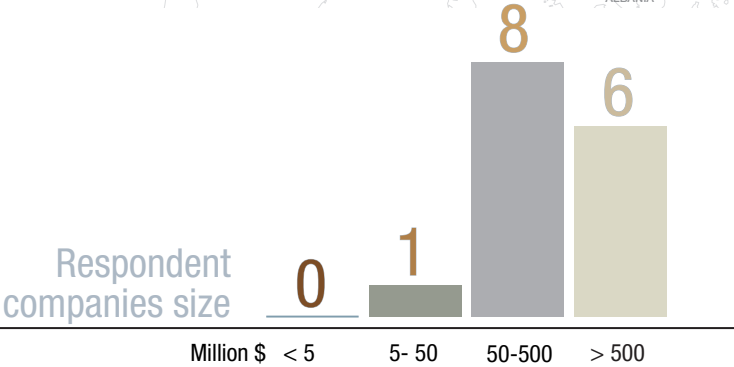**Full member association**

Population: **11.3 million**
Insurance premiums: **MUSD 39,388**
Non Life premiums: **MUSD 16,549**
NL premium/capita: **USD 1,465**

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▮▮▮▮▯

Country report by
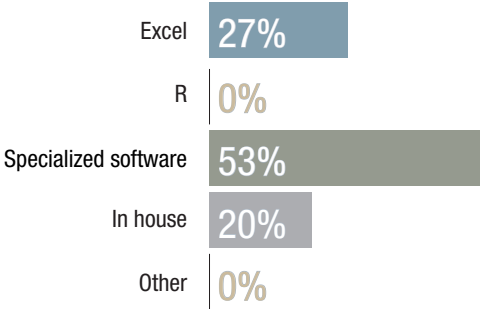**Xavier MARECHAL**
xavier.marechal@reacfin.com

There are sixty-five non-life insurance companies registered as of 31.12.2014 in Belgium. Most of these companies are small niche players. The market is therefore very concentrated: the top 10 companies represent 83% of the market premium income and the top 20 represents 92% of the market.

Respondents consist of two multinational, one regional, seven national and five small national companies representing around 65% of the market.
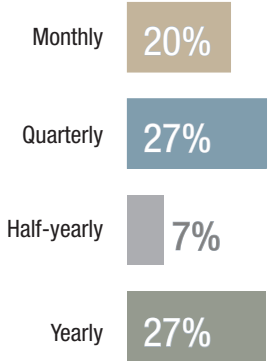
Since 1/1/2016, insurance companies fall under the Solvency 2 regulation. The main changes with respect to the Solvency 1 regulation consist in (i) the discounting of the future cash-flows in order to compute the Best Estimate of Technical Provisions and (ii) the computation of a Risk Margin. For most of the companies, this would lead to a decrease of the level of technical provisions (especially for long-tail business) when the discount rates are at a "normal" level (which is not the case for the moment).

Historically, the technical provisions were reviewed by an appointed actuary (internal or external). This role is now devoted to the actuarial function under Solvency 2.
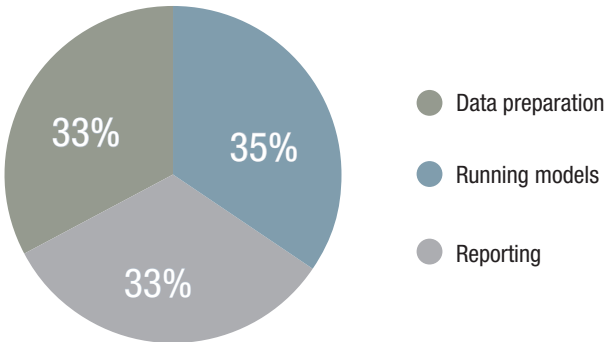
Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	0	1	8	6

Reserving tool

Excel	27%
R	0%
Specialized software	53%
In house	20%
Other	0%

Reserving exercise periodicity

Monthly	20%
Quarterly	27%
Half-yearly	7%
Yearly	27%

Resources split

- 35% Running models
- 33% Reporting
- 33% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	7%	21%	14%	57%
	Loss ratio	13%	13%	13%	60%
	Chain ladder	93%	7%	0%	0%
	Bornhuetter-Ferguson	21%	14%	7%	57%
	Cape Cod	0%	14%	0%	86%
	Average cost	0%	33%	27%	40%
	De Vylder	7%	14%	0%	79%
	Fisher-Lange	0%	14%	0%	86%
	GLM	0%	7%	0%	93%
	Munich Chain Ladder	0%	14%	7%	79%
STOCHASTIC	Market-based std dev	7%	7%	7%	79%
	Internal calibration	29%	7%	0%	64%
	Mack	20%	27%	27%	27%
	Merz & Wüthrich	20%	27%	20%	33%
	GLM	0%	0%	14%	86%
	Bootstrap / CL	53%	20%	0%	27%
	Bootstrap / BF	7%	14%	7%	71%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	7%	0%	14%	79%
ICR (Antonio-Plat)	0%	0%	8%	92%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	7%	0%	0%	93%

3. Other claims

Annuities	Deterministic math. reserves	53%	N/A	33%	Other modalities	13%
Asbestos	N/A	93%	Other	7%	Other modalities	0%
Disability/workers comp.	N/A	40%	Other	27%	Other modalities	33%
Decennal/contruction liab.	N/A	53%	Other	47%	Other modalities	0%
Credit	N/A	92%	Other	8%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	64%	Year per year	29%	Other modalities	7%
Future inflation	Not treated	64%	Flat assumption	14%	Other modalities	21%
Discounting	Dvt patterns-based	71%	Percentage	14%	Other modalities	14%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	93%	Other	7%	Other modalities	0%
Diversification effect	Not calculated	60%	Correlation matrix	33%	Other modalities	7%
Large claims	Treated separately	73%	Treated jointly	27%	Other modalities	0%
Reinsurance / retrocession	Proxy	33%	Proportional assumption	27%	Other modalities	40%
Subrogations	Not calculated	57%	Projection of net triangles	21%	Other modalities	21%
Ibnr contract allocation	Not allocated	57%	Split using weights	29%	Other modalities	14%
Equalization reserve (local)	Calculated	57%	No eq. reserve	43%	Other modalities	0%
Risk Margin	Proxy	47%	Projected	27%	Other modalities	27%
Ibnyr and Ibner diff.?	No	67%	Yes	33%	Other modalities	0%

DENMARK

Full member association
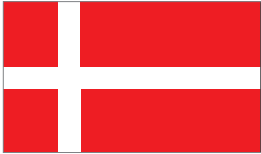
Population: 5.6 million
Insurance premiums: MUSD 34,308
Non Life premiums: MUSD 11,378
NL premium/capita: USD 2,032

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ■■■■☐

Country report by
Caspar RICHTER
caspar.richter@solvencytool.com
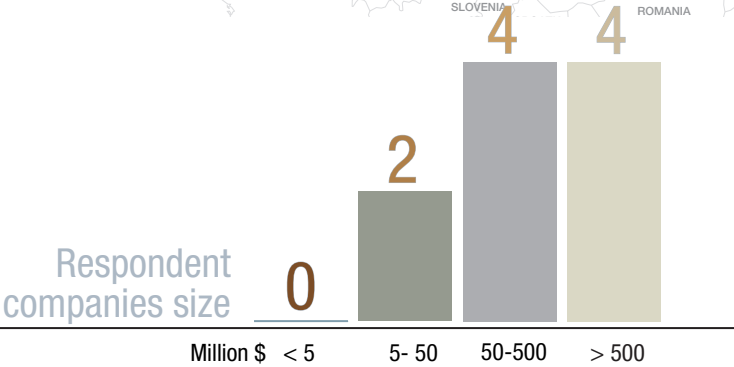
The Danish non-life insurance market consists of 75 different legal entities. Most of the undertakings are small individual mutual companies and a few are part of a larger group. Many of the small mutual companies either operate locally or specialize in a single line of business. The market also includes a hand full of captives.

In the top end, a few large players (compared to the local market) dominate: The 10% largest companies cover almost 80% of the market. Some of the large players have multinational activities as well. The total premium volume amounts a bit more than 10 billion USD.

Companies corresponding to almost 90% of the total technical provisions responded to the survey. The Danish Financial Supervisory Authorities have pushed local undertakings to prepare for Solvency II over a number of years. Most of the recent changes have been concerning the valuation of premium provision and potential adjustment for counterparty default on the reinsurance share of the provisions.

Total claim provisions are approximately 12 billion USD and the total premium provisions amount 3 billion USD.

Danish legislation does not require non-life companies to have an appointed actuary being responsible for the adequacy of the technical provisions. This is only required on the life side. However, all major players on the market have chief actuaries employed to carry out a similar function. Furthermore, the Solvency II regime is forcing all undertaking to establish an actuarial function and this is in focus for the small companies as well.

Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	0	2	4	4

Reserving tool

Excel	40%
R	10%
Specialized software	20%
In house	10%
Other	20%

Reserving exercise periodicity

Monthly	40%
Quarterly	40%
Half-yearly	20%
Yearly	0%

Resources split

- Data preparation — 27%
- Running models — 40%
- Reporting — 33%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	10%	0%	10%	80%
	Loss ratio	40%	10%	0%	50%
	Chain ladder	60%	20%	10%	10%
	Bornhuetter-Ferguson	50%	20%	20%	10%
	Cape Cod	0%	0%	0%	100%
	Average cost	10%	10%	30%	50%
	De Vylder	10%	0%	0%	90%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	10%	0%	0%	90%
STOCHASTIC	Market-based std dev	10%	0%	20%	70%
	Internal calibration	0%	0%	20%	80%
	Mack	10%	0%	10%	80%
	Merz & Wüthrich	0%	10%	0%	90%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	20%	10%	10%	60%
	Bootstrap / BF	20%	10%	0%	70%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

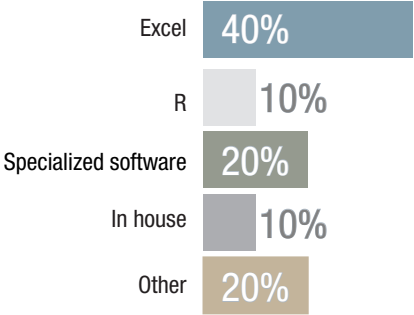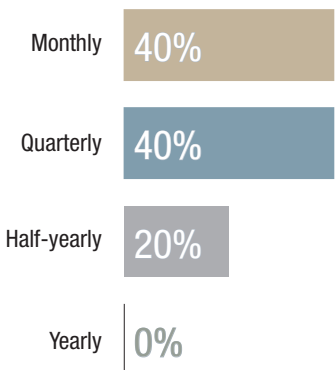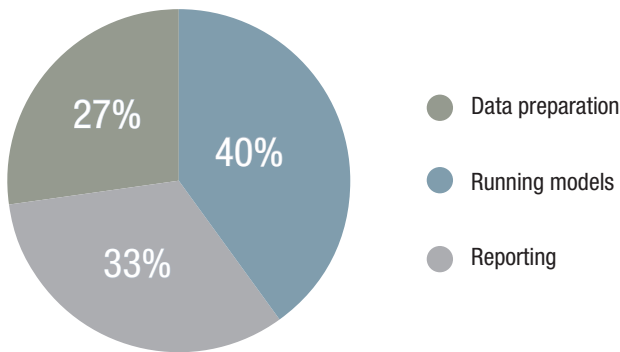|	Main method	Peer method	Informational	Unused
Percentage	11%	0%	0%	89%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	11%	0%	0%	89%

3. Other claims

Annuities	Deterministic math. reserves	60%	N/A	40%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	Other	50%	N/A	40%	Other modalities	10%
Decennal/contruction liab.	N/A	78%	Other	22%	Other modalities	0%
Credit	N/A	67%	Other	33%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Year per year	50%	Not treated	30%	Other modalities	20%
Future inflation	Year per year	40%	Not treated	30%	Other modalities	30%
Discounting	Duration-based	40%	Dvt patterns-based	40%	Other modalities	20%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	80%	De Vylder	10%	Other modalities	10%
Diversification effect	Not calculated	80%	Correlation matrix	20%	Other modalities	0%
Large claims	Treated separately	80%	Excluded	10%	Other modalities	10%
Reinsurance / retrocession	Other	40%	Not calculated	20%	Other modalities	40%
Subrogations	Not calculated	40%	Claim per claim	30%	Other modalities	30%
Ibnr contract allocation	Not allocated	40%	Split using weights	40%	Other modalities	20%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Projected	30%	Proxy	30%	Other modalities	40%
Ibnyr and Ibner diff.?	No	60%	Yes	40%		0%

FINLAND

Full member association
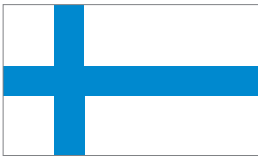
Population: 5.5 million
Insurance premiums: MUSD 29,625
Non Life premiums: MUSD 5,569
NL premium/capita: USD 1,013

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▮▮▮▮▮

Country report by
Sari ROPPONEN
Sari.Ropponen@lahitapiola.fi
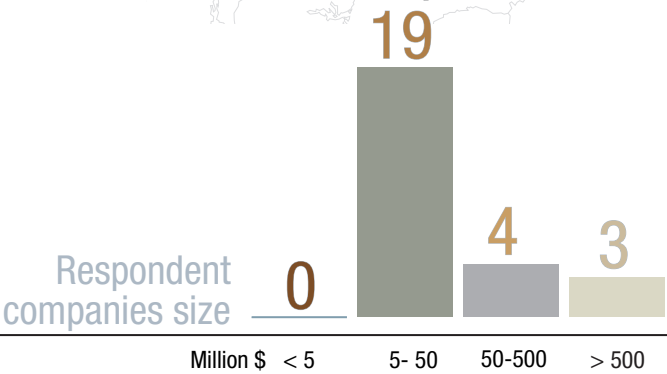
There are 38 non-life and reinsurance companies in Finland. The written premium of the non-life market was 5,037 MUSD in 2014. The growth is expected to be 0 % in 2015. All the responded companies are national or small national companies representing 82.5 % of the market. The biggest line of business is Property followed by statutory lines of business Workers' Compensation and Motor Third Party Liability.

In recent years the market has been preparing to the new EU wide solvency legislation "Solvency II" which came into force 1.1.2016. In Solvency II all reserves should be discounted in contrary to the Finnish Accounting Standards in which mainly long-tailed reserves are discounted. Therefore the methods used in solvency purposes should generate cash flows in addition to best estimates. Non-life companies have also reserves that are calculated by similar techniques to life liabilities because especially in the statutory lines of business loss of earnings are paid as annuities.

Equalization reserve is a statutory part of the technical provision in Finnish Accounting Standards but not in Solvency II in which it is part of own funds. According to the Finnish legislation each insurance company must have an appointed actuary approved by the Ministry of Social Affairs and Health. Appointed actuary is responsible for all actuarial methods used in the company. The survey was made in relation to the methods used in Solvency II.

Respondent companies size

Million $	< 5	5 - 50	50 - 500	> 500
	0	19	4	3

Reserving tool

Excel	8%
R	0%
Specialized software	92%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	12%
Quarterly	88%
Half-yearly	0%
Yearly	0%

Resources split

- 48% Running models
- 31% Reporting
- 22% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	4%	8%	81%	8%
	Loss ratio	8%	4%	85%	4%
	Chain ladder	96%	4%	0%	0%
	Bornhuetter-Ferguson	8%	92%	0%	0%
	Cape Cod	4%	85%	4%	8%
	Average cost	4%	0%	4%	92%
	De Vylder	0%	0%	4%	96%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	4%	96%
	Internal calibration	4%	0%	0%	96%
	Mack	8%	85%	0%	8%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	4%	0%	4%	92%
	Bootstrap / BF	0%	0%	4%	96%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	0%	100%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	4%	0%	0%	96%

3. Other claims

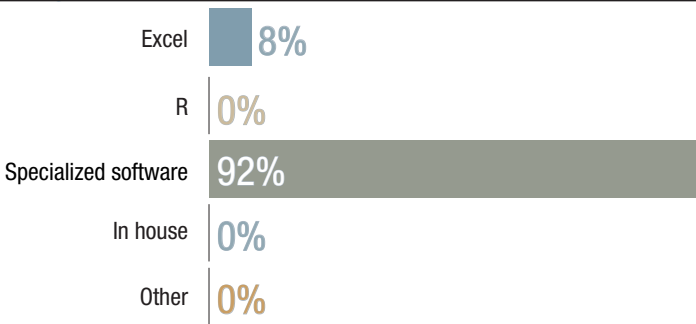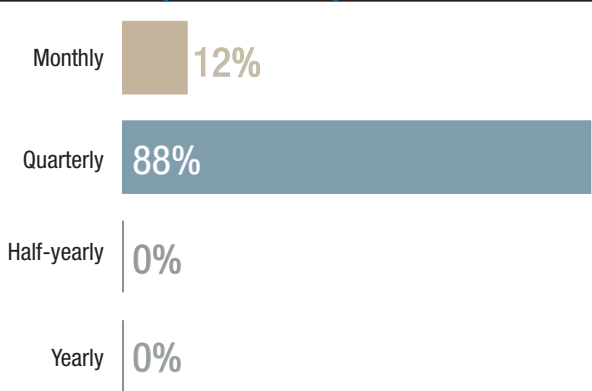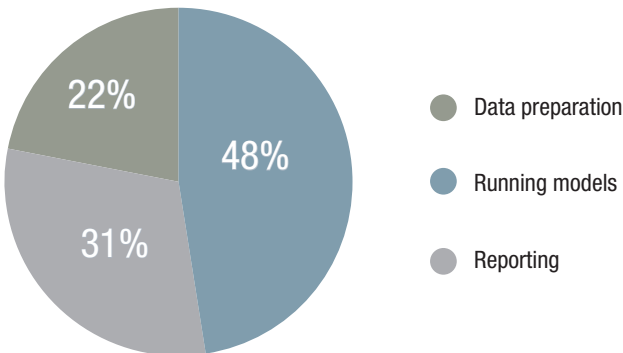|						
Annuities	Deterministic math. reserves	92%	Stochastic math. reserves	4%	Other modalities	4%
Asbestos	N/A	88%	Other	8%	Other modalities	4%
Disability/workers comp.	Market/statutory tables	85%	Experience tables	8%	Other modalities	8%
Decennal/contruction liab.	N/A	88%	Other	12%	Other modalities	0%
Credit	N/A	88%	Other	12%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	92%	Year per year	8%	Other modalities	0%
Future inflation	Not treated	92%	Flat assumption	4%	Other modalities	4%
Discounting	Dvt patterns-based	88%	Percentage	8%	Other modalities	4%
Discount type	Yield curve	96%	Flat rate	4%	Other modalities	0%
Development patterns	Chain ladder/paid	92%	Other	8%	Other modalities	0%
Diversification effect	Not calculated	96%	Correlation matrix	4%	Other modalities	0%
Large claims	Treated separately	96%	Treated jointly	4%	Other modalities	0%
Reinsurance / retrocession	Claim per claim	96%	Other	4%	Other modalities	0%
Subrogations	Claim per claim	88%	Projection of net triangles	4%	Other modalities	8%
Ibnr contract allocation	Not allocated	88%	Split using weights	12%	Other modalities	0%
Equalization reserve (local)	Calculated	100%	Percentage	0%	Other modalities	0%
Risk Margin	Projected	92%	Proxy	4%	Other modalities	4%
Ibnyr and Ibner diff.?	No	96%	Yes	4%	Other modalities	0%

FRANCE

Full member association
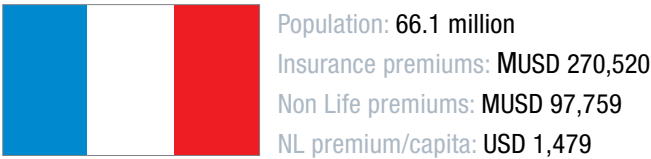
Population: 66.1 million
Insurance premiums: MUSD 270,520
Non Life premiums: MUSD 97,759
NL premium/capita: USD 1,479

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▪▪▪▫▫

Country report by
Hervé ODJO
herve.odjo@odjo-actuaire-conseil.com
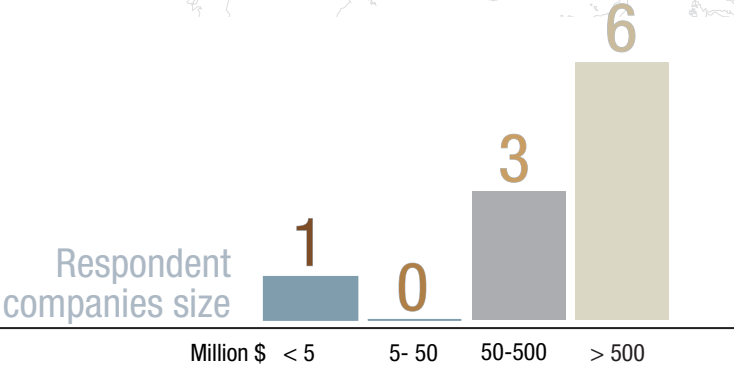
In 2016, the French Non-Life market is composed of about 200 Non-Life markets players, including insurance and reinsurance companies, mutual and foreign groups subsidiaries. French non-life market is dominated by motor and fire insurance businesses which represent more than 70% of the market in terms of premium volume. The Top 5 companies represent more than 50% of the total premium volume. The market grew of 1,6% in 2015.

The respondent companies represent about 40% of the market, in terms of the premium volume. However, this survey reflects the representative picture of the market in terms of premium volume (small, medium sized and large companies), type of company (domestic/foreign group subsidiary), nature of activity (generalist/specialized).

60% of the respondent companies use specialized software to calculate the reserves, when 30% use excel for this purpose.

The deterministic methods (Chain Ladder, Average Cost, Bornhuetter Fergusson and Loss Ratio) are the most popular methods used by the market. Stochastic methods are less used by the respondents.

At this stage, individual claim reserving approach is not popular on the market for the reserves calculation purpose.

According to the current French local requirements, companies are not allowed to discount non-life technical reserves, except for some specific lines of business like construction.

Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	1	0	3	6

Reserving tool

Excel	30%
R	0%
Specialized software	60%
In house	10%
Other	0%

Reserving exercise periodicity

Monthly	10%
Quarterly	70%
Half-yearly	10%
Yearly	10%

Resources split

- 42% Running models
- 30% Reporting
- 28% Data preparation

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	10%	0%	10%	80%
Loss ratio	50%	20%	10%	20%
Chain ladder	100%	0%	0%	0%
Bornhuetter-Ferguson	60%	0%	10%	30%
Cape Cod	10%	0%	0%	90%
Average cost	80%	10%	0%	10%
De Vylder	10%	0%	0%	90%
Fisher-Lange	10%	0%	10%	80%
GLM	0%	10%	0%	90%
Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC				
Market-based std dev	0%	10%	0%	90%
Internal calibration	20%	0%	10%	70%
Mack	30%	20%	0%	50%
Merz & Wüthrich	30%	0%	20%	50%
GLM	0%	10%	0%	90%
Bootstrap / CL	30%	20%	10%	40%
Bootstrap / BF	30%	0%	0%	70%
RJMCMC	0%	10%	0%	90%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	10%	0%	90%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	10%	90%

3. Other claims

Annuities	Deterministic math. reserves	80%	N/A	20%	Other modalities	0%
Asbestos	N/A	67%	Survival Ratio	11%	Other modalities	22%
Disability/workers comp.	N/A	70%	Experience tables	20%	Other modalities	10%
Decennal/contruction liab.	Regulatory	40%	N/A	30%	Other modalities	30%
Credit	N/A	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

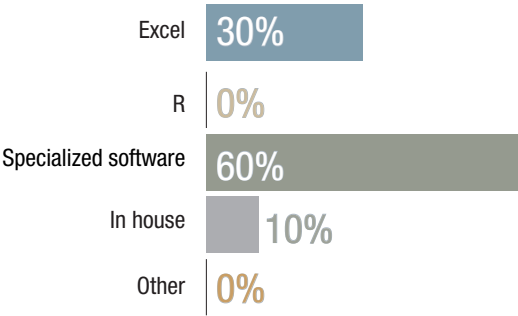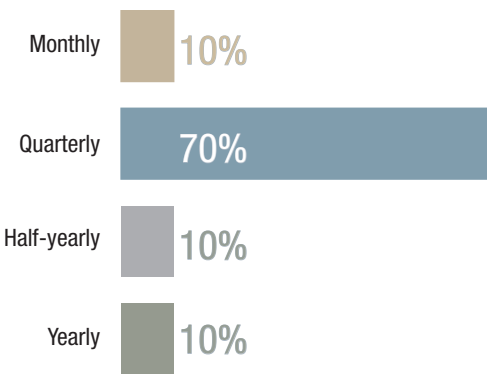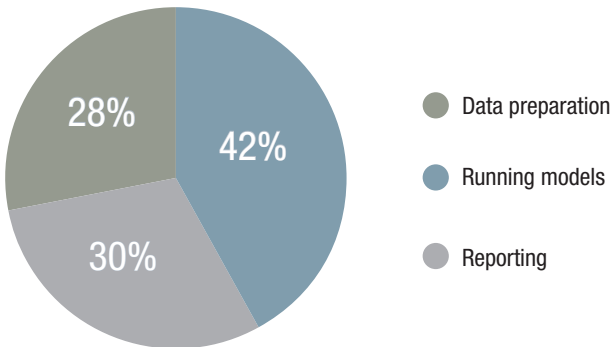|						
Past inflation	Not treated	67%	Flat assumption	22%	Other modalities	11%
Future inflation	Not treated	67%	Flat assumption	33%	Other modalities	0%
Discounting	Dvt patterns-based	56%	Not treated	33%	Other modalities	11%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	50%	Correlation matrix	30%	Other modalities	20%
Large claims	Treated separately	90%	Treated jointly	10%	Other modalities	0%
Reinsurance / retrocession	Claim per claim	50%	Proportional assumption	30%	Other modalities	20%
Subrogations	N/A	30%	Not calculated	20%	Other modalities	50%
Ibnr contract allocation	Not allocated	70%	Split using weights	30%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	70%	Calculated	30%	Other modalities	0%
Risk Margin	Proxy	40%	Projected	30%	Other modalities	30%
Ibnyr and Ibner diff.?	No	60%	Yes	40%	Other modalities	0%

GERMANY

Full member association

Population: 82.3 million
Insurance premiums: MUSD 254,644
Non Life premiums: MUSD 136,170
NL premium/capita: USD 1,655

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▮▮▮▮▯

Country report by
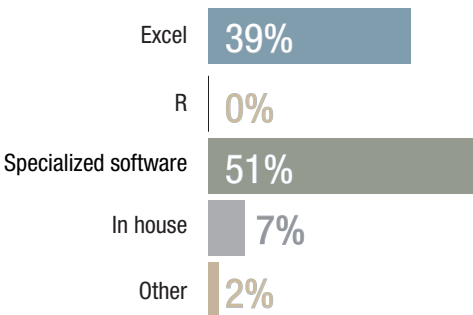Michael RADTKE
michael.radtke@fh-dortmund.de
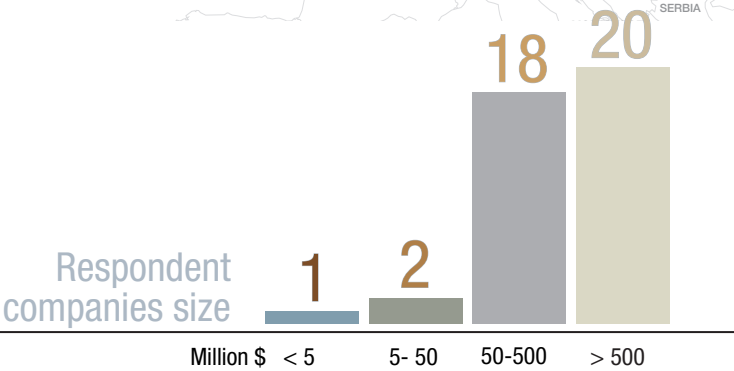
For Germany we have a response of 41 non life insurance companies with five reinsurance companies among them. Four companies are big multinationals, fifteen are operating as national companies and the rest are regional and small national operating companies. With this response we cover 76% of the market measured in earned gross premium.
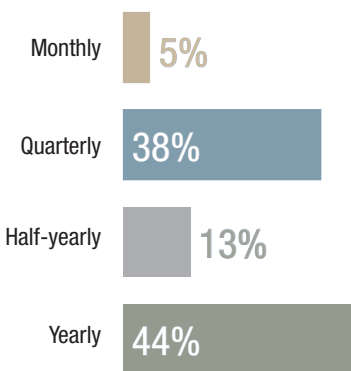
As a standard deterministic approach Chain Ladder is the most common used method in the German market. But also Bornhuetter Ferguson is a well established method at least for informational reasons and as a peer method. As stochastic methods become more important under Solvency II we see the standard Mack approach and Chain Ladder Bootstrapping as the most common used methods in the German market.

Also as a consequence of Solvency II most of the companies use a development pattern bases method for discounting reserves.
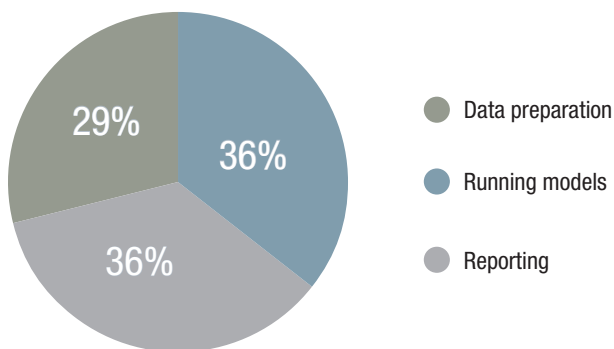
Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	1	2	18	20

Reserving tool

Excel	39%
R	0%
Specialized software	51%
In house	7%
Other	2%

Reserving exercise periodicity

Monthly	5%
Quarterly	38%
Half-yearly	13%
Yearly	44%

Resources split

Data preparation	36%
Running models	36%
Reporting	29%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	8%	15%	8%	70%
	Loss ratio	20%	13%	20%	48%
	Chain ladder	78%	20%	0%	2%
	Bornhuetter-Ferguson	40%	15%	20%	25%
	Cape Cod	10%	0%	8%	83%
	Average cost	5%	10%	10%	75%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	3%	98%
	GLM	3%	0%	10%	88%
	Munich Chain Ladder	3%	8%	10%	80%
STOCHASTIC	Market-based std dev	13%	8%	10%	70%
	Internal calibration	29%	5%	20%	46%
	Mack	38%	13%	30%	20%
	Merz & Wüthrich	20%	3%	8%	70%
	GLM	3%	0%	6%	91%
	Bootstrap / CL	27%	2%	10%	61%
	Bootstrap / BF	3%	0%	5%	93%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	24%	0%	2%	73%
ICR (Antonio-Plat)	0%	3%	0%	98%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Deterministic math. reserves	76%	N/A	17%	Other modalities	7%
Asbestos	N/A	87%	Survival Ratio	7%	Other modalities	7%
Disability/workers comp.	N/A	77%	Market/statutory tables	13%	Other modalities	10%
Decennal/contruction liab.	N/A	80%	Other	13%	Other modalities	7%
Credit	N/A	81%	Other	9%	Other modalities	9%

4. Adjustments / misc.

|						
Past inflation	Not treated	85%	Flat assumption	8%	Other modalities	8%
Future inflation	Not treated	70%	Year per year	18%	Other modalities	13%
Discounting	Dvt patterns-based	73%	Not treated	12%	Other modalities	15%
Discount type	Yield curve	95%	Flat rate	5%	Other modalities	0%
Development patterns	Chain ladder/paid	78%	Other	23%	Other modalities	0%
Diversification effect	Not calculated	53%	Correlation matrix	38%	Other modalities	10%
Large claims	Treated jointly	63%	Treated separately	33%	Other modalities	5%
Reinsurance / retrocession	Projection of net triangles	29%	Proportional assumption	27%	Other modalities	44%
Subrogations	Not calculated	50%	N/A	15%	Other modalities	35%
Ibnr contract allocation	Not allocated	76%	Split using weights	18%	Other modalities	5%
Equalization reserve (local)	Calculated	51%	No eq. reserve	49%	Other modalities	0%
Risk Margin	Projected	51%	Not calculated	24%	Other modalities	24%
Ibnyr and Ibner diff.?	No	98%	Yes	3%	Other modalities	0%

EUROPA

ITALY

Full member association

Population: 60 million
Insurance premiums: MUSD 194,735
Non Life premiums: MUSD 49,443
NL premium/capita: USD 824

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▪▪▪▪▪

Country report by
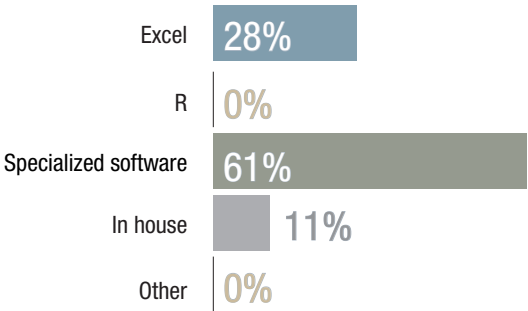Rocco CERCHIARA
cerchiara@unical.it
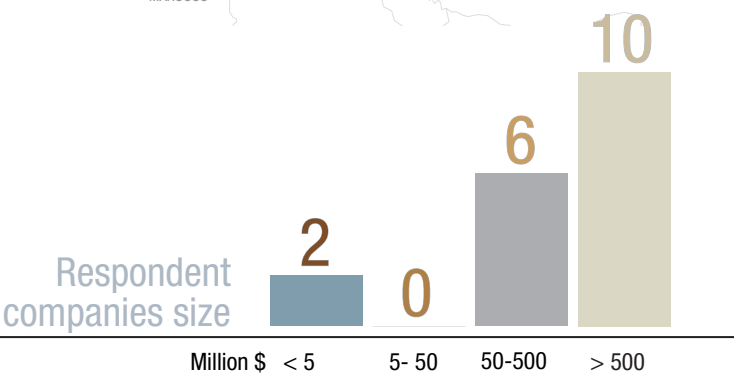
There are 81 Italian and 2 non-EU insurance companies operating in non-life classes registered as of 1.1.2015 (direct domestic business). Non-life premiums' share of total non-life and life premiums fell from 28% to 23%, as life premiums increased sharply. The most common non-life insurances in the Italian Market are motor vehicle insurance, third party liability, accident, health and property.
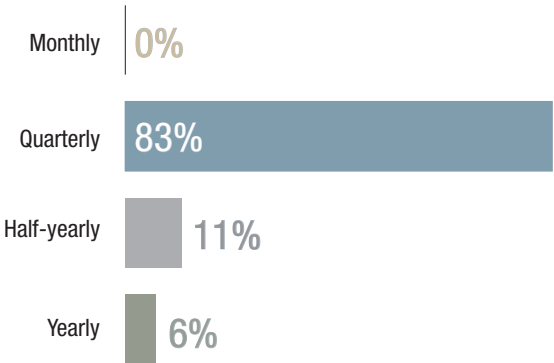
On 1 January 2016, the new supervisory framework for insurance and reinsurance companies - Solvency II - has become applicable and the Appointed Actuary was replaced by the Actuarial Function with a wider responsibility. On March 2016 the Italian Supervisor (IVASS) has published a new regulation on reserving calculation according to the Solvency II principles (discounting, reinsurance default adjustments, etc.).

Respondents consist of 7 multinationals, 7 regionals and 4 small nationals, with a market share of 90% (in terms of gross premiums). This survey shows how the new regulation framework is stimulating the sophistication in the best practice of reserving calculation of Italian non-life companies (processes, approaches, data quality, software, etc.). As a standard deterministic approach Chain Ladder, Frequency-Severity and Bornhuetter Ferguson are the most common used methods, but some companies introduced an Individual Claim Based approach as well. Stochastic methods such as standard Mack, Merz&Wüthrich and Chain Ladder Bootstrapping are mainly used.
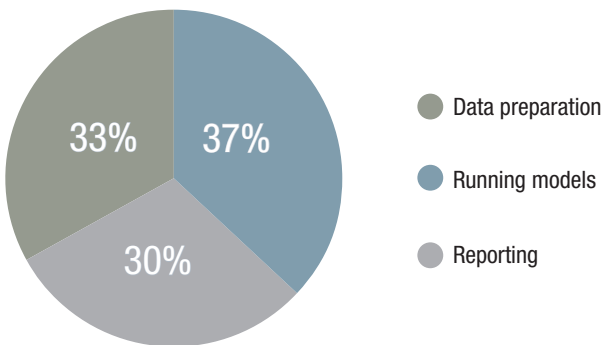
Respondent companies size

Million $: < 5 : 2 | 5- 50 : 0 | 50-500 : 6 | > 500 : 10

Reserving tool

- Excel: 28%
- R: 0%
- Specialized software: 61%
- In house: 11%
- Other: 0%

Reserving exercise periodicity

- Monthly: 0%
- Quarterly: 83%
- Half-yearly: 11%
- Yearly: 6%

Resources split

- Data preparation: 33%
- Running models: 37%
- Reporting: 30%

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
Percentage	13%	13%	6%	69%
Loss ratio	25%	19%	38%	19%
Chain ladder	94%	6%	0%	0%
Bornhuetter-Ferguson	47%	24%	24%	6%
Cape Cod	0%	13%	0%	87%
Average cost	20%	20%	33%	27%
De Vylder	0%	0%	0%	100%
Fisher-Lange	7%	13%	20%	60%
GLM	0%	7%	0%	93%
Munich Chain Ladder	0%	0%	0%	100%
Market-based std dev	7%	0%	7%	87%
Internal calibration	0%	0%	14%	86%
Mack	41%	12%	12%	35%
Merz & Wüthrich	20%	20%	7%	53%
GLM	0%	7%	7%	87%
Bootstrap / CL	19%	0%	25%	56%
Bootstrap / BF	0%	7%	7%	87%
RJMCMC	0%	0%	0%	100%

(Rows 1–10: DETERMINISTIC; Rows 11–18: STOCHASTIC)

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	14%	0%	0%	86%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	92%	Deterministic math. reserves	8%	Other modalities	0%
Asbestos	N/A	77%	IBNR vs OSL benchmark	15%	Other modalities	8%
Disability/workers comp.	N/A	69%	Market/statutory tables	15%	Other modalities	15%
Decennal/contruction liab.	N/A	67%	Regulatory	17%	Other modalities	17%
Credit	N/A	67%	Regulatory	25%	Other modalities	8%

4. Adjustments / misc.

Past inflation	Not treated	60%	Year per year	40%	Other modalities	0%
Future inflation	Not treated	57%	Year per year	29%	Other modalities	14%
Discounting	Dvt patterns-based	59%	Percentage	18%	Other modalities	24%
Discount type	Yield curve	94%	Flat rate	6%	Other modalities	0%
Development patterns	Chain ladder/paid	82%	N/A	12%	Other modalities	6%
Diversification effect	Not calculated	59%	Correlation matrix	35%	Other modalities	6%
Large claims	Treated separately	47%	Treated jointly	41%	Other modalities	12%
Reinsurance / retrocession	Proxy	29%	Proportional assumption	29%	Other modalities	41%
Subrogations	Not calculated	35%	Projection of net triangles	18%	Other modalities	47%
Ibnr contract allocation	Not allocated	33%	Individual claims reserving	33%	Other modalities	33%
Equalization reserve (local)	No eq. reserve	67%	Calculated	27%	Other modalities	7%
Risk Margin	Projected	44%	Proxy	44%	Other modalities	13%
Ibnyr and Ibner diff.?	No	53%	Yes	47%	Other modalities	0%

NETHERLANDS

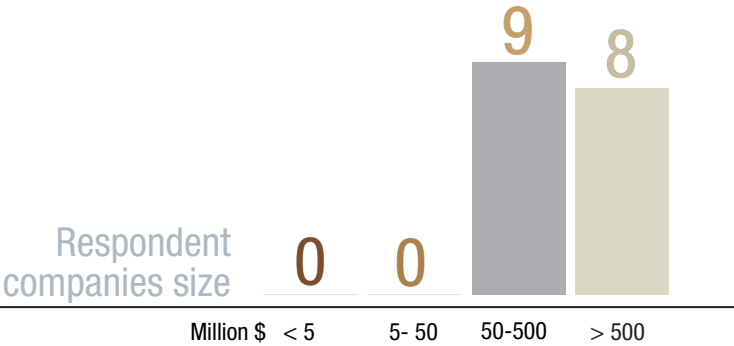**Full member association**

ASTIN

Population: 16.9 million
Insurance premiums: MUSD 95,956
Non Life premiums: MUSD 74,100
NL premium/capita: USD 4,385

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
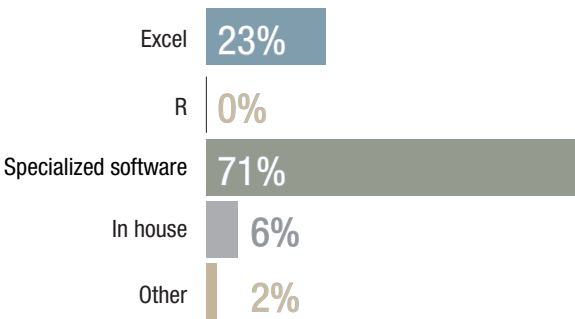Respondents market share: ■■■■☐

Country report by
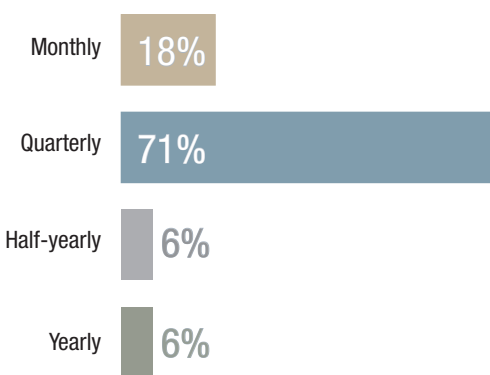Bart KLING
bart.kling@schadeactuaris.nl

There are 138 non-life insurance companies registrered in The Netherlands as of 1.1.2015, of which 36 have 90% of market share. Of the 138 companies, 35 companies (74% market share) only sell medical health: since 2006 a state system run by private insurance companies. The smallest 75 companies only have 2% market share and are really small. Respondents consist of 27 medical health companies (37% market share) and 12 general insurance companies (16% market share).

Historically deterministic actuarial methods were only used for adequacy testing at the larger and midsize insurance companies and not at the many smaller companies. Leading up to Solvency II, actuarial and statistical methods, deterministic as well as stochastic, are more commonly used. The introduction of Solvency II, but also the proposed introduction of IFRS 4, phase 2 will increase the use of these methods.
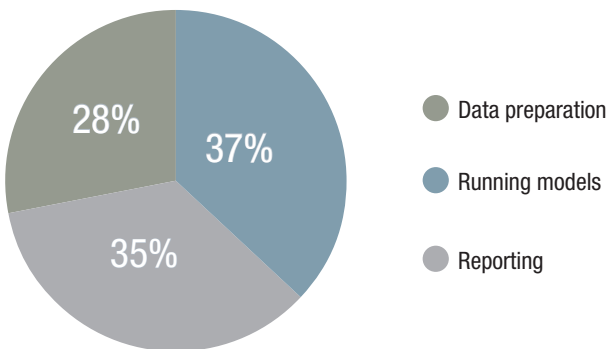
Respondent companies size

	0	0	9	8
Million $	< 5	5- 50	50-500	> 500

Reserving tool

Excel	23%
R	0%
Specialized software	71%
In house	6%
Other	2%

Reserving exercise periodicity

Monthly	18%
Quarterly	71%
Half-yearly	6%
Yearly	6%

Resources split

- 37% Running models
- 35% Reporting
- 28% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	12%	18%	0%	71%
	Loss ratio	25%	19%	19%	38%
	Chain ladder	88%	13%	0%	0%
	Bornhuetter-Ferguson	63%	13%	6%	19%
	Cape Cod	0%	0%	0%	100%
	Average cost	12%	29%	12%	47%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	6%	94%
	GLM	0%	0%	13%	88%
	Munich Chain Ladder	0%	6%	12%	82%
STOCHASTIC	Market-based std dev	6%	6%	13%	75%
	Internal calibration	31%	6%	6%	56%
	Mack	19%	13%	6%	63%
	Merz & Wüthrich	0%	13%	0%	88%
	GLM	0%	0%	13%	88%
	Bootstrap / CL	75%	0%	6%	19%
	Bootstrap / BF	6%	0%	0%	94%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	6%	0%	13%	81%
ICR (Antonio-Plat)	0%	0%	13%	88%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	53%	Deterministic math. reserves	40%	Other modalities	7%
Asbestos	N/A	73%	Other	13%	Other modalities	13%
Disability/workers comp.	N/A	47%	Market/statutory tables	27%	Other modalities	27%
Decennal/contruction liab.	N/A	93%	Other	7%	Other modalities	0%
Credit	N/A	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

|						
Past inflation	Not treated	56%	Year per year	31%	Other modalities	13%
Future inflation	Not treated	63%	Stochastic	19%	Other modalities	19%
Discounting	Dvt patterns-based	69%	Not treated	13%	Other modalities	19%
Discount type	Yield curve	93%	Flat rate	7%	Other modalities	0%
Development patterns	Chain ladder/paid	75%	Other	25%	Other modalities	0%
Diversification effect	Correlation matrix	69%	Not calculated	31%	Other modalities	0%
Large claims	Treated jointly	69%	Treated separately	31%	Other modalities	0%
Reinsurance / retrocession	N/A	25%	Not calculated	19%	Other modalities	56%
Subrogations	Projection of net triangles	38%	Not calculated	19%	Other modalities	44%
Ibnr contract allocation	Not allocated	81%	Split using weights	19%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	94%	Percentage	6%	Other modalities	0%
Risk Margin	Projected	81%	Percentage	13%	Other modalities	6%
Ibnyr and Ibner diff.?	No	88%	Yes	13%	Other modalities	0%

NORWAY

Full member association

Population: 5.1 million
Insurance premiums: MUSD 25,082
Non Life premiums: MUSD 10,443
NL premium/capita: USD 2,048

Local GAAP: ☐ Discounting   ▨ Appointed/signing actuary
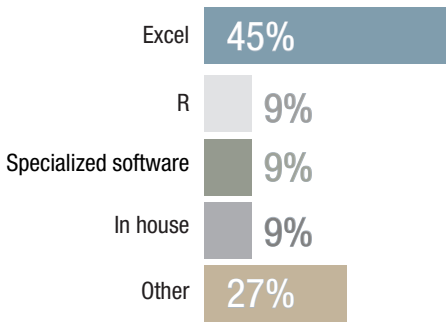Respondents market share: ▮▮▮▮▯

Country report by
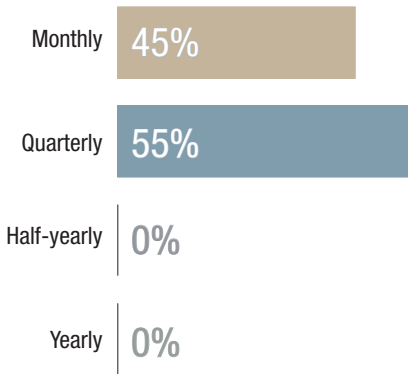Lori TAN
lori.tan@dyna-mo.com
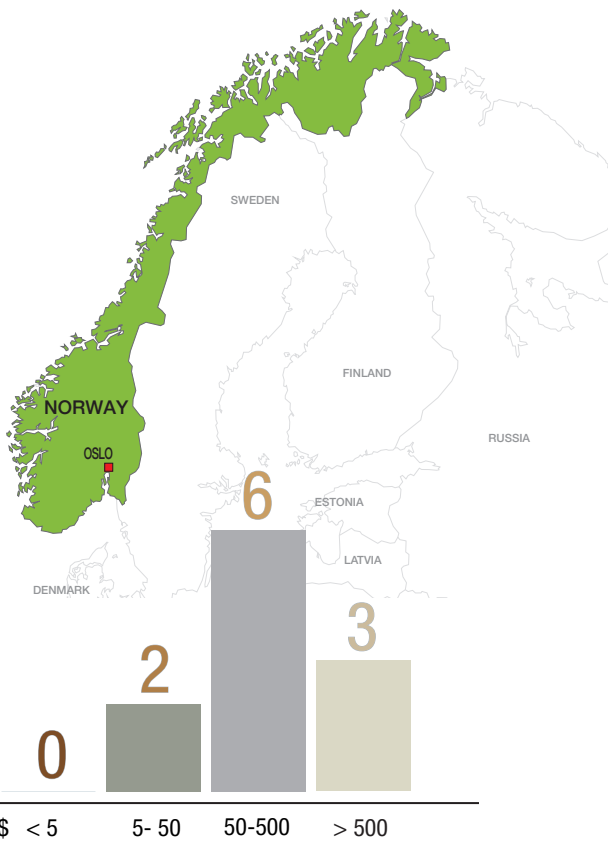
The Norwegian non-life insurance market has been dominated by four companies for many years. According to Finance Norway, who collates statistics excluding marine, energy and aviation, in 2000 these four companies combined held 94% of the market (by 'premiums in force'). However, competition has increased significantly over the past few years and their combined share has reduced to 72%. More than 25 smaller companies now have a slice of the land-based Norwegian market share. Motor insurance accounts for the largest proportion of premiums, followed by home insurance (building and contents). According to Statistics Norway, marine and energy services accounted for 12% (7 306 NOK million) of total earned premiums (63 465 NOK million) in Norway in 2014. The Nordic Association of Marine Insurers (Cefor) represents marine insurers in the Nordic countries. Whilst outside the Eurozone, Norway has transposed detailed rules of the Solvency II directive into Norwegian law (implemented 1 January 2016). This has imposed upon insurers more rigorous data governance and documentation requirements, some changes in the technical provisions calculation and more onerous reporting requirements.

Responses from Norway included both land-based and marine/energy insurers, a range of small national, regional and multi-national companies, and 3 of the 4 market dominating companies. There was considerable variation in the responses to most questions. Calculation periodicity and treatment of large claims was mixed. Peer review varied as did the reserving software used and the allocation of resources. However, the majority received individual claim data and all respondents reported using the yield curve for discounting and the chain ladder/paid for development patterns. The main methods used in Norway are the chain ladder and bornhuetter-ferguson, with a mixed selection of other techniques used by some companies (main, peer review or informational). The Benktander method was also mentioned a number of times by respondents as an additional method.
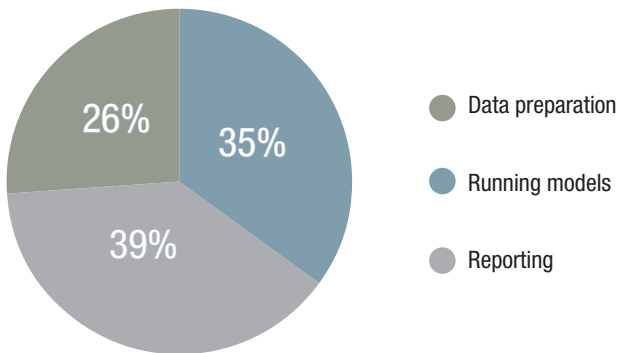
Respondent companies size

Million $	Count
< 5	0
5- 50	2
50-500	6
> 500	3

Reserving tool

Excel	45%
R	9%
Specialized software	9%
In house	9%
Other	27%

Reserving exercise periodicity

Monthly	45%
Quarterly	55%
Half-yearly	0%
Yearly	0%

Resources split

- Data preparation 26%
- Running models 35%
- Reporting 39%

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	0%	9%	18%	73%
Loss ratio	9%	9%	73%	9%
Chain ladder	82%	9%	9%	0%
Bornhuetter-Ferguson	64%	18%	9%	9%
Cape Cod	9%	0%	0%	91%
Average cost	0%	9%	55%	36%
De Vylder	0%	0%	9%	91%
Fisher-Lange	0%	0%	0%	100%
GLM	18%	0%	9%	73%
Munich Chain Ladder	0%	18%	9%	73%
STOCHASTIC				
Market-based std dev	0%	9%	36%	55%
Internal calibration	18%	18%	18%	45%
Mack	0%	9%	9%	82%
Merz & Wüthrich	0%	9%	0%	91%
GLM	18%	0%	0%	82%
Bootstrap / CL	9%	27%	9%	55%
Bootstrap / BF	9%	9%	9%	73%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	30%	0%	20%	50%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	11%	0%	0%	89%

3. Other claims

Annuities	N/A	70%	Deterministic math. reserves	20%	Other modalities	10%
Asbestos	N/A	91%	Survival Ratio	9%	Other modalities	0%
Disability/workers comp.	Market/statutory tables	30%	Experience tables	30%	Other modalities	40%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	91%	Other	9%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Year per year	45%	Not treated	36%	Other modalities	18%
Future inflation	Flat assumption	45%	Not treated	36%	Other modalities	18%
Discounting	Duration-based	55%	Dvt patterns-based	45%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	60%	Correlation matrix	40%	Other modalities	0%
Large claims	Treated separately	64%	Treated jointly	36%	Other modalities	0%
Reinsurance / retrocession	Claim per claim	60%	Not calculated	10%	Other modalities	30%
Subrogations	Claim per claim	44%	Not calculated	33%	Other modalities	22%
Ibnr contract allocation	Split using weights	50%	Not allocated	40%	Other modalities	10%
Equalization reserve (local)	No eq. reserve	90%	Calculated	10%	Other modalities	0%
Risk Margin	Projected	45%	Percentage	36%	Other modalities	18%
Ibnyr and Ibner diff.?	No	55%	Yes	45%	Other modalities	0%

POLAND

Full member association

Population: **38.6 million**
Insurance premiums: **MUSD 17,235**
Non Life premiums: **MUSD 9,798**
NL premium/capita: **USD 254**

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ■■■■☐

Country report by
Agnieszka BERGEL
agnieszkabergel@outlook.com

Respondent companies size

Million $ < 5   5- 50   50-500   > 500
1   2   7   2
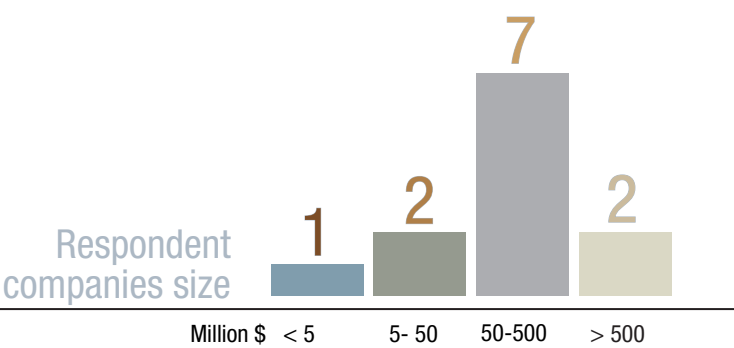
The following report was performed from the analysis of 12 questionnaires completed by insurance companies representing more than 55% of the market share of the non-life insurance industry in Poland. As we can see from the figures below, the majority of the respondent companies are national, with a size between 50 and 500 million in net written premiums.

The preferred reserving tools are Excel and specialized software, and the periodicity of the reserving exercises is divided between quarterly and monthly. None of the respondent companies have half yearly or yearly reserving exercises.

From the tables in the next page, we observe that the most of the companies use deterministic triangle based methods, like the Chain ladder and the Bornhuetter-Ferguson. For the calculation of annuities, deterministic have preference over stochastic. Almost none of the companies consider past inflation for adjustments, a majority includes future inflation instead. Most of the companies do not allocate IBNR to contracts, they perform equalization of reserves and they do not make distinction between IBNYR and IBNER, in general.

Reserving tool

Excel	42%
R	0%
Specialized software	42%
In house	8%
Other	8%

Reserving exercise periodicity

Monthly	58%
Quarterly	42%
Half-yearly	0%
Yearly	0%

Resources split

- 35% Running models
- 33% Reporting
- 32% Data preparation

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC Percentage	17%	17%	0%	67%
Loss ratio	18%	18%	18%	45%
Chain ladder	67%	0%	25%	8%
Bornhuetter-Ferguson	30%	0%	30%	40%
Cape Cod	0%	0%	0%	100%
Average cost	10%	0%	20%	70%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Munich Chain Ladder	0%	0%	20%	80%
STOCHASTIC Market-based std dev	0%	0%	0%	100%
Internal calibration	10%	0%	0%	90%
Mack	0%	10%	10%	80%
Merz & Wüthrich	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Bootstrap / CL	20%	0%	20%	60%
Bootstrap / BF	0%	0%	10%	90%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	10%	10%	0%	80%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Deterministic math. reserves	83%	Stochastic math. reserves	8%	Other modalities	8%
Asbestos	N/A	91%	IBNR vs OSL benchmark	9%	Other modalities	0%
Disability/workers comp.	N/A	64%	Experience tables	27%	Other modalities	9%
Decennal/contruction liab.	N/A	73%	Other	18%	Other modalities	9%
Credit	N/A	73%	Other	18%	Other modalities	9%

4. Adjustments / misc.

Past inflation	Not treated	92%	Year per year	8%	Other modalities	0%
Future inflation	Flat assumption	58%	Not treated	42%	Other modalities	0%
Discounting	Not treated	33%	Duration-based	25%	Other modalities	42%
Discount type	Yield curve	67%	Flat rate	33%	Other modalities	0%
Development patterns	Chain ladder/paid	58%	N/A	33%	Other modalities	8%
Diversification effect	Not calculated	92%	Correlation matrix	8%	Other modalities	0%
Large claims	Treated jointly	50%	Treated separately	42%	Other modalities	8%
Reinsurance / retrocession	Proportional assumption	67%	Not calculated	8%	Other modalities	25%
Subrogations	Not calculated	25%	Projection of net triangles	25%	Other modalities	50%
Ibnr contract allocation	Not allocated	67%	Individual claims reserving	17%	Other modalities	17%
Equalization reserve (local)	Calculated	67%	No eq. reserve	25%	Other modalities	8%
Risk Margin	Projected	42%	Not calculated	33%	Other modalities	25%
Ibnyr and Ibner diff.?	No	90%	Yes	10%	Other modalities	0%

EUROPA
PORTUGAL
Full member association

Population: **10.4 million**
Insurance premiums: **MUSD 19,151**
Non Life premiums: **MUSD 5,189**
NL premium/capita: **USD 499**
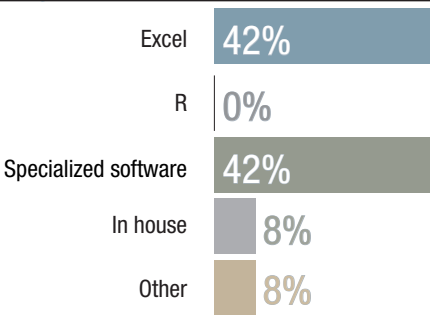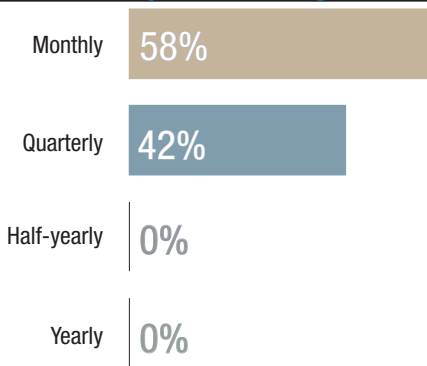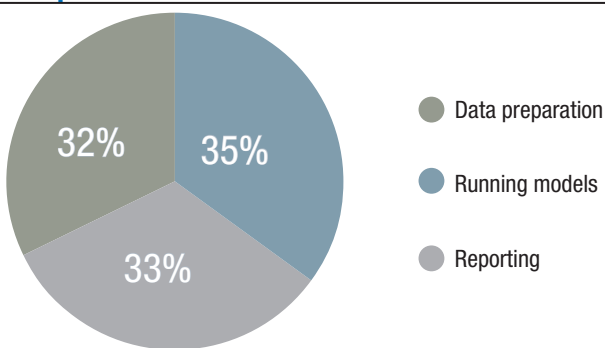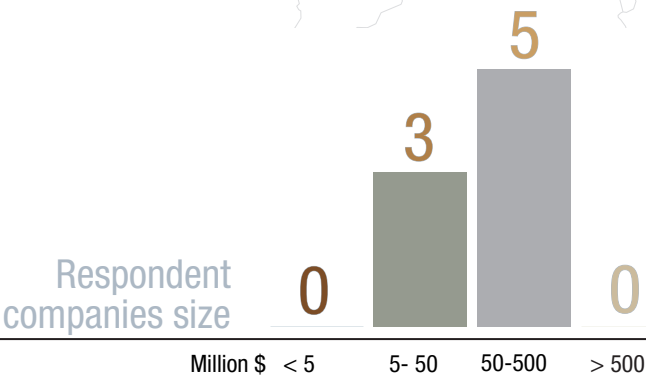
Local GAAP: ■ Discounting ■ Appointed/signing actuary
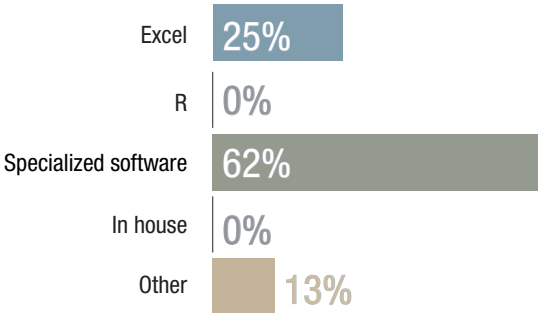Respondents market share: ■■■□□

Country report by
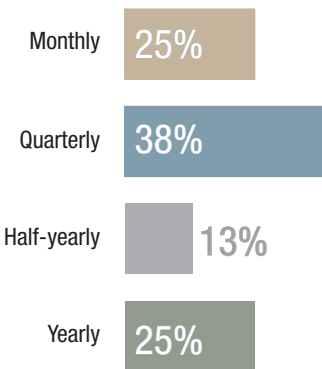Agnieszka BERGEL
agnieszkabergel@outlook.com

The following report was performed from the analysis of 8 questionnaires completed by insurance companies representing more than 30% of the market share of the non-life insurance industry in Portugal. As we can see from the figures below, the majority of the respondent companies are small national or multinational, with sizes between 5 and 500 million in net written premiums. The preferred reserving tool is specialized software, and the periodicity of the reserving exercises is roughly equally distributed in monthly, quarterly, half-yearly and yearly periods. From the tables in the next page, we observe that the most of the companies use deterministic triangle based methods, like the Chain ladder and the Bornhuetter-Ferguson, although a considerable percentage of them also use stochastic methods, like the Mack and the Bootstrap/CL.

For the calculation of annuities, deterministic have preference over stochastic. Only one quarter of the companies consider past inflation for adjustments, half of them includes future inflation instead. Most of the companies use EIOPA curves for discounting and they tend to make distinction between IBNYR and IBNER, in general.
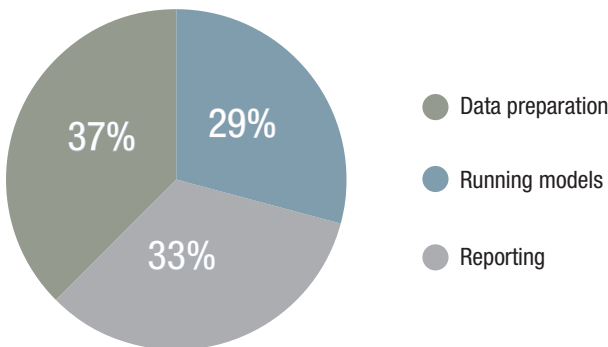
Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	0	3	5	0

Reserving tool

Excel	25%
R	0%
Specialized software	62%
In house	0%
Other	13%

Reserving exercise periodicity

Monthly	25%
Quarterly	38%
Half-yearly	13%
Yearly	25%

Resources split

- Data preparation 37%
- Running models 29%
- Reporting 33%

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	13%	0%	25%	63%
Loss ratio	13%	25%	25%	38%
Chain ladder	100%	0%	0%	0%
Bornhuetter-Ferguson	25%	38%	13%	25%
Cape Cod	0%	14%	0%	86%
Average cost	13%	50%	25%	13%
De Vylder	0%	0%	25%	75%
Fisher-Lange	0%	0%	14%	86%
GLM	0%	0%	0%	100%
Munich Chain Ladder	0%	25%	13%	63%
STOCHASTIC				
Market-based std dev	0%	0%	0%	100%
Internal calibration	0%	0%	0%	100%
Mack	25%	38%	0%	38%
Merz & Wüthrich	0%	14%	0%	86%
GLM	0%	0%	14%	86%
Bootstrap / CL	25%	25%	13%	38%
Bootstrap / BF	0%	0%	14%	86%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	25%	0%	0%	75%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Deterministic math. reserves	75%	Stochastic math. reserves	13%	Other modalities	13%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	Experience tables	50%	Market/statutory tables	38%	Other modalities	13%
Decennal/contruction liab.	N/A	88%	Regulatory	13%	Other modalities	0%
Credit	N/A	88%	Other	13%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	63%	Year per year	38%	Other modalities	0%
Future inflation	Not treated	50%	Flat assumption	25%	Other modalities	25%
Discounting	Duration-based	38%	Not treated	25%	Other modalities	38%
Discount type	Yield curve	86%	Flat rate	14%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	57%	Correlation matrix	43%	Other modalities	0%
Large claims	Treated separately	50%	Excluded	25%	Other modalities	25%
Reinsurance / retrocession	Proportional assumption	25%	Projection of net triangles	25%	Other modalities	50%
Subrogations	Not calculated	50%	Projection of net triangles	38%	Other modalities	13%
Ibnr contract allocation	Not allocated	38%	Split using weights	38%	Other modalities	25%
Equalization reserve (local)	Calculated	50%	No eq. reserve	50%	Other modalities	0%
Risk Margin	Projected	50%	Proxy	38%	Other modalities	13%
Ibnyr and Ibner diff.?	Yes	63%	No	38%	Other modalities	0%

SPAIN

Full member association

Population: 46.6 million
Insurance premiums: MUSD 71,473
Non Life premiums: MUSD 38,462
NL premium/capita: USD 825

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share:

Country report by
Antonio RUBIO & Teresa SENDRA
antonio.rubio@catalanaoccidente.com
teresa.sendra@catalanaoccidente.com
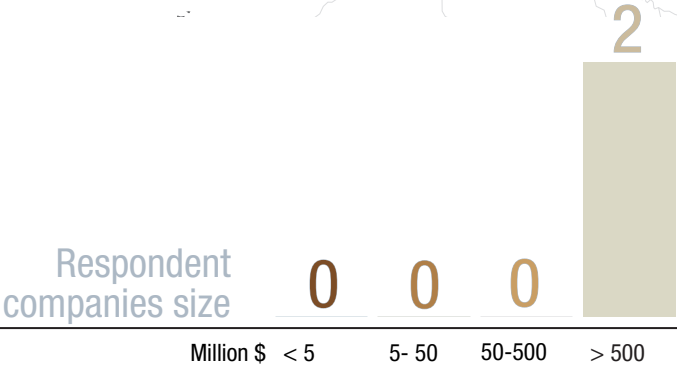
Based on 2014 data of the Insurance sector, some key indicators are described following below. Within the worldwide insurance market, Spain was in the 14th position, remaining in the 10th position in the Non-life insurance and in the 18th place in the Life insurance. Number of entities were 255, three of them were specialized reinsurers. With the entrance of the Solvency II regulation it is expected that a concentration process through mergers and acquisitions may take place in these coming years. Major distribution channel in Non-life insurance remained to be agents and brokers, accounting for a 33% and 24%, respectively. Insurance sector's penetration in Spain was of 5,2% of GDP, accounting for a premium volume of 55,5 million euros, out of which, 30,6 million euros (55%) related to Non-life insurance. Within the Non-life insurance, the most important lines of business were: Motor insurance accounting for a 17,8% of non-life, Health insurance accounting for 12,9% of non-life, Multirrisks accounting for 11,8% of non-life followed by Burial insurance in the fourth position accounting for 3,8% of non-life. Some of the key features and challenges of the Spanish market for this year 2016 are detailed below.
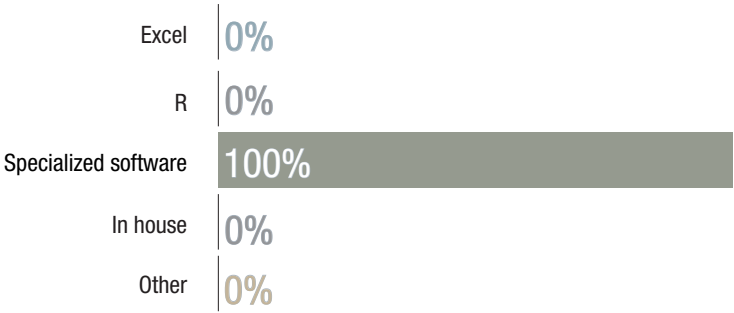
Getting ready for Solvency II implementation. Although entities started already putting in place the necessary resources and tools to be up to date with the new regulation requirements, there is still a lot of work to be done in order to have Solvency II fully implemented.

In relation to the main line of business, Motor insurance (and also affecting General third party liability), an updated version of the compulsory scale for bodily injury claims ("Baremo"), came into force in 2016. Since this new version has important upwards effects on the compensation awards, it remains to be seen how it may affect to the claims cost of the insurance companies and how this may convert into a volatile result.
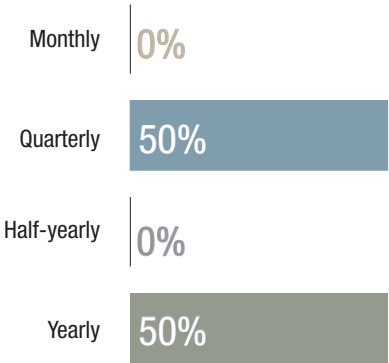
With the reactivation of the Spanish economy and the decrease in the petrol price, it remains to be seen if there will be an increase in the Motor claims frequency that could affect the results of this main line of business of Spanish market. Based on 2014 published EIOPA results, the strength of the Spanish insurance sector to comply with the capital requirements of the new regulation of Solvency II was confirmed, as 86% of the analyzed entities are adequately capitalized. Only 14% of the entities representing 3% of total assets, showed solvency capital requirements below 100%. Spain has already transposed to the Spanish regulation the new system of Solvency II as detailed in the Directive and Delegated Act.
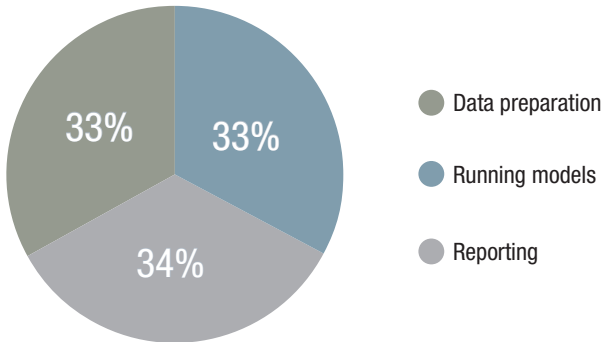
Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	0	0	0	2

Reserving tool

Excel	0%
R	0%
Specialized software	100%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	0%
Quarterly	50%
Half-yearly	0%
Yearly	50%

Resources split

- Data preparation 33%
- Running models 33%
- Reporting 34%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	0%	0%	50%	50%
	Loss ratio	0%	0%	100%	0%
	Chain ladder	100%	0%	0%	0%
	Bornhuetter-Ferguson	0%	0%	100%	0%
	Cape Cod	0%	0%	0%	100%
	Average cost	0%	0%	100%	0%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	50%	50%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	0%	100%
	Internal calibration	0%	0%	50%	50%
	Mack	50%	0%	0%	50%
	Merz & Wüthrich	0%	0%	50%	50%
	GLM	0%	0%	50%	50%
	Bootstrap / CL	100%	0%	0%	0%
	Bootstrap / BF	50%	0%	50%	0%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	50%	0%	0%	50%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Deterministic math. reserves	100%	Stochastic math. reserves	0%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	100%	Market/statutory tables	0%	Other modalities	0%
Decennal/contruction liab.	Regulatory	50%	N/A	50%	Other modalities	0%
Credit	Regulatory	50%	N/A	50%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	50%	Year per year	50%	Other modalities	0%
Future inflation	Not treated	50%	Year per year	50%	Other modalities	0%
Discounting	Dvt patterns-based	100%	Not treated	0%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Treated separately	50%	Treated jointly	50%	Other modalities	0%
Reinsurance / retrocession	Proportional assumption	50%	Projection of net triangles	50%	Other modalities	0%
Subrogations	Projection of net triangles	50%	N/A	50%	Other modalities	0%
Ibnr contract allocation	Not allocated	100%	Individual claims reserving	0%	Other modalities	0%
Equalization reserve (local)	Calculated	50%	No eq. reserve	50%	Other modalities	0%
Risk Margin	Proxy	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

SWEDEN

Full member association
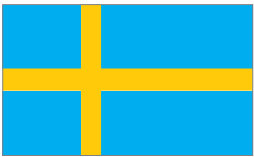
Population: 9.7 million
Insurance premiums: MUSD 38,735
Non Life premiums: MUSD 10,556
NL premium/capita: USD 1,088

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▮▮▮▯▯

Country report by
Lori TAN
lori.tan@dyna-mo.com

ASTIN
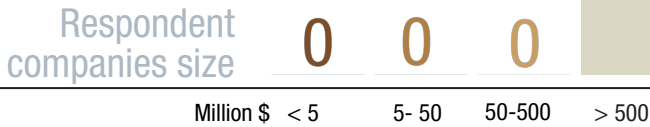
According to Insurance Sweden, gross written premiums for non-life insurance companies amounted to slightly less than SEK 70 billion in 2014. There are hundreds of registered insurance companies in Sweden, mostly small local non-life insurance companies. However, the market is dominated by just a few large companies, with the largest four insurance companies accounting for about 80% of the market. Only 4 companies responded to the survey. However, based on market share, these responses amounted to approximately 37% of the market. The most common non-life insurance is business and real property insurance, closely followed by motor vehicle insurance and householder and homeowner insurance.

Solvency II was implemented in Sweden on 1 January 2016, imposing upon insurers more rigorous governance, calculation and reporting requirements. As a consequence, the Appointed actuary was also replaced by the actuarial function. Those companies with a presence across the Nordics indicated use of the same actuarial techniques and resources across all Nordic countries (unless local requirements deviate). The main methods used in Sweden, according to the few responses, are the chain ladder and bornhuetter-ferguson, with a mixed selection of other techniques used by some companies (main, peer review or informational), including bootstrapping, GLM, Cape Cod, Mack and Benktander. There was considerable variation in the type of reserving software used and allocation of resources. However, all respondents reported using the yield curve for discounting and the chain ladder/paid for development patterns. For Solvency II purposes, discounting is performed according to EIOPA's curve. However, no discounting is applied in statutory balance sheet, with the exception of annuities.

Reserving tool

Excel	25%
R	0%
Specialized software	25%
In house	25%
Other	25%

Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	0	0	0	4

Reserving exercise periodicity

Monthly	50%
Quarterly	25%
Half-yearly	0%
Yearly	25%

Resources split

Data preparation	37%
Running models	37%
Reporting	26%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	0%	50%	0%	50%
	Loss ratio	0%	25%	50%	25%
	Chain ladder	75%	0%	25%	0%
	Bornhuetter-Ferguson	100%	0%	0%	0%
	Cape Cod	25%	25%	0%	50%
	Average cost	0%	25%	25%	50%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	25%	0%	0%	75%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	0%	100%
	Internal calibration	0%	0%	25%	75%
	Mack	0%	25%	0%	75%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	25%	0%	0%	75%
	Bootstrap / CL	50%	0%	0%	50%
	Bootstrap / BF	25%	0%	0%	75%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	0%	100%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	25%	0%	0%	75%

3. Other claims

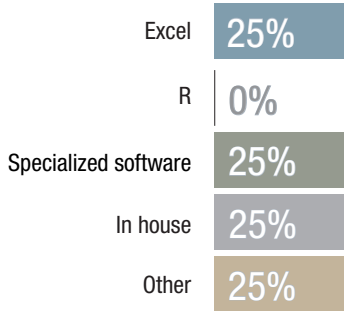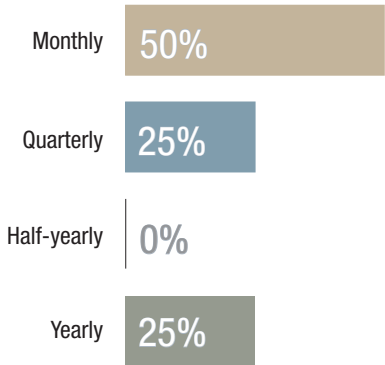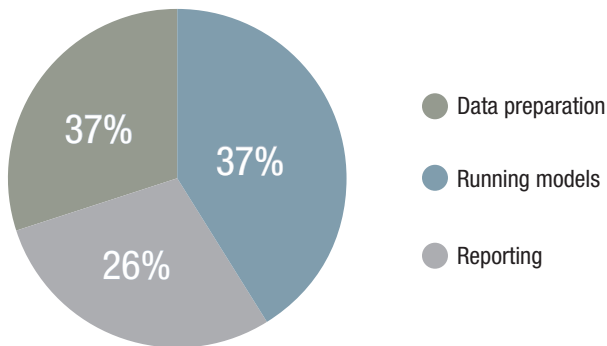| Annuities	Deterministic math. reserves	75%	N/A	25%	Other modalities	0%
Asbestos	Survival Ratio	50%	N/A	50%	Other modalities	0%
Disability/workers comp.	Experience tables	50%	Other	50%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	75%	Other	25%	Other modalities	0%

4. Adjustments / misc.

| Past inflation	Flat assumption	50%	Not treated	25%	Other modalities	25%
Future inflation	Flat assumption	75%	Not treated	25%	Other modalities	0%
Discounting	Duration-based	75%	Dvt patterns-based	25%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	50%	Correlation matrix	50%	Other modalities	0%
Large claims	Treated separately	50%	Treated jointly	50%	Other modalities	0%
Reinsurance / retrocession	Claim per claim	50%	Not calculated	25%	Other modalities	25%
Subrogations	Not calculated	75%	Claim per claim	25%	Other modalities	0%
Ibnr contract allocation	Not allocated	100%	Individual claims reserving	0%	Other modalities	0%
Equalization reserve (local)	Calculated	50%	Percentage	25%	Other modalities	25%
Risk Margin	Proxy	50%	Projected	25%	Other modalities	25%
Ibnyr and Ibner diff.?	No	75%	Yes	25%	Other modalities	0%

SWITZERLAND

Full member association

Population: 8.2 million
Insurance premiums: MUSD 65,211
Non Life premiums: MUSD 29,117
NL premium/capita: USD 3,551

Local GAAP: ☐ Discounting ◼ Appointed/signing actuary
Respondents market share: ◼◼◻◻◻

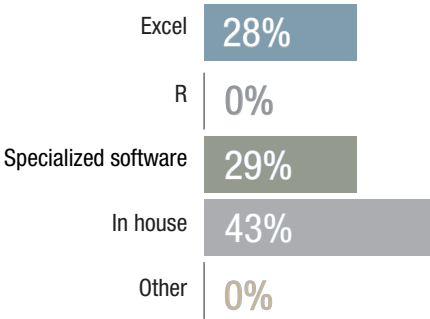Country report by
Léonard VINCENT
leonard.vincent@prs-zug.com
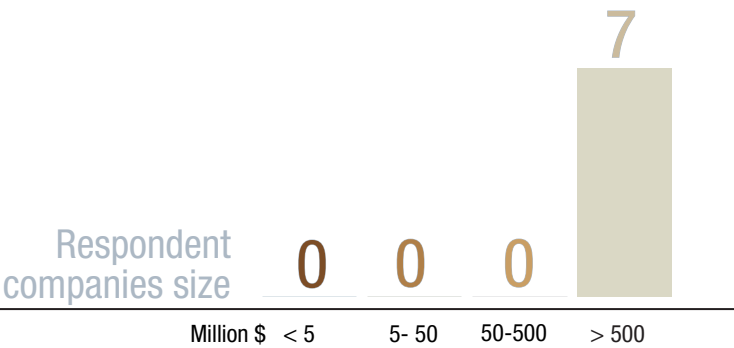
The insurance penetration in Switzerland is one of the highest in the world and amounts 9.2%. Its life sector ($USD 36bn annual premium, +1.10% over the previous year) is quite concentrated, with 80% of the market held by five companies and 57% held by two. The non-life sector ($USD 29bn annual premium, +1.70% over the previous year) mainly splits into health (37%), liability & motor (31%) and property (15%) insurance, with 30% of the market held by the 3 companies. The reinsurance industry is highly developed with approximately $USD 40bn annual premium earned all across the world. Unsurprisingly, Swiss Re is the main actor, with a share of 60% of the annual premium. In 2014 the Swiss market counted 177 licensed insurance companies, operating in the fields of life (21), health (23), non-life (104) and reinsurance (29), plus 33 reinsurance captives.
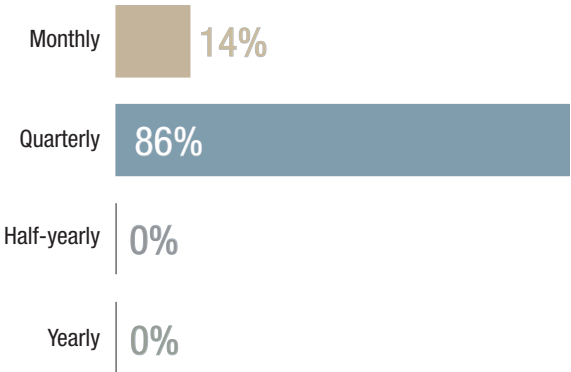
FINMA is the national supervisory authority. Its mandate is to supervise insurance companies, in addition to banks and other financial institutions. Insurance companies are required to submit a SST (Swiss Solvency Test) report to FINMA for review at least once a year. The SST determines an insurance company's required capital, by means of stochastic simulation of its assets and liabilities. Moreover, FINMA endorses (or doesn't) the Appointed actuary, who is responsible mainly for the reserves, tied assets and solvency of the company.

To obtain the status of fully qualified actuary, after three years of professional experience in the risk management field, one has to pass exams organized by the Swiss Association of Actuaries (SAA). SAA conditions the renewal of this status to the fulfilment of approximately 20 hours of ongoing training per year. Thanks to an agreement between the SAA and the Actuarial Association of Europe, there is a mutual recognition of actuarial qualifications between Switzerland and other European countries.
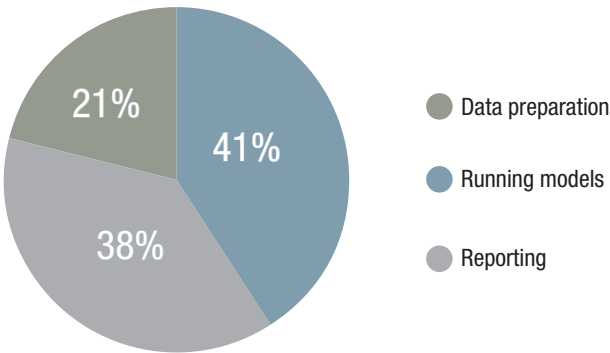
Respondent companies size

	0	0	0	7
Million $	< 5	5- 50	50-500	> 500

Reserving tool

- Excel: **28%**
- R: **0%**
- Specialized software: **29%**
- In house: **43%**
- Other: **0%**

Reserving exercise periodicity

- Monthly: **14%**
- Quarterly: **86%**
- Half-yearly: **0%**
- Yearly: **0%**

Resources split

- 41% Running models
- 38% Reporting
- 21% Data preparation

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
Percentage	29%	0%	43%	29%
Loss ratio	43%	43%	14%	0%
Chain ladder	86%	14%	0%	0%
Bornhuetter-Ferguson	86%	0%	0%	14%
Cape Cod	14%	14%	14%	57%
Average cost	29%	14%	14%	43%
De Vylder	0%	0%	0%	100%
Fisher-Lange	14%	0%	0%	86%
GLM	0%	14%	0%	86%
Munich Chain Ladder	0%	0%	0%	100%
Market-based std dev	0%	43%	14%	43%
Internal calibration	57%	14%	0%	29%
Mack	43%	14%	0%	43%
Merz & Wüthrich	57%	0%	0%	43%
GLM	0%	14%	0%	86%
Bootstrap / CL	29%	14%	14%	43%
Bootstrap / BF	29%	0%	0%	71%
RJMCMC	0%	14%	0%	86%

(DETERMINISTIC: Percentage through Munich Chain Ladder; STOCHASTIC: Market-based std dev through RJMCMC)

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	14%	0%	0%	86%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	17%	0%	17%	67%

3. Other claims

Annuities	Deterministic math. reserves	71%	Ratio	14%	Other modalities	14%
Asbestos	N/A	57%	Survival Ratio	29%	Other modalities	14%
Disability/workers comp.	Market/statutory tables	57%	N/A	29%	Other modalities	14%
Decennal/contruction liab.	N/A	67%	Other	33%	Other modalities	0%
Credit	Other	50%	N/A	33%	Other modalities	17%

4. Adjustments / misc.

|						
Past inflation	Not treated	71%	Flat assumption	29%	Other modalities	0%
Future inflation	Not treated	57%	Flat assumption	43%	Other modalities	0%
Discounting	Dvt patterns-based	57%	Not treated	29%	Other modalities	14%
Discount type	Yield curve	80%	Flat rate	20%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	43%	Correlation matrix	29%	Other modalities	29%
Large claims	Treated separately	71%	Treated jointly	29%	Other modalities	0%
Reinsurance / retrocession	Claim per claim	43%	Other	29%	Other modalities	29%
Subrogations	Not calculated	43%	Projection of net triangles	43%	Other modalities	14%
Ibnr contract allocation	Not allocated	43%	Split using weights	43%	Other modalities	14%
Equalization reserve (local)	Calculated	71%	No eq. reserve	29%	Other modalities	0%
Risk Margin	Projected	43%	Proxy	29%	Other modalities	29%
Ibnyr and Ibner diff.?	No	57%	Yes	43%	Other modalities	0%

TURKEY

Associate member association

Population: 75.9 million
Insurance premiums: MUSD 11,595
Non Life premiums: MUSD 10,119
NL premium/capita: USD 133

Local GAAP: ☐ Discounting ▨ Appointed/signing actuary
Respondents market share: ▮▮▮▮▯

Country report by
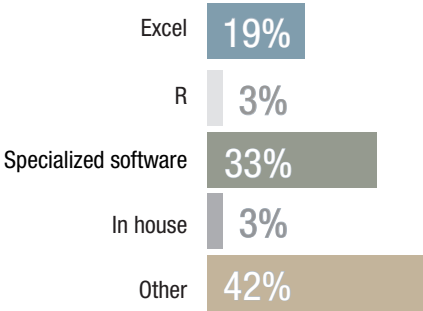Taylan MATKAP
aktuer@gmail.com
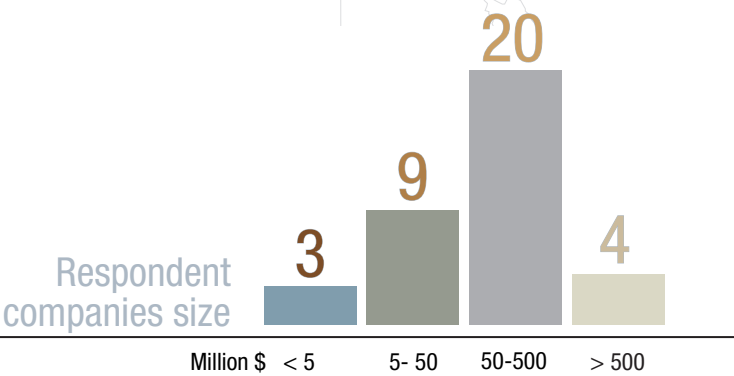
There are 39 non-life companies (represented by 19 Appointed Actuaries) registered in Turkey as of 31.12.2015 (18-Multinational, 8 National, 13 Small-size National).

36 of those non-life companies responded to the survey (15-Multinational, 8 National, 13 Small-size National – all represented by 16 Appointed Actuaries).
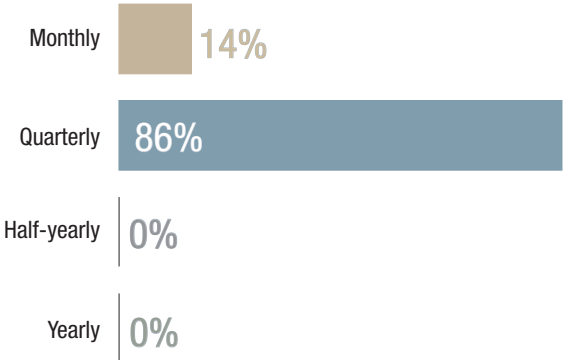
According to data published by the Insurance Association of Turkey (IAT), total premium production of all insurance companies are increased by 19.4% to TRY 31.0 billion in 2015. Of this total amount, TRY 27 billion was generated by non-life insurance companies.

In 2015, the non-life insurance industry generated the highest premium production on motor vehicle liability branch, reaching to TRY 7.5 billion. Since it is the largest portion of the non-life insurance premium, there has been much discussion on the reserving topic recently in Turkey. Changes occurred in the calculation method of IBNR provisions set aside by companies within the scope of the Undersecretariat of Treasury circular published on 5 December 2014, which came into force on 1 January 2015. The changes are settled and the reserving discussion is over for now.
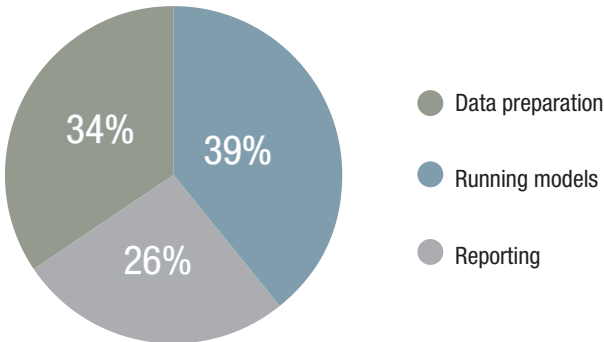
Respondent companies size

Million $	Count
< 5	3
5- 50	9
50-500	20
> 500	4

Reserving tool

Tool	%
Excel	19%
R	3%
Specialized software	33%
In house	3%
Other	42%

Reserving exercise periodicity

Period	%
Monthly	14%
Quarterly	86%
Half-yearly	0%
Yearly	0%

Resources split

Category	%
Data preparation	34%
Running models	39%
Reporting	26%

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	9%	34%	9%	49%
Loss ratio	14%	69%	9%	9%
Chain ladder	97%	3%	0%	0%
Bornhuetter-Ferguson	26%	43%	26%	6%
Cape Cod	3%	40%	6%	51%
Average cost	17%	36%	14%	33%
De Vylder	0%	0%	3%	97%
Fisher-Lange	0%	0%	3%	97%
GLM	0%	0%	3%	97%
Munich Chain Ladder	6%	60%	6%	29%
STOCHASTIC				
Market-based std dev	6%	0%	6%	89%
Internal calibration	9%	6%	0%	86%
Mack	9%	3%	0%	89%
Merz & Wüthrich	6%	0%	0%	94%
GLM	0%	6%	0%	94%
Bootstrap / CL	46%	0%	3%	51%
Bootstrap / BF	9%	0%	0%	91%
RJMCMC	0%	34%	3%	63%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	23%	0%	3%	74%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	3%	97%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Deterministic math. reserves	41%	Stochastic math. reserves	28%	Other modalities	31%
Asbestos	N/A	68%	Other	32%	Other modalities	0%
Disability/workers comp.	Market/statutory tables	50%	N/A	28%	Other modalities	22%
Decennal/contruction liab.	N/A	72%	Other	28%	Other modalities	0%
Credit	Regulatory	38%	N/A	34%	Other modalities	28%

4. Adjustments / misc.

Past inflation	Year per year	58%	Not treated	42%	Other modalities	0%
Future inflation	Year per year	63%	Not treated	31%	Other modalities	6%
Discounting	Dvt patterns-based	46%	Percentage	26%	Other modalities	29%
Discount type	Yield curve	96%	Flat rate	4%	Other modalities	0%
Development patterns	Chain ladder/paid	69%	Other	29%	Other modalities	3%
Diversification effect	Not calculated	74%	Correlation matrix	26%	Other modalities	0%
Large claims	Treated separately	56%	Excluded	42%	Other modalities	3%
Reinsurance / retrocession	Proportional assumption	64%	Claim per claim	28%	Other modalities	8%
Subrogations	Projection of net triangles	51%	Claim per claim	43%	Other modalities	6%
Ibnr contract allocation	Not allocated	65%	Individual claims reserving	29%	Other modalities	6%
Equalization reserve (local)	No eq. reserve	44%	Calculated	38%	Other modalities	18%
Risk Margin	Not calculated	76%	Percentage	12%	Other modalities	12%
Ibnyr and Ibner diff.?	No	71%	Yes	29%	Other modalities	0%

UKRAINE

Associate member association
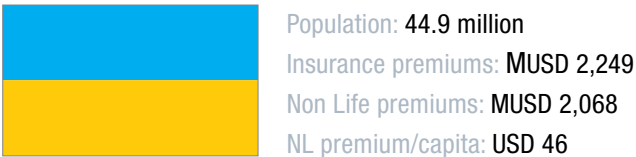
Population: **44.9 million**
Insurance premiums: **MUSD 2,249**
Non Life premiums: **MUSD 2,068**
NL premium/capita: **USD 46**

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary

Respondents market share: ▪▪▪▪▪

Country report by
Yuriy KRVAVYCH
yuriy.krvavych@uk.pwc.com
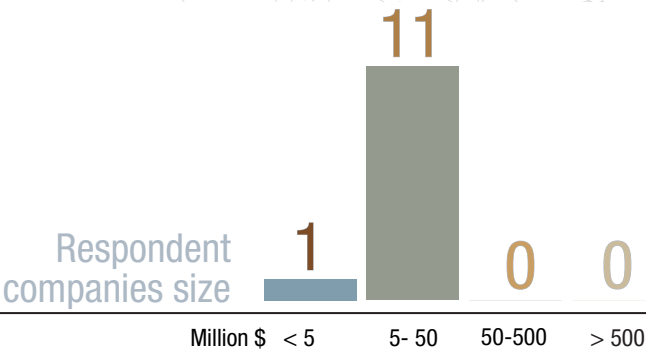
There are 318 non-life companies (being represented by approximately 20 Actuaries) registered as of 31.12.2015. There are 12 Respondent Companies that participated in the current survey - 1 Multinational, 1 Regional, 10 National. They are represented by 9 Actuaries and cover 40% of gross non-life claims in 1-3Q2015. It should be noted that the notion of 'Appointed actuary' is to be implemented in the legislation later this year. According to the data published by the State Commission for Regulating Financial Services (NatsFinPoslug), the premium production of all insurance companies combined increased by 27.1% from UAH 17.1 billion in 1-3Q2014 to UAH 21.7 billion in 1-3Q2015. Of this amount, UAH 20 billion was generated on non-life insurance.

The insurance industry generated the highest premium production on property & cargo, booking UAH 6.7 billion, UAH 5.7 billion came from motor hull & MTPL. The regulation on reserving is quite strict (for IBNR only formulaic approaches such as Chain Ladder, Bornhuetter or fixed percentage are allowed), however it is expected that the regulation will allow for more complex actuarial approaches later this year due to upcoming implementation of IFRS.

Respondent companies size

11 / 1 / 0 / 0

Million $ | < 5 | 5- 50 | 50-500 | > 500

Reserving tool

- Excel **25%**
- R **41%**
- Specialized software **0%**
- In house **17%**
- Other **17%**

Reserving exercise periodicity

- Monthly **25%**
- Quarterly **75%**
- Half-yearly **0%**
- Yearly **0%**

Resources split

- Data preparation **34%**
- Running models **35%**
- Reporting **31%**

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	33%	0%	17%	50%
Loss ratio	17%	25%	17%	42%
Chain ladder	42%	42%	17%	0%
Bornhuetter-Ferguson	50%	33%	0%	17%
Cape Cod	0%	58%	17%	25%
Average cost	8%	25%	25%	42%
De Vylder	0%	0%	8%	92%
Fisher-Lange	0%	0%	0%	100%
GLM	8%	50%	0%	42%
Munich Chain Ladder	0%	17%	8%	75%
STOCHASTIC				
Market-based std dev	8%	0%	0%	92%
Internal calibration	8%	0%	8%	83%
Mack	9%	36%	9%	45%
Merz & Wüthrich	0%	0%	0%	100%
GLM	9%	0%	9%	82%
Bootstrap / CL	0%	36%	9%	55%
Bootstrap / BF	0%	0%	0%	100%
RJMCMC	0%	0%	9%	91%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	17%	8%	25%	50%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	9%	0%	0%	91%

3. Other claims

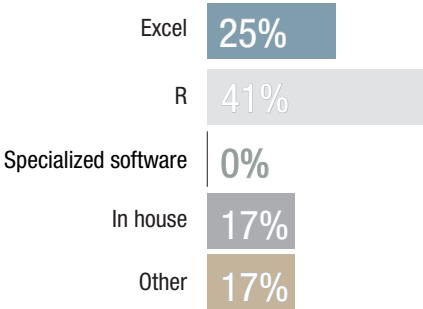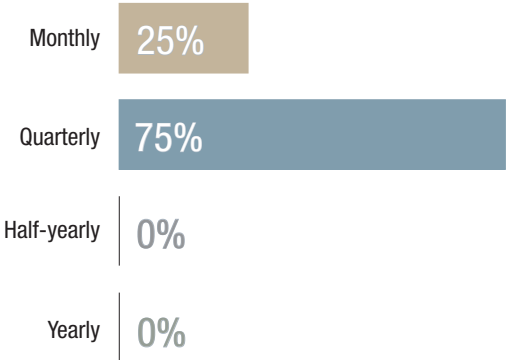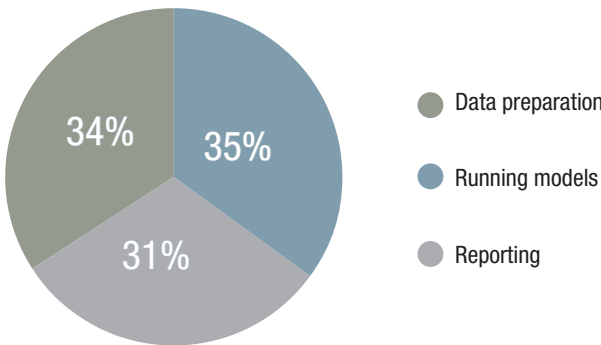|					
Annuities	N/A	92%	Stochastic math. reserves	8%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	91%	Experience tables	9%	Other modalities	0%
Decennal/contruction liab.	N/A	91%	Other	9%	Other modalities	0%
Credit	N/A	91%	Regulatory	9%	Other modalities	0%

4. Adjustments / misc.

|					
Past inflation	Not treated	83%	Year per year	17%	Other modalities	0%
Future inflation	Flat assumption	40%	Year per year	40%	Other modalities	20%
Discounting	Not treated	91%	Percentage	9%	Other modalities	0%
Discount type	Flat rate	100%	Yield curve	0%	Other modalities	0%
Development patterns	Chain ladder/paid	82%	N/A	18%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Treated separately	92%	Excluded	8%	Other modalities	0%
Reinsurance / retrocession	Claim per claim	67%	Proportional assumption	33%	Other modalities	0%
Subrogations	Not calculated	67%	Proportional assumption	17%	Other modalities	17%
Ibnr contract allocation	Not allocated	82%	Individual claims reserving	9%	Other modalities	9%
Equalization reserve (local)	Calculated	75%	No eq. reserve	25%	Other modalities	0%
Risk Margin	Not calculated	73%	Percentage	27%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

UNITED KINGDOM

Full member association

Population: 64.7 million
Insurance premiums: MUSD 351,266
Non Life premiums: MUSD 115,945
NL premium/capita: USD 1,792

Local GAAP: ☐ Discounting   ☐ Appointed/signing actuary
Respondents market share: ■■■■☐

UNITED KINGDOM

Country report by
Sarah MAC DONNELL
sarah.macdonnell@lcp.uk.com

Respondent companies size

Million $	< 5	5- 50	50-500	> 500
	0	0	8	16
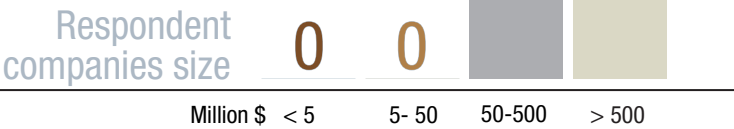
The results for the UK are based on a similar survey carried out in the UK between August 2013 and September 2014; we have no reason to expect that reserving methods have changed significantly since then. The survey included 13 personal lines companies (providing insurance directly to individuals) and 11 "London Market" companies (a combination of insurers, providing commercial and personal insurance, companies writing business through Lloyd's and reinsurers). It only included the larger firms operating in personal lines and the London Market.
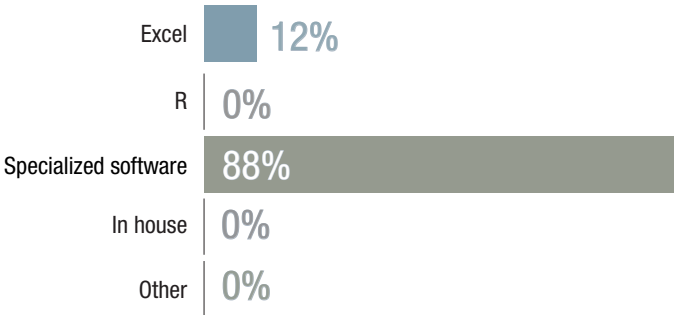
For reporting purposes, reserves tend to be undiscounted. However, for Solvency II, discounted reserve estimates need to be prepared. The latter are usually derived from the undiscounted reserves used for reporting.

Lloyd's has required its syndicates to have signing actuaries to opine on the adequacy of reserves for several years now, but there has been no statutory role the actuaries for non-Lloyd's entities until the introduction of the Actuarial Function Holder or "Chief Actuary" role with the introduction of Solvency II this year.
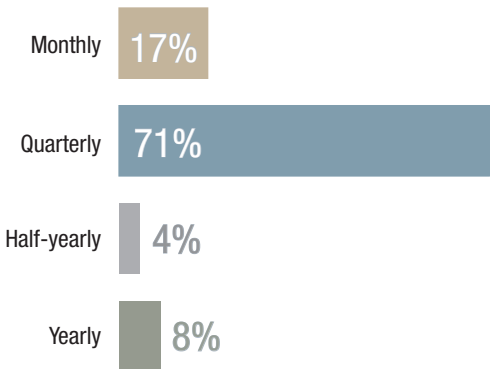
The survey indicates that Chain Ladder and Bornhuetter Ferguson/Cape Cod methods are still the most widely used methodologies. Average cost per claim or numbers and averages methods are the next most common though far more often used in personal lines than the London Market. Stochastic methods are not used for reserving estimates, although they are used, by some, for reserve uncertainty. Large claims are often projected separately and bespoke methods e.g. for PPOs or asbestos were also cited.

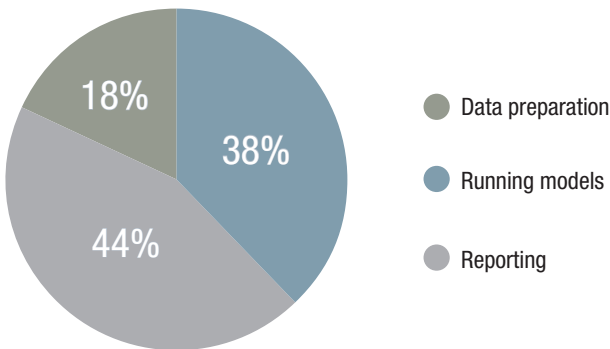The full survey can be found at the following address:
https://www.actuaries.org.uk/documents/giroc-uk-reserving-survey-2014.

Reserving tool

Excel	12%
R	0%
Specialized software	88%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	17%
Quarterly	71%
Half-yearly	4%
Yearly	8%

Resources split

- 38% Running models
- 44% Reporting
- 18% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	0%	0%	0%	100%
	Loss ratio	21%	0%	0%	79%
	Chain ladder	100%	0%	0%	0%
	Bornhuetter-Ferguson	88%	0%	0%	13%
	Cape Cod	88%	0%	0%	13%
	Average cost	58%	0%	0%	42%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	0%	100%
	Internal calibration	0%	0%	0%	100%
	Mack	75%	0%	0%	25%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	75%	0%	0%	25%
	Bootstrap / BF	0%	0%	0%	100%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	0%	100%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Deterministic math. reserves	54%	N/A	46%	Other modalities	0%
Asbestos	Unfilled	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	Unfilled	100%	Market/statutory tables	0%	Other modalities	0%
Decennal/contruction liab.	Unfilled	100%	Regulatory	0%	Other modalities	0%
Credit	Unfilled	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Flat assumption	58%	Not treated	42%	Other modalities	0%
Future inflation	Flat assumption	58%	Not treated	42%	Other modalities	0%
Discounting						
Discount type						
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect						
Large claims	Treated separately	96%	Treated jointly	4%	Other modalities	0%
Reinsurance / retrocession	Projection of net triangles	100%	Not calculated	0%	Other modalities	0%
Subrogations	Projection of net triangles	100%	Not calculated	0%	Other modalities	0%
Ibnr contract allocation						
Equalization reserve (local)						
Risk Margin						
Ibnyr and Ibner diff.?						

HONG KONG

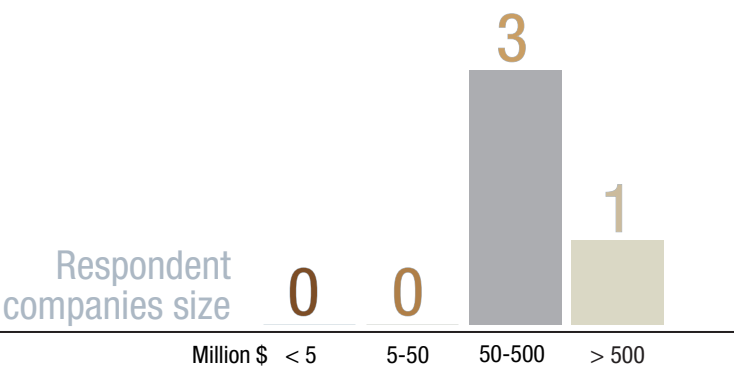**Full Member Association**

Population: **7.3 million**
Insurance premiums: **MUSD 41,038**
Non Life premiums: **MUSD 4,182**
NL premium/capita: **USD 573**

Local GAAP: ☐ Discounting   ▨ Appointed/signing actuary
Respondents market share: ▪▪▪▫▫

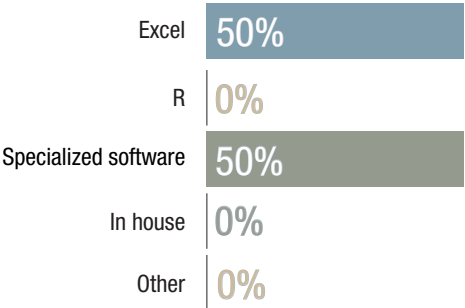Country report by
Adrian CHEUNG
adrian.cheung@aig.com

There are 112 companies in Hong Kong registered to write non-life insurance as of 11.4.2016 but only insurance companies that write statutory lines of business (Motor and Workers Compensation) are required to appoint an actuary to sign off the reserves for these business class.
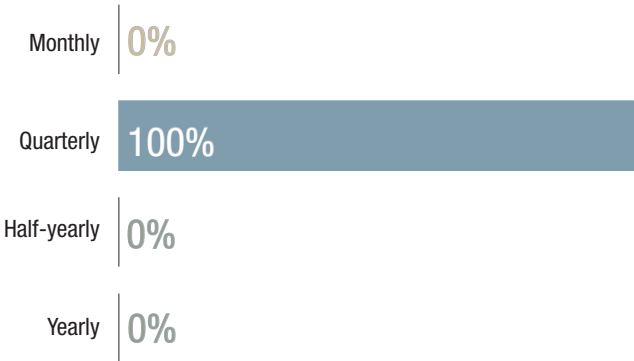
There are 4 respondents to the ASTIN survey. Chain ladder and Bornhuetter-Ferguson are the main valuation methods used in Hong Kong. Stochastic models and/or market benchmarks are used to assess the appropriate risk margin. The regulatory environment in Hong Kong is likely to change over the coming years. A new Insurance Ordinance is in place in 2015 which has resulted in the creation of an Independent Insurance Authority ("IIA"). The IIA will need to be in place by end of 2016. The IIA will be granted new enforcement powers and insurers will be required to seek approval for heads of key control functions including the appointment of the actuary signing off the reserves.

In addition, the current regulatory regime is working on a new risk based capital regime, which may have major implications on how reserve and reserving risk will be assessed. This is still in consultation phase.
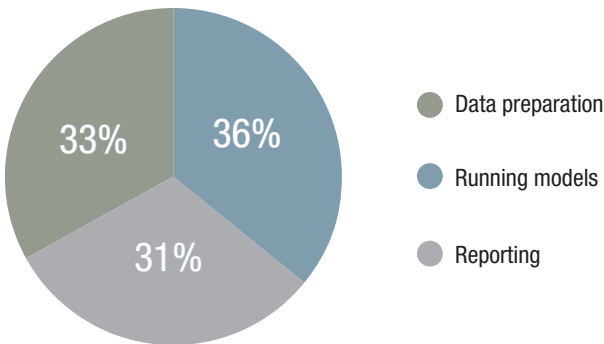
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	0	3	1

Reserving tool

Excel	50%
R	0%
Specialized software	50%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	0%
Quarterly	100%
Half-yearly	0%
Yearly	0%

Resources split

- 36% Running models
- 31% Reporting
- 33% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
	Percentage	0%	0%	25%	75%
	Loss ratio	50%	25%	25%	0%
	Chain ladder	100%	0%	0%	0%
DETERMINISTIC	Bornhuetter-Ferguson	100%	0%	0%	0%
	Cape Cod	0%	0%	0%	100%
	Average cost	25%	0%	25%	50%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	25%	75%
	Market-based std dev	0%	0%	25%	75%
	Internal calibration	50%	0%	0%	50%
	Mack	50%	0%	0%	50%
STOCHASTIC	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	50%	0%	0%	50%
	Bootstrap / BF	25%	0%	0%	75%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	25%	0%	75%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	67%	Survival Ratio	33%	Other modalities	0%
Disability/workers comp.	N/A	100%	Market/statutory tables	0%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	67%	Other	33%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Future inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Discounting	Not treated	50%	Duration-based	25%	Other modalities	25%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Correlation matrix	50%	Not calculated	25%	Other modalities	25%
Large claims	Treated separately	100%	Excluded	0%	Other modalities	0%
Reinsurance / retrocession	Other	50%	Proportional assumption	25%	Other modalities	25%
Subrogations	Not calculated	25%	Projection of net triangles	25%	Other modalities	50%
Ibnr contract allocation	Not allocated	50%	Split using weights	50%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Percentage	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

JAPAN
Full Member Association
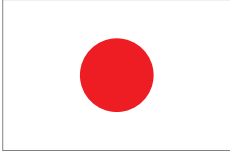
Population: 127.0 million
Insurance premiums: MUSD 479,762
Non Life premiums: MUSD 108,174
NL premium/capita: USD 852

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▮▮▮▮▮

Country report by
Miyuki EBISAKI
mebisaki@sjnk.co.jp
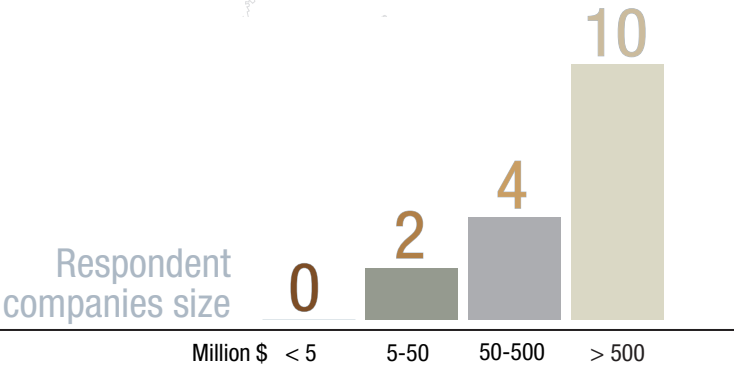
There are thirty non-life insurance companies including two reinsurance companies; nine multinational and twenty one small national are registered as of 31.12.2015. Respondents consist of six multinational and ten small national. Chief actuaries of those companies contributed to the survey.

According to the regulatory change in 2006, "Statistical estimation", which meant mainly chain ladder, was introduced in especially long-tail and significant lines while formula based calculation has been used in short-tail and non-significant lines. Since then, Chief actuaries have been appointed to be responsible for signing off the reserves.

The Japanese Financial Services Agency has conducted field tests with a view to introducing an economic value-based solvency regime in 2011 and 2014. Within the tests, it was requested in principle that claim reserves should be a best estimate of future cash flows pertaining to incurred insurance events. This would be calculated and adjusted by the discount rate. The use of the cost of capital method was adopted for calculating risk margins. Timing of the introduction of the new solvency regime has not yet been decided. At the moment, basic methods based on current regulations are largely used.

Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	2	4	10

Reserving tool

Excel	87%
R	0%
Specialized software	13%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	6%
Quarterly	63%
Half-yearly	25%
Yearly	6%

Resources split

Data preparation	31%
Running models	39%
Reporting	31%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	0%	0%	20%	80%
	Loss ratio	27%	0%	20%	53%
	Chain ladder	88%	0%	0%	13%
	Bornhuetter-Ferguson	31%	0%	31%	38%
	Cape Cod	13%	0%	0%	87%
	Average cost	7%	0%	0%	93%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	7%	0%	0%	93%
	Internal calibration	0%	0%	0%	100%
	Mack	7%	0%	0%	93%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	7%	0%	7%	87%
	Bootstrap / BF	0%	0%	0%	100%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

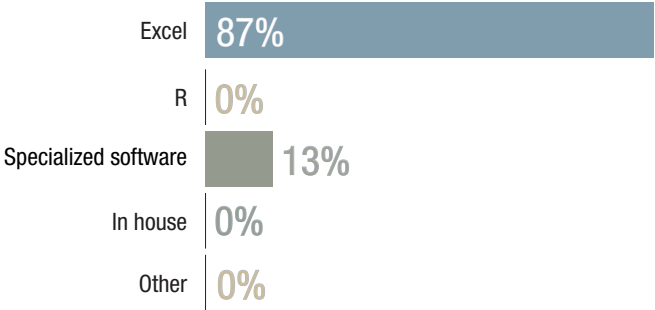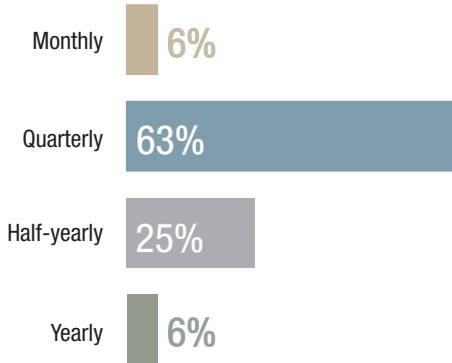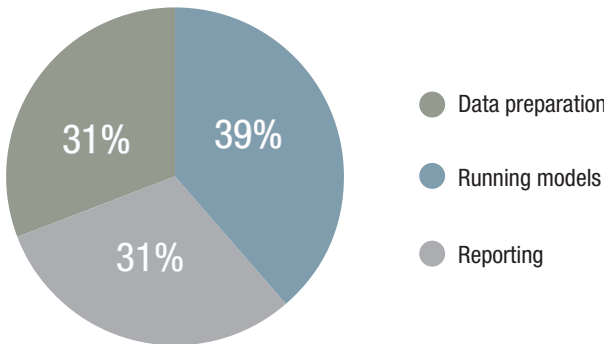|	Main method	Peer method	Informational	Unused
Percentage	7%	0%	7%	87%
ICR (Antonio-Plat)	6%	0%	0%	94%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	13%	0%	0%	87%

3. Other claims

Annuities	N/A	93%	Other	7%	Other modalities	0%
Asbestos	N/A	71%	IBNR vs OSL benchmark	21%	Other modalities	7%
Disability/workers comp.	N/A	71%	Experience tables	21%	Other modalities	7%
Decennal/contruction liab.	N/A	79%	Regulatory	14%	Other modalities	7%
Credit	N/A	79%	Regulatory	14%	Other modalities	7%

4. Adjustments / misc.

Past inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Future inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Discounting	Not treated	93%	Percentage	7%	Other modalities	0%
Discount type	Flat rate	100%	Yield curve	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	93%	Correlation matrix	7%	Other modalities	0%
Large claims	Excluded	56%	Treated separately	25%	Other modalities	19%
Reinsurance / retrocession	Proportional assumption	56%	Not calculated	19%	Other modalities	25%
Subrogations	Not calculated	56%	Projection of net triangles	31%	Other modalities	13%
Ibnr contract allocation	Not allocated	100%	Individual claims reserving	0%	Other modalities	0%
Equalization reserve (local)	Calculated	75%	No eq. reserve	25%	Other modalities	0%
Risk Margin	Not calculated	94%	Projected	6%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

MALAYSIA

Full Member Association
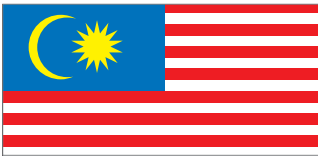
Population: **30.2 million**
Insurance premiums: **MUSD 15,864**
Non Life premiums: **MUSD 5,633**
NL premium/capita: **USD 187**

Local GAAP: ☐ Discounting ▪ Appointed/signing actuary
Respondents market share: ▪▪▪▪☐

Country report by
Steven VISVALINGAM
stevenvisvalingam@jpwall.com

The Malaysian General Insurance industry is made up of 2 types of insurers, the larger conventional general insurers [88% of Gross Direct Premiums] and the smaller Takaful insurers [12% of Gross Direct Premiums] who offer protection according to Islamic principles. It should be noted that the growth rate of Takaful business is higher than the conventional insurers. The conventional insurers comprise 23 general insurers and 6 general reinsurers and on the Takaful side, there are 8 general Takaful insurers and 4 general re-Takaful operators.

The main business written in Malaysia [2015] is Motor covering property and injuries [49%], Fire [18%], Medical & Personal Accident [13%] and Others [21%]. Others business constitute of Marine, Aviation and Transit [9%], Contractor's All Risk & Engineering [4%], Liability [3%], Workmen's Compensation & Employer's Liability [1%] and Miscellaneous [5%].

On the legislative side, Malaysia adopted the Risk Based Capital [RBC] framework for conventional insurers in 2009 which required companies to appoint a Signing Actuary to certify their reserves quarterly to support the RBC calculations. The framework required reserves to be calculated at the best estimate level after which a Provision for Adverse Deviation [PRAD] is applied to take the best estimate to the 75% confidence level of sufficiency. The RBC framework for Takaful operators was implemented in 2014. The Malaysian regulator introduced the requirement for general insurers and Takaful operators to have Appointed Actuaries for their general insurance business in 2015.

Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	2	10	1

Reserving tool

Excel	67%
R	0%
Specialized software	25%
In house	0%
Other	8%

Reserving exercise periodicity

Monthly	23%
Quarterly	77%
Half-yearly	0%
Yearly	0%

Resources split

- Data preparation — 31%
- Running models — 41%
- Reporting — 28%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	0%	8%	15%	77%
	Loss ratio	31%	8%	54%	8%
	Chain ladder	92%	8%	0%	0%
	Bornhuetter-Ferguson	92%	8%	0%	0%
	Cape Cod	0%	0%	0%	100%
	Average cost	0%	69%	8%	23%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	8%	92%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	62%	15%	23%
	Internal calibration	8%	0%	15%	77%
	Mack	85%	8%	0%	8%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	77%	15%	0%	8%
	Bootstrap / BF	54%	8%	0%	38%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	58%	0%	0%	42%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	92%	Other	8%	Other modalities	0%
Decennal/contruction liab.	N/A	92%	Other	8%	Other modalities	0%
Credit	N/A	92%	Other	8%	Other modalities	0%

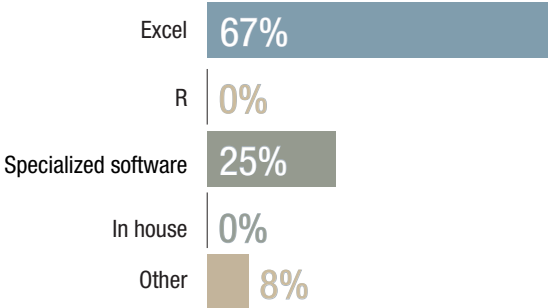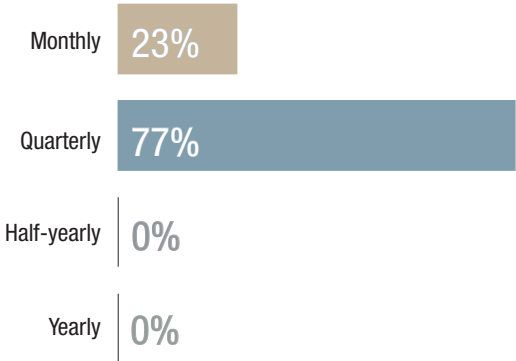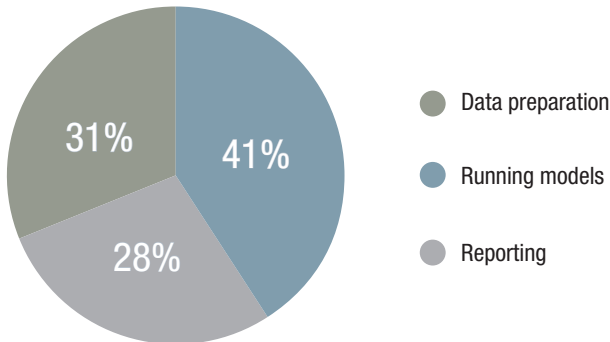## 4. Adjustments / misc.

Past inflation	Not treated	62%	Flat assumption	38%	Other modalities	0%
Future inflation	Not treated	62%	Flat assumption	38%	Other modalities	0%
Discounting	Not treated	92%	Dvt patterns-based	8%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	67%	Correlation matrix	33%	Other modalities	0%
Large claims	Treated separately	77%	Treated jointly	15%	Other modalities	8%
Reinsurance / retrocession	Projection of net triangles	77%	Not calculated	8%	Other modalities	15%
Subrogations	Not calculated	77%	Projection of net triangles	23%	Other modalities	0%
Ibnr contract allocation	Not allocated	69%	Individual claims reserving	15%	Other modalities	15%
Equalization reserve (local)	No eq. reserve	92%	Percentage	8%	Other modalities	0%
Risk Margin	Percentage	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

PHILIPPINES

Full Member Association

Population: 100.3 million
Insurance premiums: MUSD 5,788
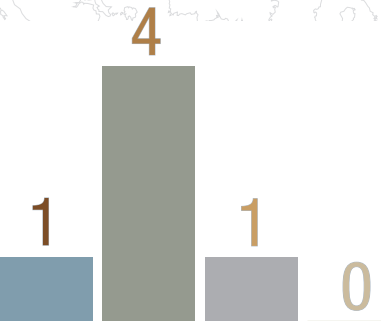**Non Life premiums:** MUSD 1,369
NL premium/capita: USD 14

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ■■■■■

Country report by
Joel A. PERLADO
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Seventy-two companies comprise the Philippines' non-life insurance industry including a lone reinsurance company. Thirteen multinational and 59 national companies are registered as of 31 December 2014. Respondents are composed of one multinational, one national, and four small national.

A major overhaul in the insurance industry of the Philippines has been made through the signing into law of Republic Act No. 10607 or the amended Insurance Code of the Philippines on the 15th of August 2013. Moreover, the non-life industry in the country has been gearing towards implementing similar ASEAN practices starting with the submission of actuarial valuation reports on the company's reserves for its liabilities which was the topic of discussion in the regulator's circular dated 10 June 2015.

In terms of growth, according to statistics from the Philippine Insurers and Reinsurers Association, the industry has been steadily growing in Gross Written Premiums over the last four years with the latest development of 2013 figures of PHP 62,859.82 million increasing in 2014 to PHP 66,545.70 million. This steady growth coupled with the adoption of regionally accepted practices and the determination of the Commissioner to update the regulatory process make being a part of the non-life industry in the Philippines very exciting.
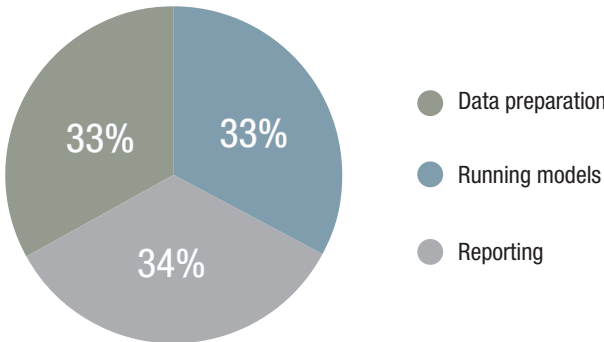
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	1	4	1	0

Reserving tool

Excel	100%
R	0%
Specialized software	0%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	0%
Quarterly	100%
Half-yearly	0%
Yearly	0%

Resources split

- Data preparation 33%
- Running models 33%
- Reporting 34%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	100%	0%	0%	0%
	Loss ratio	100%	0%	0%	0%
	Chain ladder	100%	0%	0%	0%
	Bornhuetter-Ferguson	100%	0%	0%	0%
	Cape Cod	0%	0%	0%	100%
	Average cost	0%	0%	0%	100%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	0%	100%
	Internal calibration	0%	0%	0%	100%
	Mack	0%	0%	0%	100%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	0%	0%	0%	100%
	Bootstrap / BF	0%	0%	0%	100%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	0%	100%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Unfilled	100%
Asbestos	Unfilled	100%
Disability/workers comp.	Unfilled	100%
Decennal/contruction liab.	Unfilled	100%
Credit	Unfilled	100%

4. Adjustments / misc.

Past inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Future inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Discounting	Not treated	100%	Percentage	0%	Other modalities	0%
Discount type						
Development patterns	N/A	100%	Chain ladder/paid	0%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Treated separately	100%	Excluded	0%	Other modalities	0%
Reinsurance / retrocession	Claim per claim	100%	Not calculated	0%	Other modalities	0%
Subrogations	Claim per claim	100%	Not calculated	0%	Other modalities	0%
Ibnr contract allocation	Not allocated	100%	Individual claims reserving	0%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Proxy	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

SINGAPORE

Full Member Association

Population: 5.5 million
Insurance premiums: MUSD 27,000
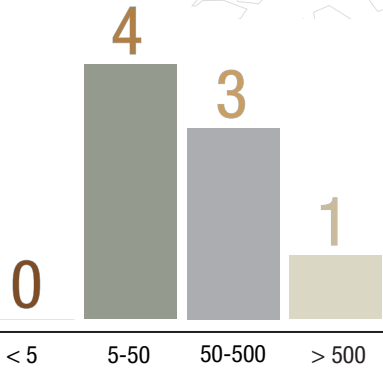Non Life premiums: MUSD 11,458
NL premium/capita: USD 2,083

Local GAAP: ☐ Discounting ■ Appointed/signing actuary
Respondents market share: ■ ■ ■ ☐ ☐

Country report by
Phyllis CHAN & Sie LAU
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sielau@gmail.com

MALAYSIA
SINGAPORE

Respondent companies size

Million $ < 5   5-50   50-500   > 500
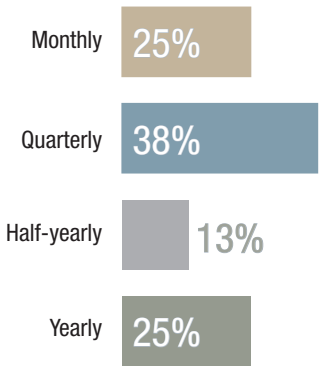(0)   (4)   (3)   (1)

In December 2014 the non-life market comprised 57 direct insurers for Singapore Insurance Fund (onshore) business, including 15 with defined business lines including health insurers, as well as five composite insurers. Although counted as one licence in Monetary Authority Singapore figures, there are 24 underwriting syndicates under the Lloyd's Asia Scheme, and 64 captive insurers. Chief actuaries have been appointed to be responsible for signing off the reserves. Consumers may place their insurances anywhere in the world provided that they do not use the services of a locally licensed insurance broker. Insurance companies are free to reinsure wherever they wish but reinsurance with an unapproved reinsurer has negative solvency margin implications, under the current risk-based capital rules and formulae. The Singapore non-life market is non-tariff. There is no restriction on foreign ownership of insurers, and licences are granted to foreign insurers on the basis of a range of criteria. Foreign insurers can be wholly owned local subsidiaries or branches.Distribution continues to be controlled by agents and brokers. The use of e-commerce and direct marketing is slowly increasing, with three specialist direct line operators in the market, and most large companies having transactional websites for personal lines. Smart phone use is also increasing for web access and purchase.Singapore is not exposed to major natural perils but it experiences minor seismic activity and windstorms from time to time. The major risk is from flooding.Compulsory insurances include: third party liability for motor vehicles and aircraft; work injury compensation (WIC); professional indemnity insurance for a number of professions; and cover against oil pollution from ships under international conventions.Non-life insurers are required to maintain technical reserves for unearned premiums or an unexpired risk provision, whichever is higher. The MAS requires insurers to follow a prudent and conservative approach to loss reserving. Loss reserves should be estimated using a proper and consistent method based on properly collated claims statistics, with particular attention paid to long-tail business and large or catastrophic losses. Actuarial certification of premium and claims reserves based on 75% level of sufficiency was introduced as a requirement by the MAS in the first quarter of 2002. Reserves are required to be established net of reinsurance. The same requirements apply to reinsurers.
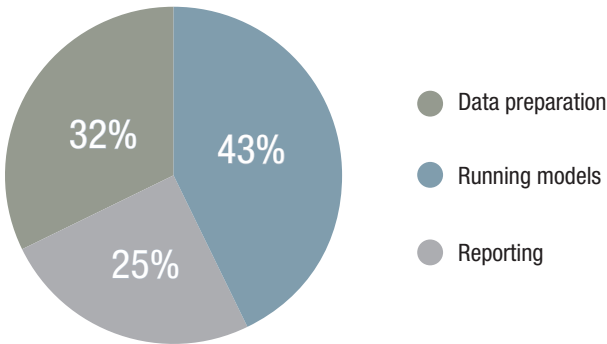
Reserving tool
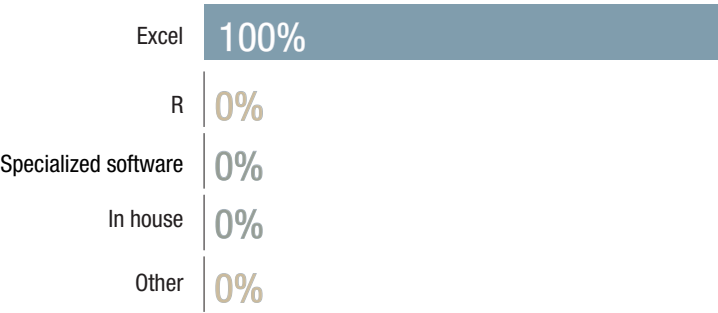
Excel	100%
R	0%
Specialized software	0%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	25%
Quarterly	38%
Half-yearly	13%
Yearly	25%

Resources split

- 43% Running models
- 32% Data preparation
- 25% Reporting

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	0%	100%
Loss ratio	38%	38%	25%	0%
Chain ladder	75%	25%	0%	0%
Bornhuetter-Ferguson	100%	0%	0%	0%
Cape Cod	0%	0%	0%	100%
Average cost	14%	14%	0%	71%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Munich Chain Ladder	0%	0%	0%	100%
Market-based std dev	25%	25%	13%	38%
Internal calibration	25%	0%	13%	63%
Mack	57%	0%	0%	43%
Merz & Wüthrich	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Bootstrap / CL	29%	29%	0%	43%
Bootstrap / BF	13%	38%	0%	50%
RJMCMC	0%	0%	0%	100%

(DETERMINISTIC / STOCHASTIC)

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	29%	0%	0%	71%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	83%	Experience tables	17%	Other modalities	0%
Decennal/contruction liab.	N/A	83%	Other	17%	Other modalities	0%
Credit	N/A	80%	Other	20%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	63%	Year per year	25%	Other modalities	13%
Future inflation	Not treated	63%	Flat assumption	38%	Other modalities	0%
Discounting	Not treated	63%	Duration-based	38%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	63%	Correlation matrix	38%	Other modalities	0%
Large claims	Treated separately	63%	Treated jointly	38%	Other modalities	0%
Reinsurance / retrocession	Projection of net triangles	88%	Proportional assumption	13%	Other modalities	0%
Subrogations	Not calculated	63%	Projection of net triangles	25%	Other modalities	13%
Ibnr contract allocation	Not allocated	50%	Split using weights	38%	Other modalities	13%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Percentage	88%	Projected	13%	Other modalities	0%
Ibnyr and Ibner diff.?	No	88%	Yes	13%	Other modalities	0%

SOUTH KOREA

Full Member Association

Population: **50.4 million**
Insurance premiums: **MUSD 159,515**
Non Life premiums: **MUSD 57,943**
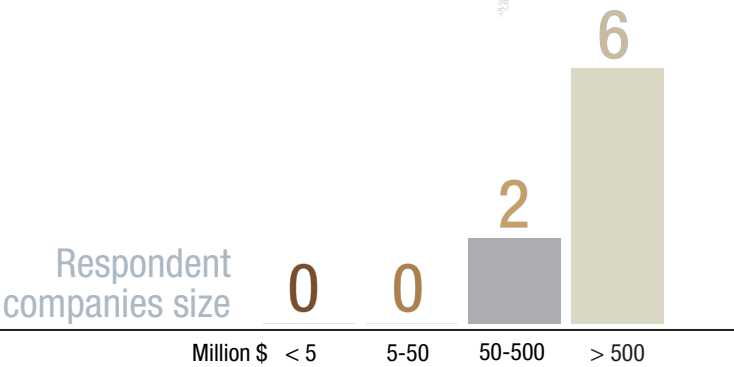NL premium/capita: **USD 1,150**

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▮▮▮▮☐

Country report by
Jason KWON and Shin DONGHYU
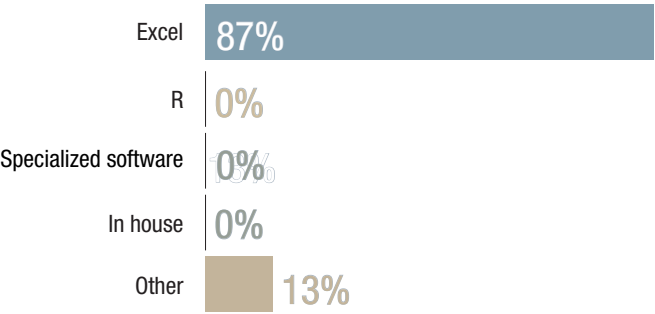sskwon@koreanre.co.kr
donghew.shin@samsung.com

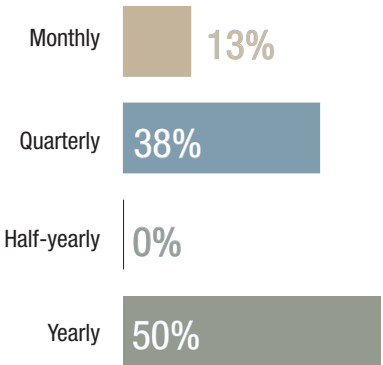8 respondent companies covers around 70% of written premium in South Korean non-life insurance market.

Traditional deterministic methodologies are dominantly used by now even though the regulation allows for any alternatives if reasonably estimated. Very limited use of stochastic methods for informational purpose are observed.

By the way, we expect more frequent use of stochastic methods such as Bootstrapping, SCLM etc. due to the IFRS4 phase II adoption in the near future where Risk Adjustment (or Risk margin) needs to be explicitly represented under the new accounting regime.
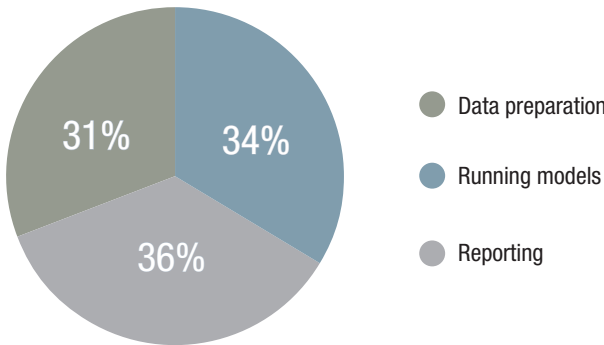
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	0	2	6

Reserving tool

Excel	87%
R	0%
Specialized software	0%
In house	0%
Other	13%

Reserving exercise periodicity

Monthly	13%
Quarterly	38%
Half-yearly	0%
Yearly	50%

Resources split

- Data preparation 31%
- Running models 34%
- Reporting 36%

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	0%	25%	38%	38%
Loss ratio	25%	13%	25%	38%
Chain ladder	88%	13%	0%	0%
Bornhuetter-Ferguson	50%	25%	13%	13%
Cape Cod	0%	0%	0%	100%
Average cost	38%	38%	25%	0%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	0%	25%	75%
Munich Chain Ladder	0%	13%	0%	88%
STOCHASTIC				
Market-based std dev	0%	0%	13%	88%
Internal calibration	13%	0%	0%	88%
Mack	13%	13%	25%	50%
Merz & Wüthrich	0%	0%	0%	100%
GLM	0%	0%	13%	88%
Bootstrap / CL	0%	0%	38%	63%
Bootstrap / BF	0%	0%	0%	100%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	0%	100%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	57%	Deterministic math. reserves	43%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	71%	Experience tables	14%	Other modalities	14%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

|						
Past inflation	Year per year	63%	Not treated	25%	Other modalities	13%
Future inflation	Not treated	75%	Flat assumption	25%	Other modalities	0%
Discounting	Not treated	88%	Percentage	13%	Other modalities	0%
Discount type	Flat rate	100%	Yield curve	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Excluded	50%	Treated separately	50%	Other modalities	0%
Reinsurance / retrocession	Proportional assumption	38%	Not calculated	25%	Other modalities	38%
Subrogations	Projection of net triangles	38%	Not calculated	25%	Other modalities	38%
Ibnr contract allocation	Split using weights	63%	Not allocated	38%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	50%	Percentage	38%	Other modalities	13%
Risk Margin	Not calculated	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	Yes	75%	No	25%	Other modalities	0%

TAIWAN

Full Member Association

Population: 23.5 million
Insurance premiums: MUSD 95,622
Non Life premiums: MUSD 16,466
NL premium/capita: USD 701

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ▮▮▮▮▮

Country report by
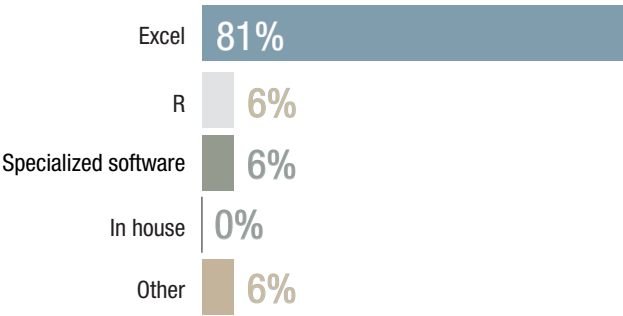**Chia-Ming CHANG**
cm.chang@tfmi.com.tw
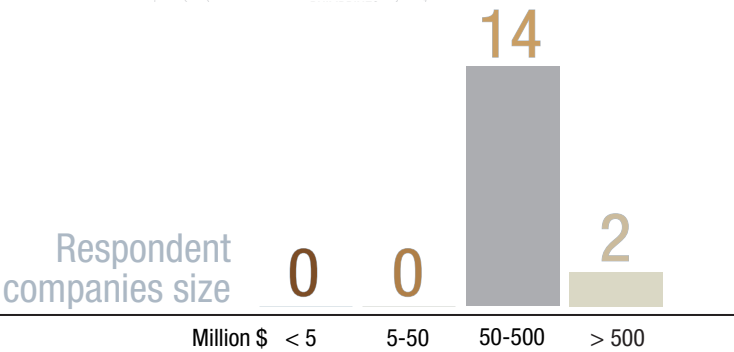
There are eighteen non-life insurance companies including one reinsurance company; eight multinational, three regional, two national and five small national are registered as of 31.12.2015.

All of companies except two multinationals responded to the survey (represented by 16 Appointed Actuaries).
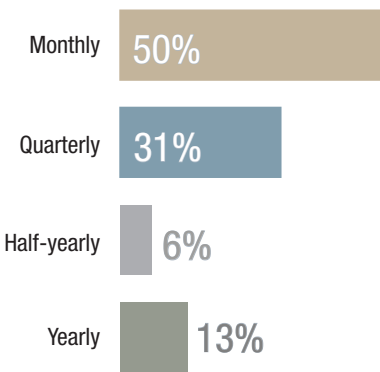
From 2001, appointed actuaries have been responsible for signing off claims reserves in AA report and use percentage method by regulatory requirement to calculate claims reserves. At the beginning of 2006, the regulator required that appointed actuaries use actuarial methods (loss triangle based) to estimate unpaid claims liability. Practically, mainly methods include chain ladder and B-F. Two years ago, the Financial Supervisory Commission of Taiwan required that companies plan response scheme and evaluate financial impact when IFRS 4 phase 2 is adopted. There has been very much discussion on the topics of Stochastic reserve technologies (ex: Mack Method, Bootstrap) and risk margin in Taiwan the last 2 years.

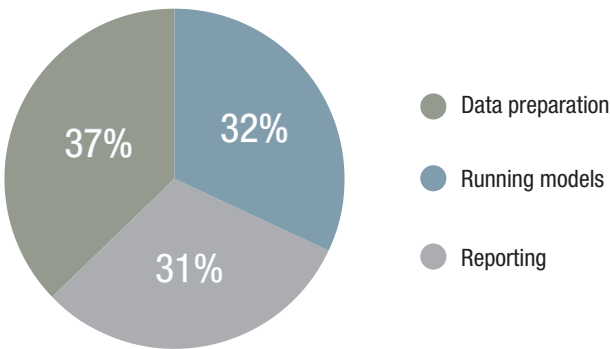These topics will continue to be discussed in the near future.

Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	0	14	2

Reserving tool

Excel	81%
R	6%
Specialized software	6%
In house	0%
Other	6%

Reserving exercise periodicity

Monthly	50%
Quarterly	31%
Half-yearly	6%
Yearly	13%

Resources split

- 37% Data preparation
- 32% Running models
- 31% Reporting

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	19%	0%	38%	44%
Loss ratio	19%	13%	50%	19%
Chain ladder	94%	0%	6%	0%
Bornhuetter-Ferguson	63%	6%	31%	0%
Cape Cod	25%	6%	19%	50%
Average cost	0%	0%	0%	100%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Munich Chain Ladder	0%	6%	0%	94%
STOCHASTIC				
Market-based std dev	6%	6%	13%	75%
Internal calibration	13%	6%	13%	69%
Mack	6%	13%	6%	75%
Merz & Wüthrich	0%	0%	0%	100%
GLM	6%	0%	0%	94%
Bootstrap / CL	19%	6%	0%	75%
Bootstrap / BF	0%	0%	0%	100%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	13%	0%	0%	87%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	92%	Survival Ratio	8%	Other modalities	0%
Disability/workers comp.	N/A	100%	Market/statutory tables	0%	Other modalities	0%
Decennal/contruction liab.	N/A	85%	Proxy	8%	Other modalities	8%
Credit	N/A	62%	Regulatory	23%	Other modalities	15%

4. Adjustments / misc.

Past inflation	Not treated	88%	Flat assumption	6%	Other modalities	6%
Future inflation	Not treated	94%	Flat assumption	6%	Other modalities	0%
Discounting	Not treated	100%	Percentage	0%	Other modalities	0%
Discount type						
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	94%	Correlation matrix	6%	Other modalities	0%
Large claims	Treated separately	50%	Treated jointly	44%	Other modalities	6%
Reinsurance / retrocession	Projection of net triangles	56%	Proportional assumption	19%	Other modalities	25%
Subrogations	Not calculated	38%	Projection of net triangles	38%	Other modalities	25%
Ibnr contract allocation	Not allocated	50%	Split using weights	31%	Other modalities	19%
Equalization reserve (local)	Calculated	100%	Percentage	0%	Other modalities	0%
Risk Margin	Not calculated	81%	Projected	19%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

THAILAND

Full Member Association

Population: 67.3 million
Insurance premiums: MUSD 21,696
Non Life premiums: MUSD 8,400
NL premium/capita: USD 125

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
Respondents market share: ■■■■☐

Country report by
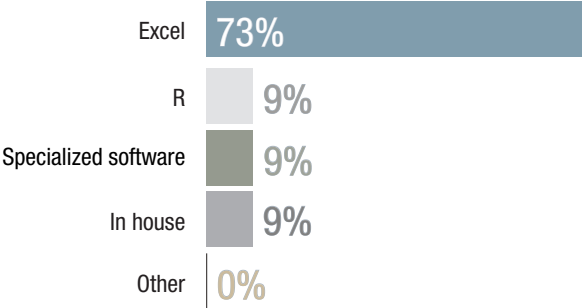**Rhachadar ANIWAT**
rhachadar@jpwall.com

Currently, Thailand has 62 non-life insurance companies, 24 foreign companies and 38 local companies ;Classified by GWP in 2015 we have 12 large companies (5 Billion Baht up), 23 middle companies (5 Billion Baht to 1 Billion Bath) and 27 small companies (less than 1 Billion Baht).

For GWP of year 2015 is about 6.2 billion dollars. increased from 2014 about 2%. Retention ration of Motor 90% and Non-Motor 51%. In the portfolios, motor insurance is 58%, IAR 12% PA 13% and other 17%. For distribution channel, Broker 56% Agent 14% Bank assurance 14% and other 16%
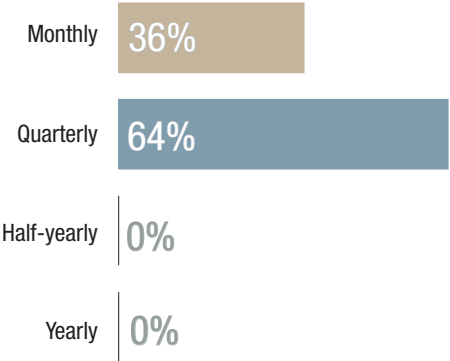
Risk-Based capital (RBC) phase I have implemented since 1 Sep 2011. The RBC phase II (2016) start with QIS 1 and Consultation paper, as the transitional period the operational risk will be added, revise group risk and focus on ORSA. For the final framework of phase II in 20xx 99.5 percentile will be applied for all risk, Catastrophe risk, and Readiness of Industry. Also IFRS 4 effective date on 1 January 2016

Direct Premium to GDP (Insurance Penetration) levelled off at 1.56% as in 2014. Amount of premium per capita (Insurance Density) increased from 3,065 Thai Baht in 2014 to 3,116 Thai Baht in 2015, representing an increase of 1.66%.
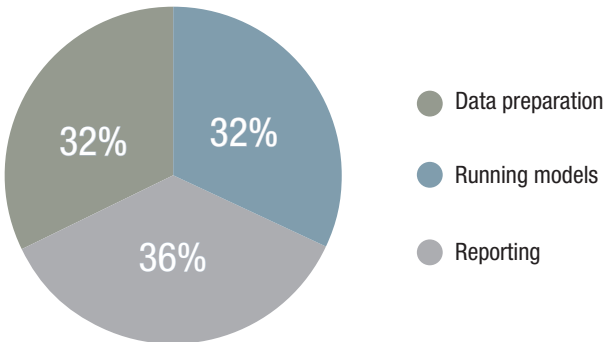
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	3	5	3

Reserving tool

Tool	%
Excel	73%
R	9%
Specialized software	9%
In house	9%
Other	0%

Reserving exercise periodicity

Period	%
Monthly	36%
Quarterly	64%
Half-yearly	0%
Yearly	0%

Resources split

Category	%
Data preparation	32%
Running models	32%
Reporting	36%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	9%	9%	18%	64%
	Loss ratio	36%	36%	27%	0%
	Chain ladder	82%	9%	0%	9%
	Bornhuetter-Ferguson	55%	36%	0%	9%
	Cape Cod	10%	10%	10%	70%
	Average cost	27%	18%	36%	18%
	De Vylder	9%	0%	0%	91%
	Fisher-Lange	9%	0%	0%	91%
	GLM	9%	0%	18%	73%
	Munich Chain Ladder	18%	9%	0%	73%
STOCHASTIC	Market-based std dev	36%	0%	18%	45%
	Internal calibration	9%	0%	27%	64%
	Mack	18%	0%	9%	73%
	Merz & Wüthrich	9%	0%	0%	91%
	GLM	0%	0%	18%	82%
	Bootstrap / CL	0%	0%	18%	82%
	Bootstrap / BF	0%	0%	18%	82%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	36%	0%	9%	55%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	89%	Stochastic math. reserves	11%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	88%	Experience tables	13%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	78%	Regulatory	22%	Other modalities	0%

4. Adjustments / misc.

|						
Past inflation	Not treated	90%	Flat assumption	10%	Other modalities	0%
Future inflation	Not treated	80%	Flat assumption	20%	Other modalities	0%
Discounting	Not treated	70%	Percentage	10%	Other modalities	20%
Discount type	Flat rate	100%	Yield curve	0%	Other modalities	0%
Development patterns	Chain ladder/paid	90%	N/A	10%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Treated separately	55%	Excluded	27%	Other modalities	18%
Reinsurance / retrocession	Projection of net triangles	36%	Proportional assumption	27%	Other modalities	36%
Subrogations	Not calculated	36%	Projection of net triangles	36%	Other modalities	27%
Ibnr contract allocation	Individual claims reserving	73%	Not allocated	18%	Other modalities	9%
Equalization reserve (local)	No eq. reserve	78%	Percentage	22%	Other modalities	0%
Risk Margin	Not calculated	44%	Percentage	33%	Other modalities	22%
Ibnyr and Ibner diff.?	Yes	50%	No	50%	Other modalities	0%

ASIA

VIETNAM
Not a member of AAI

Population: 92.5 million
Insurance premiums: MUSD 2,582
Non Life premiums: MUSD 1,293
NL premium/capita: USD 14

Local GAAP: ☐ Discounting ☒ Appointed/signing actuary
Respondents market share: ▌▌▌▌▌

Country report by
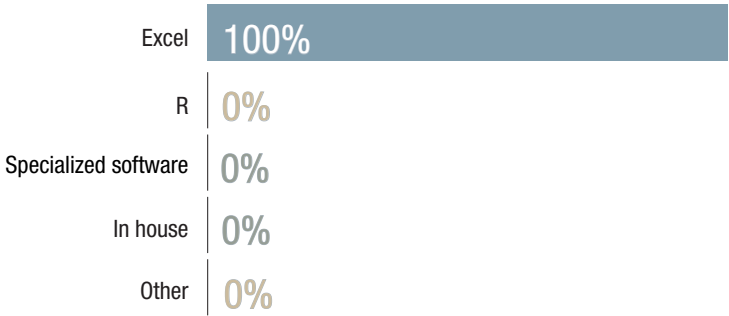**Khoa DANG DIEP DAI**
khoa3d@yahoo.com
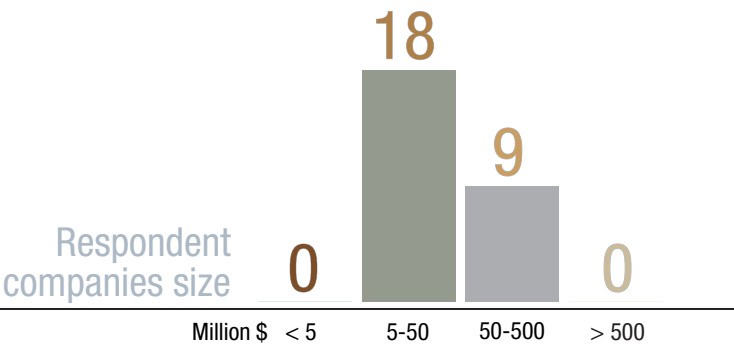
Currently, Vietnam has 32 non-life insurance companies; with GWP of year 2015 is about 1.5 billion dollars. Development rate of year 2015 compares to year 2014 has been grown 16.5%. There are 13 foreign companies and 4 companies with foreign factor and under the management of MOF. In the portfolios, motor insurance is 30%, PA and health insurance is 23%, property insurance is 21%.
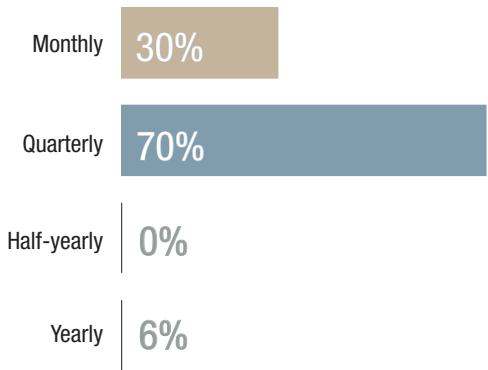
From 01/01/2016, non-life insurance company must have a Appointed actuary in responsible for calculating the reserves, solvency, and pricing PA and health care products.

Data base, non-life insurance companies of Vietnam (except for the foreign factor) are not quality, due to lacking of the standard core insurance software. Majority of the claims for customers is not completed as commitment, and the payment period usually is longer than as regulated. Non-technology Competition of premium, discount premium with customer's requests, other expense for selling a new policy is high, average 50%.
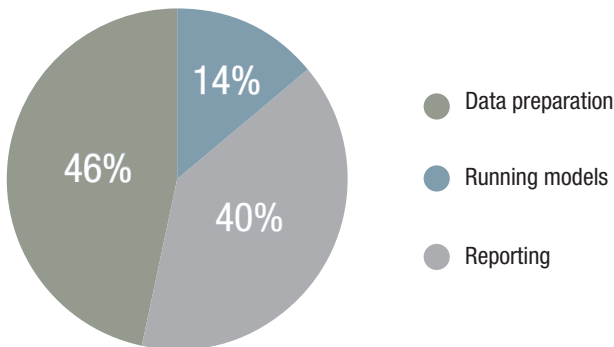
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	18	9	0

Reserving tool

Excel	100%
R	0%
Specialized software	0%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	30%
Quarterly	70%
Half-yearly	0%
Yearly	6%

Resources split

- 46% Data preparation
- 14% Running models
- 40% Reporting

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	44%	0%	56%	0%
Loss ratio	59%	0%	41%	0%
Chain ladder	7%	0%	0%	93%
Bornhuetter-Ferguson	0%	0%	0%	100%
Cape Cod	0%	0%	0%	100%
Average cost	22%	0%	15%	63%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC				
Market-based std dev	0%	0%	0%	100%
Internal calibration	0%	0%	0%	100%
Mack	0%	0%	0%	100%
Merz & Wüthrich	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Bootstrap / CL	0%	0%	0%	100%
Bootstrap / BF	0%	0%	0%	100%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	11%	0%	15%	74%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	96%	Ratio	4%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	93%	Market/statutory tables	7%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	Regulatory	70%	N/A	30%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Year per year	85%	Not treated	12%	Other modalities	4%
Future inflation	Not treated	54%	Flat assumption	27%	Other modalities	19%
Discounting	Percentage	100%	Not treated	0%	Other modalities	0%
Discount type	Flat rate	70%	Yield curve	30%	Other modalities	0%
Development patterns	N/A	100%	Chain ladder/paid	0%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Excluded	56%	Treated jointly	37%	Other modalities	7%
Reinsurance / retrocession	Not calculated	56%	Claim per claim	44%	Other modalities	0%
Subrogations	N/A	78%	Claim per claim	22%	Other modalities	0%
Ibnr contract allocation	Individual claims reserving	56%	Not allocated	44%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Percentage	67%	Not calculated	33%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

BRAZIL

Full Member Association

Population: **202.2 million**
Insurance premiums: **MUSD 85,444**
Non Life premiums: **MUSD 40,464**
NL premium/capita: **USD 200**

Local GAAP: ▪ Discounting ▪ Appointed/signing actuary
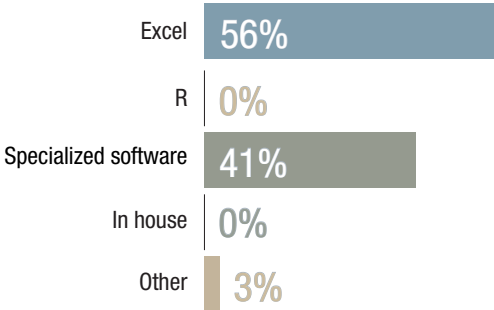Respondents market share: ▪▪▪▪▫

Country report by
Cristina MANO
cristinamano@cmanoatuaria.com

BRAZIL
BRASILIA

Respondent companies size

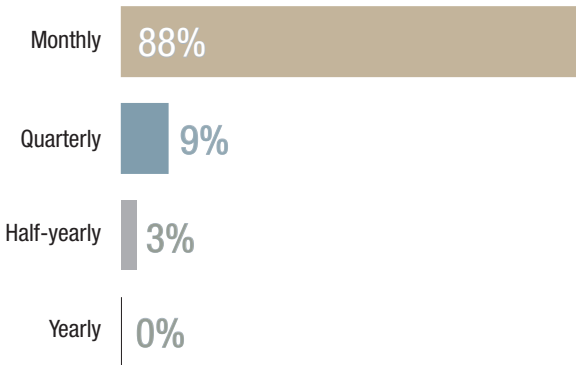|	0	8	12	14
Million $	< 5	5-50	50-500	> 500

There are 60 non-life insurances and 16 local reinsurances companies, as of 31 December 2015, authorized to operate in the Brazilian market. The respondents were in total 34 companies, 32 insurance and 2 reinsurance companies, distributed as following: 15 multinational, 1 regional, 14 national and 4 small national. The 32 insurance companies that answered the questionnaire represent more than 75% of the 2015 non-life written premium. Chief actuaries of those companies contributed to the survey. According to data published by the CNSEG (Confederação Nacional das Empresas de Seguros Gerais), the premium issuance of all insurance companies in the market increased by 10,2% in 2015, from 199 billion of Real in 2014 to 219 billion of Real in 2015 (including life insurance, non-life insurance and capitalization). Of this amount, 129 billion of Real was generated by life insurance companies, 69 billion of Real was generated by non-life insurance companies and 21 billion of Real was generated by capitalization companies (combined products with lottery and saving components). The technical provisions of the insurance and reinsurance companies are annually audited by an independent actuary and an audit firm. A report is issued to the Brazilian Regulator, as result of the audit, describing the processes, data quality, methodology and consistency tests. An Actuarial Opinion is published together with the company year-end Balance Sheet. The Brazilian market has been working to implement the principles of the Solvency II. The Pilar I has been implemented, with the requirements of the Minimum Capital Required, taking into consideration the allocation of the capital regarding underwriting , market, credit and operational risks. Pillar II is currently the biggest challenge to the adequacy of the Brazilian market to Solvency II. The regulator has developed procedures for risk management, internal controls and governance, but still in early stages.
In relation to Pillar III, Brazil is already in advanced stages of maturity. The information generated by insurance and reinsurance companies already provides the necessary conditions for transparent disclosure of financial reporting of market entities.
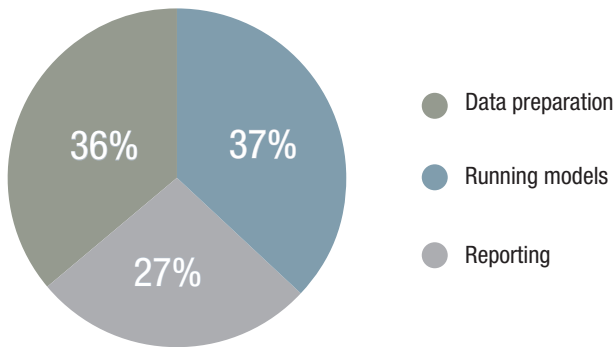
Reserving tool

Excel	**56%**
R	0%
Specialized software	**41%**
In house	0%
Other	3%

Reserving exercise periodicity

Monthly	**88%**
Quarterly	**9%**
Half-yearly	3%
Yearly	0%

Resources split

- 37% Running models
- 27% Reporting
- 36% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	9%	15%	35%	41%
	Loss ratio	9%	38%	18%	35%
	Chain ladder	79%	12%	6%	3%
	Bornhuetter-Ferguson	35%	26%	12%	26%
	Cape Cod	0%	3%	15%	82%
	Average cost	3%	15%	9%	74%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	3%	97%
	GLM	0%	3%	3%	94%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	0%	100%
	Internal calibration	0%	0%	3%	97%
	Mack	0%	12%	6%	82%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	3%	12%	6%	79%
	Bootstrap / BF	0%	12%	3%	85%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	26%	0%	0%	74%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	12%	0%	0%	88%

3. Other claims

Annuities	N/A	81%	Deterministic math. reserves	16%	Other modalities	3%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	81%	Market/statutory tables	19%	Other modalities	0%
Decennal/contruction liab.	N/A	94%	Regulatory	6%	Other modalities	0%
Credit	N/A	74%	Regulatory	23%	Other modalities	3%

4. Adjustments / misc.

|						
Past inflation	Not treated	48%	Flat assumption	26%	Other modalities	26%
Future inflation	Not treated	38%	Year per year	34%	Other modalities	28%
Discounting	Percentage	34%	Not treated	31%	Other modalities	34%
Discount type	Yield curve	86%	Flat rate	14%	Other modalities	0%
Development patterns	Chain ladder/paid	94%	N/A	6%	Other modalities	0%
Diversification effect	Not calculated	84%	Correlation matrix	16%	Other modalities	0%
Large claims	Treated separately	52%	Treated jointly	33%	Other modalities	15%
Reinsurance / retrocession	Proportional assumption	36%	Projection of net triangles	27%	Other modalities	36%
Subrogations	Not calculated	30%	Proportional assumption	30%	Other modalities	39%
Ibnr contract allocation	Not allocated	48%	Split using weights	36%	Other modalities	15%
Equalization reserve (local)	No eq. reserve	94%	Calculated	6%	Other modalities	0%
Risk Margin	Not calculated	81%	Projected	13%	Other modalities	6%
Ibnyr and Ibner diff.?	Yes	71%	No	29%	Other modalities	0%

MEXICO

Full Member Association

Population: 124.0 million
Insurance premiums: MUSD 27,242
Non Life premiums: MUSD 21,937
NL premium/capita: USD 177

Local GAAP: ☐ Discounting ■ Appointed/signing actuary
Respondents market share: ■■■■☐

Country report by
Jose BORREGO
jborrego@mx.lockton.com
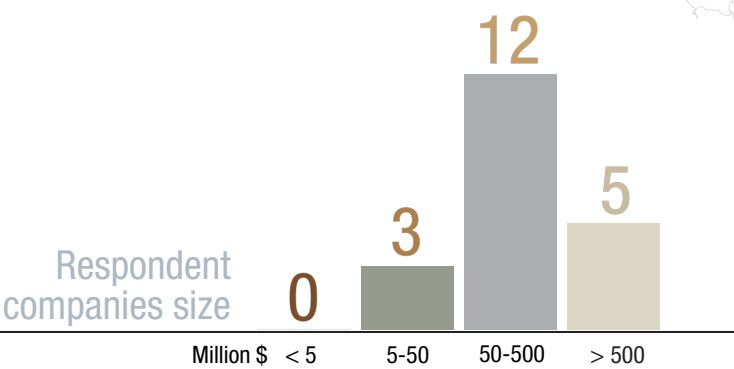
Nowadays Insurance industry is dealing with regulatory changes due to Solvency II quantitative, qualitative and reporting requirements. During the first quarter of 2016, companies have been working on closing 2015 with old regulatory requirements, analyzing and performing the final Quantitative Impact Study and preparing the first Solvency Capital Requirement under Solvency II (1st quarter 2016). Companies have invested time and money in order to be prepared for these regulatory requirements, from defining and applying governance in all the structures (actuarial function, risk management, internal audit, internal control, etc) to training actuaries, risk managers and all the employees involved in operation, actuarial function, reinsurance, pricing.
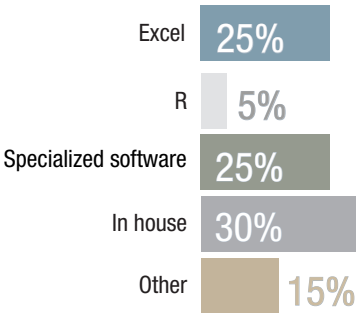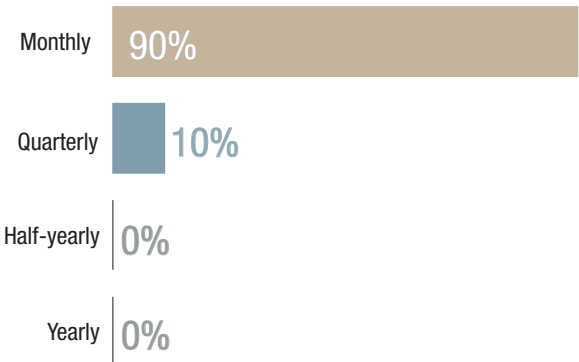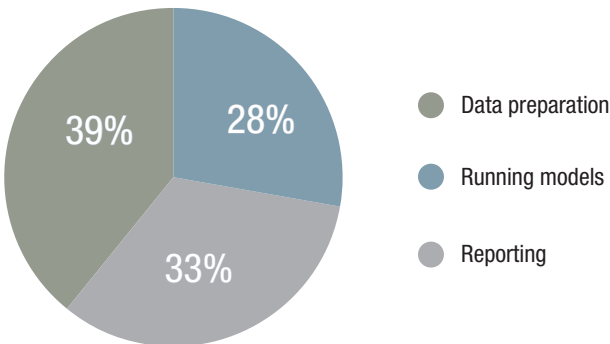
There is an Appointed actuary in every single company complying with law requirements. Most of the companies conduct peer review by an internal area, Appointed actuary or by external actuaries. The information from IT for the most part they receive individual claims and then actuaries must prepare and validate information. All companies develop their workflows, processes and documents internally. All the companies included in this report developed or acquired reserving software which helps in the main process of running models.

Due to solvency II, it is mandatory for every company to implement governance not only for actuarial function and reserves calculation, but they also have areas and committees in place, internal audit, internal control, risk management and they have documentation of the reserves calculation process as well as the main processes. Regarding methodologies, most of the companies use deterministic methodologies for best estimate and then apply a stochastic method to obtain reserves distribution that helps in risk margin calculation.

Respondent companies size

Million $ < 5 | 5-50 | 50-500 | > 500
0 | 3 | 12 | 5

Reserving tool

Excel	25%
R	5%
Specialized software	25%
In house	30%
Other	15%

Reserving exercise periodicity

Monthly	90%
Quarterly	10%
Half-yearly	0%
Yearly	0%

Resources split

- 28% Running models
- 33% Reporting
- 39% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	5%	0%	0%	95%
	Loss ratio	15%	5%	10%	70%
	Chain ladder	30%	15%	5%	50%
	Bornhuetter-Ferguson	25%	10%	0%	65%
	Cape Cod	5%	0%	0%	95%
	Average cost	0%	5%	0%	95%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	5%	0%	95%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	10%	0%	90%
	Internal calibration	5%	5%	0%	90%
	Mack	15%	0%	0%	85%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	5%	0%	95%
	Bootstrap / CL	60%	5%	0%	35%
	Bootstrap / BF	5%	0%	0%	95%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	10%	0%	0%	90%
ICR (Antonio-Plat)	5%	0%	0%	95%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	95%	Deterministic math. reserves	5%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	95%	Market/statutory tables	5%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	90%	Regulatory	5%	Other modalities	5%

4. Adjustments / misc.

Past inflation	Not treated	50%	Year per year	50%	Other modalities	0%
Future inflation	Not treated	65%	Year per year	25%	Other modalities	10%
Discounting	Percentage	70%	Not treated	15%	Other modalities	15%
Discount type	Yield curve	94%	Flat rate	6%	Other modalities	0%
Development patterns	Chain ladder/paid	95%	Other	5%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Treated jointly	80%	Treated separately	20%	Other modalities	0%
Reinsurance / retrocession	Proportional assumption	80%	Claim per claim	20%	Other modalities	0%
Subrogations	Claim per claim	47%	Not calculated	26%	Other modalities	26%
Ibnr contract allocation	Split using weights	61%	Not allocated	39%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Proxy	70%	Projected	15%	Other modalities	15%
Ibnyr and Ibner diff.?	No	75%	Yes	25%	Other modalities	0%

PERU

Not a member of AAI
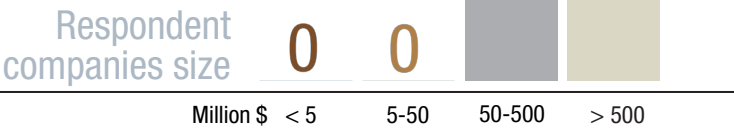
ASTIN

Population: **30.8 million**
Insurance premiums: **MUSD 3,577**
Non Life premiums: **MUSD 1,841**
NL premium/capita: **USD 60**

Local GAAP: ☐ Discounting ▨ Appointed/signing actuary
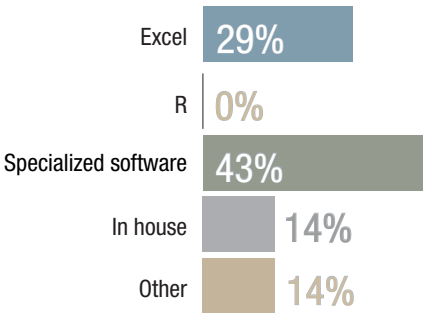
Respondents market share: ▮▮▮▮▮

Country report by
Sebastian CARILLO
& Guido MONTEVERDE
sebastian.carrillo@gmail.com,
guido.monteverde@rimac.com.pe

Respondent companies size

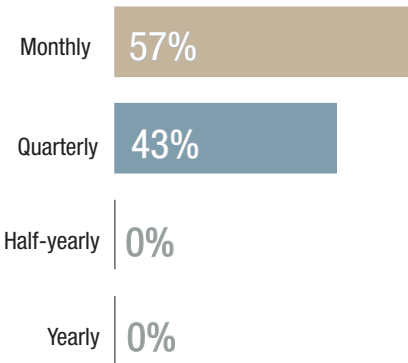0 0 **5** **2**

Million $ < 5   5-50   50-500   > 500

There are 11 non-life insurance companies as of December 2015 in Peru. The market is very concentrated, taking into account that the top three non-life insurers represent 78% of the total premiums. In 2015, the non-life written premiums have increased in 18.4% with respect to the previous year, adding up to USD 1,376 million, amount that represents 52.1% of the total market. The biggest line of business is automobile, which has reached USD 422.5 million as of December 2015. Moreover, regulatory capital of Peruvian insurance companies fall under Solvency I regulation. However, since 2016 the Peruvian supervisor (SBS) will be publishing some new regulations regarding the actuarial and risk function leading up to Solvency II framework.

Also, deterministic actuarial methods are mostly used for estimating claims reserves, specifically, Chain Ladder and Bornhuetter-Ferguson method. Finally, reserves are calculating monthly and quarterly; and 43% of the respondents -7 companies- use specialized softwares while 29% use excel.
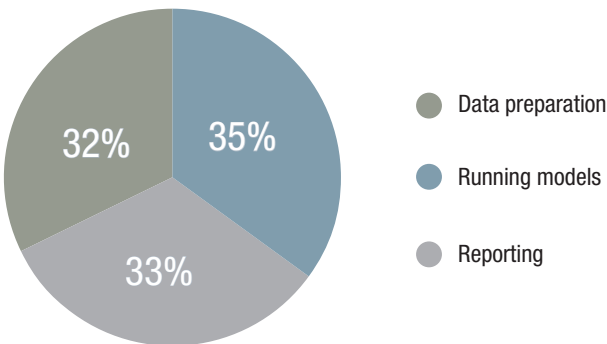
Reserving tool

Excel	29%
R	0%
Specialized software	43%
In house	14%
Other	14%

Reserving exercise periodicity

Monthly	57%
Quarterly	43%
Half-yearly	0%
Yearly	0%

Resources split

- 35% Running models
- 33% Reporting
- 32% Data preparation

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
Percentage	29%	14%	0%	57%
Loss ratio	43%	29%	29%	0%
Chain ladder	86%	14%	0%	0%
Bornhuetter-Ferguson	71%	0%	14%	14%
Cape Cod	14%	0%	0%	86%
Average cost	14%	14%	14%	57%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	14%	0%	86%
Munich Chain Ladder	0%	0%	14%	86%
Market-based std dev	0%	0%	0%	100%
Internal calibration	14%	0%	0%	86%
Mack	29%	0%	0%	71%
Merz & Wüthrich	0%	0%	14%	86%
GLM	0%	0%	0%	100%
Bootstrap / CL	0%	29%	29%	43%
Bootstrap / BF	0%	0%	14%	86%
RJMCMC	0%	0%	0%	100%

(DETERMINISTIC: Percentage through Munich Chain Ladder; STOCHASTIC: Market-based std dev through RJMCMC)

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	29%	0%	0%	71%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	86%	Deterministic math. reserves	14%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	71%	Market/statutory tables	14%	Other modalities	14%
Decennal/contruction liab.	N/A	60%	Regulatory	40%	Other modalities	0%
Credit	N/A	57%	Regulatory	29%	Other modalities	14%

4. Adjustments / misc.

Past inflation	Year per year	43%	Not treated	29%	Other modalities	29%
Future inflation	Not treated	57%	Flat assumption	29%	Other modalities	14%
Discounting	Not treated	57%	Percentage	29%	Other modalities	14%
Discount type	Flat rate	60%	Yield curve	40%	Other modalities	0%
Development patterns	Chain ladder/paid	86%	N/A	14%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Excluded	43%	Treated jointly	43%	Other modalities	14%
Reinsurance / retrocession	Projection of net triangles	43%	Proportional assumption	29%	Other modalities	29%
Subrogations	Not calculated	50%	Claim per claim	33%	Other modalities	17%
Ibnr contract allocation	Not allocated	43%	Individual claims reserving	29%	Other modalities	29%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Not calculated	57%	Percentage	43%	Other modalities	0%
Ibnyr and Ibner diff.?	No	86%	Yes	14%	Other modalities	0%

AUSTRALIA

Full member association

Population: 23.6 million
Insurance premiums: MUSD 88,075
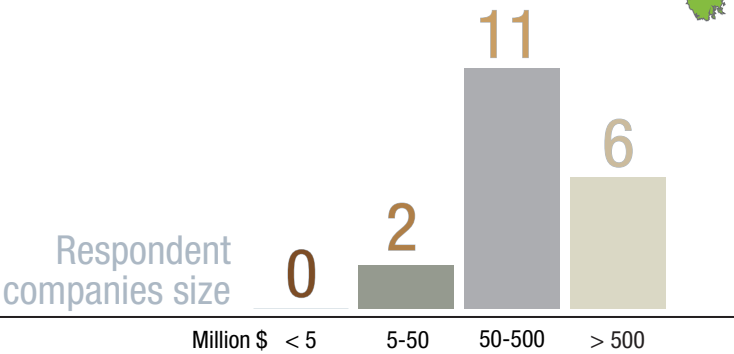Non Life premiums: MUSD 31,924
NL premium/capita: USD 1,353

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
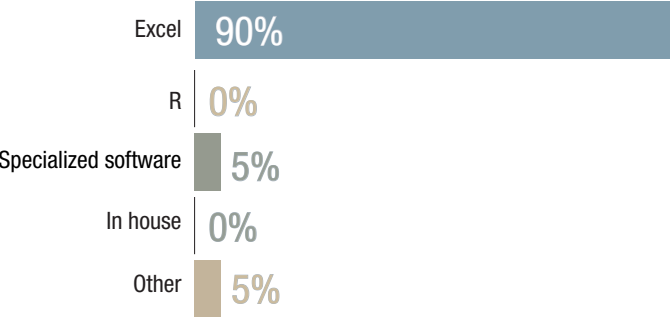Respondents market share: ■■■■☐

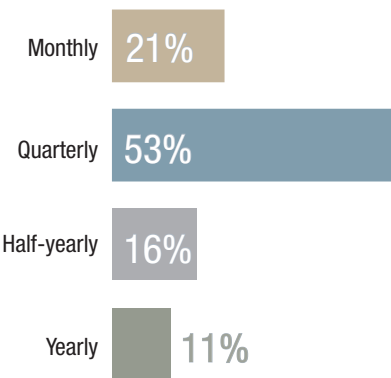Country report by
Suzanne PATTEN
suzanne.patten@iag.com.au

The Australian insurance market has distinct components split between life ($USD 56bn annual premium according to Swiss Re SIGMA 2015 report), and general ($USD 32bn annual premium), with large insurers generally focusing on one of these components. In addition, Government run statutory schemes are also in place for workers compensation and motor accidents, and severe disability. General insurance premium is approximately split 30% to long tail classes, and 70% to short tail classes. The Australian Prudential Regulation Authority (APRA) is the prudential regulator of the Australian financial services industry. At 31 December 2015, 110 insurers are licensed to conduct general insurance business, 100 being direct insurers and 10 reinsurers. Due to historical mergers and acquisitions, some companies operate using multiple licences. The market is very concentrated with 77% of the market held by 5 companies, with 50% of the market held by the two largest companies. The general insurance market covers a range of commercial and personal line classes, and except for the very large companies, most specialise in particular classes. Generally, insurers are required to have an Appointed actuary whose primary role is to determine the insurer's insurance liabilities and provide an impartial assessment of the overall financial condition of the insurer. Insurance liabilities include outstanding claims and premium liabilities, for earned and unearned exposure respectively, on both a central estimate basis, and a risk margin, which for regulatory purposes is set at a 75% probably of adequacy. From 1 January 2013, APRA also introduced Internal Capital Adequacy Assessment Process (ICAAP), which significantly changed how capital adequacy is determined for general insurers. Up until 31 December 2015, APRA required most Actuarial valuations to have a formal peer review process, which required an external actuary review of the reasonableness of the Actuarial valuation process and outcomes. The Australian Actuaries Institute supports APRA and the Reserving Actuaries through the production of Professional Standards and Practice Guidelines. The General Insurance committee and the Institute membership also publish papers as part of continuing professional development requirements. Australian reserving practice generally places an emphasis on understanding and investigating the underlying operational processes and claims trends, to understand the detail behind the numbers.
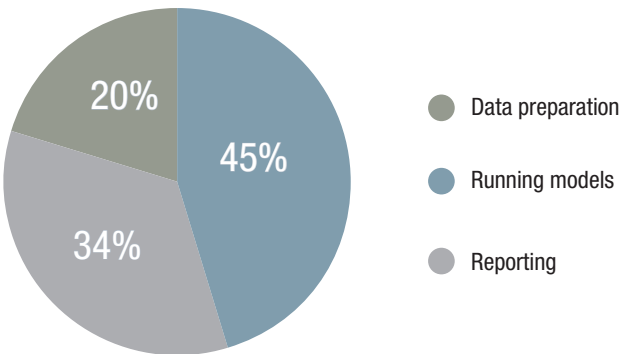
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	2	11	6

Reserving tool

Excel	90%
R	0%
Specialized software	5%
In house	0%
Other	5%

Reserving exercise periodicity

Monthly	21%
Quarterly	53%
Half-yearly	16%
Yearly	11%

Resources split

- 45% Running models
- 34% Reporting
- 20% Data preparation

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	5%	5%	21%	68%
	Loss ratio	0%	26%	37%	37%
	Chain ladder	63%	16%	16%	5%
	Bornhuetter-Ferguson	68%	5%	0%	26%
	Cape Cod	0%	0%	5%	95%
	Average cost	37%	21%	5%	37%
	De Vylder	0%	0%	5%	95%
	Fisher-Lange	0%	0%	0%	100%
	GLM	5%	0%	5%	89%
	Munich Chain Ladder	5%	0%	0%	95%
STOCHASTIC	Market-based std dev	22%	11%	22%	44%
	Internal calibration	11%	6%	17%	67%
	Mack	6%	13%	6%	75%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	6%	0%	0%	94%
	Bootstrap / CL	28%	0%	22%	50%
	Bootstrap / BF	6%	6%	11%	78%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	12%	0%	0%	88%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	6%	0%	0%	94%

3. Other claims

Annuities	N/A	88%	Deterministic math. reserves	13%	Other modalities	0%
Asbestos	Other	50%	N/A	44%	Other modalities	6%
Disability/workers comp.	N/A	67%	Other	33%	Other modalities	0%
Decennal/contruction liab.	N/A	87%	Other	13%	Other modalities	0%
Credit	N/A	67%	Other	33%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Year per year	47%	Not treated	42%	Other modalities	11%
Future inflation	Flat assumption	42%	Not treated	32%	Other modalities	26%
Discounting	Dvt patterns-based	53%	Duration-based	47%	Other modalities	0%
Discount type	Yield curve	84%	Flat rate	16%	Other modalities	0%
Development patterns	Chain ladder/paid	78%	Other	22%	Other modalities	0%
Diversification effect	Correlation matrix	89%	Not calculated	11%	Other modalities	0%
Large claims	Treated separately	74%	Treated jointly	26%	Other modalities	0%
Reinsurance / retrocession	Projection of net triangles	32%	Claim per claim	26%	Other modalities	42%
Subrogations	Proportional assumption	33%	Projection of net triangles	33%	Other modalities	33%
Ibnr contract allocation	Not allocated	59%	Split using weights	35%	Other modalities	6%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Percentage	89%	Proxy	11%	Other modalities	0%
Ibnyr and Ibner diff.?	No	89%	Yes	11%	Other modalities	0%

NEW ZEALAND

NEW ZEALAND
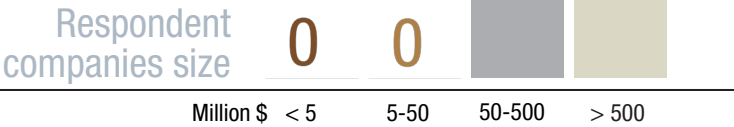
Full member association
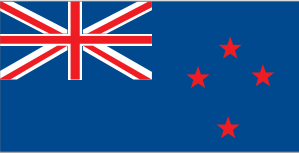
Population: 4.6 million
Insurance premiums: MUSD 11,634
Non Life premiums: MUSD 9,808
NL premium/capita: USD 2,132

Local GAAP: ▪ Discounting ▪ Appointed/signing actuary

Respondents market share: ▪▪▪▪▫

Country report by
Christian BARRINGTON
christian.barrington@iag.co.nz

Respondent companies size

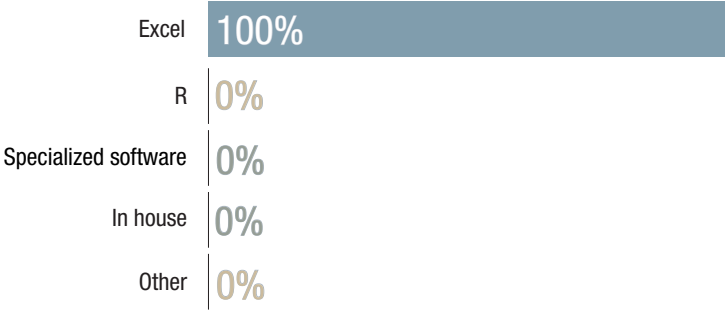| Million $	< 5	5-50	50-500	> 500
	0	0	2	2

The NZ insurance market is around NZ$6bn in annual gross written premium, split evenly between personal and commercial lines. The New Zealand market is dominated by Australian owned companies. Two distinguishing features of the NZ Market are the government entities of the Earthquake Commission ("EQC"), which provides first loss cover for natural disasters, and the Accident Compensation Corporation ("ACC") which provides state regulated no-fault insurance cover for accidents. Due to the seismic risk the government run EQC is a first loss insurer that covers the first NZ$100k and $20k in respect of losses for residential dwelling and contents respectively and partial coverage for land damage associated with earthquakes and other geological risks. Only those individuals who have a residential insurance policy, which includes an involuntary EQC levy, are covered by this scheme. Last year the EQC collected NZ$281m in gross earned premiums. There is no private personal accident or workers compensation in NZ, this is covered by the ACC which means that the vast majority of the market is short tailed in nature and the valuation techniques adopted by the private insurers reflect this. Last year ACC's revenue from levies and investments totalled NZ$8.3bn and its total claim cost for the 12 months was $6.1bn. In 2010/2011 Christchurch was struck by three significant earthquakes. The current estimate of the total cost to private insurers is estimated at over NZ$30bn. There has been considerable uncertainty in the ultimate cost of the earthquakes for the past five years with a number of significant uplifts in the estimates across the industry.
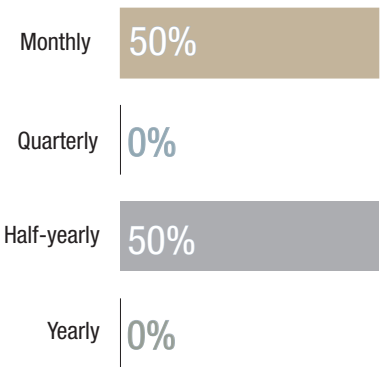
Prior to the earthquakes, Home policies were generally on a replacement basis resulting in open ended exposures for insurers. Following the earthquakes the market changed to fixed sum insured policies. The respondents did not explicitly state the valuation methodologies of the Canterbury earthquakes. The Insurance Supervision Act was enacted in 2010 and required NZ insurers to have in place an Appointed actuary to review the reserves in the financial statements. Prior to this there was no requirement for any actuarial review from a local perspective.

There are 28 members of the ICNZ that write more than 95% of the non-life market. Four of these companies corresponding to over 70% market share participated in this survey. EQC, Southern Response and ACC have not participated in this survey. The NZ market tends to mirror the Australian market with actuarial techniques.
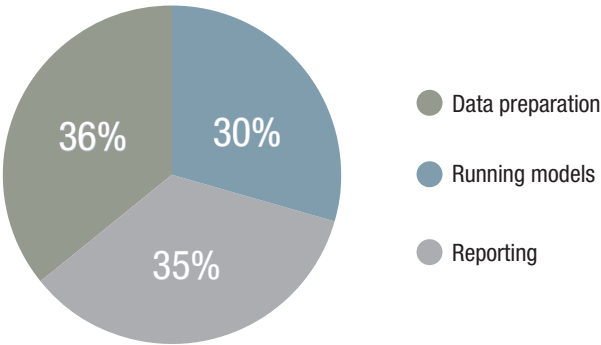
Reserving tool

Excel	100%
R	0%
Specialized software	0%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	50%
Quarterly	0%
Half-yearly	50%
Yearly	0%

Resources split

- Data preparation: 36%
- Running models: 30%
- Reporting: 35%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	0%	25%	25%	50%
	Loss ratio	0%	50%	25%	25%
	Chain ladder	100%	0%	0%	0%
	Bornhuetter-Ferguson	100%	0%	0%	0%
	Cape Cod	0%	0%	0%	100%
	Average cost	0%	75%	0%	25%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	0%	100%
	Internal calibration	0%	0%	0%	100%
	Mack	0%	0%	0%	100%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	0%	0%	0%	100%
	Bootstrap / BF	0%	0%	0%	100%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	25%	0%	25%	50%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	75%	Experience tables	25%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

|						
Past inflation	Not treated	75%	Year per year	25%	Other modalities	0%
Future inflation	Not treated	50%	Flat assumption	50%	Other modalities	0%
Discounting	Dvt patterns-based	75%	Percentage	25%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Correlation matrix	100%	Not calculated	0%	Other modalities	0%
Large claims	Treated separately	75%	Treated jointly	25%	Other modalities	0%
Reinsurance / retrocession	Projection of net triangles	50%	Proportional assumption	25%	Other modalities	25%
Subrogations	N/A	50%	Proportional assumption	25%	Other modalities	25%
Ibnr contract allocation	Not allocated	50%	Individual claims reserving	25%	Other modalities	25%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Percentage	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	No	75%	Yes	25%	Other modalities	0%

LEBANON

Full member association

Population: 4.9 million
Insurance premiums: MUSD 1,513
Non Life premiums: MUSD 1,078
NL premium/capita: USD 220

Local GAAP: ☐ Discounting ☐ Appointed/signing actuary
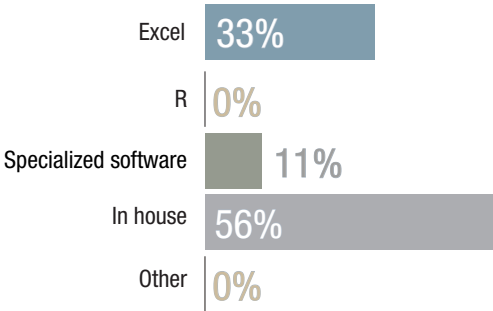Respondents market share: ■■■■☐
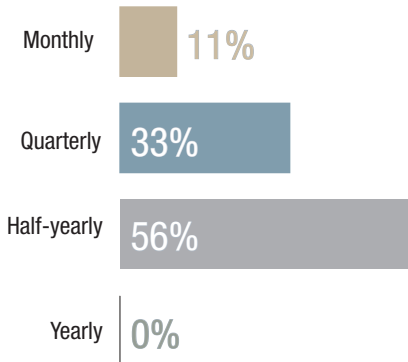
Country report by
Roger BOU HARB
rogbh@yahoo.com
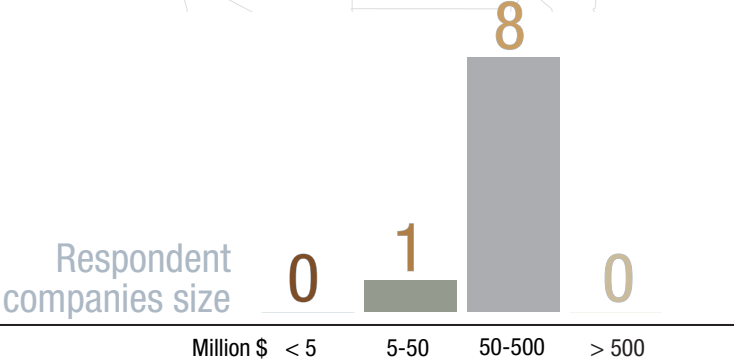
There are 45 non-life insurance companies registered as of 31.12.2015 including 5 multinational; 9 large companies (GWP greater than USD 50 Million) constituting 62% of the non-life market share, and the rest is constituted of medium and small companies (GWP less than USD 50 Million) based on statistics provided by the Insurance Control Commission of the Ministry of Economy and Trade. Respondents represent 64% of the market share and consist of ten companies including two multinationals. The other companies were not included in the study because their market share was ranging between 0.9% and 2.8%. Despite sustained resilience, the development of the insurance sector continues to be hindered by a number of structural factors, stemming primarily from the inability to modernise insurance regulations, which lead to a much needed strengthening of solvency requirements. The non-life insurance sector continues to achieve growth and profitability with a penetration rate of 2.3%. The non-life insurance sector grew by 4.1% in terms of GWP between 2013 and 2014 reaching 1.6b LBP (1,054m USD), with a profitability of 4.4% in 2014.

Based on the survey conducted, it has been noticed that the questionnaire is too advanced for Lebanon and that non-life reserving estimation does not take into account the time value of money and is predominantly based on the following principles: Unearned Premium: classical prorata temporis method; Premium Deficiency Reserves: application of a formula provided by the regulator; Outstanding Claims: considering the amount as reported; IBNER: is being only considered for Compulsory Motor Third Party Liability (bodily injury) where a formula is being imposed by the regulator; and IBNR: no clear methodology is being applied, but depends on the nature of business. There are 5 main companies that need to compute reserves through an independent Appointed actuary as they are being rated, or simply because they are multinational.
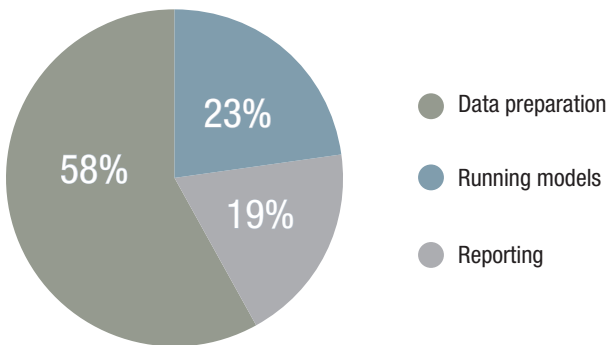
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	1	8	0

Reserving tool

Excel	33%
R	0%
Specialized software	11%
In house	56%
Other	0%

Reserving exercise periodicity

Monthly	11%
Quarterly	33%
Half-yearly	56%
Yearly	0%

Resources split

Data preparation	58%
Running models	23%
Reporting	19%

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	0%	0%	0%	100%
Loss ratio	0%	33%	67%	0%
Chain ladder	100%	0%	0%	0%
Bornhuetter-Ferguson	67%	0%	0%	33%
Cape Cod	0%	33%	11%	56%
Average cost	0%	33%	67%	0%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	0%	11%	89%
Munich Chain Ladder	0%	33%	0%	67%
STOCHASTIC				
Market-based std dev	0%	33%	0%	67%
Internal calibration	0%	33%	11%	56%
Mack	0%	0%	0%	100%
Merz & Wüthrich	0%	0%	0%	100%
GLM	0%	0%	11%	89%
Bootstrap / CL	33%	0%	11%	56%
Bootstrap / BF	33%	0%	11%	56%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	67%	33%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	89%	Deterministic math. reserves	11%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	Other	67%	N/A	33%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	67%	Other	33%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Year per year	56%	Flat assumption	44%	Other modalities	0%
Future inflation	Year per year	56%	Flat assumption	44%	Other modalities	0%
Discounting	Not treated	89%	Percentage	11%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	75%	Correlation matrix	25%	Other modalities	0%
Large claims	Treated separately	100%	Excluded	0%	Other modalities	0%
Reinsurance / retrocession	Proportional assumption	67%	Claim per claim	33%	Other modalities	0%
Subrogations	Claim per claim	100%	Not calculated	0%	Other modalities	0%
Ibnr contract allocation	Individual claims reserving	56%	Split using weights	44%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Not calculated	89%	Percentage	11%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

QATAR

Not a member of AAI
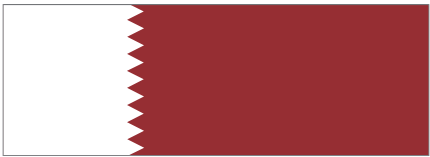
Population: 2.2 million
Insurance premiums: MUSD 2,183
Non Life premiums: MUSD 2,118
NL premium/capita: USD 963

Local GAAP: ☐ Discounting   ☐ Appointed/signing actuary
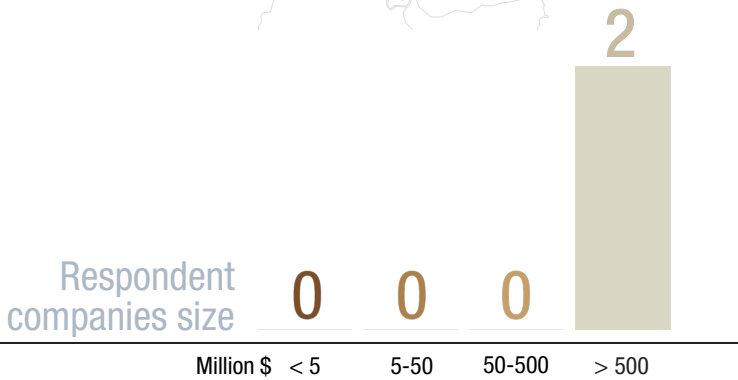Respondents market share: ■■■■□

Country report by
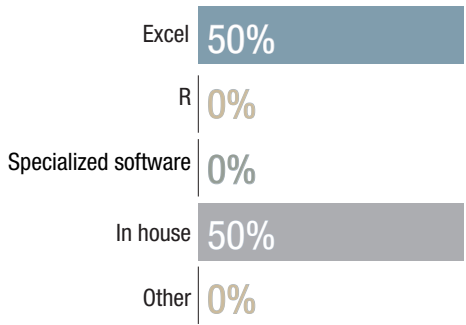**Claude PERRET**
claude.said.perret@gmail.com

Qatar is a small country but thanks to the high volume of oil and LNG (Liquefied Natural Gas), it is one of the richest country in the world using GDP per capita as the measure. Qatar 2030 vision lays a roadmap up to the year 2030 for growing and diversifying Qatar's economy, social, human and environmental standards, developing its infrastructure and essentially "putting Qatar on the map". As examples, this led Qatar to focus on sports (e.g. Football World Cup 2022) and the growth of Qatar Airways to transform Doha into a global aviation hub.

All these developments generate a booming economy that the local and international insurance market support and benefit from. Market data in Qatar is not easily obtainable since companies do not have to publish their data. However, there is some data but not necessarily reliable. The market is growing fast fuelled by the growing economy. Insurance premiums have grown double-digit for the last few years whilst GDP has been growing around 6% per annum. Qatar is the 58th largest insurance market in the world with $2bn of premiums. Market penetration as a percentage of GDP and expenditure is low at approximately 1% but this could be partly driven by the high GDP in relation to the size of the country and bearing in mind the unreliability of the market statistics. The market comprises of 26 insurance companies, dominated by QIC and its subsidiaries, without accounting for its international arms Qatar Re and Antares Lloyd's syndicate. Recent news: the financial regulator QCB (Qatar Central Bank) has issued in April 2016 new regulations that materially change the regulatory landscape for insurance companies in Qatar.
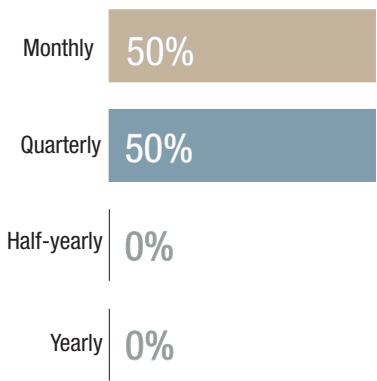
Until now, actuaries in Qatar were very few and had very limited regulatory roles. This is now drastically changing and the new regulations require Actuarial input and sign-off across many areas such as reserving and pricing.
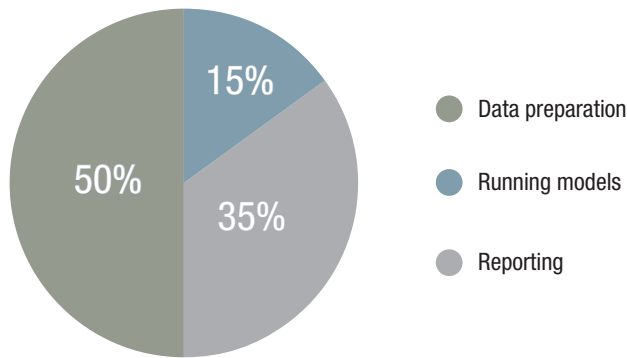
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	0	0	2

Reserving tool

Excel	50%
R	0%
Specialized software	0%
In house	50%
Other	0%

Reserving exercise periodicity

Monthly	50%
Quarterly	50%
Half-yearly	0%
Yearly	0%

Resources split

- Data preparation: 50%
- Running models: 15%
- Reporting: 35%

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
DETERMINISTIC				
Percentage	50%	0%	50%	0%
Loss ratio	50%	0%	0%	50%
Chain ladder	50%	0%	0%	50%
Bornhuetter-Ferguson	50%	0%	0%	50%
Cape Cod	0%	0%	0%	100%
Average cost	0%	0%	0%	100%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC				
Market-based std dev	0%	0%	0%	100%
Internal calibration	0%	0%	0%	100%
Mack	0%	0%	0%	100%
Merz & Wüthrich	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Bootstrap / CL	0%	0%	0%	100%
Bootstrap / BF	0%	0%	0%	100%
RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	50%	0%	0%	50%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	Deterministic math. reserves	50%	N/A	50%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	100%	Market/statutory tables	0%	Other modalities	0%
Decennal/contruction liab.	Other	100%	Regulatory	0%	Other modalities	0%
Credit	Other	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Future inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Discounting	Not treated	50%	Dvt patterns-based	50%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	50%	N/A	50%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Treated separately	50%	Treated jointly	50%	Other modalities	0%
Reinsurance / retrocession	Proxy	100%	Not calculated	0%	Other modalities	0%
Subrogations	N/A	100%	Not calculated	0%	Other modalities	0%
Ibnr contract allocation	Individual claims reserving	50%	Split using weights	50%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Not calculated	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

SAUDI ARABIA

Not a member of AAI

Population: 29.4 million
Insurance premiums: MUSD 8,128
Non Life premiums: MUSD 7,887
NL premium/capita: USD 268

Local GAAP: ☐ Discounting ▨ Appointed/signing actuary
Respondents market share: ▮▮▯▯▯
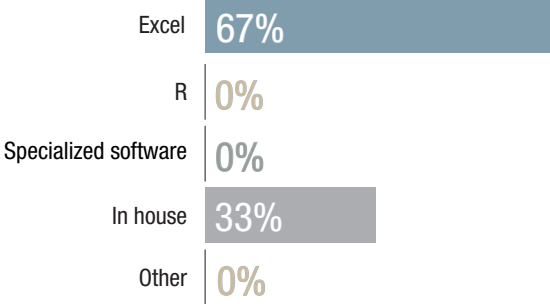
Country report by
François BOIT
francois@luxactuaries.com

The general insurance market has seen annual growth of 15% to 20% in the past few years. It is dominated by Health and Motor insurance, which together account for 80% of written premiums.
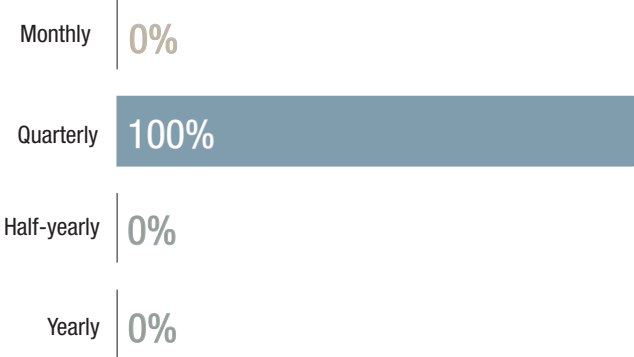
There are thirty-five licensed insurance companies, including local subsidiaries of multinational groups. Four large national companies collect 60% of premiums. Respondents consist of three large national companies, accounting for over a third of gross written premiums. Traditional reserving methodologies prevail. Stochastic and individual claims-based methodologies are not common. The use of an (external) Appointed actuary is mandated by the Saudi Arabian Monetary Authority, the insurance regulator, and companies must book the Appointed actuary's estimated reserves. Reserves must be held on an undiscounted basis.

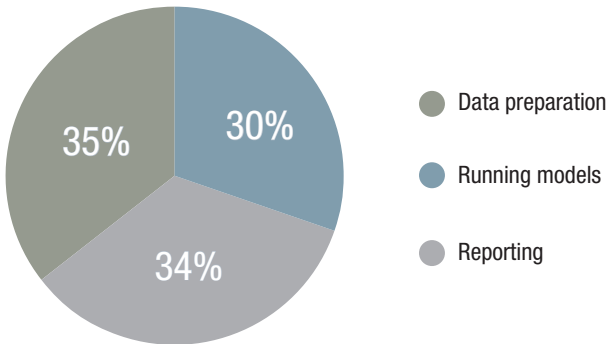Minimum capital requirements are based on an approach similar to Solvency-I.

Respondent companies size

	0	0	0	3
Million $	< 5	5-50	50-500	> 500

Reserving tool

Excel	67%
R	0%
Specialized software	0%
In house	33%
Other	0%

Reserving exercise periodicity

Monthly	0%
Quarterly	100%
Half-yearly	0%
Yearly	0%

Resources split

Data preparation	35%
Running models	30%
Reporting	34%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	33%	0%	0%	67%
	Loss ratio	0%	67%	33%	0%
	Chain ladder	100%	0%	0%	0%
	Bornhuetter-Ferguson	33%	33%	0%	33%
	Cape Cod	0%	0%	0%	100%
	Average cost	0%	33%	33%	33%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	0%	100%
	Internal calibration	0%	0%	0%	100%
	Mack	0%	0%	0%	100%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	33%	0%	0%	67%
	Bootstrap / BF	0%	0%	0%	100%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	0%	0%	100%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	Other	67%	N/A	33%	Other modalities	0%
Decennal/contruction liab.	Regulatory	33%	Other	33%	Other modalities	33%
Credit	N/A	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Flat assumption	67%	Not treated	33%	Other modalities	0%
Future inflation	Flat assumption	67%	Not treated	33%	Other modalities	0%
Discounting	Not treated	100%	Percentage	0%	Other modalities	0%
Discount type	Yield curve	100%	Flat rate	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Treated separately	67%	Excluded	33%	Other modalities	0%
Reinsurance / retrocession	Not calculated	33%	Proportional assumption	33%	Other modalities	33%
Subrogations	Proportional assumption	33%	Claim per claim	33%	Other modalities	33%
Ibnr contract allocation	Not allocated	67%	Split using weights	33%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	100%	Calculated	0%	Other modalities	0%
Risk Margin	Not calculated	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	No	100%	Yes	0%	Other modalities	0%

U.A.E.

Not a member of AAI

Population: 9.4 million
Insurance premiums: MUSD 9,106
Non Life premiums: MUSD 6,905
NL premium/capita: USD 735
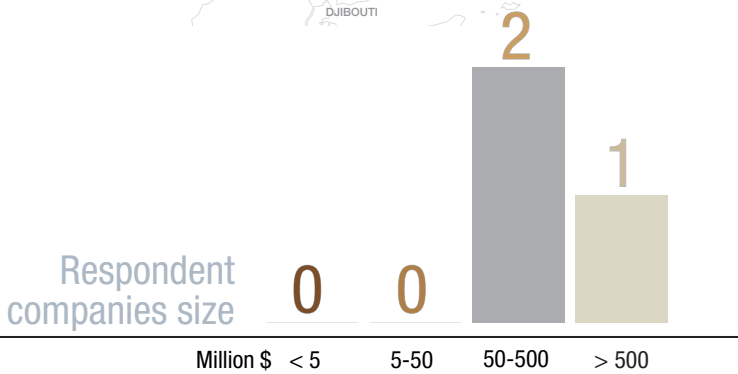
Local GAAP: ☐ Discounting ■ Appointed/signing actuary
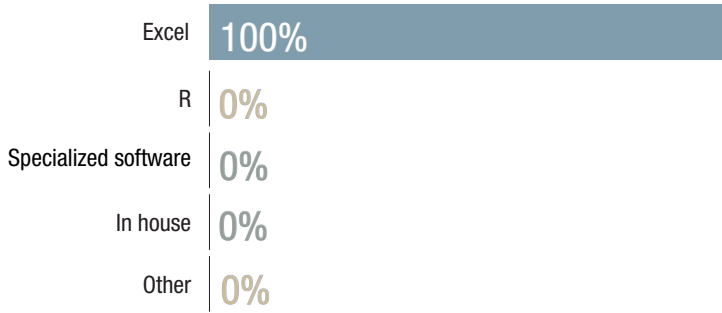Respondents market share: ■■■■■
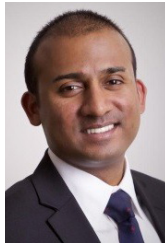
Country report by
Shivash BAGALOO
shivash@luxactuaries.com

By YE 2014, there were 60 insurance and takaful companies in the UAE market, 34 of which were locally owned and 26 were foreign. 13 of these were composite insurers, 37 were engaged in only non-life insurance, and 10 offered only life insurance. The number of local Takaful companies stood at 11.
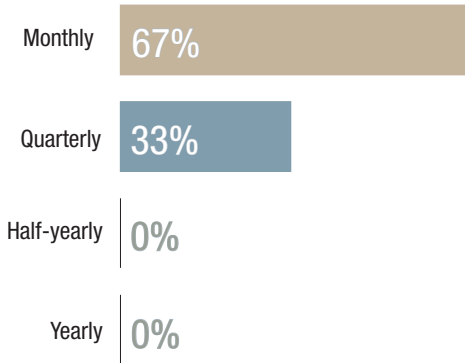
The UAE's insurance sector, one of the few bright spots in financial services amid a slowing economy, is expected to grow by 15 per cent this year, says the Insurance Authority. Insurance premiums were expected to rise to USD10,350 million for 2015 from USD9,130 million in 2014. Written premiums for the 29 listed insurers in the UAE are forecast to rise 10 per cent annually in 2015 and 2016, according to estimates by S&P. Motor and medical lines constitute about 60 per cent of market growth. Despite the growth, premium rates are nosediving. With 60 insurers competing in a country of 9.5 million people, premium rates particularly for motor and medical are under pressure. But some insurers are taking a stand and raising some of their prices. The Insurance Authority recently issued regulations governing the financial status of insurance and takaful companies, a move widely seen as developing the industry and eventually bringing it in line with Solvency II in Europe. The IA's release of Decisions numbered 25 and 26 of 2014 could signal the next wave of major regulatory developments in the GCC insurance industry. There is now the requirement for Appointed actuary reserving on a quarterly basis, which is expected to strengthen the reserving position of the market. Basic reserving methods are currently being used but these are expected to evolve over the next 3 – 5 years.
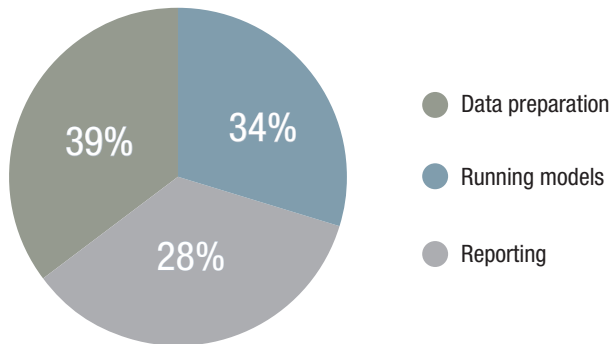
Respondent companies size

Million $	< 5	5-50	50-500	> 500
	0	0	2	1

Reserving tool

Excel	100%
R	0%
Specialized software	0%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	67%
Quarterly	33%
Half-yearly	0%
Yearly	0%

Resources split

- 34% Running models
- 28% Reporting
- 39% Data preparation

1. Standard claims: triangle-based technologies

	Main method	Peer method	Informational	Unused
Percentage	0%	33%	0%	67%
Loss ratio	33%	33%	0%	33%
Chain ladder	100%	0%	0%	0%
Bornhuetter-Ferguson	100%	0%	0%	0%
Cape Cod	33%	0%	33%	33%
Average cost	33%	0%	33%	33%
De Vylder	0%	0%	0%	100%
Fisher-Lange	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Munich Chain Ladder	0%	0%	0%	100%
Market-based std dev	0%	0%	0%	100%
Internal calibration	0%	0%	0%	100%
Mack	0%	0%	0%	100%
Merz & Wüthrich	0%	0%	0%	100%
GLM	0%	0%	0%	100%
Bootstrap / CL	0%	0%	0%	100%
Bootstrap / BF	0%	0%	0%	100%
RJMCMC	0%	0%	0%	100%

DETERMINISTIC (rows: Percentage through Average cost)
STOCHASTIC (rows: Market-based std dev through RJMCMC)

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	33%	0%	0%	67%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	67%	Other	33%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

|						
Past inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Future inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Discounting	Not treated	100%	Percentage	0%	Other modalities	0%
Discount type						
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Excluded	33%	Treated separately	33%	Other modalities	33%
Reinsurance / retrocession	Proportional assumption	67%	Projection of net triangles	33%	Other modalities	0%
Subrogations	Projection of net triangles	67%	Claim per claim	33%	Other modalities	0%
Ibnr contract allocation	Not allocated	50%	Individual claims reserving	50%	Other modalities	0%
Equalization reserve (local)	No eq. reserve	67%	Calculated	33%	Other modalities	0%
Risk Margin	Not calculated	100%	Projected	0%	Other modalities	0%
Ibnyr and Ibner diff.?	No	67%	Yes	33%	Other modalities	0%

KENYA

Full Member Association

Population: 45.6 million

Insurance premiums: **MUSD 1,834**

Non Life premiums: **MUSD 1,152**

NL premium/capita: **USD 25**

Local GAAP: ☐ Discounting   ☐ Appointed/signing actuary
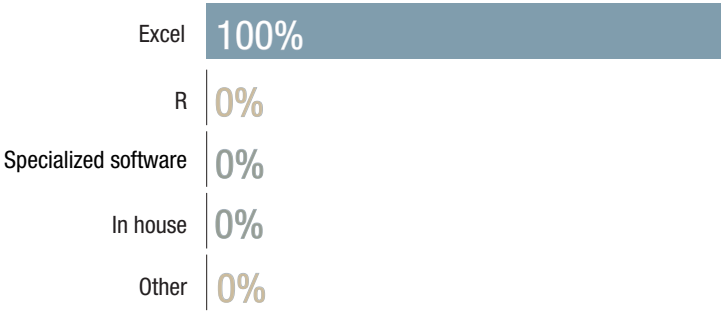
Respondents market share: ▉▉▉☐☐

Country report by
Gauri SHAH
gauri.shah@ke.pwc.com

KENYA
NAIROBI

Respondent companies size

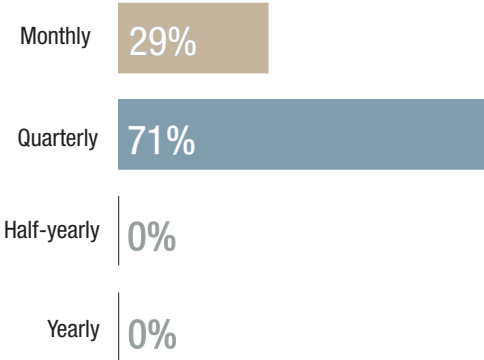|	< 5	5-50	50-500	> 500
	0	4	3	0

Million $
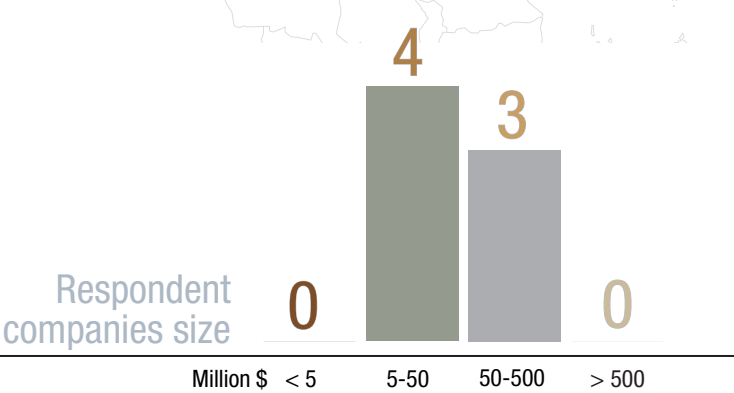
There are 25 primary non-life insurance companies together with an additional 11 composite insurers registered in Kenya. The largest classes of non-life business are motor and medical. These classes accounted for 64% of gross written premiums in 2014 across the industry. During the early part of 2013, the Kenyan Insurance Regulatory Authority ("IRA") issued updated regulatory requirements on the role of Actuarial Function as well as the valuation of technical liabilities for general insurers. These requirements necessitated insurers to have in place "a robust actuarial function that is well positioned, resourced and properly authorized and staffed". Additionally the requirements specified the need to have in place an "Appointed actuary" – an appointment that must be approved by the IRA. The guidelines issued in respect of the valuation of technical liabilities set out strict requirements in terms of performing at-least 2 statistical actuarial methods for calculating IBNR, for insurers older than 3 years. Insurers that have been existence for not more than 3 years are allowed to use a "factor-based" approach, with the appropriate factors being specified by the IRA. At present, there is a skills shortage in the market with very few internal actuarial resources in various companies being qualified actuaries. The size of the actuarial departments is also small with more than half of the respondents having only 1 or 2 dedicated actuarial resources. However, this number is growing as companies start to see the value of the actuarial skill set and also in order to comply with the increasing IRA guidelines. The reserving methodology applied is mainly Chain Ladder, Bornhuetter-Ferguson and Expected Loss Ratio techniques with only 2 of the respondents applying an additional different reserving technique (Cape-Cod). All of the respondents compute gross actuarial reserves, then apply a proportional assumption of the reinsurance recovery rate in order to determine net reserves. Overall obtaining sufficient quality and quantity of data to perform robust and detailed reserving projections, remains a challenge for many insurers in the market. However with the strong growth prospects and investment in the region over the recent past, many of the appointed actuaries remain optimistic about the ability to overcome this challenge.
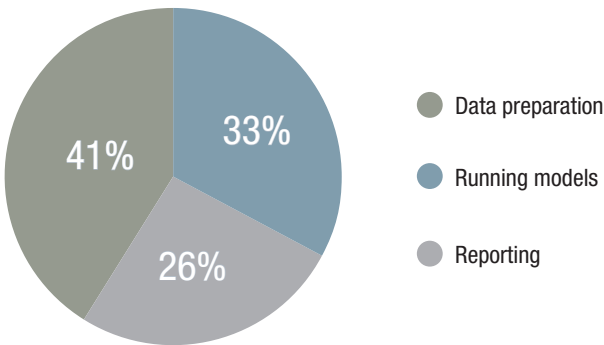
Reserving tool

Excel	**100%**
R	0%
Specialized software	0%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	29%
Quarterly	71%
Half-yearly	0%
Yearly	0%

Resources split

Data preparation	41%
Running models	33%
Reporting	26%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	0%	0%	17%	83%
	Loss ratio	0%	43%	29%	29%
	Chain ladder	100%	0%	0%	0%
	Bornhuetter-Ferguson	71%	29%	0%	0%
	Cape Cod	14%	14%	0%	71%
	Average cost	14%	0%	14%	71%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	0%	0%	0%	100%
	Internal calibration	0%	0%	0%	100%
	Mack	0%	0%	0%	100%
	Merz & Wüthrich	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	0%	0%	0%	100%
	Bootstrap / BF	0%	0%	0%	100%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	14%	0%	0%	86%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	0%	0%	0%	100%

3. Other claims

Annuities	N/A	86%	Deterministic math. reserves	14%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	83%	Market/statutory tables	17%	Other modalities	0%
Decennal/contruction liab.	N/A	100%	Regulatory	0%	Other modalities	0%
Credit	N/A	100%	Regulatory	0%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	57%	Year per year	29%	Other modalities	14%
Future inflation	Not treated	100%	Flat assumption	0%	Other modalities	0%
Discounting	Not treated	100%	Percentage	0%	Other modalities	0%
Discount type	Flat rate	100%	Yield curve	0%	Other modalities	0%
Development patterns	Chain ladder/paid	100%	De Vylder	0%	Other modalities	0%
Diversification effect	Not calculated	100%	Correlation matrix	0%	Other modalities	0%
Large claims	Treated separately	57%	Excluded	43%	Other modalities	0%
Reinsurance / retrocession	Proportional assumption	100%	Not calculated	0%	Other modalities	0%
Subrogations	Not calculated	43%	Claim per claim	43%	Other modalities	14%
Ibnr contract allocation	Not allocated	67%	Individual claims reserving	17%	Other modalities	17%
Equalization reserve (local)	No eq. reserve	83%	Percentage	17%	Other modalities	0%
Risk Margin	Not calculated	71%	Proxy	14%	Other modalities	14%
Ibnyr and Ibner diff.?	No	86%	Yes	14%	Other modalities	0%

SOUTH AFRICA

Full Member Association

Population: 54.5 million
Insurance premiums: MUSD 38,915
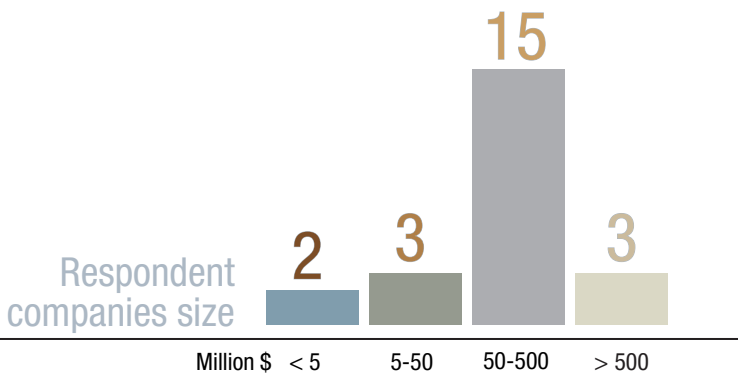Non Life premiums: MUSD 7,713
NL premium/capita: USD 141.52

Local GAAP: ☐ Discounting ▨ Appointed/signing actuary
Respondents market share: ▉▉▉▉▢

Country report by
Junaid KHAN
junaid.khan@za.pwc.com

ANGOLA ZAMBIA MALAWI
ZIMBABWE
BOTSWANA MOZAMBIQUE
NAMIBIA PRETORIA SWAZILAND
LESOTHO
SOUTH AFRICA

Respondent companies size

| | 2 | 3 | 15 | 3 |
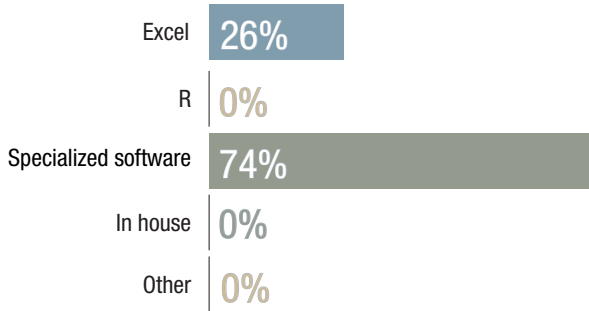Million $ | < 5 | 5-50 | 50-500 | > 500 |

According to the latest available annual report produced by the Financial Services Board ("FSB") there are 92 primary non-life insurance companies registered in South Africa. Of these, 23 insurers participated in the survey, accounting for approximately 79% of the market in terms of premium volumes.

The South African Non-Life Insurance market has seen rapid evolution in terms of reserving practices over the recent past. This has been driven largely off the back of proposed changes to regulation both from a statutory/ regulatory reporting perspective as well as a financial statement reporting (IFRS) perspective. This has been supported by investment in data systems, software and actuarial resources, which allow a number of insurers to efficiently extract large amounts of data and carry out detailed reserving analyses at a line of business level. The "best in class" have automated their reserving process to a large extent, thus enabling the reserving actuaries to draw value-adding insight from the reserving analysis/process i.e. by identifying potential actions/recommendations to be fed back to business e.g. identification of trends in the case estimate reserves and making recommendations for change in terms of the case estimation process. These insurers tend to adhere to a number of the following:
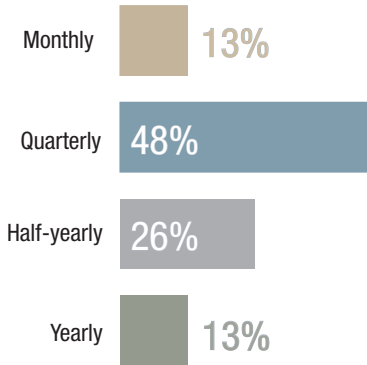• Segregation at a more a granular level than the regulatory "line of business" level e.g. splitting personal lines motor into own damage, third party liability, etc.
• Consideration of various methodologies in terms of determining the most appropriate per segment
• Use of specialized software
• Reserving separately for large claims
• Calculation of an explicit risk margin using stochastic techniques

A number of insurers in the South African market do however revert to the current statutory requirements for reserving purposes. The statutory method specifies different factors of premium to be applied per line of business. There are various reasons for adopting this simplistic approach, such as lack of quality and/ or quantity of data, resource constraints, etc. For these insurers a lot of work is required to not only meet the requirements proposed under the impending risk-based regulatory/ supervisory regime (Solvency Assessment and Management or "SAM") and IFRS 4 Phase II but to get closer to their counterparts in terms of best-practice.
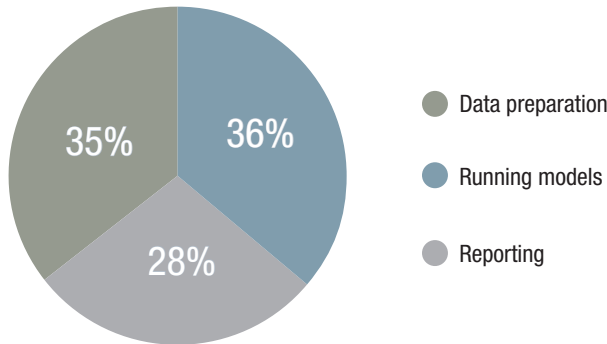
Reserving tool

Excel	26%
R	0%
Specialized software	74%
In house	0%
Other	0%

Reserving exercise periodicity

Monthly	13%
Quarterly	48%
Half-yearly	26%
Yearly	13%

Resources split

Data preparation	35%
Running models	36%
Reporting	28%

1. Standard claims: triangle-based technologies

		Main method	Peer method	Informational	Unused
DETERMINISTIC	Percentage	10%	0%	5%	86%
	Loss ratio	5%	24%	14%	57%
	Chain ladder	74%	0%	17%	9%
	Bornhuetter-Ferguson	32%	23%	18%	27%
	Cape Cod	9%	5%	0%	86%
	Average cost	14%	5%	29%	52%
	De Vylder	0%	0%	0%	100%
	Fisher-Lange	0%	0%	0%	100%
	GLM	0%	0%	0%	100%
	Munich Chain Ladder	0%	0%	0%	100%
STOCHASTIC	Market-based std dev	5%	5%	0%	91%
	Internal calibration	5%	0%	0%	95%
	Mack	24%	19%	0%	57%
	Merz & Wüthrich	5%	0%	5%	90%
	GLM	0%	0%	0%	100%
	Bootstrap / CL	57%	4%	0%	39%
	Bootstrap / BF	5%	0%	5%	90%
	RJMCMC	0%	0%	0%	100%

2. Standard claims: individual claims-based technologies

	Main method	Peer method	Informational	Unused
Percentage	10%	0%	5%	86%
ICR (Antonio-Plat)	0%	0%	0%	100%
ICR (Chalnot-Gremillet)	0%	0%	0%	100%
ICR (other)	5%	0%	0%	95%

3. Other claims

Annuities	N/A	100%	Deterministic math. reserves	0%	Other modalities	0%
Asbestos	N/A	100%	Survival Ratio	0%	Other modalities	0%
Disability/workers comp.	N/A	90%	Other	10%	Other modalities	0%
Decennal/contruction liab.	N/A	95%	Other	5%	Other modalities	0%
Credit	N/A	85%	Other	15%	Other modalities	0%

4. Adjustments / misc.

Past inflation	Not treated	86%	Year per year	14%	Other modalities	0%
Future inflation	Not treated	87%	Flat assumption	13%	Other modalities	0%
Discounting	Not treated	57%	Dvt patterns-based	26%	Other modalities	17%
Discount type	Yield curve	75%	Flat rate	25%	Other modalities	0%
Development patterns	Chain ladder/paid	91%	Other	5%	Other modalities	5%
Diversification effect	Not calculated	96%	Correlation matrix	4%	Other modalities	0%
Large claims	Treated separately	48%	Treated jointly	43%	Other modalities	9%
Reinsurance / retrocession	Projection of net triangles	43%	N/A	26%	Other modalities	30%
Subrogations	Projection of net triangles	48%	Not calculated	17%	Other modalities	35%
Ibnr contract allocation	Not allocated	65%	Individual claims reserving	17%	Other modalities	17%
Equalization reserve (local)	No eq. reserve	83%	Calculated	17%	Other modalities	0%
Risk Margin	Projected	64%	Percentage	18%	Other modalities	18%
Ibnyr and Ibner diff.?	No	83%	Yes	17%	Other modalities	0%

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