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INSURANCE RISK BENCHMARKS RESEARCH

ANNUAL STATISTICAL REVIEW

ANNUAL STATISTICAL REVIEW
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GUY CARPENTER STRATEGIC ADVISORY
OLIVER WYMAN ACTUARIAL CONSULTING

MARSH & McLENNAN COMPANIES

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ON THE COVER

The correlation in ultimate loss ratio between general liability and products liability for individual companies writing both lines of business is shown as a function of the companies' market share in each line. For more information on the relationship between market share and pairwise correlation between lines of business, see Section 3.1 for the US Industry.

For more information and detail on this research, please contact us at riskbenchmarks@guycarp.com

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EXECUTIVE SUMMARY

We are pleased to release the 2014 edition of *Insurance Risk Benchmarks Research: Annual Statistical Review.* This year's report is full of new analysis and insights designed to assist our clients in recognizing industry trends and benchmarking the inputs to economic capital models.

The material you'll find here incorporates the financial results of an excellent 2013 for the property/casualty (P&C) industry. Relatively low natural peril activity, impressive returns on the stock market, benefits from deferred tax assets, and changes to pension accounting were among the many factors which contributed to a great result in 2013.

We undertake this research each year when the statutory returns are finalized and available across the industry. However, the effort is much more than an annual update. Rather, it is a living exercise in industry risk management which grows and creates new value with each installment. This year, we have refined the industry market segments to include true regional composites designed to better group companies with similar exposure to natural perils.

In addition, we will be releasing a second report this year: *Insurance Risk Benchmarks Research: Applications and Perspectives* in December. This will contain a series of applications for these statistics using Guy Carpenter's impressive suite of analytical tools, including MetaRisk® and MetaRisk Reserve™. *Applications and Perspectives* will include:

- Generalized linear modeling of industry reserve risk
- Industry-wide economic capital modeling
- Discussion of standardization in risk tolerance statements and illustrative quantification for the industry capital model
- Applying industry correlation metrics to the company level based on market share

These topics are all exciting ways to get the most value from the *Annual Statistical Review*. They deliver on our promise to assist clients not only in benchmarking capital model *inputs*, but the *outputs* as well.

When these puzzle pieces are properly interlocked with your own viewpoints, we can assemble a complete image of risk and opportunity for your company. Please contact your Guy Carpenter account executive to discuss how this is possible.

Andrew Marcell
Chief Executive Officer, US Operations

THIS YEAR'S CONTRIBUTORS

For the US section of the *Annual Statistical Review*, **Micah Woolstenhulme** and **Joel Vaag** were responsible for production and content.

Micah leads initiatives at Guy Carpenter to develop standards in economic capital modeling, expression of risk tolerances, and quantification of risk profile. He has fifteen years of experience as a P&C actuary in insurance and reinsurance, and is a regular speaker at industry forums on topics of financial modeling and enterprise risk management.

Joel is a principal with Oliver Wyman Actuarial. He has twenty years of experience as a P&C actuary in insurance and reinsurance. He offers a range of professional services including Statements of Actuarial Opinion, economic capital modeling, mergers and acquisitions support, pricing for reinsurance programs and individual accounts, rate filings and regulatory compliance.

Phil Lee was responsible for verifying the statutory loss database, reconciling discrepancies with previous years and adding new information. Phil is a Vice President for Guy Carpenter working with the ERM Services Team. He has ten years of experience in reinsurance, risk management, and electrical engineering.

Xuan Fu, **Hanbing He**, and **Yan Li** worked through the extensive detail required to update our databases and create the compelling exhibits in this report. They are students in the Masters of Actuarial Science Program at Columbia University and interned with Guy Carpenter during the summer of 2014.

Chris Apps was responsible for writing the UK section of the Annual Statistical Review. Chris is a member of the Guy Carpenter Technical Innovation team based in London, providing support to broking teams across all business lines and GC Securities. He has three years of experience in reinsurance pricing and capital modeling.

I. OVERVIEW

1.1 INTRODUCTION TO THE ANNUAL STATISTICAL REVIEW ("ASR")

The *ASR* is produced annually as part of Guy Carpenter and Oliver Wyman Actuarial Consulting's Insurance Risk Benchmarks research. This year's research was also supported by important contributions from Columbia University's Masters in Actuarial Science program. For several years now, we have been constructing and refining a comprehensive database of statutory financial data for the entire P&C insurance industry.

Certain irregularities can be found in the statutory loss history for individual companies. These irregularities may stem from mergers and acquisitions or simple data error. It is a painstaking exercise to detect and correct these irregularities, but we undertake this effort in order to ensure that our empirical view of industry risk is accurate.

Changes in This Year's Report

- You'll notice that there is a new outline to the report. We have consolidated and simplified the presentation of key metrics. We hope that the new format is easier to navigate and focuses on the metrics which matter most to you.
- For three casualty lines (general liability, medical professional liability, and products liability), we now break out the results between occurrence and claims-made business. You will find that the experience is quite different between these two triggers. The additional detail brings the number of lines of business on which we report to 11.
- Our market segments have also been redefined. Appendix A.1 provides more detail on this stratification overhaul, but the main idea was to provide groups for which the combined experience is more comparable and meaningful to those that use this report. In addition, we now provide the explicit detail on which companies have been included in each segment. We believe that this *"open source"* approach will function to facilitate continuous refinement and improvement to the report.

Guiding Principle to the Risk Benchmarks

The risk benchmarks are based upon the observed financial results of hundreds of companies over a 35-year period. We have not applied models to derive the measures and we have deliberately minimized the amount of judgment applied. *Applications and Perspectives,* on the other hand, will specifically apply this work to various modeling applications, but the ASR is a pure snapshot on the observed risk.

Our Extensive Database

Our database contains Schedule P filings from 1989 to 2013, including experience back to accident year 1980.There are 954 companies and company groups out of a total of 1,426 included in the creation of these statistics. The 472 companies not included, approximately 9 percent of the industry, are not allocated to any of the market segments in the *ASR* due to lack of credible loss history or a risk profile not consistent with one of the defined market segments (as defined and discussed below in Appendix A.1).

Line of Business Definitions

For the US benchmarks, lines of business are associated with the following Schedule P definitions and presented with the following acronyms:

Other Schedule P lines are excluded from this report, but will be addressed separately in one or more of the *Applications and Perspectives* reports.

Schedule P Definition	Risk Benchmark Acronym	Lines of Business
A	HO	Homeowners/Farmowners
B	PPA	Private Passenger Auto Liability
C	CAL	Commercial Auto Liability
D	WC	Workers Compensation
E	CMP	Commercial Multiple Peril
F1	MPLO	Medical Professional Liability (Occurrence)
F2	MPLC	Medical Professional Liability (Claims Made)
H1	GLO	General Liability (Occurrence)
H2	GLC	General Liability (Claims Made)
R1	PLO	Products Liability (Occurrence)
R2	PLC	Products Liability (Claims Made)

1.2 CALCULATION NOTES AND LIMITATIONS

The following notes provide information about the calculations in this report:

- **Net/Gross of Reinsurance:** The risk benchmarks for the United States are calculated using data net of reinsurance and the risk benchmarks for the United Kingdom use data gross of reinsurance.
- **Reserve Adequacy:** The risk benchmarks are based on the carried reserves as found in the financial statements. We have made no attempt to assess the potential redundancy or deficiency in carried amounts.
- **Ultimate Reserve Risk:** Our view of ultimate reserve risk is limited to ten years of development for an accident year. The duration and reserve risk for very long-tailed lines of business such as workers compensation must be reviewed with this caveat. Because ten financial reports is the extent of explicit reporting in the financial statements, the metrics on ultimate reserve risk are based on accident years 1980 to 2004.
- **Definition of Loss:** In this report we use the term *"loss"* to mean loss and allocated loss adjustment expense (ALAE), also known as defense and cost containment expense.
- **Pearson's Correlation Coefficient:** The correlations in this report are Pearson's correlation coefficient, i.e. the linear correlation. Other measures of correlation can be made available upon request.
- **Correlation Matrices:** The correlation matrices for the industry and for the market segments will necessarily include coefficients which are stronger than what an individual company should expect to experience. This is because an individual company experiences more noisy "process risk." In fact, we can show that the *expected* correlation between two lines of business for an individual company can be modeled as a function of that company's market share. Look to *Applications and Perspectives* for a discussion of how to use market share to adjust the industry correlations to the market share of your company.
- **Payment Patterns Past 10 Years:** To measure duration, we assume that carried reserves are exactly adequate and that the incremental payment, as a percentage of ultimate in the 10th payment period, will repeat until either the ultimate loss burden is satisfied or the 15th year — whichever is earlier. In the event that the total losses are not fully disbursed by the 15th year under this projection, we assume that the entire remaining amount is then paid in the 15th year. Note that this methodology is consistent with the Internal Revenue Service's method for discounting loss reserves, found in the Internal Revenue Code §§ 846(d)(3)(C) and (D), "Special rule for certain long-tail lines."
- **Auto-correlation:** As shown in the last column of Table 6 (page 22), the series of single-year reserve development percentages exhibit a strong auto-correlation. By applying auto-regressive integrated moving average (ARIMA) modeling to these time series, we estimate that 25 percent to 90 percent (depending on segment) of the volatility shown in industry underwriting results is explained by the cycle.
- **Length of Loss History Special Cases:** For most lines of business, the data set begins in accident year 1980. For products liability, reporting as a line separate from general liability began in 1982. Reporting for products liability separating occurrence and claims made business began in 1984. For certain lines of business within particular market segments, we did not include data for the earliest accident years due to credibility and data quality concerns.
- **Portfolio Size and Differences:** We are measuring the variability of the industry in aggregate. All things being equal, each individual insurer will likely experience more variability due to its smaller relative portfolio size. An individual insurer's true risk will also differ from these benchmarks to the extent that the insurer's portfolio is dissimilar to the industry or market segment in general.

II. TIMING RISK

2.1 INDUSTRY REVIEW

This is the first year we show distinct results between occurrence and claims made business. As expected, claims-made business exhibits markedly shorter duration.

Lines of business with significant property coverage (e.g., homeowners, commercial multiple peril) exhibit the shortest durations.

The potential for a change to the low interest rate and inflation environment highlights the importance of the duration benchmarks. The aggregate industry portfolio for fixed income assets (approximately 64 percent of invested assets) possesses duration of about five years. For all lines of business combined, both the accident year duration and the effective reserve runoff duration are less than five years. This implies that an increase in interest rates could reduce the value of fixed income assets more than it would reduce the present value of claim liabilities.

MEAN PAYMENT PATTERN AND DURATION

Table T1 calculates the percentage of the ultimate loss that is paid in each development period, for a single accident year. Table T1 also estimates the undiscounted Macaulay Duration for each line of business[1].

$$\text{Increment} = \frac{\text{Paid Loss for a 12-Month period}^{1} \text{ for an Accident Year}}{\text{Carried Ultimate Loss at 120 months for an Accident Year}}$$

$$\text{Duration} = \frac{\text{Sum Across Increments [Product of (Development Month} - 6) \text{ and Increment]}}{12}$$

T1 | MEAN PAYMENT PATTERN AND DURATION
US INDUSTRY IN AGGREGATE, NET OF REINSURANCE

Line of Business	Duration (In Years)	Development Period (In Months)										
		0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120+
CAL	2.6	22%	25%	20%	14%	8%	5%	2%	1%	1%	0%	2%
CMP	2.5	36%	23%	11%	9%	6%	4%	3%	2%	1%	1%	3%
GLC	3.9	10%	18%	19%	16%	12%	7%	6%	4%	3%	2%	5%
GLO	4.8	8%	13%	15%	15%	12%	9%	6%	4%	3%	2%	12%
HO	1.0	69%	22%	4%	2%	1%	1%	0%	0%	0%	0%	0%
MPLC	3.6	5%	20%	25%	18%	11%	7%	4%	2%	2%	1%	4%
MPLO	4.6	13%	9%	11%	15%	13%	10%	7%	5%	4%	2%	10%
PPA	1.8	37%	31%	15%	8%	4%	2%	1%	1%	0%	0%	1%
PLC	4.4	5%	19%	22%	16%	11%	8%	5%	3%	2%	2%	6%
PLO	5.7	5%	7%	12%	14%	13%	11%	8%	6%	5%	3%	16%
WC	4.2	21%	25%	15%	9%	6%	4%	3%	2%	2%	1%	13%

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1. Duration is calculated using projections of payment pattern consistent with the assumptions described in section 1.2, [Payment Patterns Past 10 Years].

PAYMENT PATTERN VOLATILITY

Table T2 calculates the coefficient of variation of incremental loss that is paid in each development period for a single accident year.

$$\text{Incremental CV} = \frac{\text{Standard Deviation of Incremental Percentage for a Development Period}}{\text{Mean Incremental Percentage from Table T1}}$$

When interpreting Table T2, note that because each CV is a ratio to the mean for that increment, the value in dollars of the volatility changes across the payment pattern for an individual line of business.

T2 | COEFFICIENT OF VARIATION OF PAYMENT PATTERN INCREMENTS US INDUSTRY IN AGGREGATE, NET OF REINSURANCE

Line of Business	Development Month										
	12	24	36	48	60	72	84	96	108	120	120+
CAL	11%	7%	6%	6%	10%	16%	18%	26%	26%	28%	62%
CMP	7%	7%	11%	8%	12%	14%	16%	16%	14%	22%	21%
GLC	54%	26%	21%	19%	23%	20%	29%	34%	40%	48%	44%
GLO	26%	15%	16%	10%	10%	16%	18%	23%	31%	33%	23%
HO	4%	9%	15%	13%	20%	27%	30%	24%	30%	78%	54%
MPLC	34%	12%	8%	9%	17%	15%	20%	21%	39%	47%	50%
MPLO	57%	23%	14%	9%	11%	12%	17%	26%	48%	37%	55%
PPA	8%	4%	6%	6%	7%	11%	16%	16%	22%	29%	42%
PLC	61%	30%	39%	24%	46%	41%	55%	60%	70%	99%	56%
PLO	45%	18%	16%	13%	9%	12%	16%	19%	20%	30%	22%
WC	7%	5%	7%	9%	12%	13%	12%	13%	13%	18%	19%

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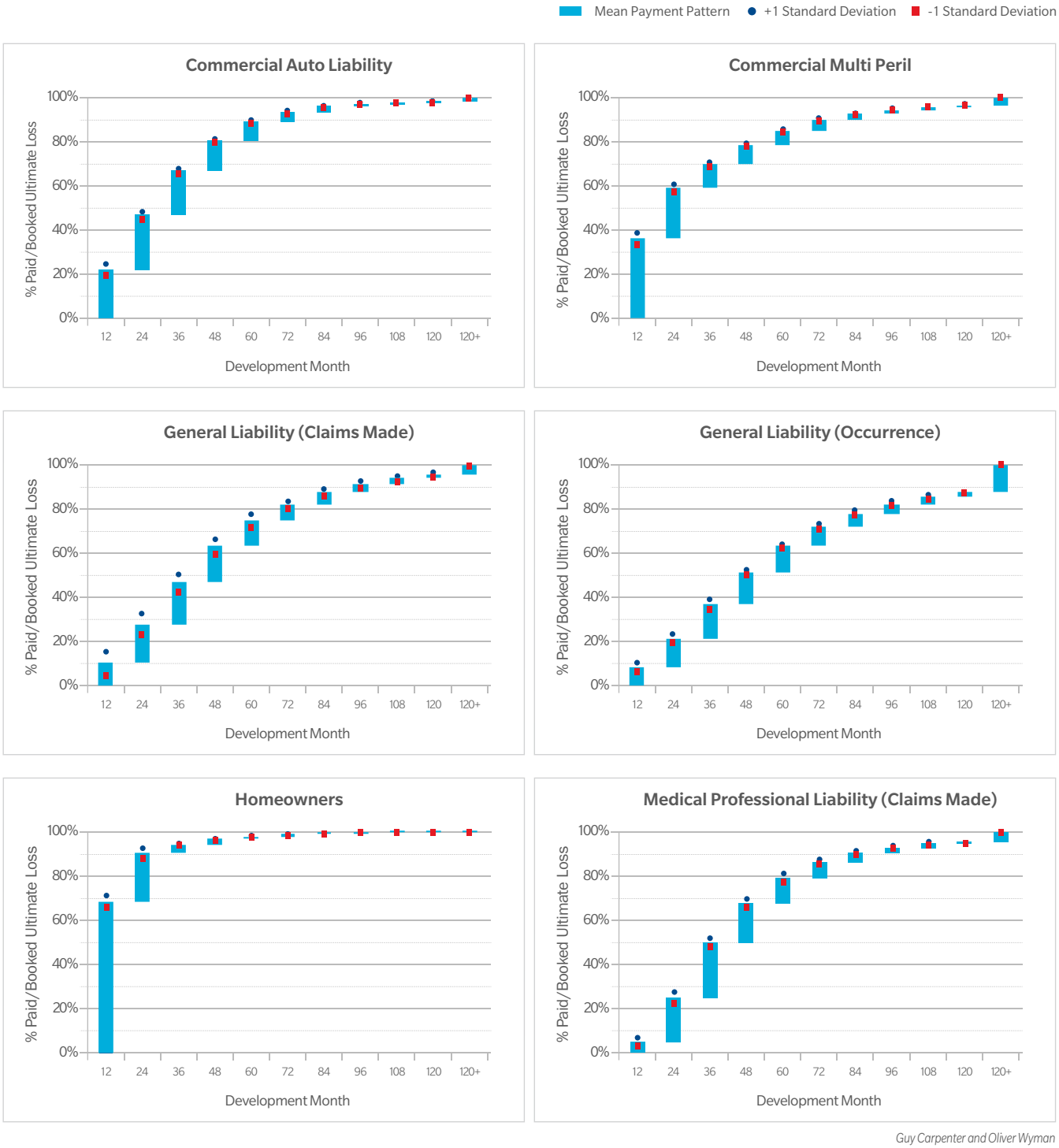
GRAPHICS 2.1 PAYMENT PATTERN BEHAVIOR BY LINE OF BUSINESS

G 1 | PAYMENT PATTERN MEAN AND VOLATILITY US INDUSTRY IN AGGREGATE, NET OF REINSURANCE



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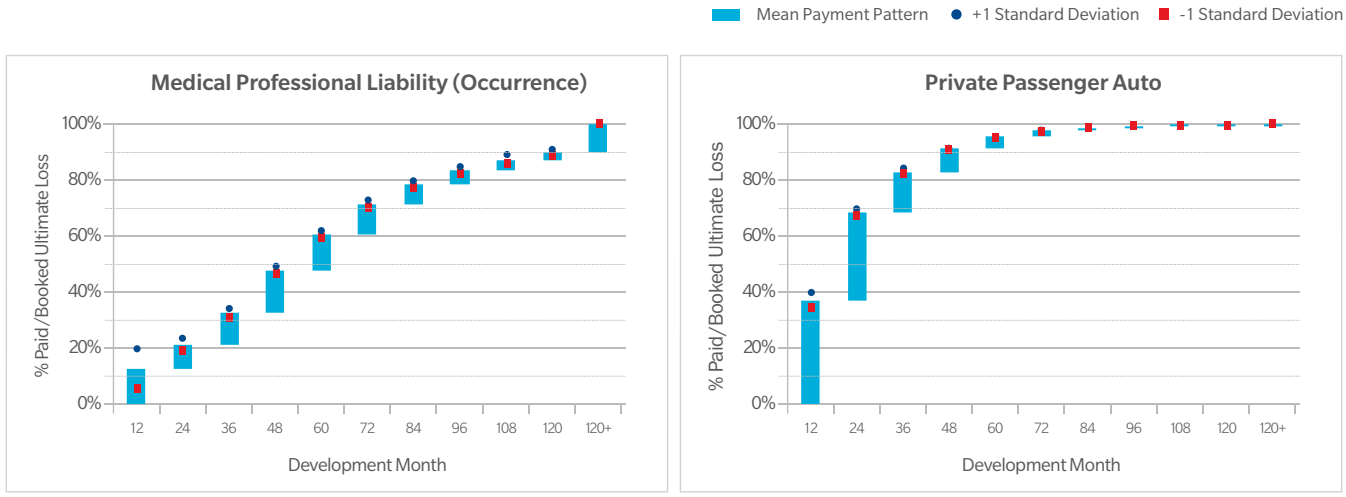
G 1 | CONTINUED



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2.2 MARKET SEGMENT TABLES

T3 | MEAN PAYMENT PATTERN BY MARKET SEGMENT, NET OF REINSURANCE

Line of Business	Market Segment	Duration (InYears)	Development Period (In Months)										
			0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120+
Commercial Auto Liability	Top 15 Writers	2.7	22%	24%	20%	14%	8%	5%	2%	1%	1%	0%	2%
	National	2.5	22%	26%	20%	14%	8%	4%	2%	1%	1%	0%	1%
	Multi Regional	2.5	24%	25%	19%	14%	8%	4%	2%	1%	0%	0%	2%
	Southeast/Gulf	2.3	29%	27%	19%	12%	7%	3%	1%	1%	0%	0%	0%
	Midwest	2.4	30%	24%	18%	13%	8%	4%	2%	1%	0%	0%	1%
	Northeast/Atlantic	2.7	20%	24%	17%	15%	10%	6%	3%	2%	1%	1%	1%
	West	2.2	25%	30%	21%	12%	6%	3%	1%	0%	1%	0%	1%
	E&S	2.5	23%	29%	21%	13%	7%	3%	2%	1%	1%	0%	3%
Commercial Multi Peril	Top 15 Writers	2.5	37%	22%	11%	9%	6%	5%	3%	2%	1%	1%	4%
	National	2.4	35%	23%	11%	10%	7%	5%	3%	2%	1%	1%	3%
	Multi Regional	2.5	40%	21%	9%	8%	6%	4%	3%	2%	1%	1%	5%
	Southeast/Gulf	2.1	47%	23%	9%	7%	5%	3%	2%	1%	1%	1%	2%
	Midwest	1.7	50%	22%	8%	7%	4%	3%	2%	1%	1%	1%	2%
	Northeast/Atlantic	2.4	34%	22%	11%	10%	8%	5%	3%	2%	1%	1%	2%
	West	2.5	29%	22%	15%	11%	6%	4%	3%	2%	2%	2%	4%
	E&S	2.6	28%	22%	14%	11%	8%	4%	3%	2%	2%	2%	5%
General Liability (CM)	Top 15 Writers	4.0	6%	17%	19%	17%	13%	8%	6%	4%	3%	2%	5%
	National	3.9	8%	21%	20%	15%	10%	7%	5%	3%	3%	1%	7%
	Multi Regional	3.5	7%	23%	23%	17%	11%	6%	5%	2%	2%	1%	4%
	Southeast/Gulf	2.4	53%	15%	12%	7%	4%	2%	2%	1%	1%	1%	4%
	Midwest	1.9	66%	10%	4%	5%	4%	2%	3%	1%	1%	1%	2%
	Northeast/Atlantic	3.7	7%	20%	22%	18%	11%	8%	4%	3%	2%	3%	4%
	West	2.5	10%	36%	26%	14%	8%	4%	2%	1%	1%	0%	1%
	E&S	4.0	8%	23%	24%	17%	9%	6%	4%	3%	1%	1%	6%
General Liability (Occ)	Top 15 Writers	4.9	7%	13%	16%	15%	12%	9%	6%	4%	3%	2%	13%
	National	4.7	7%	13%	17%	16%	12%	9%	6%	4%	3%	2%	12%
	Multi Regional	3.0	17%	15%	16%	15%	11%	8%	4%	4%	2%	2%	7%
	Southeast/Gulf	4.1	16%	15%	17%	14%	10%	7%	4%	3%	3%	1%	9%
	Midwest	3.4	25%	19%	15%	11%	9%	6%	4%	3%	2%	1%	6%
	Northeast/Atlantic	4.3	11%	13%	15%	15%	13%	9%	6%	5%	3%	2%	8%
	West	2.9	28%	17%	12%	10%	7%	5%	5%	4%	3%	2%	8%
	E&S	5.0	4%	12%	18%	17%	12%	8%	6%	4%	3%	3%	13%
Homeowners	Top 15 Writers	1.0	69%	22%	4%	2%	1%	1%	1%	0%	0%	0%	0%
	National	1.0	68%	23%	4%	2%	1%	1%	0%	0%	0%	0%	0%
	Multi Regional	0.9	71%	21%	3%	2%	1%	1%	0%	0%	0%	0%	0%
	Southeast/Gulf	0.9	75%	19%	2%	1%	1%	0%	0%	0%	0%	0%	1%
	Midwest	0.9	75%	18%	3%	2%	1%	0%	0%	0%	0%	0%	0%
	Northeast/Atlantic	1.1	67%	22%	4%	3%	2%	1%	1%	0%	0%	0%	0%
	West	1.0	61%	26%	7%	3%	2%	1%	0%	0%	0%	0%	0%
	E&S	1.1	62%	27%	6%	3%	1%	0%	0%	0%	0%	0%	0%
Medical Professional Liability (CM)	Top 15 Writers	3.9	4%	18%	24%	18%	12%	8%	5%	3%	2%	1%	5%
	National	3.3	5%	21%	32%	20%	10%	5%	3%	2%	1%	0%	2%
	Multi Regional	3.3	5%	23%	26%	17%	10%	6%	3%	2%	2%	1%	3%
	Southeast/Gulf	3.5	5%	21%	26%	20%	10%	6%	5%	2%	2%	1%	5%
	Midwest	3.9	5%	18%	19%	16%	18%	11%	8%	3%	2%	2%	3%
	Northeast/Atlantic	3.4	4%	18%	26%	22%	14%	7%	3%	3%	2%	1%	2%
	West	3.0	6%	25%	29%	18%	9%	5%	2%	2%	1%	1%	3%
	E&S												

T3 | CONTINUED

Line of Business	Market Segment	Duration (InYears)	Development Period (In Months)										
			0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120+
Medical Professional Liability (Occ)	Top 15 Writers	3.7	23%	11%	11%	13%	12%	9%	6%	4%	3%	2%	8%
	National	5.4	2%	8%	16%	21%	14%	10%	7%	5%	4%	2%	10%
	Multi Regional	5.8	1%	5%	14%	18%	17%	13%	8%	7%	5%	3%	11%
	Southeast/ Gulf	4.7	1%	8%	17%	20%	16%	11%	8%	4%	3%	3%	8%
	Midwest	4.9	2%	6%	11%	18%	18%	13%	12%	10%	8%	4%	11%
	Northeast / Atlantic	6.5	0%	2%	4%	11%	14%	16%	13%	13%	8%	5%	15%
	West	3.7	1%	9%	24%	17%	18%	23%	9%	6%	6%	3%	5%
	E&S	4.6	2%	11%	20%	21%	17%	8%	7%	3%	3%	2%	9%
Private Passenger Auto	Top 15 Writers	1.7	38%	31%	14%	8%	4%	2%	1%	1%	0%	0%	1%
	National	1.8	35%	32%	16%	9%	5%	2%	1%	0%	0%	0%	0%
	Multi Regional	1.8	36%	31%	16%	8%	4%	2%	1%	0%	0%	0%	1%
	Southeast/ Gulf	1.4	45%	31%	12%	6%	3%	1%	1%	0%	0%	0%	1%
	Midwest	1.8	38%	29%	15%	9%	4%	2%	1%	0%	0%	0%	1%
	Northeast / Atlantic	2.0	31%	31%	16%	10%	6%	3%	1%	1%	0%	0%	1%
	West	1.5	36%	38%	16%	6%	2%	1%	0%	0%	0%	0%	0%
	E&S	1.4	43%	37%	12%	5%	2%	1%	0%	0%	0%	0%	1%
Products Liability (CM)	Top 15 Writers	5.0	7%	16%	18%	14%	10%	10%	6%	5%	3%	4%	10%
	National	3.6	4%	21%	25%	19%	13%	8%	5%	1%	2%	0%	3%
	Multi Regional	3.5	4%	21%	28%	18%	11%	6%	5%	2%	2%	2%	2%
	Southeast/ Gulf												
	Midwest												
	Northeast / Atlantic												
	West												
	E&S												
Products Liability (Occ)	Top 15 Writers	5.9	4%	6%	11%	14%	13%	11%	9%	7%	5%	4%	16%
	National	5.5	5%	8%	14%	17%	13%	10%	7%	5%	3%	3%	15%
	Multi Regional	5.3	7%	11%	14%	14%	14%	10%	6%	4%	3%	4%	12%
	Southeast/ Gulf	5.4	4%	8%	11%	15%	13%	12%	7%	6%	5%	4%	15%
	Midwest	4.6	10%	12%	14%	16%	15%	9%	7%	5%	4%	3%	6%
	Northeast / Atlantic	3.7	12%	15%	15%	14%	14%	7%	5%	7%	4%	3%	10%
	West	5.2	5%	8%	12%	15%	14%	9%	10%	9%	7%	6%	12%
	E&S	6.5	2%	6%	13%	18%	13%	10%	7%	6%	4%	5%	17%
Workers Compensation	Top 15 Writers	4.4	21%	24%	14%	9%	6%	4%	3%	2%	2%	1%	14%
	National	4.4	21%	26%	15%	9%	6%	4%	3%	2%	2%	1%	11%
	Multi Regional	4.5	19%	23%	14%	8%	5%	3%	3%	2%	1%	1%	22%
	Southeast/ Gulf	3.4	25%	28%	15%	9%	5%	3%	2%	2%	1%	1%	8%
	Midwest	2.8	31%	30%	15%	8%	4%	3%	2%	1%	1%	1%	5%
	Northeast / Atlantic	4.2	23%	23%	13%	9%	6%	4%	3%	2%	2%	1%	14%
	West	5.1	21%	24%	12%	7%	5%	3%	2%	2%	1%	1%	21%
	E&S	4.3	21%	23%	15%	11%	7%	4%	3%	4%	2%	2%	13%

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T4 | COEFFICIENT OF VARIATION OF PAYMENT PATTERN INCREMENTS BY MARKET SEGMENT, NET OF REINSURANCE

Line of Business	Segment	Development Month 12	24	36	48	60	72	84	96	108	120	120+
Commercial Auto Liability	Top 15 Writers	17%	13%	6%	7%	13%	23%	19%	24%	23%	31%	60%
	National	6%	4%	8%	7%	9%	19%	27%	46%	65%	45%	26%
	Multi Regional	10%	8%	7%	11%	16%	21%	38%	49%	64%	71%	292%
	Southeast/ Gulf	11%	16%	14%	24%	17%	25%	35%	57%	132%	79%	67%
	Midwest	12%	6%	13%	13%	16%	26%	35%	46%	69%	90%	79%
	Northeast / Atlantic	12%	12%	14%	12%	10%	16%	27%	34%	40%	43%	142%
	West	14%	10%	17%	22%	39%	70%	99%	66%	282%	158%	98%
	E&S	34%	30%	32%	30%	39%	46%	74%	95%	144%	189%	108%
Commercial Multi Peril	Top 15 Writers	7%	8%	12%	9%	16%	14%	20%	17%	15%	19%	19%
	National	10%	9%	11%	14%	12%	30%	22%	27%	21%	36%	19%
	Multi Regional	10%	12%	17%	14%	20%	22%	22%	38%	40%	40%	139%
	Southeast/ Gulf	12%	17%	21%	24%	34%	36%	54%	64%	148%	96%	77%
	Midwest	9%	13%	13%	14%	18%	31%	54%	71%	70%	100%	81%
	Northeast / Atlantic	19%	17%	13%	15%	29%	26%	40%	94%	59%	52%	63%
	West	23%	29%	24%	24%	37%	38%	48%	40%	55%	75%	81%
	E&S	25%	16%	20%	22%	39%	45%	50%	92%	185%	140%	92%
General Liability (CM)	Top 15 Writers	29%	18%	13%	14%	17%	17%	30%	31%	40%	47%	55%
	National	24%	24%	17%	16%	32%	40%	54%	57%	64%	53%	71%
	Multi Regional	33%	25%	21%	18%	27%	50%	60%	73%	83%	116%	87%
	Southeast/ Gulf	21%	31%	27%	26%	40%	50%	75%	74%	109%	206%	105%
	Midwest	24%	36%	59%	80%	62%	114%	147%	125%	136%	192%	69%
	Northeast / Atlantic	43%	25%	29%	26%	34%	38%	65%	111%	74%	261%	66%
	West	23%	21%	19%	26%	57%	64%	84%	116%	89%	90%	105%
	E&S	46%	21%	23%	31%	28%	44%	70%	101%	56%	150%	92%
General Liability (Occ)	Top 15 Writers	26%	18%	19%	14%	14%	19%	23%	26%	37%	34%	26%
	National	21%	18%	17%	11%	10%	24%	31%	32%	32%	45%	26%
	Multi Regional	71%	18%	24%	19%	27%	29%	34%	53%	62%	90%	57%
	Southeast/ Gulf	31%	24%	16%	13%	24%	47%	27%	44%	146%	56%	37%
	Midwest	40%	26%	22%	20%	17%	42%	56%	66%	74%	125%	116%
	Northeast / Atlantic	34%	24%	20%	22%	19%	33%	47%	54%	55%	65%	31%
	West	60%	25%	34%	35%	54%	75%	194%	135%	246%	242%	90%
	E&S	26%	25%	23%	19%	20%	35%	32%	29%	37%	36%	41%
Homeowners	Top 15 Writers	5%	10%	18%	14%	21%	21%	32%	25%	33%	95%	62%
	National	5%	12%	14%	24%	32%	62%	48%	41%	65%	86%	38%
	Multi Regional	4%	9%	18%	20%	22%	28%	37%	67%	87%	106%	57%
	Southeast/ Gulf	8%	15%	33%	34%	41%	100%	81%	123%	131%	264%	421%
	Midwest	3%	10%	17%	17%	17%	34%	45%	66%	103%	88%	256%
	Northeast / Atlantic	5%	12%	16%	18%	17%	26%	25%	43%	63%	47%	74%
	West	11%	13%	54%	49%	114%	198%	76%	97%	82%	150%	65%
	E&S	17%	28%	91%	113%	80%	73%	103%	142%	128%	191%	202%
Medical Professional Liability (CM)	Top 15 Writers	28%	11%	10%	15%	29%	23%	23%	33%	33%	65%	58%
	National	55%	31%	27%	36%	39%	63%	72%	100%	120%	98%	66%
	Multi Regional	26%	19%	17%	14%	18%	30%	43%	100%	218%	113%	43%
	Southeast/ Gulf	31%	24%	10%	24%	33%	37%	71%	44%	88%	81%	78%
	Midwest	55%	59%	44%	47%	60%	48%	203%	72%	75%	84%	66%
	Northeast / Atlantic	34%	25%	18%	14%	38%	47%	56%	63%	68%	88%	121%
	West	29%	23%	12%	16%	35%	57%	65%	109%	67%	142%	111%
	E&S											

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T4 | CONTINUED

Line of Business	Segment	Development Month 12	24	36	48	60	72	84	96	108	120	120+
Medical Professional Liability (Occ)	Top 15 Writers	61%	29%	18%	17%	21%	29%	34%	44%	46%	61%	75%
	National	159%	44%	41%	37%	34%	40%	44%	95%	119%	89%	93%
	Multi Regional	82%	47%	34%	37%	19%	37%	42%	54%	78%	67%	46%
	Southeast/ Gulf	48%	35%	29%	22%	23%	34%	53%	47%	102%	92%	73%
	Midwest	157%	95%	66%	44%	62%	103%	154%	188%	122%	111%	95%
	Northeast / Atlantic	205%	59%	52%	54%	31%	28%	39%	27%	55%	37%	35%
	West	76%	77%	115%	28%	40%	112%	50%	47%	175%	106%	40%
	E&S	97%	60%	39%	33%	30%	56%	90%	89%	126%	181%	117%
Private Passenger Auto	Top 15 Writers	8%	5%	6%	5%	6%	10%	17%	14%	21%	24%	40%
	National	8%	4%	7%	8%	10%	15%	21%	25%	40%	52%	33%
	Multi Regional	7%	4%	7%	11%	9%	18%	21%	28%	34%	82%	44%
	Southeast/ Gulf	8%	8%	14%	22%	22%	35%	53%	56%	75%	117%	217%
	Midwest	7%	3%	6%	10%	15%	22%	36%	43%	35%	55%	44%
	Northeast / Atlantic	6%	4%	7%	8%	11%	11%	10%	23%	29%	68%	102%
	West	9%	6%	8%	17%	32%	40%	64%	45%	334%	115%	151%
	E&S	23%	21%	47%	52%	50%	55%	77%	122%	242%	99%	108%
Products Liability (CM)	Top 15 Writers	103%	55%	71%	39%	56%	77%	68%	77%	111%	125%	62%
	National	52%	40%	35%	37%	59%	66%	70%	129%	125%	95%	93%
	Multi Regional	63%	36%	31%	34%	36%	64%	84%	151%	96%	129%	83%
	Southeast/ Gulf											
	Midwest											
	Northeast / Atlantic											
	West											
	E&S											
Products Liability (Occ)	Top 15 Writers	51%	29%	21%	14%	12%	15%	20%	25%	24%	36%	23%
	National	32%	32%	22%	25%	19%	22%	28%	38%	37%	42%	32%
	Multi Regional	41%	49%	44%	39%	38%	39%	69%	55%	92%	89%	44%
	Southeast/ Gulf	64%	48%	61%	61%	38%	59%	61%	82%	77%	83%	59%
	Midwest	43%	43%	45%	36%	43%	46%	63%	73%	90%	88%	86%
	Northeast / Atlantic	68%	54%	58%	50%	56%	56%	69%	133%	188%	122%	78%
	West	115%	59%	52%	67%	69%	82%	97%	103%	111%	122%	88%
	E&S	58%	48%	32%	19%	31%	34%	66%	63%	52%	98%	48%
Workers Compensation	Top 15 Writers	8%	7%	9%	11%	16%	18%	12%	16%	16%	19%	29%
	National	6%	5%	8%	16%	18%	16%	23%	21%	27%	26%	18%
	Multi Regional	26%	29%	31%	42%	21%	30%	81%	29%	30%	31%	67%
	Southeast/ Gulf	11%	7%	12%	13%	19%	27%	37%	30%	45%	57%	34%
	Midwest	12%	7%	7%	12%	19%	28%	28%	31%	32%	31%	30%
	Northeast / Atlantic	9%	8%	10%	7%	10%	11%	12%	13%	17%	15%	15%
	West	7%	12%	15%	21%	30%	30%	29%	31%	31%	48%	19%
	E&S	21%	26%	36%	22%	40%	41%	107%	161%	61%	77%	42%

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III. UNDERWRITING RISK

3.1 INDUSTRY REVIEW

In general, 2013 loss ratios compared favorably with those of recent years. Mild natural peril activity and modest trends in loss cost contributed to these results. Among the lines of business most favorably impacted were the two covering real property: homeowners and commercial multiple peril.

The measured loss ratio volatility for homeowners and commercial multiple peril appears to be less than that for other lines of business, but should be interpreted with a grain of salt as the full range of potential natural peril losses is not extant in the loss history. Also, because much of the volatility affecting these lines stems from natural peril losses that are independent between years, both the auto-correlation and correlation with other lines of business is comparatively low. These loss ratios exhibit strong dependence on regional market segment. Companies in the Southeast/Gulf market segment have fared the worst. Northeast/Atlantic carriers seem to vary the most in terms of profitability and Midwest carriers are generally on the higher side.

Private passenger auto loss ratios are the most stable in the industry and do not appear to be materially better or worse in individual regions. This line of business has become tremendously commoditized in a market of intense competition.

The strongest loss ratio correlations have occurred between lines of business driven by trends in bodily injury costs, including general liability occurrence, products liability occurrence and medical professional liability occurrence. This suggests that risk models need to consider the common dependence of these claims on systemic drivers of loss cost. We show in table T6* that correlation between line of business is a predictable function of market share and will follow up to this report in *Applications and Perspectives* with an exposition of how to model this relationship with collective risk theory.

Very interestingly, the largest companies in the industry have also exhibited the largest loss ratio volatility in the historical results; this is generally true across all lines.

In this year's report we introduce the concept of *market slope*, which measures the degree to which underwriting experience is different for each line of business. In graphic G4, medical professional liability (occurrence) and products liability (occurrence) exhibit the steepest market slopes, suggesting that some of the best opportunities for outperforming the market exist in these lines of business.

ACTUAL ULTIMATE LOSS RATIO

We call the ultimate loss ratio based on carried reserves (if any) at 120 months of development for an accident year the "*actual ultimate loss ratio*:"

$$\text{Actual Ultimate Loss Ratio} = \frac{\text{Paid and Reserved Losses and ALAE at 120 Months of Development}}{\text{Earned Premium}}$$

Table T5 details descriptive statistics for the Actual Ultimate Loss Ratio by line of business. We tabulate results from accident years 1980 to 2004.

T5 | ACTUAL ULTIMATE LOSS RATIO US INDUSTRY IN AGGREGATE, NET OF REINSURANCE

Line of Business	Mean (1)	CV = St Dev/Mean (2)	Minimum (3)	Maximum (4)	AY 2013 Current Booked (5)
CAL	80%	16%	58%	115%	66%
CMP	71%	19%	48%	99%	57%
GLC	69%	31%	44%	111%	66%
GLO	85%	30%	51%	146%	62%
HO	71%	16%	58%	113%	54%
MPLC	84%	31%	45%	125%	76%
MPLO	99%	34%	51%	165%	76%
PPA	76%	8%	63%	89%	70%
PLC	62%	54%	28%	164%	60%
PLO	91%	32%	54%	159%	65%
WC	81%	17%	59%	103%	70%

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CORRELATION BETWEEN ULTIMATE LOSS RATIOS

Table T6 details the correlation between the actual ultimate loss ratio by line of business. It also includes the autocorrelation for each line with itself over time. For example, for CAL and CMP we calculate:

$$\text{Correlation (CAL, CMP)} = \frac{E[(LR_{CAL} - \text{Mean}(LR_{CAL}))*(LR_{CMP} - \text{Mean}(LR_{CMP}))]}{(\text{Standard Deviation of } LR_{CAL}) * (\text{Standard Deviation of } LR_{CMP})},$$

T 6 | CORRELATION BETWEEN THE ACTUAL ULTIMATE LOSS RATIO US INDUSTRY IN AGGREGATE, NET OF REINSURANCE (CORRELATIONS THAT ARE STATISTICALLY SIGNIFICANTLY DIFFERENT FROM ZERO ARE IN BOLD.[2])

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	**80%**	**56%**	**87%**	0%	**60%**	**71%**	**52%**	**58%**	**91%**	**60%**	**78%**
CMP	**80%**	100%	**57%**	**82%**	**46%**	**75%**	**75%**	17%	**63%**	**89%**	24%	**66%**
GLC	**56%**	**57%**	100%	**86%**	12%	**78%**	**70%**	6%	**81%**	**76%**	**46%**	**82%**
GLO	**87%**	**82%**	**86%**	100%	7%	**82%**	**86%**	26%	**83%**	**98%**	**47%**	**78%**
HO	0%	**46%**	12%	7%	100%	20%	2%	1%	23%	17%	-13%	23%
MPLC	**60%**	**75%**	**78%**	**82%**	20%	100%	**91%**	-11%	**75%**	**80%**	19%	**85%**
MPLO	**71%**	**75%**	**70%**	**86%**	2%	**91%**	100%	-6%	**65%**	**84%**	8%	**88%**
PPA	**52%**	17%	6%	26%	1%	-11%	-6%	100%	10%	30%	**77%**	**83%**
PLC	**58%**	**63%**	**81%**	**83%**	23%	**75%**	**65%**	10%	100%	**82%**	36%	**51%**
PLO	**91%**	**89%**	**76%**	**98%**	17%	**80%**	**84%**	30%	**82%**	100%	**45%**	**76%**
WC	**60%**	24%	**46%**	**47%**	-13%	19%	8%	**77%**	36%	**45%**	100%	**82%**

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Where:

E is the expectation operator, LR_{CMP} is the Actual Ultimate Loss Ratio for CMP

The auto-correlation is a similar calculation except that we measure the loss ratio history for a single line with itself and a lag of 1 year:

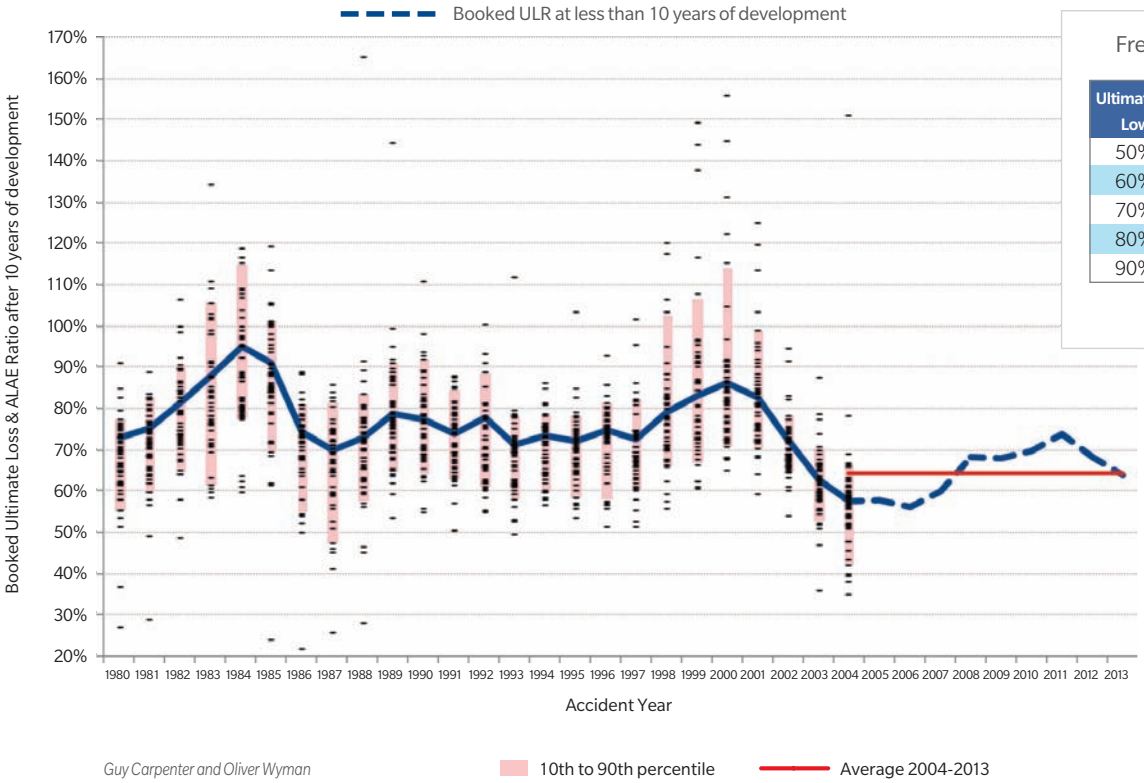
$$\text{Auto-correlation (CAL)} = \frac{E[(LR_{CAL,t} - \text{Mean}(LR_{CAL}))*(LR_{CAL,t-1} - \text{Mean}(LR_{CAL}))]}{(\text{Standard Deviation of } LR_{CAL})^2},$$

If an accident year with a high loss ratio is followed by an accident year with another high loss ratio, then a high autocorrelation will be seen in Table T6.

2. *These are correlations with p-values less than 5 percent.*

GRAPHICS 3.1 LOSS RATIO CYCLES, INDIVIDUAL COMPANY CORRELATION EXPERIENCE

G2 | ACTUAL ULTIMATE LOSS RATIO BY ACCIDENT YEAR, US INDUSTRY IN AGGREGATE, ELEVEN[3] LINES OF BUSINESS COMBINED, NET OF REINSURANCE



Frequency by Band

Ultimate Loss Ratio Band		
Low	High	Count
50%	60%	4
60%	70%	7
70%	80%	16
80%	90%	5
90%	100%	2
		34

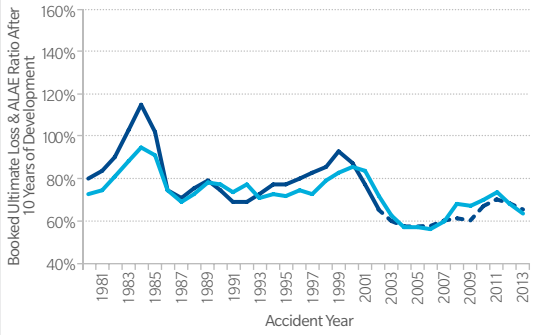
3. Includes all lines in the ASR: CAL, CMP, GLO, GLC, HO, MPLO, MPLC, PPA, PLC, PLO, and WC.

G3 | ACTUAL ULTIMATE LOSS RATIO BY ACCIDENT YEAR, US INDUSTRY IN AGGREGATE, BY LINE OF BUSINESS NET OF REINSURANCE

Explanation

Graphic G2 shows the industry loss ratio for all lines combined for more than three decades. It also includes an individual hash mark indicating the actual ultimate loss ratios for each of the 50 largest companies (measured by premium writings) for each accident year, as well as a colored band indicating the range between the 10th to the 90th percentile across these company results. It is interesting to note that the spread of results is actually wider during the most unprofitable years.

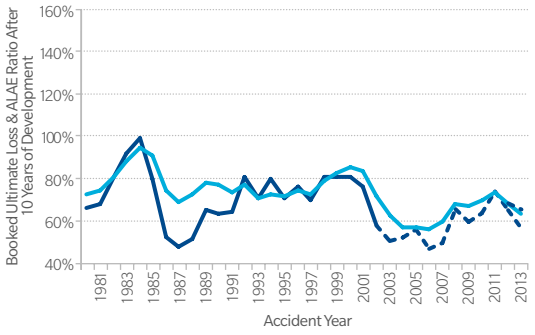
Commercial Auto Liability



Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	0
50%	65%	7
65%	80%	17
80%	95%	7
95%	110%	2
110%	125%	1
125%	140%	0
140%	155%	0
155%	170%	0
		34

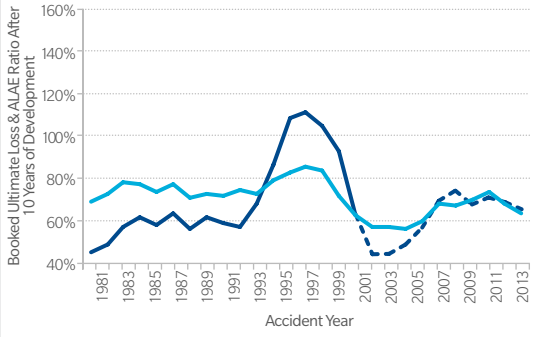
Commercial Multi Peril



Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	3
50%	65%	11
65%	80%	11
80%	95%	8
95%	110%	1
110%	125%	0
125%	140%	0
140%	155%	0
155%	170%	0
		34

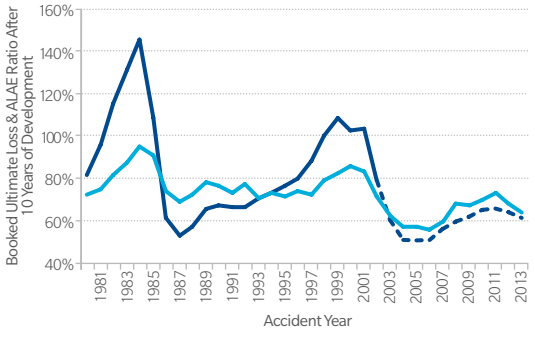
General Liability (Claims Made)



Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	5
50%	65%	10
65%	80%	7
80%	95%	2
95%	110%	2
110%	125%	1
125%	140%	0
140%	155%	0
155%	170%	0
		27

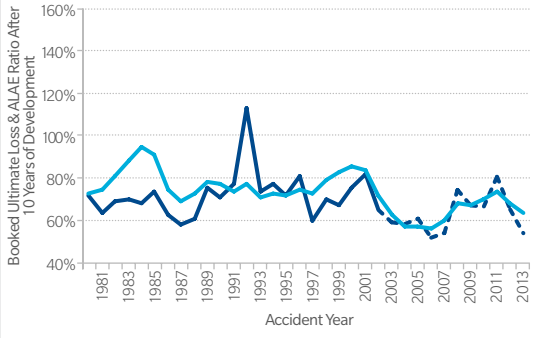
General Liability (Occurrence)



Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	0
50%	65%	12
65%	80%	10
80%	95%	3
95%	110%	6
110%	125%	1
125%	140%	1
140%	155%	1
155%	170%	0
		34

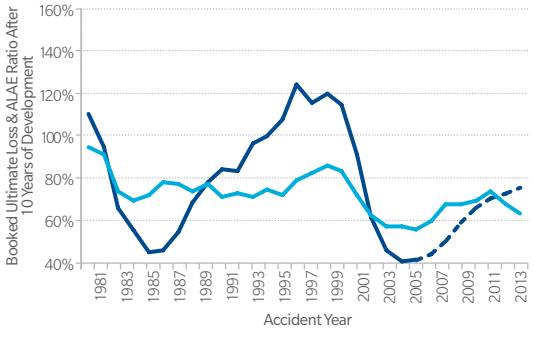
Homeowners



Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	0
50%	65%	11
65%	80%	19
80%	95%	3
95%	110%	0
110%	125%	1
125%	140%	0
140%	155%	0
155%	170%	0
		34

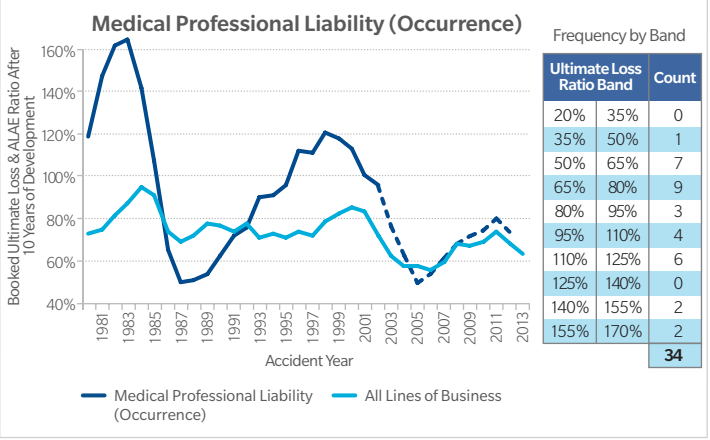
Medical Professional Liability (Claims Made)



Frequency by Band

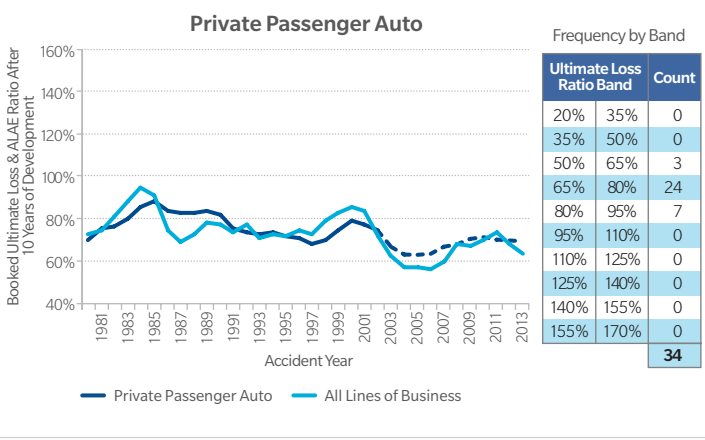
Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	6
50%	65%	5
65%	80%	7
80%	95%	3
95%	110%	4
110%	125%	5
125%	140%	0
140%	155%	0
155%	170%	0
		30

Loss ratios are not often modeled with autocorrelation, but multi-year economic capital models should reflect the tendency for loss ratios to move with momentum over time. Graphic G2 shows that a series of unprofitable years is a plausible concern for P&C insurance companies. For more details on how to model the underwriting cycle, see *US Property-Casualty: Underwriting Cycle Modeling and Risk Benchmarks*[4].



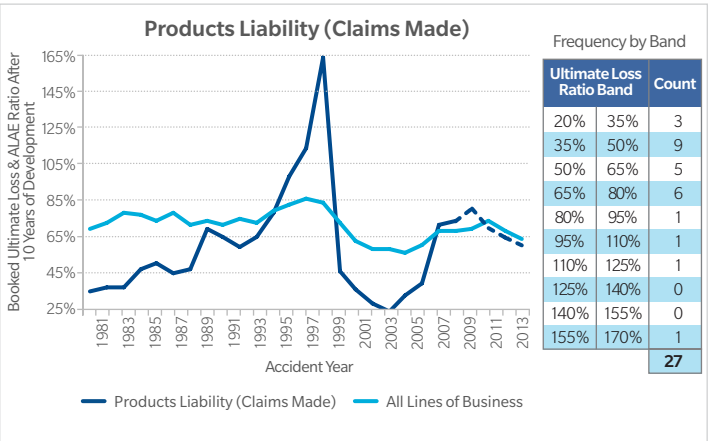
Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	1
50%	65%	7
65%	80%	9
80%	95%	3
95%	110%	4
110%	125%	6
125%	140%	0
140%	155%	2
155%	170%	2
		34



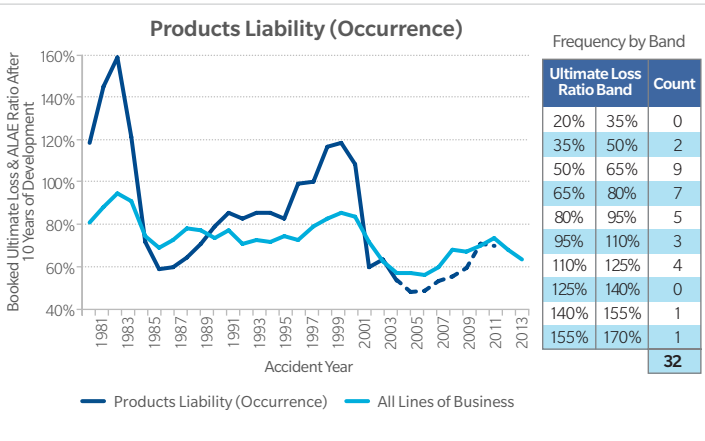
Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	0
50%	65%	3
65%	80%	24
80%	95%	7
95%	110%	0
110%	125%	0
125%	140%	0
140%	155%	0
155%	170%	0
		34



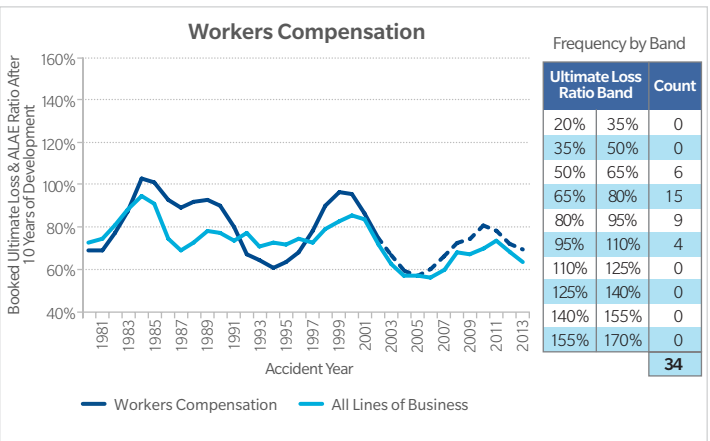
Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	3
35%	50%	9
50%	65%	5
65%	80%	6
80%	95%	1
95%	110%	1
110%	125%	1
125%	140%	0
140%	155%	0
155%	170%	1
		27



Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	2
50%	65%	9
65%	80%	7
80%	95%	5
95%	110%	3
110%	125%	4
125%	140%	0
140%	155%	1
155%	170%	1
		32



Frequency by Band

Ultimate Loss Ratio Band		Count
20%	35%	0
35%	50%	0
50%	65%	6
65%	80%	15
80%	95%	9
95%	110%	4
110%	125%	0
125%	140%	0
140%	155%	0
155%	170%	0
		34

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Booked ULR at less than 10 years of development

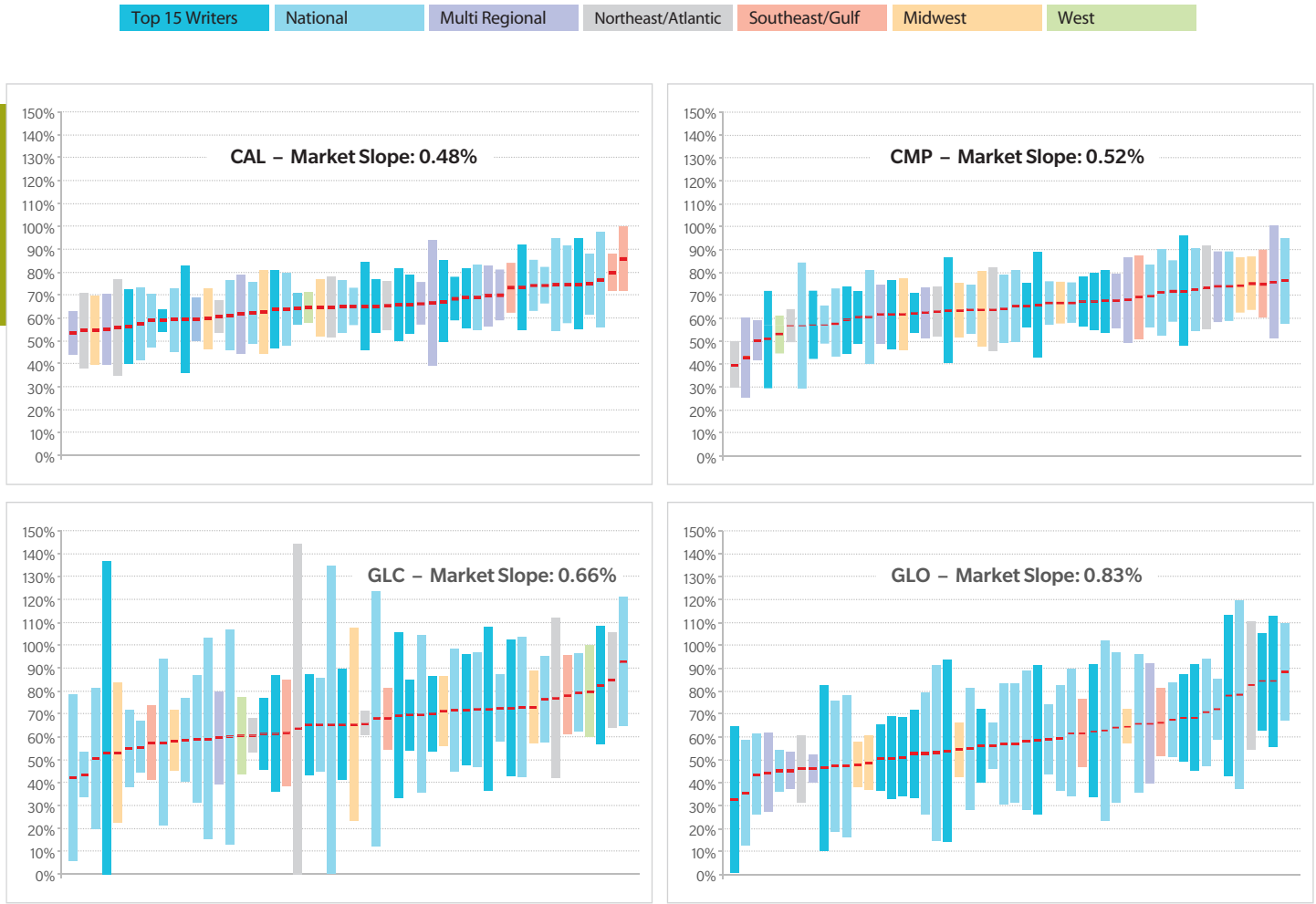
4. *The report, US Property-Casualty: Underwriting Cycle Modeling and Risk Benchmarks, is available online: http://www.variancejournal.org/*

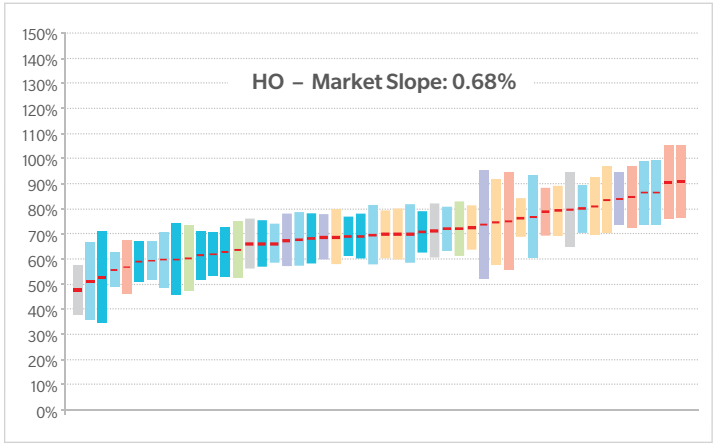
G 4 | LOSS RATIO SPREAD FOR TOP 50 WRITERS OF EACH LINE OF BUSINESS SORTED IN ASCENDING ORDER OF AVERAGE PERFORMANCE FROM 2009-2013
VOLATILITY ESTIMATED FROM ACCIDENT YEARS 1980-2013

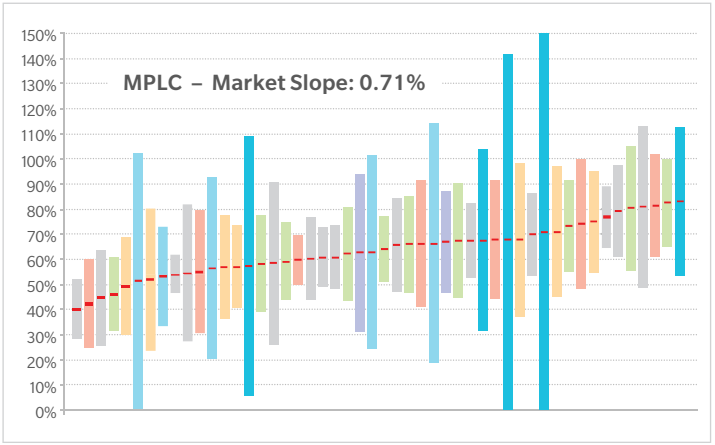
Explanation

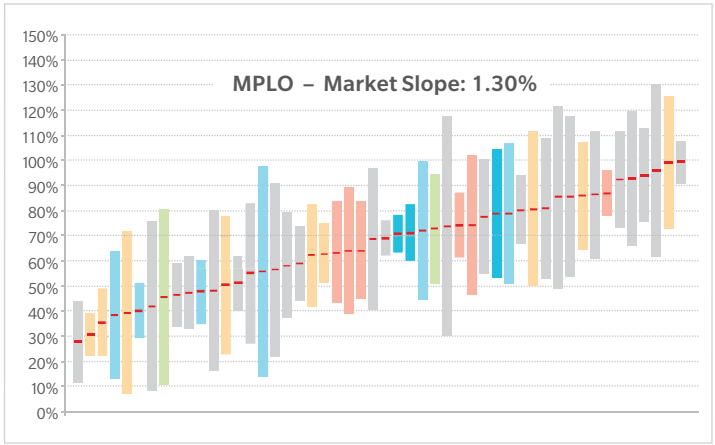
Graphic G4 shows the recent performance and volatility for the top 50 companies in each line of business. The graphic sorts companies by mean loss ratio, from lowest to highest. A colored bar illustrates the band spanning one standard deviation on either side of the loss ratio.

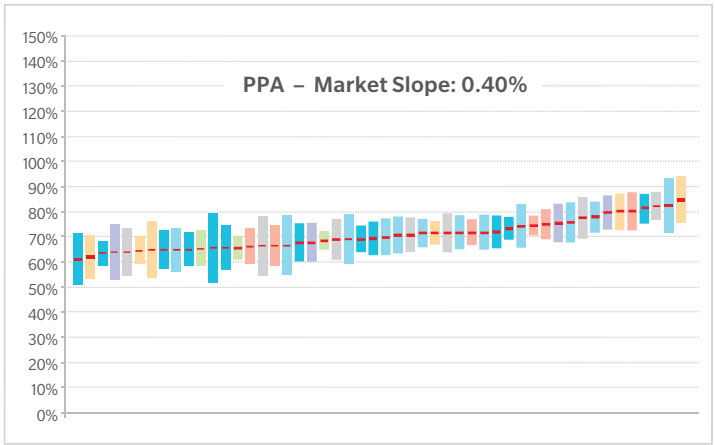
The *market slope* shown in each line's plot measures the disparity in results across companies; a higher market slope means some companies are performing much better than others. We have also colored the volatility bands for each company to indicate the market segment to which they belong.

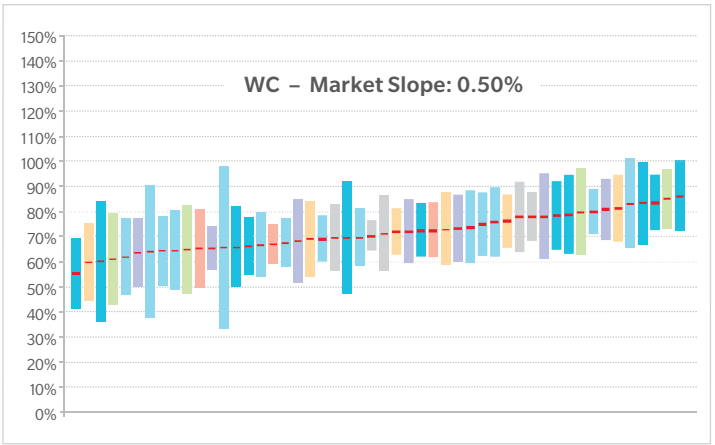












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T 6* | CORRELATION IN ACTUAL ULTIMATE LOSS RATIO INDIVIDUAL COMPANY EXPERIENCE

Explanation

T6* embellishes table T6 to include a graphic for each correlation coefficient. The individual graphics plot the correlation measured for the largest 50 companies writing each pair of business lines. In each graphic, the axes indicate market share, one in the direction of each line of business. Company correlation metrics are indicated with blue bubbles.

The correlation for the industry is shown as a red bubble. Each bubble size represents the correlation value scaled to the industry red bubble. A red bubble does not appear where the correlation is statistically insignificant.

We observe that correlation is strongest at the industry level and clearly a function of market share. In *Applications and Perspectives*, to be released this fall, we will show how this relationship can be modeled.

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC
CAL	100%	80%	56%	87%	0%	60%	71%	52%	58%	91%	60%
CMP		100%	57%	82%	46%	75%	75%	17%	63%	89%	24%
GLC			100%	86%	12%	78%	70%	6%	81%	76%	46%
GLO				100%	7%	82%	86%	26%	83%	98%	47%
HO					100%	20%	2%	1%	23%	17%	-13%
MPLC						100%	91%	-11%	75%	80%	19%
MPLO							100%	-6%	65%	84%	8%
PPA								100%	10%	30%	77%
PLC									100%	82%	36%
PLO										100%	45%
WC											100%

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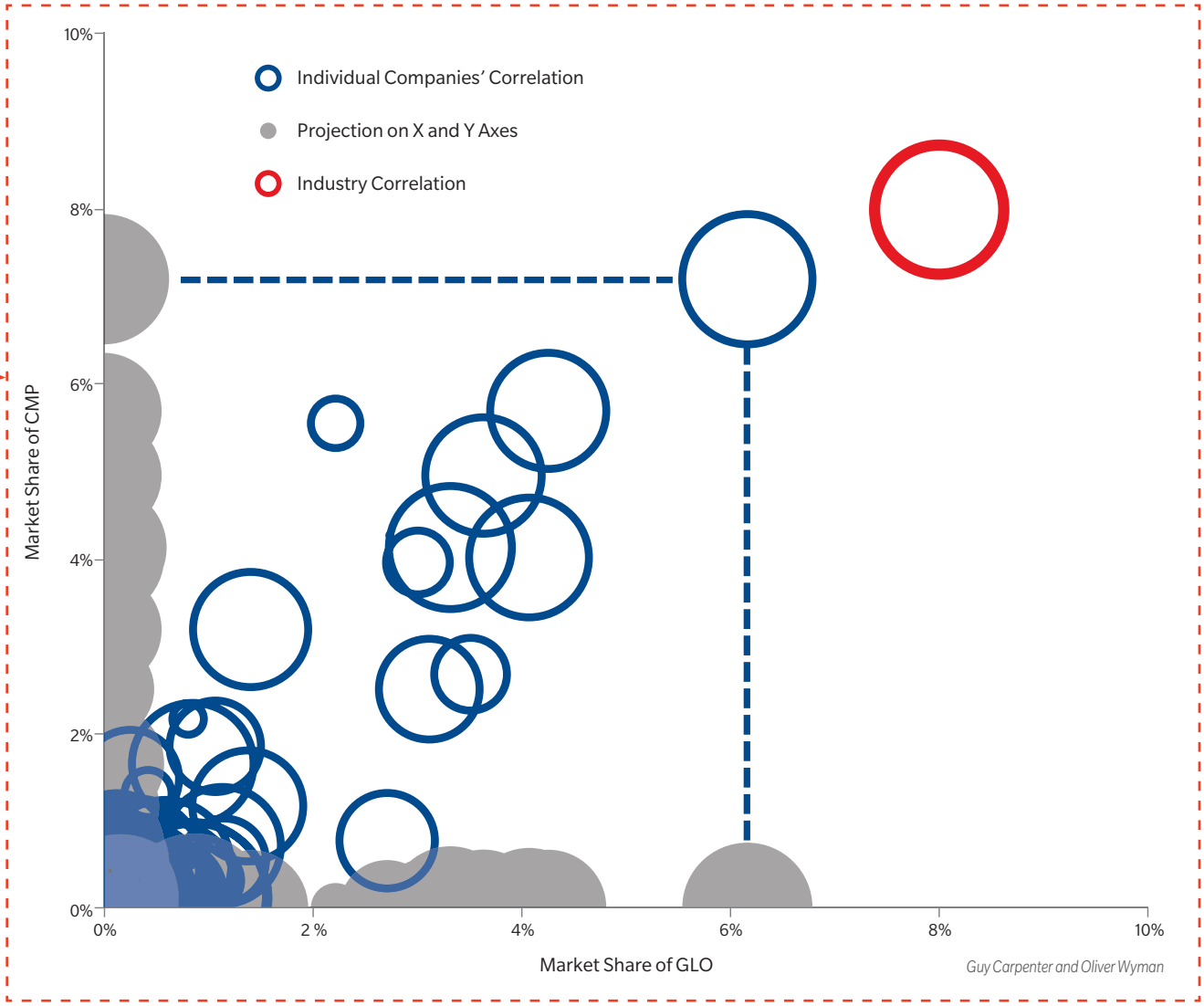
G 5 | CORRELATION IN ACTUAL ULTIMATE LOSS RATIO INDIVIDUAL COMPANY EXPERIENCE PLOTTED AGAINST MARKET SHARE GENERAL LIABILITY (OCCURRENCE) AND COMMERCIAL MULTIPLE PERIL

Explanation

Graphic G5 zooms in on the graphic in table T6* for the pairing of general liability (occurrence) and commercial multiple peril. The red bubble represents the correlation measured from aggregated industry data, 82 percent. Individual companies are shown in blue. The size of each bubble indicates how close the company's experienced correlation is to that of the industry. As market share increases, variety in dot size decreases and the size itself increases to become close to that of red bubble. A similar pattern is observed in the projection on each axis.

The cover art of this report is a three-dimensional view of the same phenomenon for another combination of lines of business: products liability (occurrence) and general liability (occurrence).



3.2 US MARKET SEGMENT TABLES

T7 | ACTUAL ULTIMATE LOSS RATIO, BY LINE OF BUSINESS BY MARKET SEGMENT, NET OF REINSURANCE

Line of Business	Segment	Mean	CV = St Dev/Mean	Minimum	Maximum	AY 2013 Current Booked
		(1)	(2)	(3)	(4)	(5)
Commercial Auto Liability	Top 15 Writers	81%	17%	55%	114%	65%
	National	82%	17%	59%	122%	67%
	Multi Regional	74%	14%	56%	97%	63%
	Southeast/ Gulf	78%	17%	58%	108%	71%
	Midwest	71%	15%	49%	92%	64%
	Northeast / Atlantic	73%	13%	56%	95%	61%
	West	73%	15%	59%	103%	67%
	E&S	67%	18%	51%	92%	67%
Commercial Multi Peril	Top 15 Writers	72%	19%	49%	98%	55%
	National	71%	20%	46%	99%	62%
	Multi Regional	64%	21%	43%	96%	58%
	Southeast/ Gulf	65%	22%	41%	96%	51%
	Midwest	59%	16%	42%	76%	62%
	Northeast / Atlantic	61%	24%	44%	96%	55%
	West	73%	23%	47%	124%	62%
	E&S	66%	26%	41%	102%	60%
General Liability (CM)	Top 15 Writers	70%	39%	38%	125%	68%
	National	61%	21%	37%	87%	61%
	Multi Regional	70%	38%	37%	148%	76%
	Southeast/ Gulf	58%	29%	39%	107%	65%
	Midwest	75%	16%	57%	103%	67%
	Northeast / Atlantic	76%	23%	49%	111%	66%
	West	75%	12%	57%	95%	74%
	E&S	50%	32%	23%	79%	67%
General Liability (Occ)	Top 15 Writers	87%	27%	55%	135%	64%
	National	77%	36%	42%	149%	60%
	Multi Regional	62%	27%	43%	105%	50%
	Southeast/ Gulf	75%	37%	45%	146%	59%
	Midwest	62%	54%	23%	177%	51%
	Northeast / Atlantic	68%	28%	42%	111%	48%
	West	82%	43%	47%	189%	47%
	E&S	62%	24%	43%	90%	61%
Homeowners	Top 15 Writers	72%	20%	56%	130%	53%
	National	69%	12%	56%	84%	56%
	Multi Regional	70%	14%	51%	87%	61%
	Southeast/ Gulf	76%	9%	63%	87%	53%
	Midwest	73%	11%	56%	89%	63%
	Northeast / Atlantic	65%	15%	56%	95%	53%
	West	70%	18%	48%	120%	64%
	E&S	65%	22%	45%	102%	51%
Medical Professional Liability (CM)	Top 15 Writers	94%	43%	40%	166%	76%
	National	72%	36%	28%	114%	64%
	Multi Regional	75%	26%	36%	98%	73%
	Southeast/ Gulf	77%	22%	52%	102%	85%
	Midwest	79%	61%	0%	156%	73%
	Northeast / Atlantic	78%	29%	35%	109%	78%
	West	75%	25%	43%	108%	81%
	E&S					

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T 7 | CONTINUED

Line of Business	Segment	Mean	CV = St Dev/Mean	Minimum	Maximum	AY 2013 Current Booked
		(1)	(2)	(3)	(4)	(5)
Medical Professional Liability (Occ)	Top 15 Writers	103%	30%	59%	166%	65%
	National	94%	50%	40%	196%	57%
	Multi Regional	114%	26%	52%	168%	101%
	Southeast/ Gulf	95%	26%	54%	139%	107%
	Midwest	83%	85%	17%	301%	87%
	Northeast / Atlantic	113%	19%	77%	146%	93%
	West	131%	12%	100%	150%	108%
	E&S	71%	45%	28%	156%	67%
Private Passenger Auto	Top 15 Writers	76%	8%	63%	88%	69%
	National	77%	9%	66%	91%	72%
	Multi Regional	80%	10%	66%	95%	71%
	Southeast/ Gulf	76%	12%	65%	109%	67%
	Midwest	75%	9%	63%	87%	69%
	Northeast / Atlantic	77%	9%	65%	90%	70%
	West	71%	13%	60%	92%	71%
	E&S	65%	11%	53%	81%	67%
Products Liability (CM)	Top 15 Writers	73%	100%	30%	342%	62%
	National	48%	39%	20%	89%	56%
	Multi Regional	62%	33%	40%	106%	51%
	Southeast/ Gulf					
	Midwest					
	Northeast / Atlantic					
	West					
	E&S					
Products Liability (Occ)	Top 15 Writers	102%	32%	56%	177%	67%
	National	67%	40%	28%	125%	63%
	Multi Regional	83%	47%	25%	162%	76%
	Southeast/ Gulf	76%	50%	23%	154%	63%
	Midwest	48%	41%	18%	85%	48%
	Northeast / Atlantic	54%	55%	14%	113%	107%
	West	81%	59%	24%	227%	41%
	E&S	51%	47%	22%	95%	57%
Workers Compensation	Top 15 Writers	85%	17%	60%	107%	71%
	National	77%	16%	53%	100%	66%
	Multi Regional	82%	32%	56%	157%	66%
	Southeast/ Gulf	70%	18%	53%	96%	71%
	Midwest	66%	17%	45%	81%	69%
	Northeast / Atlantic	74%	18%	48%	91%	75%
	West	86%	20%	56%	119%	78%
	E&S	60%	17%	38%	77%	60%

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T8 | CORRELATION BETWEEN ACTUAL ULTIMATE LOSS RATIO BY MARKET SEGMENT, NET OF REINSURANCE (CORRELATIONS THAT ARE SIGNIFICANTLY DIFFERENT FROM ZERO ARE IN BOLD.[5])

Top 15 Writers

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	**78%**	**51%**	**80%**	-2%	**59%**	**77%**	**50%**	37%	**88%**	**64%**	**79%**
CMP	**78%**	100%	44%	**76%**	**46%**	67%	**74%**	21%	42%	**84%**	29%	**65%**
GLC	**51%**	44%	100%	**81%**	2%	**79%**	**40%**	**5%**	**64%**	**79%**	**56%**	**82%**
GLO	**80%**	**76%**	**81%**	100%	8%	**83%**	**74%**	**21%**	**78%**	**95%**	**50%**	**69%**
HO	-2%	**46%**	2%	8%	100%	11%	3%	9%	15%	14%	-13%	21%
MPLC	**59%**	67%	**79%**	**83%**	11%	100%	**66%**	-10%	**60%**	**77%**	**41%**	**86%**
MPLO	**77%**	**74%**	**40%**	**74%**	3%	**66%**	100%	10%	27%	**78%**	12%	**82%**
PPA	**50%**	21%	**5%**	**21%**	9%	-10%	10%	100%	**14%**	**28%**	**68%**	**81%**
PLC	37%	42%	**64%**	**78%**	15%	**60%**	27%	**14%**	100%	**59%**	**41%**	22%
PLO	**88%**	**84%**	**79%**	**95%**	14%	**77%**	**78%**	**28%**	**59%**	100%	**52%**	**73%**
WC	**64%**	29%	**56%**	**50%**	-13%	**41%**	12%	**68%**	**41%**	**52%**	100%	**81%**

National

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	**80%**	60%	**90%**	14%	43%	**76%**	**52%**	77%	**80%**	**66%**	**78%**
CMP	**80%**	100%	54%	**84%**	**52%**	63%	**66%**	**7%**	**84%**	82%	**37%**	**66%**
GLC	60%	54%	100%	**73%**	42%	**77%**	41%	**30%**	67%	**58%**	**64%**	**82%**
GLO	**90%**	**84%**	**73%**	100%	19%	**74%**	**82%**	**26%**	**86%**	**83%**	**53%**	**78%**
HO	14%	**52%**	42%	19%	100%	45%	4%	-13%	48%	28%	11%	23%
MPLC	43%	63%	**77%**	**74%**	45%	100%	41%	**-15%**	71%	48%	21%	**85%**
MPLO	**76%**	**66%**	41%	**82%**	4%	41%	100%	**16%**	76%	80%	36%	**88%**
PPA	**52%**	**7%**	**30%**	**26%**	-13%	**-15%**	**16%**	100%	2%	**32%**	**72%**	**83%**
PLC	77%	**84%**	67%	**86%**	48%	71%	76%	2%	100%	68%	48%	**51%**
PLO	**80%**	82%	**58%**	**83%**	28%	48%	80%	**32%**	68%	100%	**53%**	**76%**
WC	**66%**	**37%**	**64%**	**53%**	11%	21%	36%	**72%**	48%	**53%**	100%	**82%**

Multi Regional

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	**71%**	43%	51%	5%	56%	73%	**40%**	62%	42%	43%	**82%**
CMP	**71%**	100%	64%	31%	29%	74%	70%	-10%	65%	53%	**8%**	**78%**
GLC	43%	64%	100%	55%	46%	**61%**	24%	-34%	46%	**70%**	-22%	23%
GLO	51%	31%	55%	100%	-32%	16%	2%	**36%**	11%	**83%**	40%	**85%**
HO	5%	29%	46%	-32%	100%	39%	47%	-28%	31%	-25%	-28%	**88%**
MPLC	56%	74%	**61%**	16%	39%	100%	**63%**	-31%	36%	33%	-33%	**83%**
MPLO	73%	70%	24%	2%	47%	**63%**	100%	34%	60%	-5%	**36%**	51%
PPA	**40%**	-10%	-34%	**36%**	-28%	-31%	34%	100%	6%	-8%	93%	**76%**
PLC	62%	65%	46%	11%	31%	36%	60%	6%	100%	26%	29%	82%
PLO	42%	53%	**70%**	**83%**	-25%	33%	-5%	-8%	26%	100%	8%	**0%**
WC	43%	**8%**	-22%	40%	-28%	-33%	**36%**	93%	29%	8%	100%	**0%**

Southeast/Gulf

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	**88%**	-43%	**88%**	36%	**68%**	50%	**31%**		75%	24%	**80%**
CMP	**88%**	100%	-59%	76%	**44%**	63%	54%	11%		70%	7%	**63%**
GLC	-43%	-59%	100%	-42%	-12%	-56%	-37%	42%		-53%	65%	**81%**
GLO	**88%**	76%	-42%	100%	37%	54%	**51%**	43%		**68%**	**30%**	**81%**
HO	36%	**44%**	-12%	37%	100%	-13%	-8%	6%		10%	27%	12%
MPLC	**68%**	63%	-56%	54%	-13%	100%	72%	2%		**68%**	-18%	**66%**
MPLO	50%	54%	-37%	51%	-8%	72%	100%	18%		67%	9%	**57%**
PPA	**31%**	11%	42%	43%	6%	2%	18%	100%		6%	**48%**	23%
PLC												
PLO	75%	70%	-53%	**68%**	10%	**68%**	67%	6%		100%	10%	**72%**
WC	24%	7%	65%	**30%**	27%	-18%	9%	**48%**		10%	100%	**81%**

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T8 | CONTINUED

Midwest

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	43%	-27%	27%	19%	-40%	16%	**66%**		-4%	27%	**56%**
CMP	43%	100%	-18%	**52%**	**71%**	21%	**22%**	-8%		64%	-4%	**54%**
GLC	-27%	-18%	100%	51%	3%	-17%	**25%**	25%		-10%	**36%**	**12%**
GLO	27%	**52%**	51%	100%	31%	**-9%**	**77%**	5%		34%	-2%	**55%**
HO	19%	**71%**	3%	31%	100%	37%	17%	-8%		51%	-18%	**36%**
MPLC	-40%	21%	-17%	**-9%**	37%	100%	-26%	-69%		**63%**	-72%	**82%**
MPLO	16%	**22%**	**25%**	**77%**	17%	-26%	100%	-7%		15%	-25%	**72%**
PPA	**66%**	-8%	25%	5%	-8%	-69%	-7%	100%		-50%	**71%**	**83%**
PLC												
PLO	-4%	64%	-10%	34%	51%	**63%**	15%	-50%		100%	-38%	**68%**
WC	27%	-4%	**36%**	-2%	-18%	-72%	-25%	**71%**		-38%	100%	**85%**

Northeast/Atlantic

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	**62%**	0%	56%	-14%	43%	**79%**	58%		**4%**	-3%	**45%**
CMP	**62%**	100%	17%	**56%**	3%	10%	22%	29%		**-17%**	-22%	**68%**
GLC	0%	17%	100%	**6%**	1%	-7%	4%	-1%		6%	24%	-35%
GLO	56%	**56%**	**6%**	100%	11%	78%	51%	2%		**35%**	-53%	**74%**
HO	-14%	3%	1%	11%	100%	28%	-9%	-35%		27%	-21%	1%
MPLC	43%	10%	-7%	78%	28%	100%	**70%**	-15%		61%	-21%	**79%**
MPLO	**79%**	22%	4%	51%	-9%	**70%**	100%	**48%**		15%	**25%**	**59%**
PPA	58%	29%	-1%	2%	-35%	-15%	**48%**	100%		-46%	9%	**83%**
PLC												
PLO	**4%**	**-17%**	6%	**35%**	27%	61%	15%	-46%		100%	-32%	**76%**
WC	-3%	-22%	24%	-53%	-21%	-21%	25%	9%		-32%	100%	**86%**

West

Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	**68%**	29%	51%	13%	27%	51%	**70%**		**53%**	**58%**	**61%**
CMP	**68%**	100%	54%	**57%**	**40%**	48%	74%	40%		**58%**	**33%**	**62%**
GLC	29%	54%	100%	28%	60%	-5%	39%	27%		-5%	-4%	45%
GLO	51%	**57%**	28%	100%	15%	28%	8%	29%		**29%**	16%	**59%**
HO	13%	**40%**	60%	15%	100%	4%	**51%**	11%		**13%**	-7%	4%
MPLC	27%	48%	-5%	28%	4%	100%	**59%**	-7%		26%	36%	**80%**
MPLO	51%	74%	39%	8%	**51%**	**59%**	100%	16%		34%	14%	29%
PPA	**70%**	40%	27%	29%	11%	-7%	16%	100%		**58%**	**64%**	**88%**
PLC												
PLO	**53%**	**58%**	-5%	**29%**	**13%**	26%	34%	**58%**		100%	**55%**	28%
WC	**58%**	**33%**	-4%	16%	-7%	36%	14%	**64%**		**55%**	100%	**78%**

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Line of Business	CAL	CMP	GLC	GLO	HO	MPLC	MPLO	PPA	PLC	PLO	WC	Auto-Correlation
CAL	100%	32%	**83%**	**62%**	-22%		38%	-22%		**51%**	-21%	**50%**
CMP	32%	100%	48%	37%	-19%		**52%**	-60%		23%	-21%	**51%**
GLC	**83%**	48%	100%	**84%**	-40%		**70%**	-47%		**82%**	-14%	**73%**
GLO	**62%**	37%	**84%**	100%	-61%		**73%**	-37%		**83%**	-5%	**85%**
HO	-22%	-19%	-40%	-61%	100%		-43%	-2%		-33%	-41%	-3%
MPLC												
MPLO	38%	**52%**	**70%**	**73%**	-43%		100%	-52%		**70%**	-16%	**63%**
PPA	-22%	-60%	-47%	-37%	-2%		-52%	100%		-47%	36%	35%
PLC												
PLO	**51%**	23%	**82%**	**83%**	-33%		**70%**	-47%		100%	-3%	**78%**
WC	-21%	-21%	-14%	-5%	-41%		-16%	36%		-3%	100%	-7%

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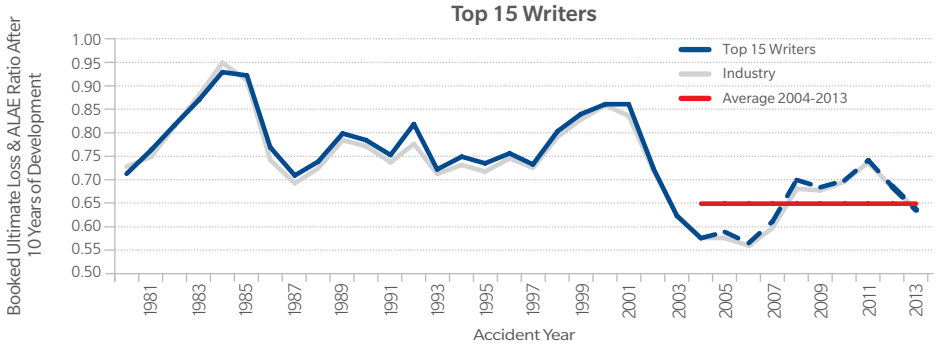
5. These are correlations with p-values less than 5 percent.

GRAPHICS 3.2 LOSS RATIO CYCLES BY US MARKET SEGMENT

G 6 | ACTUAL ULTIMATE LOSS RATIO BY ACCIDENT YEAR, US INDUSTRY BY MARKET SEGMENT, ELEVEN[6] LINES OF BUSINESS COMBINED, NET OF REINSURANCE

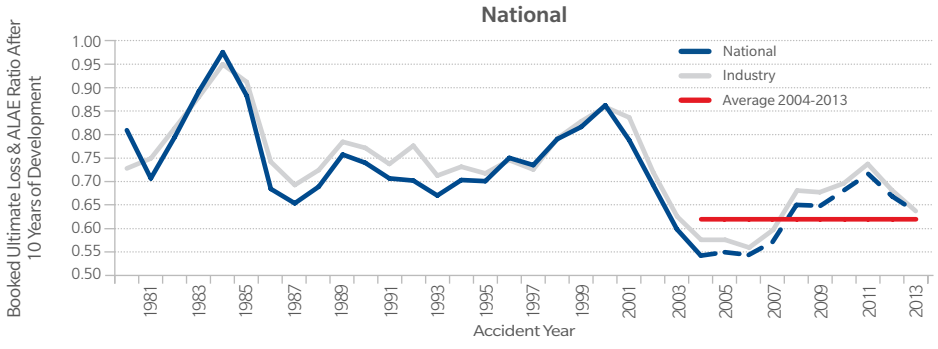
Top 15 Writers



Frequency by Band

Ultimate Loss Ratio Band Low	High	Count
30%	40%	0
40%	50%	0
50%	60%	3
60%	70%	7
70%	80%	15
80%	90%	7
90%	100%	2
100%	110%	0
		34

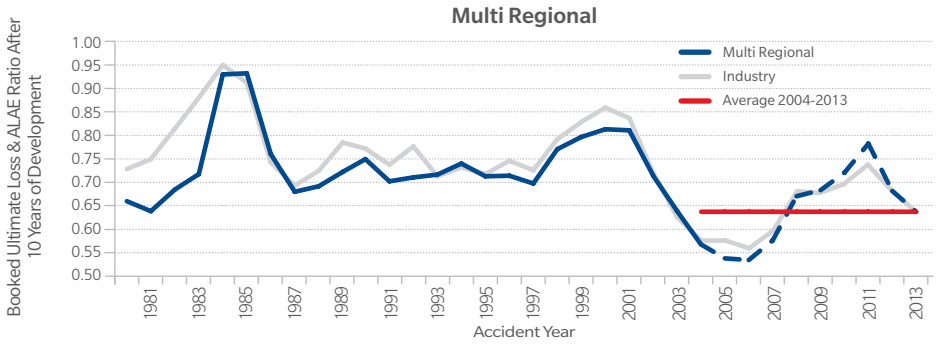
National



Frequency by Band

Ultimate Loss Ratio Band Low	High	Count
30%	40%	0
40%	50%	0
50%	60%	5
60%	70%	10
70%	80%	13
80%	90%	5
90%	100%	1
100%	110%	0
		34

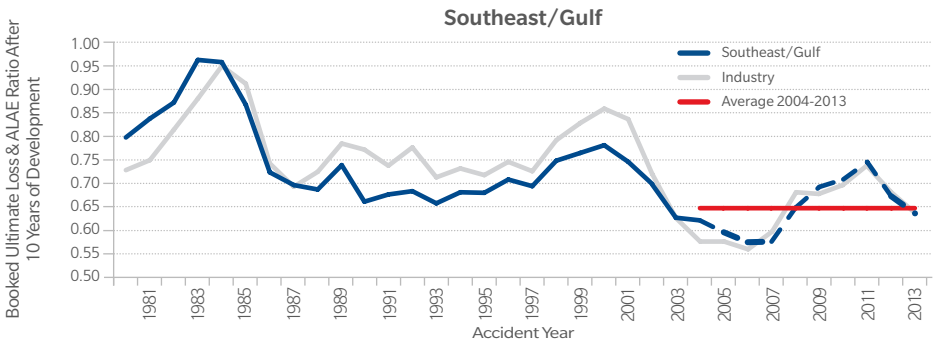
Multi Regional



Frequency by Band

Ultimate Loss Ratio Band Low	High	Count
30%	40%	0
40%	50%	0
50%	60%	4
60%	70%	11
70%	80%	15
80%	90%	2
90%	100%	2
100%	110%	0
		34

Southeast/Gulf



Frequency by Band

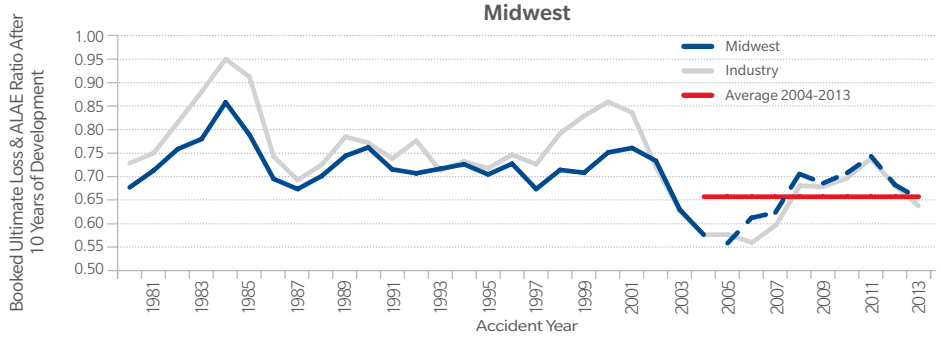
Ultimate Loss Ratio Band Low	High	Count
30%		
40%	50%	0
50%	60%	3
60%	70%	16
70%	80%	10
80%	90%	3
90%	100%	2
100%	110%	0
		34

6. Includes all lines in the ASR: CAL, CMP, GLO, GLC, HO, MPLO, MPLC, PPA, PLO, PLC, and WC.

G 6 | CONTINUED

Booked ULR at less than 10 years of development

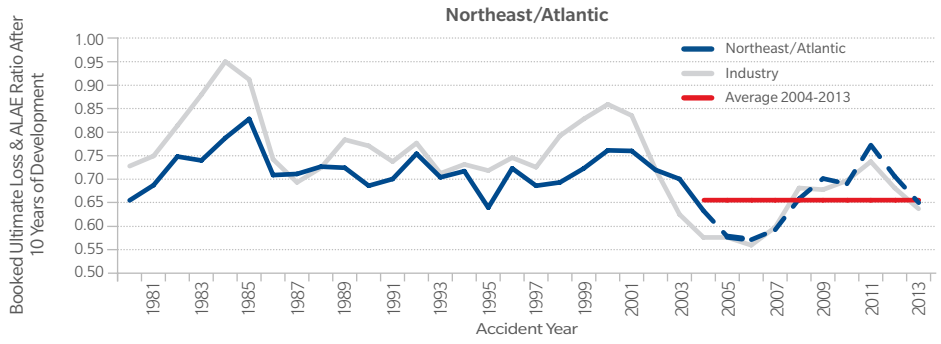
Midwest



Frequency by Band

Ultimate Loss Ratio Band Low	High	Count
30%	40%	0
40%	50%	0
50%	60%	2
60%	70%	10
70%	80%	21
80%	90%	1
90%	100%	0
100%	110%	0
		34

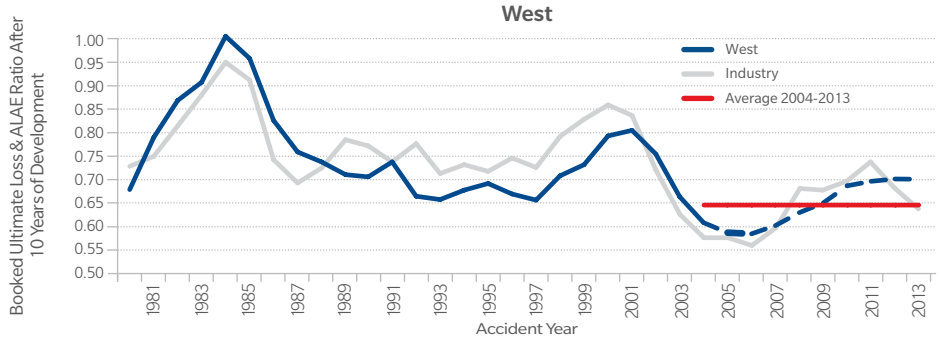
Northeast/Atlantic



Frequency by Band

Ultimate Loss Ratio Band Low	High	Count
30%	40%	0
40%	50%	0
50%	60%	3
60%	70%	10
70%	80%	20
80%	90%	1
90%	100%	0
100%	110%	0
		34

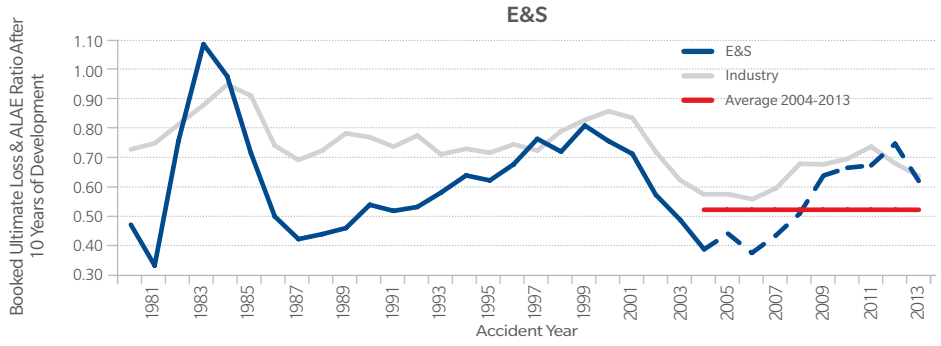
West



Frequency by Band

Ultimate Loss Ratio Band Low	High	Count
30%	40%	0
40%	50%	0
50%	60%	2
60%	70%	14
70%	80%	12
80%	90%	3
90%	100%	2
100%	110%	1
		34

E&S



Frequency by Band

Ultimate Loss Ratio Band Low	High	Count
30%	40%	3
40%	50%	7
50%	60%	7
60%	70%	7
70%	80%	7
80%	90%	1
90%	100%	1
100%	110%	1
		34

IV. RESERVING RISK

4.1 INDUSTRY REVIEW

During 2013, ultimate loss estimates for each historical accident year from 2004 to 2012 were reduced on an all-lines combined basis. This trend in reserve releases has persisted for some years now. Interestingly, the single-year reduction to estimated ultimate loss for the youngest accident year, 2012, was approximately 2 percent and represented the largest such decrease since 2007.

The experience of the last three decades supports the view that the lines of business with highest concentration of bodily injury costs (general liability, products liability, and medical professional liability) present the largest uncertainty in initial reserve estimates. This highlights the need for reserve modules of economic capital models to consider the relationship between these liabilities and macroeconomic drivers.

This is the first year to include metrics for occurrence business separately from metrics for claims made business. Reserves for claims made business have exhibited comparatively more volatility.

Graphic G7 is a signature exhibit for the *ASR* and presents an historical picture of reserve risk, pointing to two key insights:

1. Accident years which develop adversely do so in a consistent pattern.
2. Series of good accident years have historically been followed by a series of bad accident years.

The key driver of the cycle is unexpected (and unpriced) changes in calendar year trends, such as changes in inflation. Indeed, price inflation itself, as well as trends in medical cost utilization, has exhibited cycle patterns which correlate with the reserve cycle.

In order to assess the contribution to total reserve risk posed by the uncertainty in future inflation estimates, Guy Carpenter offers software applying generalized linear modeling (GLM) to model the runoff of unsettled claim values. Our software, MetaRisk Reserve, is licensed by our clients to understand claims inflation trends in loss triangles. These trends generally exceed economic inflation and differ for each book of business.

SINGLE-YEAR RESERVE RISK

For a book of business spanning ten accident years, we can measure the change in the booked reserve as of 12/XX to 12/XX+1. That is, we calculate:

$$\text{Statistic} = \frac{(\text{Reserve at } 12/2013 + \text{Paid During } 12/2013) - \text{Reserve at } 12/2012}{\text{Reserve at } 12/2012}$$

where the reserve at 12/2013 is the total reserve for accident years 2003 to 2012 and the paid during 2013 is also for accident years 2003 to 2012[7].

We repeat this calculation for all periods 12/2012, 12/2011... to 12/1989.

7. It is assumed the booked ultimate loss does not change for the oldest accident year.

T9 | ONE-YEAR DEVELOPMENT OF A GROUP OF TEN ACCIDENT YEARS, BY LINE OF BUSINESS US INDUSTRY IN AGGREGATE, NET OF REINSURANCE

Line of Business	Mean (1)	CV = St Dev/Mean (2)	Minimum (3)	Maximum (4)
CAL	0%	3%	-4%	8%
CMP	-1%	3%	-5%	5%
GLC	0%	6%	-10%	14%
GLO	-1%	3%	-4%	6%
HO	-3%	5%	-9%	11%
MPLC	-4%	8%	-12%	15%
MPLO	-2%	4%	-8%	9%
PPA	-4%	2%	-8%	0%
PLC	-4%	8%	-16%	15%
PLO	1%	4%	-5%	9%
WC	0%	3%	-5%	5%

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ULTIMATE RESERVE RISK

For a book of business spanning ten accident years, we can measure the change in the booked reserve over nine development years, from 12/XX to 12/XX+9. For example, for 2004 we calculate:

$$\text{Statistic} = \frac{\text{Sum [Booked Ultimate Loss at 120 months – Paid Loss at 12/2004]}}{\text{Sum [Booked Ultimate Loss at 12/2004 – Paid Loss at 12/2004]}}$$

where all values are for accident years 1995 to 2004[8].

For example, when we repeat this calculation as of 12/2003, the values are for accident years 1994 to 2003. We perform this calculation for all periods 12/2004, 12/2003... to 12/1989.

T10 | ULTIMATE DEVELOPMENT OF A GROUP OF TEN ACCIDENT YEARS, BY LINE OF BUSINESS US INDUSTRY IN AGGREGATE, NET OF REINSURANCE

Line of Business	Mean (1)	CV = St Dev/Mean (2)	Minimum (3)	Maximum (4)
CAL	1.00	10%	0.87	1.17
CMP	1.04	8%	0.93	1.21
GLC	1.19	34%	0.70	1.60
GLO	1.01	16%	0.86	1.30
HO	0.93	7%	0.85	1.11
MPLC	0.97	18%	0.72	1.26
MPLO	0.93	15%	0.76	1.14
PPA	0.91	7%	0.81	1.00
PLC	0.95	26%	0.68	1.44
PLO	1.21	21%	0.99	1.56
WC	1.03	13%	0.86	1.23

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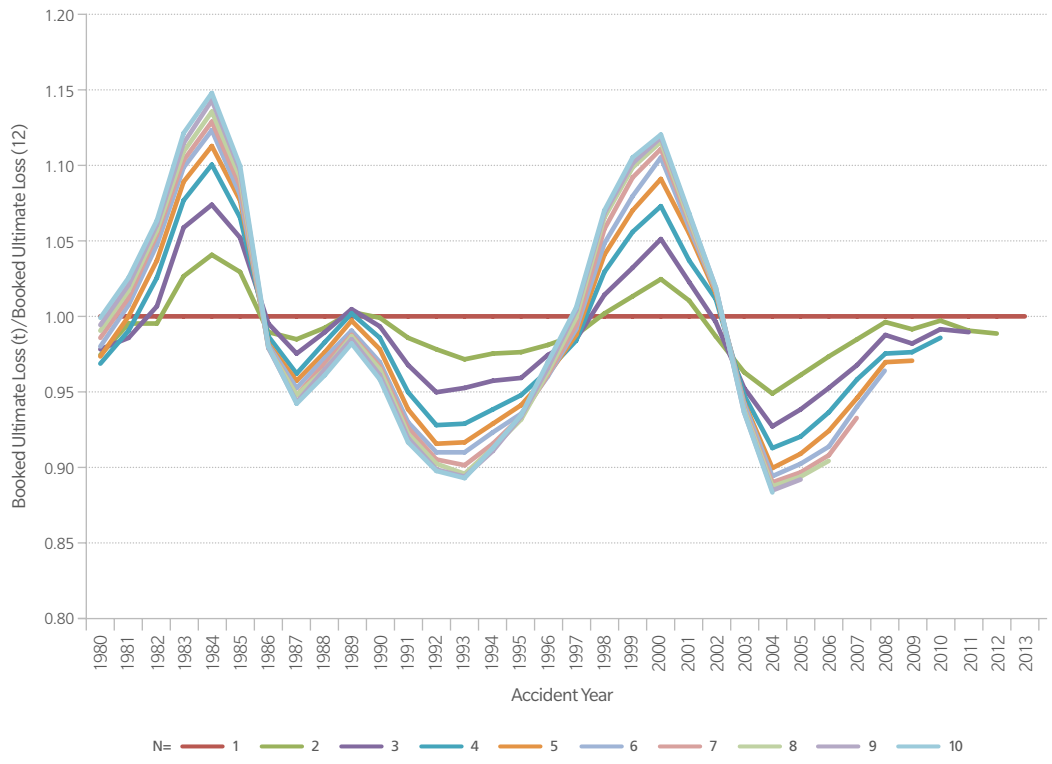
8. It is assumed the booked ultimate loss does not change for the oldest accident year.

GRAPHICS 4.1 RESERVE DEVELOPMENT CYCLE AND FREQUENCY

Explanation

The reserve for a particular accident year is re-estimated periodically. The reserving cycle in Graphic G7 illustrates these re-estimates, where each line is the booked ultimate loss at subsequently older evaluations, indexed on the initial booked ultimate loss at 12 months of development, set at 1.00. For example, after ten years of re-estimates, the booked ultimate loss for accident year 2000 was 12 percent higher than the initial estimate of the booked ultimate loss (made in December 2000).

G 7 | BOOKED ULTIMATE LOSS AFTER N YEARS OF DEVELOPMENT / BOOKED ULTIMATE LOSS AFTER ONE YEAR'S DEVELOPMENT, BY ACCIDENT YEAR
U.S. INDUSTRY IN AGGREGATE, ELEVEN LINES OF BUSINESS COMBINED[9], NET OF REINSURANCE



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.80	0.85	0
0.85	0.90	4
0.90	0.95	7
0.95	1.00	11
1.00	1.05	4
1.05	1.10	4
1.10	1.15	4
1.15	1.20	0
		34

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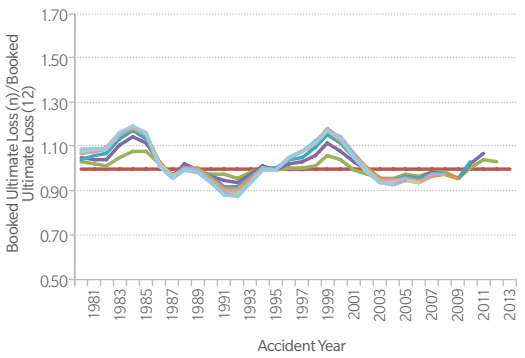
9. *Includes all lines in the ASR: CAL, CMP, GLO, GLC, HO, MPLO, MPLC, PPA, PLO, PLC, and WC.*

G 8 | BOOKED ULTIMATE LOSS AFTER N YEARS OF DEVELOPMENT/BOOKED ULTIMATE LOSS AFTER ONE YEAR'S DEVELOPMENT, BY ACCIDENT YEAR, U.S. INDUSTRY IN AGGREGATE BY LINE OF BUSINESS, NET OF REINSURANCE

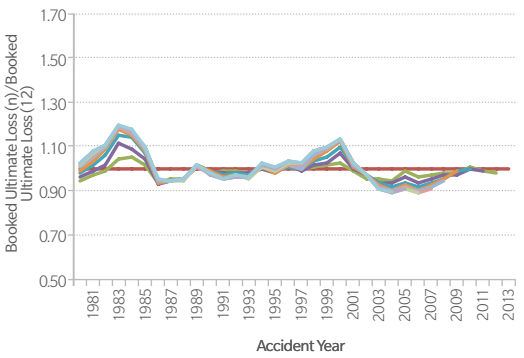
Commercial Auto Liability



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.40	0.55	0
0.55	0.70	0
0.70	0.85	0
0.85	1.00	17
1.00	1.15	13
1.15	1.30	4
1.30	1.45	0
1.45	1.60	0
		34

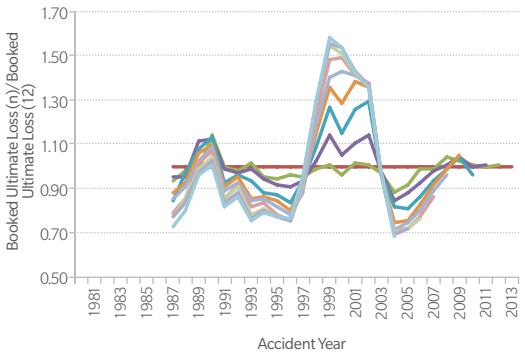
Commercial Multi Peril



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.40	0.55	0
0.55	0.70	0
0.70	0.85	0
0.85	1.00	18
1.00	1.15	14
1.15	1.30	2
1.30	1.45	0
1.45	1.60	0
		34

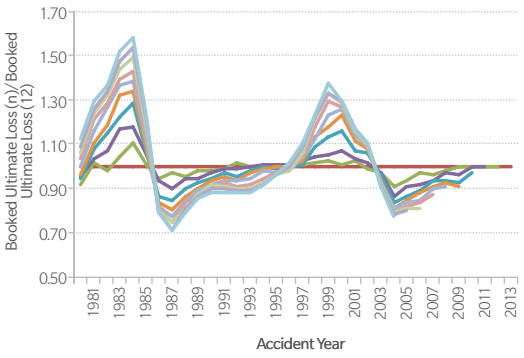
General Liability (Claims Made)



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.40	0.55	0
0.55	0.70	1
0.70	0.85	9
0.85	1.00	7
1.00	1.15	5
1.15	1.30	0
1.30	1.45	3
1.45	1.60	2
		27

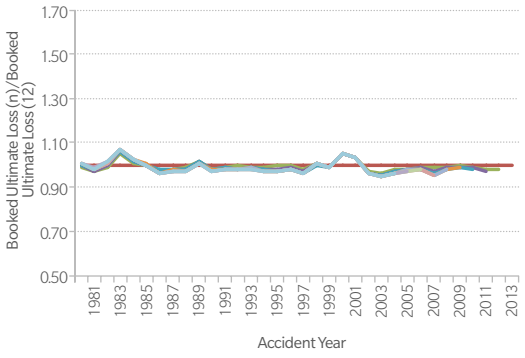
General Liability (Occurrence)



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.40	0.55	0
0.55	0.70	0
0.70	0.85	6
0.85	1.00	14
1.00	1.15	5
1.15	1.30	5
1.30	1.45	2
1.45	1.60	2
		34

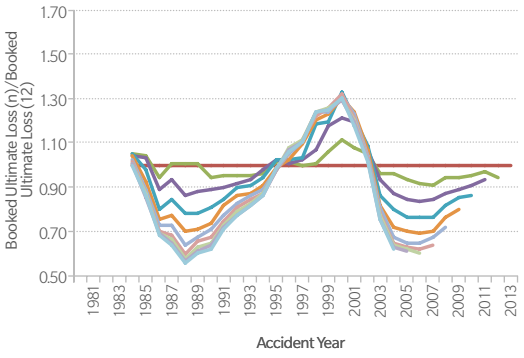
Homeowners



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.40	0.55	0
0.55	0.70	0
0.70	0.85	0
0.85	1.00	24
1.00	1.15	10
1.15	1.30	0
1.30	1.45	0
1.45	1.60	0
		34

Medical Professional Liability (Claims Made)



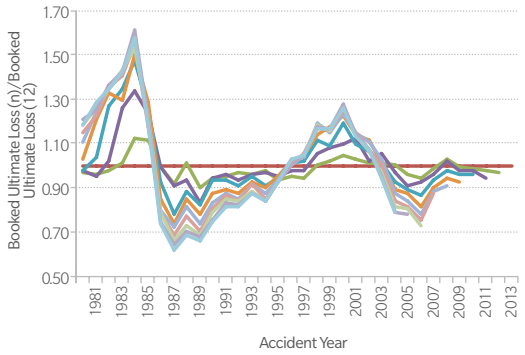
Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.40	0.55	0
0.55	0.70	9
0.70	0.85	6
0.85	1.00	6
1.00	1.15	5
1.15	1.30	3
1.30	1.45	1
1.45	1.60	0
		30

G 8 | CONTINUED

N= 1 2 3 4 5 6 7 8 9 10

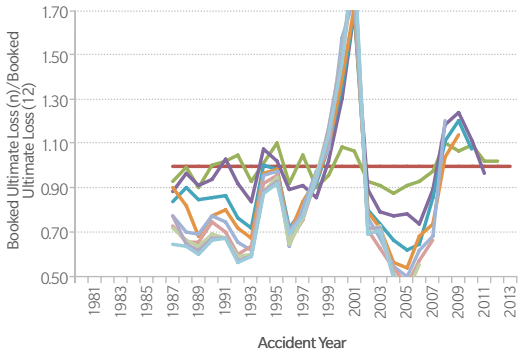
Medical Professional Liability (Occurrence)



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.40	0.55	0
0.55	0.70	3
0.70	0.85	8
0.85	1.00	9
1.00	1.15	5
1.15	1.30	6
1.30	1.45	2
1.45	1.60	1
		34

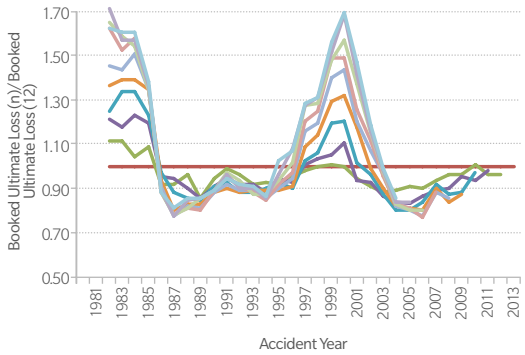
Products Liability (Claims Made)



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.40	0.55	2
0.55	0.70	11
0.70	0.85	2
0.85	1.00	4
1.00	1.15	5
1.15	1.30	1
1.30	1.45	0
1.45	1.60	1
		26

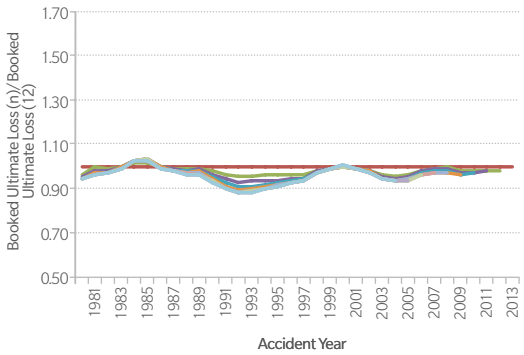
Products Liability (Occurrence)



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.40	0.55	0
0.55	0.70	0
0.70	0.85	3
0.85	1.00	16
1.00	1.15	3
1.15	1.30	2
1.30	1.45	2
1.45	1.60	2
		28

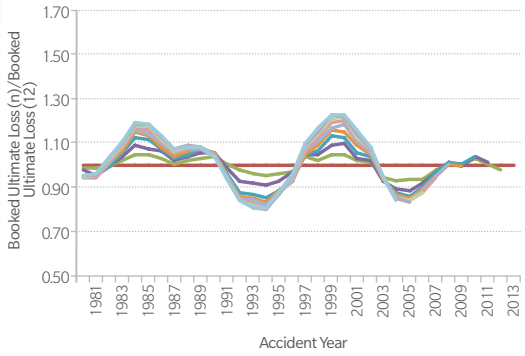
Private Passenger Auto



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.40	0.55	0
0.55	0.70	0
0.70	0.85	0
0.85	1.00	30
1.00	1.15	4
1.15	1.30	0
1.30	1.45	0
1.45	1.60	0
		34

Workers Compensation



Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.40	0.55	0
0.55	0.70	0
0.70	0.85	5
0.85	1.00	10
1.00	1.15	13
1.15	1.30	6
1.30	1.45	0
1.45	1.60	0
		34

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4.2 US MARKET SEGMENT TABLES

T11 | ONE-YEAR DEVELOPMENT OF A GROUP OF TEN ACCIDENT YEARS BY MARKET SEGMENT, NET OF REINSURANCE

Line of Business	Segment	Mean	CV = St Dev/Mean	Minimum	Maximum
		(1)	(2)	(3)	(4)
Commercial Auto Liability	Top 15 Writers	0%	3%	-4%	7%
	National	-1%	3%	-6%	9%
	Multi Regional	2%	4%	-5%	15%
	Southeast/ Gulf	0%	4%	-8%	12%
	Midwest	-2%	5%	-9%	8%
	Northeast / Atlantic	2%	4%	-5%	8%
	West	-3%	4%	-12%	8%
	E&S	-2%	6%	-13%	8%
Commercial Multi Peril	Top 15 Writers	-1%	3%	-7%	4%
	National	0%	4%	-6%	11%
	Multi Regional	-2%	4%	-8%	7%
	Southeast/ Gulf	-2%	5%	-9%	9%
	Midwest	-6%	5%	-14%	8%
	Northeast / Atlantic	1%	5%	-6%	21%
	West	1%	8%	-11%	16%
	E&S	-4%	11%	-19%	23%
General Liability (CM)	Top 15 Writers	0%	8%	-11%	16%
	National	-1%	4%	-10%	8%
	Multi Regional	-2%	7%	-12%	10%
	Southeast/ Gulf	-9%	3%	-13%	-3%
	Midwest	-2%	13%	-15%	35%
	Northeast / Atlantic	-7%	4%	-14%	0%
	West	-13%	5%	-23%	-4%
	E&S	-6%	6%	-17%	4%
General Liability (Occ)	Top 15 Writers	-1%	3%	-5%	7%
	National	-2%	3%	-7%	4%
	Multi Regional	-1%	8%	-12%	20%
	Southeast/ Gulf	-2%	4%	-7%	5%
	Midwest	-7%	5%	-16%	2%
	Northeast / Atlantic	-2%	5%	-8%	10%
	West	-5%	11%	-20%	33%
	E&S	-2%	6%	-15%	7%
Homeowners	Top 15 Writers	-3%	6%	-9%	14%
	National	-5%	4%	-10%	6%
	Multi Regional	-6%	4%	-11%	4%
	Southeast/ Gulf	-6%	6%	-15%	5%
	Midwest	-7%	3%	-12%	-1%
	Northeast / Atlantic	-5%	4%	-13%	2%
	West	-8%	6%	-18%	15%
	E&S	-2%	19%	-30%	40%
Medical Professional Liability (CM)	Top 15 Writers	0%	14%	-11%	42%
	National	-1%	13%	-23%	26%
	Multi Regional	-7%	6%	-17%	4%
	Southeast/ Gulf	-6%	6%	-14%	6%
	Midwest	-3%	5%	-12%	6%
	Northeast / Atlantic	-7%	5%	-18%	0%
	West	-10%	4%	-20%	0%
	E&S				

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T11 | CONTINUED

Line of Business	Segment	Mean	CV = St Dev/Mean	Minimum	Maximum
		(1)	(2)	(3)	(4)
Medical Professional Liability (Occ)	Top 15 Writers	2%	8%	-8%	20%
	National	-6%	9%	-28%	17%
	Multi Regional	-1%	7%	-14%	11%
	Southeast/ Gulf	-4%	6%	-16%	8%
	Midwest	-8%	18%	-48%	58%
	Northeast / Atlantic	-3%	3%	-6%	3%
	West	-15%	19%	-61%	7%
	E&S	-4%	9%	-17%	22%
Private Passenger Auto	Top 15 Writers	-4%	3%	-9%	0%
	National	-3%	3%	-8%	1%
	Multi Regional	-3%	4%	-11%	3%
	Southeast/ Gulf	-1%	3%	-9%	6%
	Midwest	-4%	3%	-8%	3%
	Northeast / Atlantic	-5%	3%	-9%	1%
	West	-6%	6%	-17%	2%
	E&S	-7%	19%	-47%	33%
Products Liability (CM)	Top 15 Writers	1%	16%	-18%	48%
	National	-11%	11%	-25%	12%
	Multi Regional	-8%	5%	-18%	1%
	Southeast/ Gulf				
	Midwest				
	Northeast / Atlantic				
	West				
	E&S				
Products Liability (Occ)	Top 15 Writers	2%	4%	-4%	10%
	National	-3%	6%	-15%	10%
	Multi Regional	5%	18%	-11%	63%
	Southeast/ Gulf	-1%	10%	-21%	15%
	Midwest	1%	10%	-16%	30%
	Northeast / Atlantic	1%	14%	-27%	38%
	West	5%	18%	-20%	40%
	E&S	-8%	9%	-22%	17%
Workers Compensation	Top 15 Writers	0%	3%	-5%	7%
	National	0%	4%	-6%	7%
	Multi Regional	0%	10%	-7%	43%
	Southeast/ Gulf	-2%	4%	-9%	7%
	Midwest	-2%	6%	-12%	9%
	Northeast / Atlantic	-1%	4%	-6%	9%
	West	-5%	4%	-16%	2%
	E&S	-1%	6%	-11%	8%

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T12 | ULTIMATE DEVELOPMENT OF A GROUP OF TEN ACCIDENT YEARS BY MARKET SEGMENT, NET OF REINSURANCE

Line of Business	Segment	Mean	CV = St Dev/Mean	Minimum	Maximum
		(1)	(2)	(3)	(4)
Commercial Auto Liability	Top 15 Writers	0.99	10%	0.86	1.17
	National	0.99	8%	0.86	1.16
	Multi Regional	0.99	6%	0.91	1.14
	Southeast/ Gulf	0.89	9%	0.75	1.05
	Midwest	0.97	8%	0.88	1.16
	Northeast / Atlantic	1.12	11%	0.97	1.30
	West	0.89	7%	0.77	1.01
	E&S	0.84	16%	0.63	1.13
Commercial Multi Peril	Top 15 Writers	1.03	8%	0.91	1.18
	National	1.06	11%	0.92	1.30
	Multi Regional	1.03	12%	0.90	1.26
	Southeast/ Gulf	1.08	17%	0.78	1.31
	Midwest	0.90	8%	0.80	1.01
	Northeast / Atlantic	0.96	7%	0.83	1.04
	West	1.34	19%	0.90	1.56
	E&S	1.18	31%	0.77	1.51
General Liability (CM)	Top 15 Writers	1.25	41%	0.66	1.76
	National	0.98	19%	0.69	1.27
	Multi Regional	0.95	19%	0.70	1.18
	Southeast/ Gulf	0.65	6%	0.56	0.74
	Midwest	1.00	20%	0.81	1.24
	Northeast / Atlantic	0.77	6%	0.68	0.82
	West	0.55	7%	0.46	0.64
	E&S	0.69	16%	0.43	0.88
General Liability (Occ)	Top 15 Writers	0.99	15%	0.85	1.27
	National	0.98	11%	0.85	1.18
	Multi Regional	0.94	17%	0.79	1.35
	Southeast/ Gulf	1.00	17%	0.79	1.28
	Midwest	0.84	8%	0.75	1.03
	Northeast / Atlantic	0.97	12%	0.77	1.13
	West	1.01	28%	0.74	1.70
	E&S	1.01	13%	0.82	1.16
Homeowners	Top 15 Writers	0.95	9%	0.85	1.17
	National	0.93	5%	0.83	1.03
	Multi Regional	0.86	5%	0.80	0.99
	Southeast/ Gulf	0.86	9%	0.71	1.00
	Midwest	0.87	5%	0.78	0.95
	Northeast / Atlantic	0.88	7%	0.77	1.01
	West	0.84	9%	0.76	1.11
	E&S	0.95	34%	0.47	1.39
Medical Professional Liability (CM)	Top 15 Writers	1.13	33%	0.73	1.73
	National	0.98	20%	0.63	1.26
	Multi Regional	0.84	15%	0.66	1.03
	Southeast/ Gulf	0.84	10%	0.65	0.98
	Midwest	0.97	8%	0.86	1.11
	Northeast / Atlantic	0.76	8%	0.63	0.88
	West	0.71	11%	0.55	0.89
	E&S				

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T12 | CONTINUED

Line of Business	Segment	Mean	CV = St Dev/Mean	Minimum	Maximum
		(1)	(2)	(3)	(4)
Medical Professional Liability (Occ)	Top 15 Writers	1.12	28%	0.78	1.52
	National	0.83	10%	0.67	1.01
	Multi Regional	1.02	11%	0.91	1.13
	Southeast/ Gulf	0.82	8%	0.66	0.94
	Midwest	0.68	19%	0.47	0.98
	Northeast / Atlantic	0.92	4%	0.87	0.97
	West	0.81	11%	0.68	0.90
	E&S	0.75	14%	0.38	0.89
Private Passenger Auto	Top 15 Writers	0.91	7%	0.80	1.00
	National	0.91	6%	0.82	1.01
	Multi Regional	0.88	8%	0.76	0.99
	Southeast/ Gulf	0.93	6%	0.86	1.07
	Midwest	0.92	5%	0.83	1.01
	Northeast / Atlantic	0.88	6%	0.80	0.98
	West	0.83	12%	0.64	0.99
	E&S	0.73	10%	0.59	0.90
Products Liability (CM)	Top 15 Writers	1.25	45%	0.70	2.06
	National	0.68	16%	0.46	0.98
	Multi Regional	0.75	10%	0.62	0.89
	Southeast/ Gulf				
	Midwest				
	Northeast / Atlantic				
	West				
	E&S				
Products Liability (Occ)	Top 15 Writers	1.25	19%	1.06	1.57
	National	0.99	28%	0.67	1.48
	Multi Regional	1.19	37%	0.87	1.82
	Southeast/ Gulf	1.13	27%	0.66	1.60
	Midwest	1.33	28%	0.92	1.96
	Northeast / Atlantic	1.09	27%	0.53	1.58
	West	1.34	24%	0.90	1.67
	E&S	1.07	31%	0.61	1.48
Workers Compensation	Top 15 Writers	1.08	16%	0.86	1.34
	National	1.02	11%	0.85	1.19
	Multi Regional	0.99	12%	0.85	1.30
	Southeast/ Gulf	0.96	10%	0.84	1.17
	Midwest	0.96	14%	0.77	1.19
	Northeast / Atlantic	0.96	12%	0.79	1.13
	West	0.82	12%	0.68	1.00
	E&S	1.05	7%	0.98	1.17

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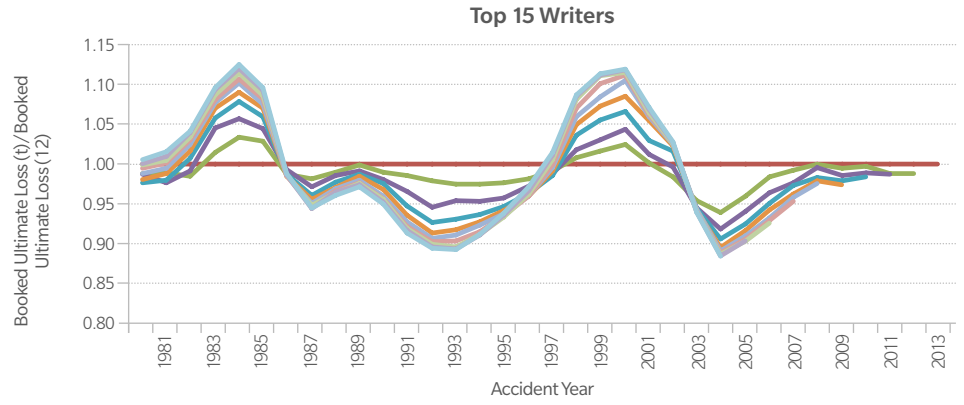
GRAPHICS 4.2 RESERVE DEVELOPMENT CYCLE AND FREQUENCY BY US MARKET SEGMENT

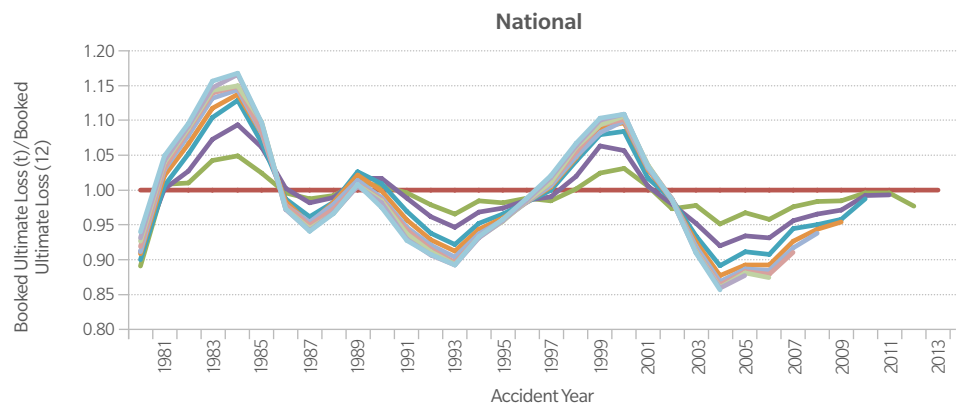
G 9 | BOOKED ULTIMATE LOSS AFTER N YEARS OF DEVELOPMENT/BOOKED ULTIMATE LOSS AFTER ONE YEAR DEVELOPMENT, BY ACCIDENT YEAR

BY MARKET SEGMENT, ELEVEN[10] LINES OF BUSINESS COMBINED, NET OF REINSURANCE

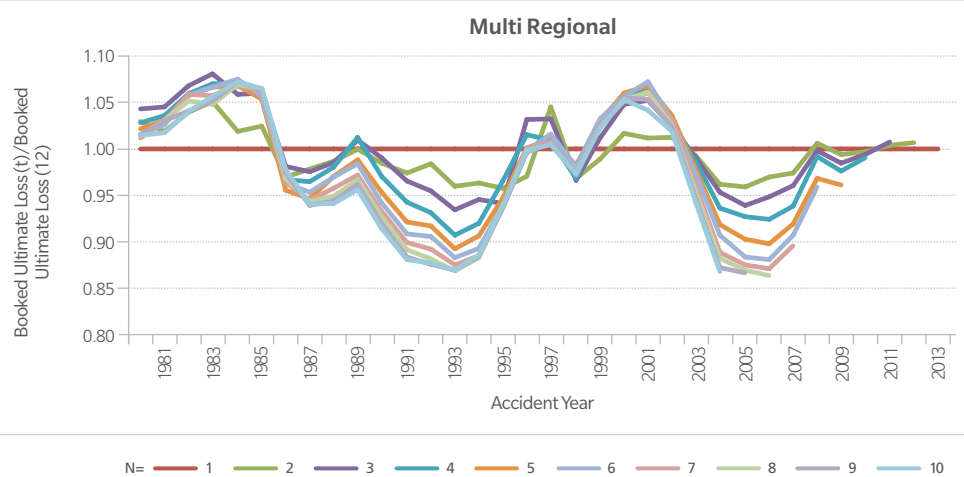


Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.70	0.80	0
0.80	0.90	3
0.90	1.00	18
1.00	1.10	10
1.10	1.20	3
1.20	1.30	0
1.30	1.40	0
1.40	1.50	0
1.50	1.60	0
1.60	1.70	0
		34



Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.70	0.80	0
0.80	0.90	4
0.90	1.00	18
1.00	1.10	8
1.10	1.20	4
1.20	1.30	0
1.30	1.40	0
1.40	1.50	0
1.50	1.60	0
1.60	1.70	0
		34



Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.70	0.80	0
0.80	0.90	8
0.90	1.00	12
1.00	1.10	14
1.10	1.20	0
1.20	1.30	0
1.30	1.40	0
1.40	1.50	0
1.50	1.60	0
1.60	1.70	0
		34

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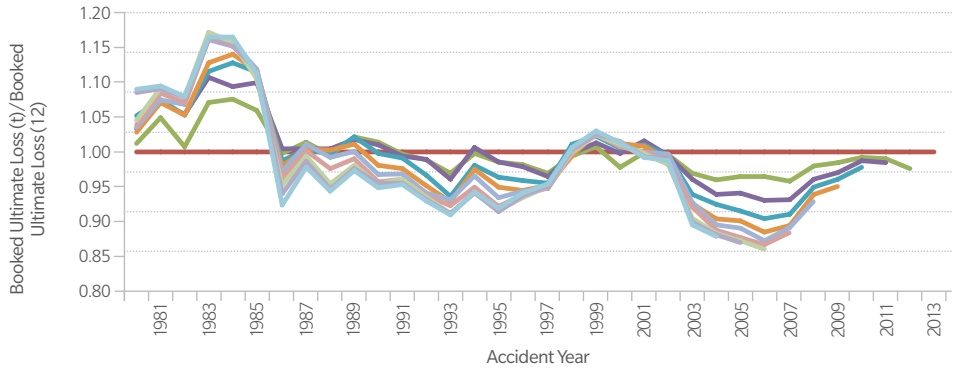
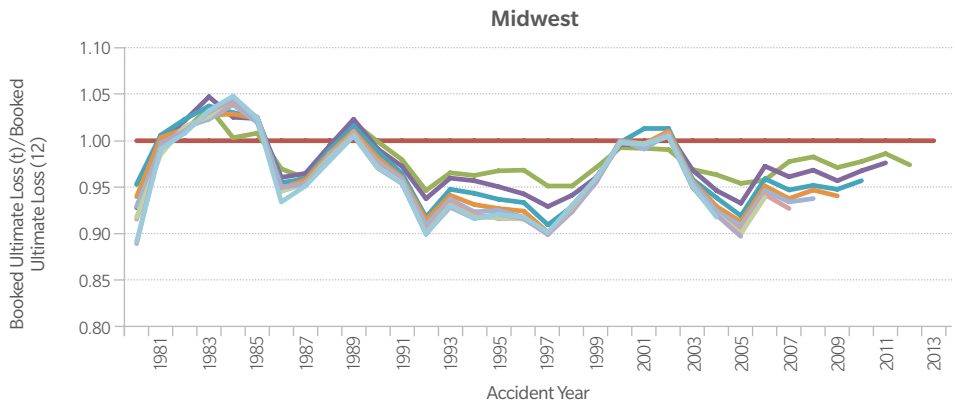
10. Includes all lines in the ASR: CAL, CMP, GLO, GLC, HO, MPLO, MPLC, PPA, PLO, PLC, and WC.

G 9 | CONTINUED

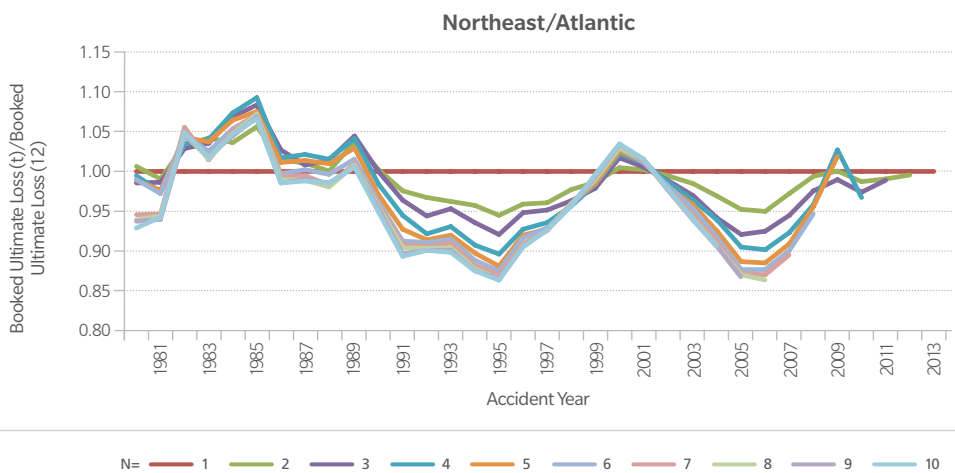


Frequency by Band

Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.70	0.80	0
0.80	0.90	5
0.90	1.00	19
1.00	1.10	7
1.10	1.20	3
1.20	1.30	0
1.30	1.40	0
1.40	1.50	0
1.50	1.60	0
1.60	1.70	0
		34



Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.70	0.80	0
0.80	0.90	3
0.90	1.00	24
1.00	1.10	7
1.10	1.20	0
1.20	1.30	0
1.30	1.40	0
1.40	1.50	0
1.50	1.60	0
1.60	1.70	0
		34



Current Booked Ultimate/Booked Ultimate at 12 mos. Low	High	# of Years
0.70	0.80	0
0.80	0.90	7
0.90	1.00	18
1.00	1.10	9
1.10	1.20	0
1.20	1.30	0
1.30	1.40	0
1.40	1.50	0
1.50	1.60	0
1.60	1.70	0
		34

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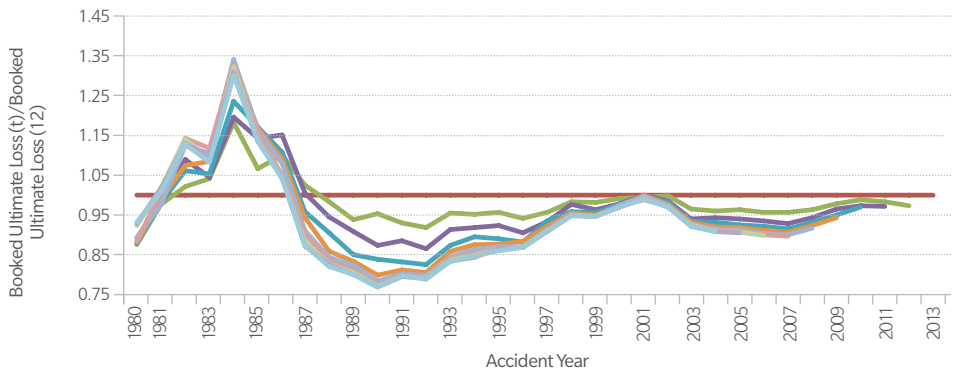
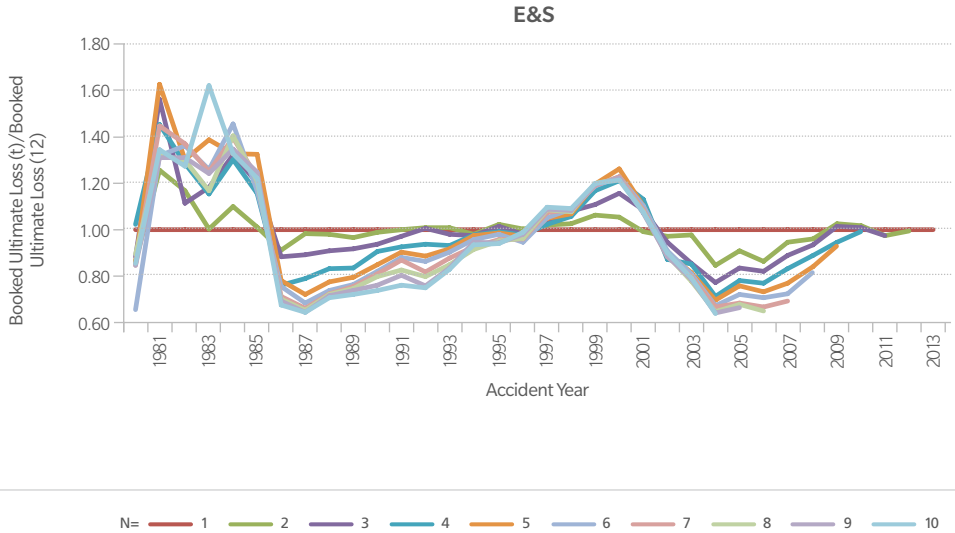
G 9 | CONTINUED

Frequency by Band



Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.70	0.80	3
0.80	0.90	9
0.90	1.00	15
1.00	1.10	4
1.10	1.20	2
1.20	1.30	0
1.30	1.40	1
1.40	1.50	0
1.50	1.60	0
1.60	1.70	0
		34



Current Booked Ultimate/Booked Ultimate at 12 mos.		# of Years
Low	High	
0.70	0.80	12
0.80	0.90	4
0.90	1.00	7
1.00	1.10	4
1.10	1.20	1
1.20	1.30	3
1.30	1.40	2
1.40	1.50	0
1.50	1.60	0
1.60	1.70	1
		34

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V. APPENDIX

A.1 DEFINITION OF US MARKET SEGMENTS

The market segments illustrated in this report were defined carefully to provide insurers of various sizes and geographic footprints a collection of risk benchmarks closely reflecting their own profile. The four regional market segments can also provide insight into the dynamics of regions into which a company is considering expansion.

The market segments include:

Segment	Count	2013 Total DWP (Millions)	Average DWP	% of Industry
Top 15 Writters	15	291,651.4	19,443.4	54%
National	40	81,589.8	2,039.7	15%
Multi Regional	17	19,534.3	1,149.1	4%
Southeast/Gulf	305	32,591.9	106.9	6%
Midwest	184	21,998.8	119.6	4%
Northeast/Atlantic	263	27,516.1	104.6	5%
West	130	17,627.2	135.6	3%
Industry	1426	539,174.6	378.1	91%
E&S	52	9,160.6	176.1	2%

As noted in Section 1.2, 472 companies (approximately 9 percent of the industry) are not allocated to any of the market segments in the *ASR* due to lack of credible loss history or a risk profile not consistent with one of the defined segments. Furthermore, the excess & surplus (E&S) segment is not defined such that it is mutually exclusive with the rest; hence it cannot be included in the summation.

The initial universe of companies reviewed to construct these market segments was A.M. Best's listing of insurance groups and unaffiliated single entities, excluding E&S. From that universe, companies with less than USD1 million in direct written premium were removed due to lack of loss experience sufficiently credible for computing the risk benchmarks. The insurance groups and unaffiliated single entities were then segmented as follows:

- **Top 15 Writers:** include the 15 largest insurance groups in the industry based on total direct written premium. These companies manage their insurance risks on a national scale.
- **National:** includes companies with at least USD500 million in direct written premium and write in at least 40 states.
- **Multi Regional:** includes companies with at least USD500 million in direct written premium and write in at least 25 states.
- The four regional segments (**Northeast/Atlantic, Southeast/Gulf, Midwest, and West**) represent the rest of the companies which write business in fewer than 25 states or have less than USD500 million in direct written premium. The following table details the states associated with each region:
- The **E&S** market segment includes entities defined as "Surplus Lines" writers according to A.M. Best's database. E&S writers with less than USD5 million in direct written premium were removed. Also removed were companies with zero net written premium and companies whose assumed written premium from affiliates was greater than 25 percent of direct plus reinsurance assumed from affiliates written premium. These definitions were necessary to remove companies which may be identified as an E&S writer but because of the effects of intercompany reinsurance or pooling the net results do not reflect the E&S business.

Northeast/ Atlantic	Southwest Gulf	Midwest	West
CT	AL	IA	AK
DC	AR	IL	AZ
DE	FL	IN	CA
MA	GA	KS	CO
MD	LA	KY	HI
ME	MS	MI	ID
NH	NC	MN	MT
NJ	OK	MO	NM
NY	SC	ND	NV
PA	TN	NE	OR
RI	TX	OH	UT
VT	VA	SD	WA
WV		WI	WY

The subsequent tables provide a listing of the companies within each market segment:

Top 15 Writers

Company	2013 Total DWP ($000s)
State Farm Mutl Automobile Ins	54,199.7
Liberty Mutual	28,416.3
Allstate Insurance Group	27,583.6
Berkshire Hathaway Inc.	23,156.0
Travelers Companies Inc.	22,615.1
Farmers Insurance Group of Companies	18,284.1
Nationwide Mutual Group	18,078.4
American International Group	18,053.5

Company	2013 Total DWP ($000s)
Progressive Corp.	17,547.8
USAA Insurance Group	14,501.2
Zurich American Insurance Company	10,984.9
Hartford Mutual Insurance Co.	10,854.1
Chubb Corp.	9,782.8
ACE Ltd.	9,082.9
Continental Casualty Company	8,511.0

National: 40 Companies

Company	2013 Total DWP ($000s)
American Family Mutual	6,608.6
American Financial Group, Inc.	4,885.7
W. R. Berkley Corporation	4,512.5
Assurant Group	4,101.6
Cincinnati Financial Corp.	4,084.5
Allianz Group	3,934.5
Hanover Insurance Company	3,823.3
MetLife Inc.	3,446.1
Old Repub International Corp.	3,375.7
Factory Mutual Insurance Company	3,083.4
Fairfax Financial Holdings	2,910.4
AmTrust Financial Services	2,834.8
Wells Fargo & Co.	2,603.6
Markel Corp.	2,319.2
Selective Insurance Group Inc.	2,135.2
State Auto Group	1,995.3
Sentry Insurance a Mutual Co.	1,918.6
Amica Mutual Insurance Co.	1,792.8
Starr International Co.	1,609.2
Kemper Corp.	1,442.1

Company	2013 Total DWP ($000s)
Employers Mutual Casualty Co.	1,417.4
Federated Mutual Group	1,186.7
American National Property & Casualty Company	1,181.6
HCC Insurance Holdings Group	1,129.6
White Mountains Insurance	1,122.2
Radian Guaranty Inc.	1,050.2
Argo Group International	996.3
CUMIS Insurance Society, Inc.	995.0
Mortgage Guaranty Insurance Corporation	973.7
IAT Reinsurance (US)	901.4
IDS Property Casualty Insurance Company	900.0
Ironshore Inc.	889.3
State National Insurance Company, Inc.	816.6
RLI Insurance Company	756.4
Catlin Group Ltd	742.0
Star Insurance Company	735.4
Navigators Group Inc.	693.1
Church Mutual Insurance Co.	618.6
Horace Mann Insurance Company	588.6
ProSight Specialty Ins Grp Inc	479.0

Multi Regional: 17 Companies

Company	2013 Total DWP ($000s)
Auto-Owners Insurance Co.	5,527.8
COUNTRY Mutual Insurance Company	2,348.5
Ohio Farmers Insurance Co.	1,694.0
GuideOne Mutual & GuideOne Specialty Mutual	1,138.6
Main Street America Group	971.6
Accident Fund Insurance Company of America	870.1
Utica Mutual Insurance Company	769.6
ProAssurance Corp.	762.8
United Fire Group Inc.	754.6

Company	2013 Total DWP ($000s)
Doctors Company, An Interinsurance Exchange	736.1
Amerisure Mutual Insurance Company	691.3
Employers Insurance Group	680.5
Wright Insurance Group LLC	585.8
Virginia Surety Co.	546.2
Aspen American Insurance Co. & Aspen Specialty Insurance Co.	527.5
John Deere Insurance Co.	474.7
American Hallmark Ins Co of TX	454.7

Source: Guy Carpenter

Continued Overleaf

Southeast/Gulf: 305 Companies

Company	2013 Total DWP ($000s)
Alfa Mutual Insurance Company	1,096.8
Texas Mutual Insurance Co.	1,031.4
ARX Holding Corp.	1,022.5
Texas Farm Bureau	1,002.3
NC Farm Bureau Insurance Group	932.2
Republic Companies, Inc.	736.4
Tower Hill Group	693.6
Home State Insurance Grp Inc.	633.4
FCCI Insurance Group	593.5
Central Mutual of Ohio Group	533.7
Old Amer County Mutl Fire Ins Co. & Old Amer Indemnity Co.	519.7
Loya Insurance Company	495.7
GA Farm Bureau Mutual Ins Co.	449.8
Germania Mutual Group	425.1
Direct General Group	405.0
PMI Mortgage Insurance Co.	375.8
SPARTA Insurance Company	372.0
AMERISAFE Combined Group	364.2
United P&C Insurance Co.	343.9
Houston International Insurance Group	342.1
BCS Insurance Co.	341.8
Safeway Insurance Company	334.4
Brotherhood Mutual Ins Co.	324.0
HCI Group, Inc.	319.1
Universal Insurance Holdings of North America	314.1
Florida Peninsula Holdings LLC	310.4
CompSource OK	310.1
Affirmative Insurance Company	304.0
American Coastal Ins Co.	300.2
Courtesy Insurance Co.	298.9
ACCC Insurance Co.	293.6
St. Johns Insurance Co.	282.1
Western World Insurance Company	279.7
Virginia Farm Bureau Mutual Insurance Company	276.8
Geovera Holdings, Inc. Group	274.1
Sompo Japan Insurance Company of America	269.1
Fortegra Financial Corp.	260.9
Oklahoma Farm Bureau Insurance Group	252.8
Privilege Underwriters Reciprocal Exchange	251.3
Federated National Ins Co.	249.5
Farm Bureau Mutl Ins Co. of AR	246.4
United Automobile Insurance Group	244.4
MAG Mutual Group	241.9
Global Indemnity Group	232.4
Security First Insurance Co.	228.7
First Financial Insurance Company	228.0
Consolidated Lloyds	219.6
Guarantee Insurance Co.	215.6
James River Insurance Group	214.5

Company	2013 Total DWP ($000s)
Loudoun Mutual Insurance Co.	38.7
Agricultural Workers Mutl Auto	37.7
Synergy Insurance Co.	37.0
Modern USA Insurance Co.	36.8
FHM Insurance Co.	36.2
Southern General Insurance Co.	35.5
Southern Mutual Church Ins Co.	35.5
Traders Insurance Co.	35.5
PLICO Inc.	35.1
Assure Holding Corp.	33.3
Repwest Insurance Co.	31.9
Discovery Insurance Co.	31.9
Aetna Insurance Co. of CT	31.3
Plateau Casualty Insurance Co.	31.3
Southern Trust Insurance Co.	29.8
SUNZ Insurance Co.	29.4
Peachtree Casualty Ins Co.	29.2
Florida Doctors Insurance Co.	28.9
AF&L Holdings LLC	28.0
Carolina Mutual Insurance Inc.	25.8
Access Home Insurance Co.	25.5
American Risk Insurance Co.	25.4
United Home Insurance Co.	25.2
Leon Hix Group	23.4
Granada Insurance Co.	23.0
Star Casualty Insurance Co.	22.5
Star & Shield Ins Exchange	22.4
Zale Indemnity Co.	22.1
Retailers Casualty Ins Co.	22.0
Texas Lawyers' Ins Exchange	21.7
Southern States Ins Exchange	19.5
Responsive Auto Insurance Co.	19.2
N.C. Grange Mutual Ins Co.	19.2
Forestry Mutual Insurance Co.	19.2
US Lloyds Insurance Co.	18.5
First Benefits Ins Mutual Inc.	18.4
Harbor Insurance Co.	18.1
Seven Seas Insurance Co.	17.8
Titan Insurance Co. Inc. A RRG	17.8
Frank Winston Crum Ins Co	17.7
Lawyers Mutl Liab Ins Co of NC	17.6
Lion Insurance Co (FL)	17.5
American Federated Ins Co.	17.0
Centennial Casualty Co.	16.9
Work First Casualty Co.	16.7
Southwest Physicians RRG Inc.	16.7
Madison Insurance Co.	16.6
LEMIC Insurance Co.	16.4
Global Hawk Insurance Co. RRG	16.0

Southeast/Gulf: 305 Companies – *Continued*

Company	2013 Total DWP ($000s)
Torus Insurance Holdings Limited	211.4
People's Trust Insurance Co.	211.2
Amer Integrity Ins Co. of FL	207.6
Pennsylvania Lumbermens Group	205.6
Bankers Insurance Company	202.5
Builders Mutual Insurance Company	200.8
South Carolina Farm Bureau Mutual Insurance Company	198.8
Canal Insurance Company	198.7
MGA Insurance Co.	191.5
Essent Guaranty, Inc. & Essent Guaranty of PA, Inc.	186.2
Louisiana Workers' Comp Corp.	185.3
Hochheim Prairie Insurance Group	182.1
Auto Club Insurance Co. of FL	181.8
First Acceptance Insurance Company, Inc.	177.4
National Lloyds Insurance Co.	174.0
Windhaven Insurance Co.	173.3
Southern Fidelity Insurance Co	170.2
Maxum Specialty Insurance Group	168.2
Builders Insurance	168.0
International Fidelity Ins Co.	166.7
Cherokee Insurance Co.	164.0
Federated Rural Electric Ins	157.5
State Volunteer Mutual	152.3
Cypress Insurance Group Inc.	146.6
Jewelers Mutual Insurance Co.	146.6
LA Farm Bureau Mutual Ins Co.	146.5
Southport Lane Group (G)	144.0
Dealers Assurance Co.	138.7
Gulfstream P&C Insurance Co.	128.1
Securian Casualty Co.	127.1
Kinsale Insurance Co.	124.6
Florida Family Insurance Company	124.3
Texas FAIR Plan Association	122.7
Heritage P&C Insurance Co.	122.5
National American Insurance Co	122.4
First Protective Insurance Co.	116.0
Ark Royal Insurance Co.	115.7
Lumbermen's Undrwtg Alliance	114.5
Amer Farmers & Ranchers Mutl	109.4
RetailFirst Insurance Group	108.6
Service Lloyds Insurance Co.	108.6
Ohio Indemnity Co.	108.5
Olympus Insurance Co.	105.5
Fidelity Fire & Casualty Co.	105.2
FFVA Mutual Insurance Co.	103.6
Southern Oak Insurance Co.	103.0
Medical Insurance Group	101.3
Ranchers & Farmers Ins Co.	99.5
Atlantic Casualty Insurance Company	92.7

Company	2013 Total DWP ($000s)
Southern Pioneer P&C Ins Co.	15.9
Normandy Harbor Insurance Co.	15.2
Premier Group Insurance Co.	14.2
Capson Physicians Ins Co.	14.1
Capacity Insurance Co.	13.5
Avatar P&C Insurance Co.	13.4
Kingsway Amigo Insurance Co.	13.3
Florida Lawyers Mutual Ins Co.	12.8
Lancet Indemnity RRG Inc.	12.5
Building Industry Ins Assn Inc	12.2
USPlate Glass Insurance Co.	11.9
Standard Casualty Co.	11.6
Union Mutual Insurance Co.	11.6
Texas Medical Liability Trust	11.0
MedMal Direct Insurance Co.	10.9
States Self-Insurers RRG Inc.	10.9
USA Insurance Co.	10.9
Delta Lloyds Ins Co of Houston	10.7
Farmers Mutl Fire Ins Co. (OK)	10.7
New Home Warranty Ins Co A RRG	10.4
Casualty Corp. of America Inc.	10.3
Oklahoma Attorneys Mutl Ins Co	10.0
Farmers Mutual of Tennessee	9.9
Mental Health RRG Inc.	9.5
Accredited Surety & Cas Co.	9.5
Chase Family Ltd.	9.4
Spartan Property Insurance Co.	9.4
Hlthcr Providers Ins Co. (RRG)	9.3
Old Glory Insurance Co.	9.2
ARCOA RRG Inc.	8.8
Agent Alliance Insurance Co.	8.5
Coastal Insurance Co.	8.4
Samaritan RRG Inc.	8.4
Health Care Casualty RRG Inc.	8.4
Halifax Mutual Insurance Co.	8.3
Circle Star Insurance Co A RRG	8.2
German American Farm Mutual	8.0
Petroleum Casualty Co.	7.6
Texas Hospital Ins Exchange	7.5
CompTrust AGC Mutl Captive Ins	7.3
Agents Mutual Insurance Co.	7.3
Colonial Insurance Group	7.1
Versant Casualty Insurance Co.	7.1
Georgia Dealers Insurance Co.	7.0
Baldwin Mutual Insurance Co.	6.9
Family Security Insurance Co.	6.8
Hlthcr Underwriters Grp of FL	6.7
American Resources Ins Co.	6.6
Dealers Choice Mutual Ins Inc.	6.4

Continued Overleaf

Southeast/Gulf: 305 Companies – *Continued*

Company	2013 Total DWP ($000s)
National Group	90.4
Atain Insurance Companies	89.2
LUBA Casualty Insurance Co.	84.3
RVOS Farm Mutual Insurance Co.	83.5
Southern Fidelity P&C Inc.	78.7
Armed Forces Ins Exchange	77.9
Sunshine State Insurance Co.	76.7
Capitol Preferred Insurance Co	75.4
Auto Club South Insurance Co.	75.3
AssuranceAmerica Insurance Co.	72.0
Gray Insurance Company	70.2
T.H.E. Insurance Co.	67.4
Lighthouse Property Ins Corp.	64.6
Stonetrust Commercial Ins Co.	62.5
CorePointe Insurance Co.	61.8
SureTec Financial Corp.	59.2
Accident Insurance Co.	58.2
GoAuto Insurance Co.	58.2
Comp Options Insurance Co.	58.0
Homeowners of America Ins Co.	58.0
Elephant Insurance Co.	57.9
Triton Insurance Co.	57.5
Independence American Ins Co.	56.6
Conifer Holdings Inc.	56.0
Pre-Paid Legal Casualty Inc.	55.7
National Security Fire & Casualty Company	55.7
Yosemite Insurance Co.	53.4
Health Care Indemnity Inc.	53.3
CEM Insurance Co.	52.9
Centauri Specialty Ins Co.	52.3
National Unity Insurance Co.	51.9
OOIDA RRG Inc.	51.1
Northern Neck Insurance Co.	50.9
American Agricultural Ins Co.	49.7
American Contractors Insurance Group	49.3
American Traditions Ins Co.	47.4
Sentruity Casualty Co.	46.0
Southern General Financial Group	45.7
Southern Vanguard Insurance Co	45.0
Triangle Insurance Co.	44.7
Cornerstone National Ins Co.	43.9
Weston Insurance Co.	43.7
Prepared Insurance Co.	43.7
Carolina Motor Club Inc.	43.3
Ophthalmic Mutl Ins Co (A RRG)	43.3
Grte Co. of North America USA	42.6
Ascendant Commercial Ins Inc.	42.0
Healthcare Undrwtg Co. A RRG	41.9
Atlantic American / Delta Grp	41.7

Company	2013 Total DWP ($000s)
VFH Captive Insurance Company	6.4
Preferred Auto Insurance Co.	6.2
Security Plan Fire Ins Co.	6.1
HlthCare Mutual Captive Ins Co	6.0
Caregivers United Liab Ins Co.	6.0
Med Mal RRG Inc.	6.0
SteadPoint Insurance Co.	5.8
Coastal American Insurance Co.	5.5
Physicians Prof Liab RRG Inc.	5.5
First Mutual Insurance Co.	5.5
Sunland RRG Inc.	4.7
TX Med Liab Ins Undrwtg Assn.	4.4
United Bus. Insurance Co.	4.3
GHS P&C Insurance Co.	4.1
National Medical Prof RRG Inc.	4.0
Cmnty Blood Centers' Exchange	4.0
Golden Insurance Co. A RRG	3.9
Physicians Casualty RRG Inc.	3.9
Ethio-American Insurance Co.	3.8
Carolina Farmers Mutual Ins Co	3.7
MidSouth Mutual Insurance Co.	3.7
Farmers Union Mutl Ins Co (AR)	3.7
Great Central Fire Ins Co.	3.7
Tank Owner Members Ins Co.	3.6
Attorneys Insurance Mutual	3.5
Waco Fire & Casualty Ins Co.	3.4
Arkansas Mutual Insurance Co.	3.3
Palmetto Surety Corp.	3.3
Road Contractors Mutual Ins Co	3.2
AGIC Inc.	3.0
Roche Surety & Casualty Co.	2.9
Piedmont Mutual Insurance Co.	2.9
Alamance Farmers' Mutl Ins Co.	2.8
Physicians Indemnity RRG Inc.	2.8
Heartland Healthcare Recpl RRG	2.8
Spartan Insurance Co.	2.8
Century Mutual Insurance Co.	2.6
Ponce De Leon LTC RRG Inc.	2.6
Cruden Bay RRG Inc.	2.5
Gables RRG Inc.	2.5
British American Insurance Co.	2.4
Warranty Underwriters Ins Co.	2.3
Novant Health RRG Inc.	2.2
Fredericksburg Prof Risk	2.2
Red Clay RRG Inc.	1.9
Delta Fire & Casualty Ins Co.	1.8
Emergency Medicine RRG Inc.	1.7
Virginia Physicians RRG Inc.	1.5
MAKE Transportation Ins Inc.	1.5

Southeast/Gulf: 305 Companies – *Continued*

Company	2013 Total DWP ($000s)
ALPS P&C Ins Co.	41.4
Wellington Insurance Co.	40.8
Rockingham Insurance Company	40.8
Alabama Municipal Ins Corp.	40.7
Consumers Insurance USA Inc.	39.9
Sawgrass Mutual Insurance Co.	39.7

Company	2013 Total DWP ($000s)
Med Prvdrs Mutl Ins Co. A RRG	1.5
Gulf Guaranty Insurance Co.	1.2
St. Charles Insurance Co. RRG	1.2
Yel Co. Insurance	1.2
Slavonic Mutual Fire Ins Assn.	1.2

Midwest: 184 Companies

Company	2013 Total DWP ($000s)
Auto Club Insurance Association	2,098.4
Shelter Mutual Insurance Company	1,349.3
Farm Bureau Property & Casualty Insurance Company	1,343.4
Grange Mutual Cas Co	1,191.4
ACUITY A Mutual Insurance Co.	1,124.3
West Bend Mutual Insurance Co.	901.4
Kentucky Farm Bureau Mutual Insurance Company	901.3
Motorists Insurance Group	691.3
Farmers Mutual Hail Insurance Company of Iowa	664.6
Farm Bureau Mutual Insurance Company of Michigan	636.0
Frankenmuth Insurance	593.0
United Farm Family Mutual Insurance Company	584.7
Farmers Automobile Ins Assn. & Farmers Automobile Mgmt Corp.	567.9
SECURA Insurance Companies	466.2
Western National Mutual Insurance Company	410.9
Grinnell Mutual Group	394.8
Hastings Mutual Insurance Co.	393.6
North Star Companies Group	328.6
Safe Auto Insurance Co.	286.5
Columbia Mutual Insurance Company	286.0
Farmers Mutual Ins Co. of NE	285.8
American Road Insurance Co.	259.8
ISMIE Mutual Insurance Company	245.1
Caterpillar Insurance Co.	235.7
Western Reserve Mutual Casualty Company and its Affiliates	198.0
Ohio Mutual Insurance Group	197.0
Pioneer State Mutual Ins Co.	196.8
IMT Mutual Holding Group	184.2
Missouri Farm Bureau Fedn	183.8
Indiana Farmers Mutual Ins Co.	183.1
Society Insurance A Mutual Co.	177.3
American Access Casualty Co.	176.1
MO Employers Mutual Ins Co.	167.0
Rural Mutual Insurance Co.	165.5
Nodak Mutual Insurance Co.	160.3
Farmers Alliance Mutual Insurance Company	156.4
Old United Casualty Co.	153.9
SFM Mutual Insurance Co.	146.1
Kentucky Employers' Mutual Ins	143.8

Company	2013 Total DWP ($000s)
Bar Plan Group	18.8
Northern Mutual Insurance Co.	18.1
IL State Bar Assn. Mutl Ins Co	17.7
Diamond Insurance Co.	16.8
Manufacturing Technology Mutl	16.5
NHRMA Mutual Insurance Co.	16.4
Fairmont Farmers Mutual Ins Co	15.7
First Guard Insurance Co.	15.7
American Alliance Casualty Co.	15.6
Michigan Prof Ins Exchange	15.2
Northwest G.F. Mutual Ins Co.	14.9
National Guardian RRG Inc.	13.9
Direct Auto Insurance Co.	13.7
InsureMax Insurance Co.	13.5
Mennonite Mutual Insurance Co.	13.1
WEA P&C Insurance Co.	13.0
Cities & Villages Mutl Ins Co.	13.0
Interstate Bankers Casualty Co	12.9
Governmental Interinsurance	12.0
Transit General Insurance Co.	11.9
Mutual of Wausau Ins Corp.	11.6
Medical Alliance Insurance Co.	11.2
SU Insurance Co.	10.9
MPM Grp	10.9
McMillan Warner Mutual Ins Co.	10.2
Affinity Mutual Insurance Co.	9.5
Kansas Mutual Insurance Co.	9.4
NAMIC Insurance Co.	9.4
Emergency Physicians Ins Co.	8.5
OHA Insurance Solutions Inc.	8.3
CHC Casualty RRG Inc.	7.9
Ohio Bar Liability Ins Co.	7.4
Lawyers Mutual Ins Co. of KY	7.3
Kentuckiana Medical Recpl RRG	7.1
Universal Surety Company & Inland Insurance Company	6.5
Specialty Risk of America	6.3
Districts Mutual Insurance	6.1
Maple Valley Mutual Ins Co.	6.1
Health Care Insurance Recpl	6.1

Continued Overleaf

Midwest: 184 Companies – *Continued*

Company	2013 Total DWP ($000s)
Celina Mutual Group	119.2
Michigan Millers Mutual Ins Co	115.1
Lyndon Property Insurance Co.	112.7
Midwest Family Mutual Ins Co.	110.4
Pharmacists Mutual Ins Co.	108.2
NCMIC Insurance Company	101.7
Preferred Professional Ins Co.	100.7
Badger Mutual Insurance Co.	99.6
Merchants Bonding Co. (Mutual)	82.2
Wisconsin Mutual Insurance Co.	68.6
Producers Agriculture Insurance Company	68.1
Undrwrtrs at Lloyd's London-KY	62.2
Buckeye Insurance Group	61.1
Underwriters at Lloyd's London	61.0
Dakota Group	59.5
Cameron Insurance Companies	58.6
Farmers Union Mutual Insurance	52.8
Rockford Mutual Insurance Co.	47.7
RAM Mutual Insurance Co.	47.5
De Smet Farm Mutual Insurance Co. of South Dakota	46.6
Standard Mutual Insurance Co.	45.9
Michigan Commercial Ins Mutual	45.6
Germantown Mutual Insurance Co	45.6
Wolverine Mutual Insurance Co.	44.2
IL Cas Co. (A Mutual Ins Co.)	43.0
Healthcare Services Group	39.5
Minnesota Lawyers Mutl Ins Co.	36.1
Prime Insurance Company	35.6
Madison Mutual Ins Co. (IL)	34.9
ReliaMax Insurance Company	30.9
Wayne Mutual Insurance Co.	28.7
Midwest Insurance Co.	27.8
First Chicago Insurance Co.	27.6
Kentucky National Insurance Co	27.5
Bremen Farmers Mutual Ins Co.	27.0
Center Mutual Insurance Co.	26.2
Ohio FAIR Plan Undrwtg Assn.	25.9
Amer Excess Ins Exchange RRG	25.3
Kansas Medical Mutual Ins Co.	24.8
Granite Re Inc.	24.8
United Equitable Group Ltd.	24.5
League of WI Municipalities	24.3
Marysville Mutual Insurance Co	23.6
Wisconsin Reinsurance Corp.	23.3
Amer Inter-Fidelity Exchange	22.7
Wisconsin County Mutual Group	21.9
R.V.I. America Insurance Co.	21.4
Caring Communities a Recpl RRG	21.0
IU Health RRG Inc.	20.8

Company	2013 Total DWP ($000s)
Hartland Mutual Insurance Co.	6.0
Hlthcr Underwriters Group Mutl	6.0
Retailers Mutual Insurance Co.	5.8
Great Plains Casualty Inc.	5.5
Kentucky Hospital Ins Co A RRG	5.3
Galen Insurance Co.	5.2
Indiana Healthcare Recpl RRG	5.1
WI Municipal Mutual Ins Co.	5.0
Wisconsin Lawyers Mutl Ins Co.	4.9
Mount Carroll Mutual Ins Co.	4.7
Great Lakes Mutual Ins Co.	4.7
Saint Lukes Health System RRG	4.6
US Insurance Co. of America	4.5
National Insurance Co. of WI	4.5
Missouri Doctors Mutual Ins Co	4.3
Hlthcr Underwriters Grp of KY	4.2
Missouri Valley Mutual Ins Co.	4.2
Mound Prairie Mutual Ins Co.	4.2
Farmers & Mrchnt Mutl Fire Ins	4.2
Physicians Prof Indem Assn.	4.1
Doctors Direct Insurance Inc.	4.0
Little Black Mutual Ins Co.	3.8
Heartland Mutual Insurance Co.	3.8
Hay Creek Mutual Insurance Co.	3.6
Bloomfield Mutual Insurance Co	3.6
Whitecap Surety Co.	3.4
Petroleum Marketers Mgmt Ins	3.4
Ellington Mutual Insurance Co.	3.3
Emergency Cap Mgmt LLC A RRG	3.2
Vasa-Spring Garden Mutl Ins Co	3.1
Western Mutual Fire Ins Co.	3.0
Farmers Mutual Ins Co. (KS)	3.0
Indemnity National Ins Co.	2.9
Transit Mutual Ins Corp. of WI	2.8
National Fire & Casualty Co.	2.8
Integra Insurance Inc.	2.7
National Heritage Insurance Co	2.6
Geneva Insurance Co.	2.5
Falcon Insurance Co.	2.2
Suburban Health Org. RRG LLC	1.9
Forward Mutual Insurance Co.	1.9
Mower Cnty Farmers Mutl Ins Co	1.8
Farmington Mutual Insurance Co	1.6
Midwest Ins Grp Inc. a RRG	1.6
Benefit Security Insurance Co.	1.6
Keystone Mutual Insurance Co.	1.5
Trinity Risk Solutions Recpl	1.5
Indiana Old National Ins Co.	1.4
Farmers Mutual Fire Ins Co.	1.3

Midwest: 184 Companies – *Continued*

Company	2013 Total DWP ($000s)
Mt. Morris Mutual Insurance Co	20.3
Midwest Builders' Casualty Mutual Company	20.2
MutualAid eXchange	20.0
Upland Mutual Insurance Inc.	18.9

Company	2013 Total DWP ($000s)
Innovative Physician Solutions	1.3
Club Insurance Co.	1.3
MFS Mutual Insurance Co.	1.2
Fort Wayne Med Surety Co. RRG	1.0

Northeast/Atlantic: 263 Companies

Company	2013 Total DWP ($000s)
Erie Insurance Group	5,076.0
MAPFRE	2,039.5
New Jersey Manufacturers Insurance Company	1,770.3
Arbella Insurance Group	775.4
Safety Insurance Group Inc.	731.7
Donegal Mutual Insurance Company	720.1
Palisades Safety and Insurance Association	692.1
Pennsylvania National Mutual Casualty Insurance Company	681.7
New York Central Mutual Fire Insurance Company	484.0
HDI-Gerling America Ins Co.	400.4
Plymouth Rock Assurance Corporation	372.7
Medical Professional Mutual Insurance Company	364.5
Vermont Mutual Insurance Group	354.8
Protective Insurance Company	344.2
Electric Insurance Co.	338.3
Attorneys' Liab Assr Society	322.9
BrickStreet Mutual Insurance Company	307.5
Greater New York Mutual Insurance Company	293.5
Stonebridge Casualty Ins Co.	289.2
Assured Guaranty Municipal Corp.	284.3
Preferred Mutual Insurance Co.	278.4
American Independent Companies, Inc.	262.5
Quincy Mutual Group	260.2
Merchants Insurance Group	256.4
Hospitals Insurance Co.	237.1
Lancer Insurance Group	232.4
MEMIC Group	230.0
Highmark Casualty Insurance Co. & HM Casualty Insurance Co.	220.0
State Workers' Insurance Fund	218.6
Public Svc Ins Co., Paramount Ins Co. & Western Select Ins	207.0
Nuclear Electric Insurance Ltd	203.1
Narragansett Bay Insurance Company Group	200.6
AMEX Assurance Co.	180.8
Coliseum Reinsurance Company	179.8
Concord General Mutual Insurance Company	172.1
Norfolk & Dedham Group	169.6
Queen City Assurance Inc.	169.6
Leading Ins Group Ins Co. Ltd.	163.7
Beazley Insurance Co.	163.5

Company	2013 Total DWP ($000s)
Physicians Specialty Ltd. RRG	15.4
Professional Casualty Assn.	14.8
Farmers Fire Insurance Co.	14.6
Central PA Physicians RRG Inc.	14.2
NJ Physicians United Recpl	14.0
Eveready Insurance Co.	14.0
Kensington Insurance Co.	13.9
Midstate Mutual Insurance Co.	13.9
Wayne Cooperative Insurance Co	13.8
Build America Mutual Assr Co.	13.6
Geisinger Insurance Corp. RRG	13.3
Cmnty Hlth Alliance Recpl RRG	13.0
Park Insurance Co.	12.8
Hospitality Insurance Group	12.7
Lexington National Ins Corp.	12.6
Colonial Surety Co.	12.5
Municipal Mutual Ins Co. of WV	12.3
Westminster American Ins Co.	12.1
West Virginia Insurance Co.	12.1
Eastern Dentists Ins Co. RRG	11.8
Farmers Mut Fire Ins Co Mrb PA	11.6
St. Luke's Hlth Ntwrk Ins Co.	11.5
Alliance National Insurance Co	11.0
Marathon Finl Ins Co.	10.9
Daily Underwriters of America	10.7
Finger Lakes F&C Co.	10.7
First Medical Ins Co. (A RRG)	10.6
Physicians Proactive	10.3
NY Hlthcr Ins Co. Inc. A RRG	10.2
West Virginia Natl Auto Ins Co	10.2
Leatherstocking Coop Ins Co.	9.6
Terra Insurance Co. (A RRG)	9.1
Chautauqua Patrons Ins Co.	9.0
Positive Physicians Insurance	8.9
Reamstown Mutual Insurance Co.	8.6
North Country Insurance Co.	8.4
Ins Placement Facility of PA	8.3
Hyundai Marine & Fire Ins Co.	8.0
Mid-Hudson Co-Operative Ins Co	7.9

Continued Overleaf

Northeast/Atlantic: 263 Companies – *Continued*

Company	2013 Total DWP ($000s)
Associated Industries of Massachusetts Mutual Ins. Co.	155.8
MMG Insurance Co.	148.6
Untd Educators Ins A Recpl RRG	146.8
Franklin Mutual Group	145.6
Medical Mutual Group	144.3
American Transit Insurance Co.	141.1
Cumberland Insurance Group	135.0
Philadelphia Contributionship	134.2
Brethren Mutual Insurance Co.	129.8
Samsung Fire & Marine Ins Co.	128.9
Goodville & German Mutual Grp	127.1
Country-Wide Insurance Co.	125.5
Union Mutual of Vermont	123.3
Utica First Insurance Co.	118.8
KnightBrook Insurance Co. Guilderland Reinsurance Co.	118.4
Controlled Risk Ins Co. of VT	118.1
Beacon Mutual Insurance Co.	113.1
Hereford Insurance Group (G)	107.4
Aegis Security & American Sentinel Insurance Companies	106.7
Mutual Benefit Ins. Co. & Affiliate Select Risk Ins. Co.	106.2
American Steamship Owners	105.4
MCIC Vermont Inc. (A RRG)	101.4
Lackawanna Casualty Company	100.6
Coface North America Ins Co.	97.3
Bond Safeguard Ins Co., Lexon Ins Co. & Peninsular Surety Co	96.5
Ambac Assurance Corporation	94.3
New London County Mutual Insurance Company	92.1
ICI Mutual Insurance Co. a RRG	87.5
New York Schools Ins Recpl	87.3
Providence Group	76.0
Academic Hlth Professionals	72.6
Lititz Mutual Insurance Co.	70.6
Florists' Mutual Insurance Company	70.3
Agency Insurance Co. of MD Inc	67.4
Interboro Insurance Company	66.8
Co-operative Insurance Cos	64.3
Atradius Trade Credit Ins Inc.	62.5
Fiduciary Ins Co. of Am Inc.	61.7
Kingstone Insurance Co.	60.4
Erie & Niagara Insurance Assn.	60.4
Everett Cash Mutual Ins Co.	59.4
Citizens United Recpl Exchange	59.1
Millers Capital Insurance Co.	58.7
Atlantic Charter Insurance Company	58.2
Mountain Laurel RRG Inc.	55.1
Sterling Insurance Co.	53.5
Dryden Mutual Insurance Co.	53.0
MDAdvantage Insurance Co of NJ	51.8
New York Municipal Ins Recpl	51.6

Company	2013 Total DWP ($000s)
PACE RRG Inc.	7.8
First Keystone RRG Inc.	7.8
Guthrie RRG Inc.	7.7
Crystal Run Reciprocal RRG	7.7
CARE RRG Inc.	7.5
SCRUBS Mutual Assurance Co RRG	7.5
J.M. Woodworth RRG Inc.	7.5
Nazareth Mutual Insurance Co.	7.5
Eastern Mutual Insurance Co.	7.5
First Indemnity of Am Ins Co.	7.4
PA Physicians' Recpl Insurers	7.4
OrthoForum Insurance Co.	7.4
Balboa Insurance Company	7.3
Associated Mutual Ins Coop	7.2
Schuylkill Crossing RRRG	7.1
Architects & Engineers Ins Co.	7.0
Paramount Insurance Co.	7.0
Doctors & Surgeons Natl RRG	7.0
Broome Co-operative Ins Co.	6.9
Oswego County Mutual Ins Co.	6.8
WellSpan Reciprocal RRG	6.8
Mountaineer Freedom RRG Inc.	6.5
Fulmont Mutual Insurance Co.	6.4
Synergy Comp Insurance Co.	6.4
Callicoon Co-operative Ins Co.	6.0
Central Co-operative Ins Co.	5.9
North Shore - LIJ Physicians	5.9
Farmers Mutual Ins Co. (WV)	5.8
CBIA Comp. Services Inc.	5.8
Great Falls Insurance Co.	5.8
Physicians' Insurance Program	5.8
Arrow Mutual Liability Ins Co.	5.7
Bedford Grange Mutual Ins Co.	5.7
Laundry Owners Mutual Liab Ins	5.7
Natl Indepdnt Truckers Ins Co.	5.4
Juniata Mutual Insurance Co.	5.3
Farmers Mutl Fire McCandless	5.2
Pinnacle Consortium of Higher	5.1
Freedom Advantage Insurance Co	5.1
Amalgamated Casualty Ins Co.	5.0
Genesee Patrons Coop Ins Co.	4.8
PA Professional Liability JUA	4.8
Pinelands Insurance Co RRG Inc	4.8
Ontario Insurance Co.	4.6
Midrox Insurance Co.	4.5
United Central PA. Recpl RRG	4.5
Briar Creek Mutual Ins Co.	4.2
Constitution Insurance Co.	4.1
Madison Mutual Ins Co. (NY)	4.0

Northeast/Atlantic: 263 Companies – *Continued*

Company	2013 Total DWP ($000s)
Tuscarora Wayne Mutual Grp Inc	48.5
IFA Insurance Co.	47.2
Applied Medico-Legal Solutions	44.9
Franklin Cas Ins Co. (A RRG)	44.4
ARI Mutual Insurance Company	43.8
Community Hospital Alternative	43.4
Connecticut Medical Group	43.0
American European Insurance Group	42.9
Medical Mutual Ins Co. of ME	42.0
Farmers Mutl Fire Ins Co Salem	40.9
Security Mutual Insurance Co.	40.0
Global Liberty Ins Co. of NY	38.8
Healthcare Prvdrs Ins Exchange	38.0
Pfd Physicians Med RRG Inc.	37.5
Oceanus Insurance Co. a RRG	36.0
Tri-State Consumer Ins Co.	35.6
Financial Guaranty Ins Co.	34.0
Evergreen National Indem Co.	33.3
BAR Vermont RRG Inc.	32.5
Farmers and Mechanics Mutual Group	30.7
Farmers Ins Co. of Flemington	29.2
Windsor Mount Joy Mutl Ins Co.	28.8
Barnstable Group	28.6
Oriska Insurance Co.	28.1
Broadline RRG Inc.	28.1
Millville Mutual Insurance Co.	28.0
Rider Insurance Co.	27.9
Frederick Mutual Insurance Co.	27.1
West Virginia Mutual Ins Co.	26.5
Hlthcr Professionals Ins Co.	25.7
AmeriHealth Casualty Ins Co.	25.4
Housing & Redevelopment Ins	25.3
National Catholic RRG Inc.	23.9
Cassatt RRG Inc.	22.8
Capitol Insurance Co.	21.4
Maya Assurance Co.	21.2
Fire Districts NY Group	20.5
Conventus Inter-Insurance	20.3
Bedford Physicians RRG Inc.	17.2
Otsego Mutual Fire Ins Co.	16.6
American Millennium Ins Co.	16.4
Allegany Insurance Group	15.9
CIFG Assurance North Am Inc.	15.6
Eastern Atlantic Insurance Co.	15.5

Company	2013 Total DWP ($000s)
National Mortgage Insurance Holdings Group	3.5
Hanover Fire & Casualty Ins Co	3.5
Wilmington Insurance Co.	3.4
Friends Cove Mutual Ins Co.	3.4
Regis Insurance Co.	3.3
Safe Insurance Co.	3.3
Peace Church RRG (a Recpl)	3.2
Service Insurance Co. (NJ)	3.2
United Frontier Mutual Ins Co.	2.9
PELICAN Ins (A Reciprocal RRG)	2.9
Pan Handle Farmers Mutl Ins Co	2.9
United Cas & Surety Ins Co.	2.7
Franklin Homeowners and Its Affiliated Insurance Companies	2.7
Washington County Co-op Ins Co	2.7
Sigma RRG Inc.	2.5
Centre County Mutl Fire Ins Co	2.5
Ironshore RRG Inc.	2.4
Mutual Ins Co. of Lehigh Cnty	2.2
Good Shepherd Recpl RRG Inc.	1.9
Pine Tree Ins A Reciprocal RRG	1.9
Hannahstown Mutual Ins Co.	1.8
Millbrook NMF RRG Inc.	1.7
Graco RRG Inc.	1.7
AEGIS Healthcare RRG Inc.	1.7
Otsego Cnty Patrons Co-Op Fire	1.6
Continental Mutual Ins Co.	1.6
Physicians' Ins Exchange Rsrc	1.5
Bondex Insurance Co.	1.5
CareNext RRG Inc.	1.5
Wall Rose Mutual Insurance Co.	1.5
Public Utility Mutual Ins Co.	1.5
COMCARE PRO Ins (A Recpl RRG)	1.4
Faith Affiliated RRG Inc.	1.3
First Surety Corp.	1.2
Farmers & Mechanics Mutual Ins	1.2
Clearfield County Grange Mutl	1.2
Delaware Prof Insurance Co RRG	1.2
Grange Mutual Fire Ins Co.	1.1
Anacostia Holding Co.	1.1
DuBois Medical RRG	1.1
Commonwealth Mutl Ins Co of Am	1.0
Allied Services RRG	1.0
Sauquoit Valley Insurance Co.	1.0

Continued Overleaf

West: 130 Companies

Company	2013 Total DWP ($000s)
Auto Club Enterprises Insurance Group	2,907.2
CSAA Insurance Exchange	2,836.8
Mercury General Corp.	2,682.1
Insurance Company of the West	657.6
CA Earthquake Authority	574.0
SAIF Corp.	436.2
California Capital Insurance Company	403.2
Enumclaw Insurance Group	359.2
PEMCO Mutual Insurance Co.	354.0
Wawanesa General Insurance Co.	332.7
California Casualty Indemnity Exchange	326.9
NORCAL Mutual Insurance Company	285.2
Alliance United Insurance Co.	243.0
Alaska National Insurance Co.	229.4
SCF Arizona	220.1
Access Insurance Co.	209.8
Idaho State Insurance Fund	195.3
Workers Compensation Fund	191.7
Pacific Specialty Insurance Company	188.2
Mtn W Farm Bureau Mutl Ins Co.	168.4
Century-National Insurance Co.	162.0
Farm Bureau Mutual Insurance Company of Idaho	161.6
Oregon Mutual Insurance Company	157.8
Consolidated Civil Svc Employees & CSE Safeguard	146.6
Grange Insurance Association	141.7
Dongbu Ins Co. Ltd (US Branch)	132.1
First American Financial Corp.	127.4
Mutual Insurance Co. of AZ	118.8
Island Insurance Companies	118.0
Hiscox Insurance Co.	114.1
Mendota Insurance Company	111.9
Anchor Insurance Holdings Inc.	104.6
Bear River Mutual Insurance Co	101.6
Topa Insurance Company	95.2
New Mexico Mutual Group	92.9
Benchmark Insurance Co.	88.4
COPIC Insurance Co.	88.0
Physicians Insurance A Mutual Group	86.9
Western Mutual Insurance Group	68.2
Toyota Motor Insurance Co.	66.3
American Pet Insurance Co.	63.3
Medical Ins Exchange of CA	60.9
CO Farm Bureau Mutual Ins Co.	60.2
United Heritage Mutual Hldg Co	60.1
Dentists Insurance Co.	59.6
ARAG Insurance Co.	59.2
Generali - US Branch	57.7
Hawaii Employers' Mutl Ins Co.	49.9
Golden Bear Insurance Co.	48.3

Company	2013 Total DWP ($000s)
Allied Professionals Ins Co.	21.6
Sutter Insurance Co.	20.5
Idaho Counties Risk Mgmt	19.7
Sterling Casualty Insurance Co	19.4
Farmers Union Mutl Ins Co (MT)	19.1
Advantage Workers Comp Ins Co.	17.2
Farm Crdt Sys Assn Captive Ins	15.9
Red Shield Insurance Company	15.8
Nations Insurance Co.	15.0
Adriatic Insurance Co.	14.5
Financial Cas & Surety Inc.	13.7
Fairway Physicians Ins Co. RRG	13.2
Restoration RRG Inc.	13.1
Primero Insurance Co.	12.7
Oregon Dental Service	12.1
Associated Loggers Exchange	11.6
American Liberty Insurance Co.	11.5
Allegiant Ins Co. Inc. A RRG	10.7
Nevada Mut & First Choice Cas Grp	10.6
Victory Insurance Co.	10.1
Bell United Insurance Co.	9.4
Amer Assn Orthodontists Ins Co	8.7
Amer Trucking & Transportation	8.3
ARECA Insurance Exchange	8.2
Landcar Casualty Co.	8.1
Seaview Insurance Co.	8.0
American Surety Co.	7.9
Health Prvdrs Ins Recpl A RRG	7.8
CPA Mutual Ins Co. of Am RRG	7.4
Alaska Timber Ins Exchange	6.7
Yellowstone Insurance Exchange	6.0
Emergency Medicine Prof Assr	5.9
Bus. Alliance Insurance Co.	5.7
Centurion Med Liab Prtctv RRG	5.5
Premier Physicians Ins Co.	5.4
Contractors Ins Co of North Am	5.3
Financial American P&C Ins Co.	5.3
Pacific Pioneer Insurance Co.	5.2
Attorneys Ins Mutual RRG Inc.	5.1
Commonwealth Casualty Co.	4.9
Sunderland Marine Mutl Ins Co.	4.8
MD RRG Inc.	4.5
PIH Health Ins Co. A Recpl RRG	4.5
National Direct Insurance Co.	4.3
Utah Business Insurance Co.	4.2
Trans City Casualty Ins Co.	4.2
Sentinel Assurance RRG Inc.	4.1
Gem State Insurance Co.	4.1
California Med Grp Ins Co. RRG	3.9

West: 130 Companies – *Continued*

Company	2013 Total DWP ($000s)
Western General Insurance Co.	47.4
Mountain States Insurance Group	40.9
Lawyers' Mutual Insurance Co.	39.6
CAMICO Mutual Insurance Co.	35.8
Workmen's Auto Insurance Co.	33.7
Key Insurance Co.	33.5
NIPPONKOA Ins Co Ltd. (USB)	33.1
Crusader Insurance Co.	31.2
Pfd Contractors Ins Co. RRG	30.3
Care West Insurance Co.	29.7
Springfield Insurance Co.	28.5
United Insurance Co.	27.9
CA Hlthcr Ins Co. Inc. A RRG	27.8
Mtn States Hlthcr Recpl RRG	25.2
Mutual RRG Inc.	24.1
Spirit Commercial Auto RRG Inc	21.6

Company	2013 Total DWP ($000s)
California Mutual Insurance Co	3.7
Western Catholic Ins Co. RRG	3.7
Professionals RRG Inc.	3.6
Continuing Care RRG Inc.	3.4
RPX RRG Inc.	3.2
Sun Surety Insurance Co.	3.1
Physicians Reimbursement Fund	2.8
Onyx Insurance Co. Inc. A RRG	2.6
Workers Compensation Exchange	2.2
National American Insurance Company of California	2.2
American Forest Cas Co. RRG	2.2
College Liab Ins Co. A Recpl	2.2
Prof Exchange Assr Co. (A RRG)	2.0
Select MD RRG Inc.	1.7
Professional Ins Exchange	1.6
Casualty Underwriters Ins Co.	1.5

E&S: 52 Companies

Company	2013 Total DWP ($000s)
Ironshore Specialty Insurance Co	820.1
Landmark American Insurance Company	573.6
AXIS Surplus Insurance Company	548.1
Westchester Surplus Lines Insurance Co	532.2
Colony Insurance Company	495.7
Houston Casualty Company	392.9
Chubb Custom Insurance Company	370.9
Allied World Assurance Co (US) Inc.	319.3
Aspen Specialty Insurance Company	311.0
Starr Surplus Lines Insurance Company	304.9
National Fire & Marine Insurance Co	270.8
Mt Hawley Insurance Company	265.0
Darwin Select Insurance Company	230.3
Hudson Specialty Insurance Company	220.0
First Specialty Insurance Corporation	216.9
Burlington Insurance Company	199.7
James River Insurance Company	187.2
Western World Insurance Company	185.3
Everest Indemnity Insurance Company	179.4
General Star Indemnity Company	151.4
GeoVera Specialty Insurance Company	148.6
American Safety Indemnity Company	147.7
General Security Indemnity Co of Arizona	147.1
Maxum Indemnity Company	144.3
Mount Vernon Fire Insurance Company	138.7
Cincinnati Specialty Underwriters Ins Co	136.4

Company	2013 Total DWP ($000s)
Covington Specialty Insurance Company	133.5
American Empire Surplus Lines Ins Co	125.3
Kinsale Insurance Company	124.6
Houston Specialty Insurance Company	115.0
Associated Industries Insurance Co, Inc	111.5
Torus Specialty Insurance Company	107.9
Acceptance Indemnity Insurance Company	104.3
Atlantic Casualty Insurance Company	92.7
Atain Specialty Insurance Company	83.6
Canopius US Insurance, Inc.	72.0
Penn-America Insurance Company	69.7
Tudor Insurance Company	59.0
United National Insurance Company	54.0
Oklahoma Specialty Insurance Company	49.9
Associated International Insurance Co	44.2
Penn-Star Insurance Company	38.1
U S Underwriters Insurance Company	29.2
Prime Insurance Company	28.8
First Financial Insurance Company	25.7
Noetic Specialty Insurance Company	15.8
Adriatic Insurance Company	14.5
Acceptance Casualty Insurance Company	12.2
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A.3 CONTACT INFORMATION

Guy Carpenter and Oliver Wyman can assist you in applying this research in several ways. These metrics are reasonability checks in peer review analysis of existing economic capital models. MetaRisk licensees can receive a MetaRisk project populated with their own statutory financial data and risk parameterization derived from these benchmarks. In addition, Guy Carpenter and Oliver Wyman are available to assist in applying economic capital model output to strategic decision-making in areas such as capital adequacy, capital allocation and articulation of risk preferences.

The Insurance Risk Benchmarks Research is supported by a large working group of experts and professionals at Guy Carpenter and Oliver Wyman. Please contact any member of this network with questions and feedback. Contact details are found on the last page of this report.

VI. UK RISK BENCHMARKS REPORT 2014: ANNUAL STATISTICAL REVIEW

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1 GETTING STARTED

For the second time, we have analyzed the United Kingdom insurance market. The techniques and charts used are largely the same as for the United States parts of this year's report, but with some subtle differences that should be highlighted:

- **Data are gross of reinsurance:** The risk benchmarks are calculated using data gross of reinsurance, in contrast to the statistics in the United States parts of the report. This is because the available data for the United Kingdom losses are of better quality before reinsurance is applied.

- **Breadth of Data:** The data is drawn from Forms 31 and 32 of the Financial Services Authority (FSA) (now known as the Prudential Regulation Authority [PRA]) returns. Most of the data reflects business written in the United Kingdom, but some international business is included where written by UK-domiciled insurers. All claims and premium data are in British pound (GBP).

- **Accident years 1994 to 2013:** Our UK data from FSA returns spans accident years 1994 to 2013. This is in contrast to the US data which spans from 1980 to 2013. This is reflected in fewer correlations being identified as statistically significant.

- **Allocated Loss and Adjustment Expense:** Similar to the US analyses, "*loss*" refers to mean loss including allocated loss and adjustment expenses.

- **Line of Business classification:** The classification of insurance business follows what is UK industry standard and this differs slightly from the United States. Some lines, such as marine, did not have sufficient data to warrant inclusion. Those included have been aggregated to improve homogeneity within each group. The following classifications have been used:

  - **Employers Liability**
  - **Professional Indemnity**
  - **Products and Public Liability**
  - **Commercial Motor:** comprised of commercial fleets, commercial vehicles (non-fleet) and commercial motor (other).
  - **Commercial Property:** comprised of commercial property, consequential loss and contractors.
  - **Household and Domestic**
  - **Personal Motor:** comprised of private motor comprehensive and private motor non-comprehensive.

This classification differs from last year in that commercial liability has been split out into employers liability, professional indemnity and products & public liability.

Finally, for UK companies, we highlight that the ultimate development measures will in general be more useful in an Individual Capital Assessment (ICA) style capital model, while the one year development measures will be more useful in a Solvency II style capital model.

2 TIMING RISK

2.1 MEAN AND CV OF INDUSTRY PAYMENT PATTERNS

What is it?

In T 13 we show the percentage of the ultimate loss that is paid in each development period, for a single accident year. Specifically, we show the distribution of this statistic:

$$\text{Statistic} = \frac{\text{Paid loss in a 12 month development period}^{11} \text{ for a single accident year}}{\text{Booked Ultimate Loss at 120 months for a single accident year}}$$

This statistic is calculated for all accident years 1994 to 2004.

T13 | MEAN OF THE PAYMENT PATTERN, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Duration	Development Month										
		12	24	36	48	60	72	84	96	108	120	120+
Employers Liability	5.36	1%	9%	16%	21%	20%	11%	5%	2%	1%	1%	13%
Professional Indemnity	5.28	4%	14%	16%	18%	12%	7%	6%	4%	2%	2%	14%
Public/Products Liability	5.84	5%	14%	14%	15%	13%	9%	5%	3%	2%	1%	19%
Commercial Motor	2.67	40%	24%	9%	8%	6%	4%	2%	1%	1%	0%	6%
Commercial Property	2.00	43%	35%	10%	4%	2%	1%	0%	0%	0%	0%	4%
Household and Domestic	1.28	57%	30%	6%	3%	2%	1%	0%	0%	0%	0%	1%
Personal Motor	2.31	49%	21%	8%	6%	5%	3%	2%	1%	1%	0%	5%

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T14 | COEFFICIENT OF VARIATION (= STDEV / MEAN) OF THE PAYMENT PATTERN, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Development Month										
	12	24	36	48	60	72	84	96	108	120	120+
Employers Liability	25%	11%	13%	8%	7%	18%	34%	36%	45%	67%	21%
Professional Indemnity	51%	30%	58%	64%	79%	72%	51%	49%	53%	95%	76%
Public/Products Liability	39%	20%	19%	34%	22%	39%	56%	91%	71%	95%	76%
Commercial Motor	6%	4%	16%	17%	22%	21%	42%	61%	46%	46%	82%
Commercial Property	7%	12%	20%	24%	47%	90%	275%	61%	422%	91%	133%
Household and Domestic	8%	16%	23%	45%	46%	57%	52%	74%	38%	59%	83%
Personal Motor	4%	3%	8%	9%	12%	13%	27%	17%	42%	44%	60%

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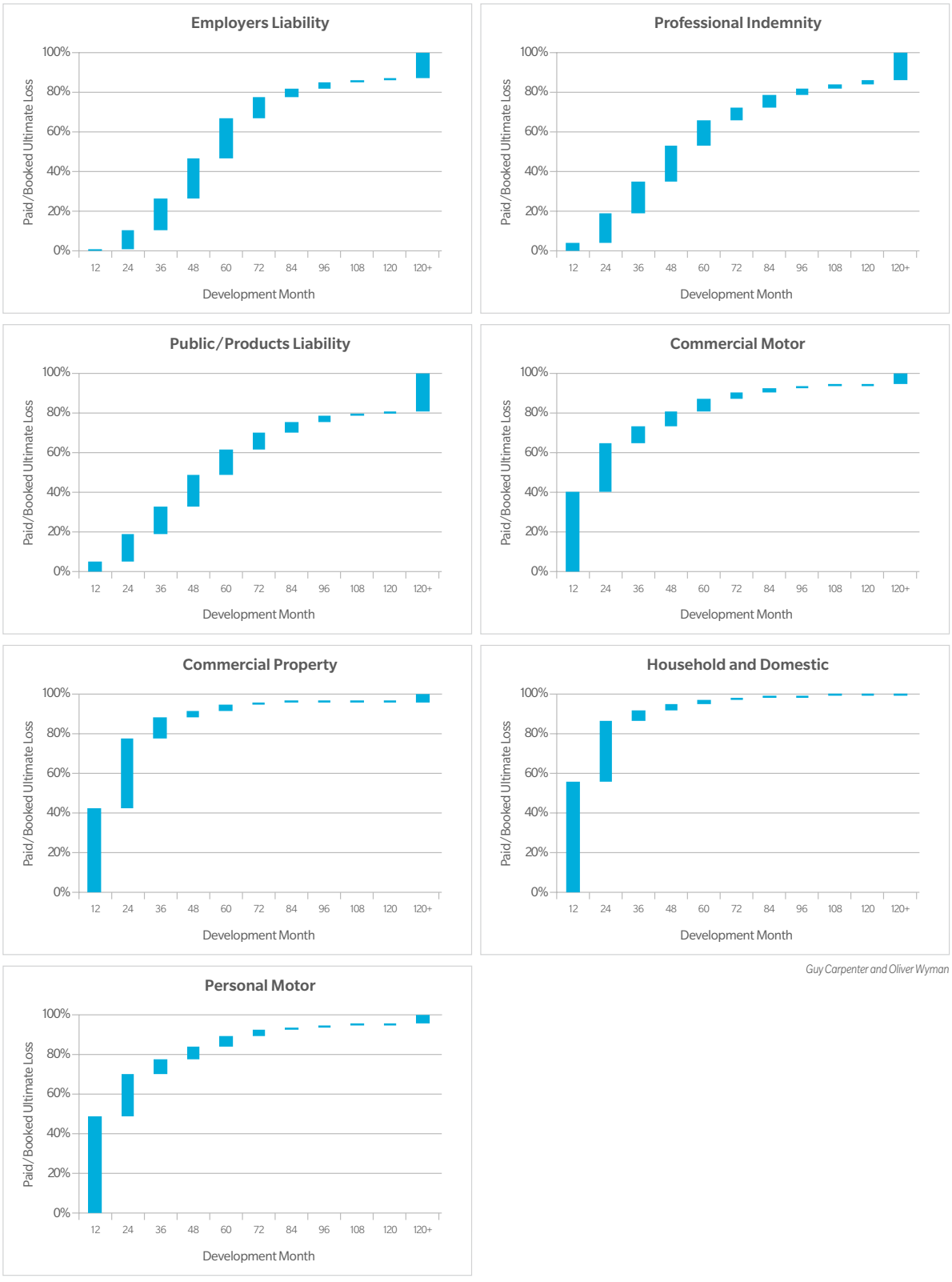
How can it be used?

This can provide a payment pattern and payment timing risk for an ultimate loss selection.

11. For the purpose of calculating duration, it is assumed that the percentage paid in the 132nd development period is the same as the percentage paid in the 120th development period. If there is more unpaid after 132 months, the same process is repeated for up to 5 years. In the sixth year, all remaining reserves are assumed to be paid.

G 10 | MEAN OF THE PAYMENT PATTERN UK INDUSTRY IN AGGREGATE, ACCIDENT, YEARS 1994 T0 2004, GROSS OF REINSURANCE



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3 UNDERWRITING RISK

3.1 LOSS RATIOS MEANS AND DISTRIBUTIONS

T15 | ULTIMATE LOSS RATIO AT 12 MONTHS OF DEVELOPMENT, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2013, GROSS OF REINSURANCE

Line of Business	Mean	CV = St Dev/Mean	75th Percentile	Maximum
	(1)	(2)	(3)	(4)
Employers Liability	88%	18%	101%	118%
Professional Indemnity	71%	15%	77%	91%
Public/Products Liability	73%	10%	81%	86%
Commercial Motor	82%	9%	87%	97%
Commercial Property	57%	19%	68%	78%
Household and Domestic	57%	15%	61%	78%
Personal Motor	83%	9%	87%	98%

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What Is It?

The ultimate loss ratio at 12 months of development exhibits volatility inherent in the loss process. These risk benchmarks assist in parameterizing the initial underwriting risk of an economic capital model and do not measure reserve risk subsequent to the first report for an accident year.

How Can It Be Used?

The mean loss ratios provide an indication of current market pricing conditions. The risk measures provide an indication of the spread surrounding an expected loss ratio plan.

T16 | ACTUAL ULTIMATE LOSS RATIO, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Mean	CV = St Dev/Mean	75th Percentile	Maximum
	(1)	(2)	(3)	(4)
Employers Liability	99%	31%	118%	149%
Professional Indemnity	63%	25%	73%	82%
Public/Products Liability	70%	26%	85%	95%
Commercial Motor	79%	21%	91%	103%
Commercial Property	50%	24%	58%	70%
Household and Domestic	57%	14%	62%	69%
Personal Motor	80%	13%	89%	94%

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What Is It?

We call the booked ultimate loss ratio for an accident year after 120 months of development the "*actual ultimate loss ratio*" because most claims are paid and closed and the ultimate loss ratio is more certain.

Statistic = ultimate loss ratio for an accident year at 120 months of development

How Can It Be Used?

It provides management with an indication of the historical variability of the actual ultimate loss ratio, which can be useful for parameterizing an ICA-style capital model.

3.2 CORRELATION OF ULTIMATE LOSS RATIOS BETWEEN LINES OF BUSINESS

T 17 | CORRELATION BETWEEN LINES OF BUSINESS OF ACTUAL ULTIMATE LOSS RATIO, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Employers Liability	Professional Indemnity	Public/Products Liability	Commercial Motor	Commercial Property	Household and Domestic	Personal Motor
Employers Liability	100%	55%	**81%**	32%	**75%**	**62%**	38%
Professional Indemnity	55%	100%	**66%**	23%	**60%**	54%	49%
Public/Products Liability	**81%**	**66%**	100%	38%	**84%**	**70%**	**61%**
Commercial Motor	32%	23%	38%	100%	**61%**	17%	**83%**
Commercial Property	**75%**	**60%**	**84%**	**61%**	100%	57%	**71%**
Household & domestic	**62%**	54%	**70%**	17%	57%	100%	56%
Personal Motor	38%	49%	**61%**	**83%**	**71%**	56%	100%

(Correlations that are significantly different from zero are in bold[12].)

Guy Carpenter and Oliver Wyman

What is it?

T 17 shows the correlations between the actual ultimate loss ratio by line of business. For a particular accident year, the actual ultimate loss ratio is the booked ultimate loss ratio 10 years after the start of the accident year (at 120 months of development). Each line of business has a series of actual ultimate loss ratios by accident year, and

How can it be used?

It can be used by management to determine the inherent correlation of the actual ultimate loss ratios between different lines of business.

3.3 AUTO-CORRELATION OF ULTIMATE LOSS RATIOS BETWEEN

T 18 | AUTO-CORRELATION OF ULTIMATE LOSS RATIO, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Auto-correlation
	(1)
Employers Liability	**78%**
Professional Indemnity	33%
Public/Products Liability	**77%**
Commercial Motor	**82%**
Commercial Property	62%
Household and Domestic	35%
Personal Motor	**73%**

(Correlations that are significantly different from zero are in bold[13].)

Guy Carpenter and Oliver Wyman

What is it?

The actual ultimate loss ratio is an accident year's loss ratio after 120 months of development. If, generally, an accident year with a high loss ratio is followed by another accident year with a high loss ratio and an accident year with a low loss ratio is followed by another accident years with a low loss ratio, then this will show a high auto-correlation in T 18 below.

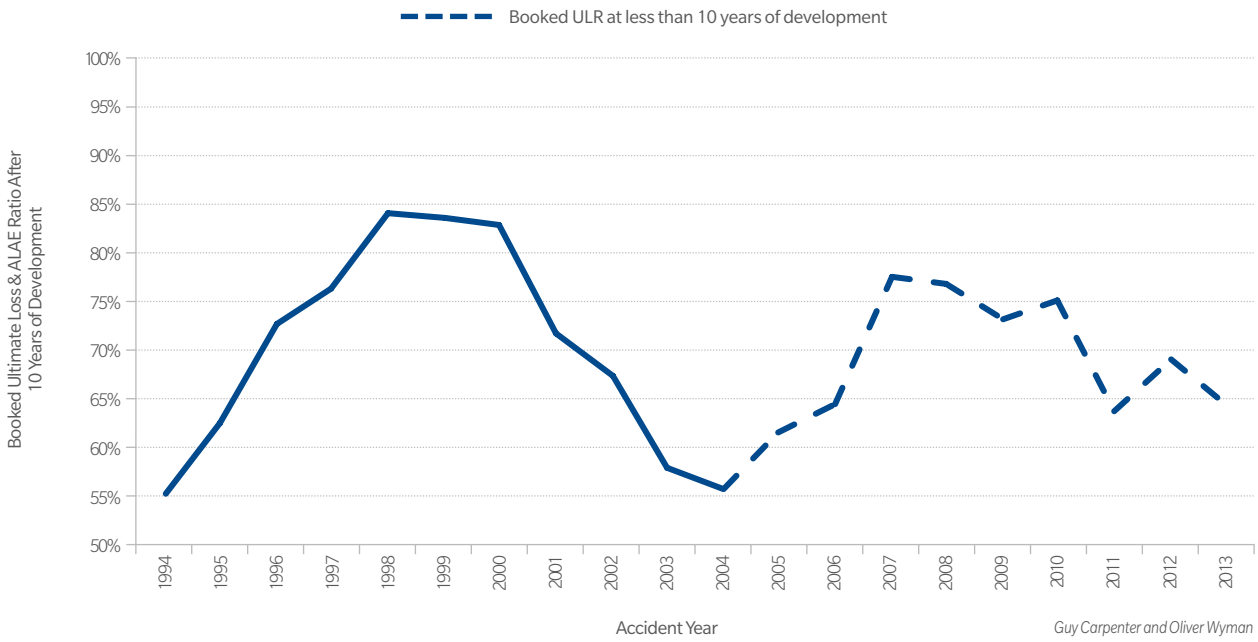
How can it be used?

This could be used in a multi-year economic capital model to auto-correlate loss ratios from one accident year to the next. For most lines, correlations are high and not correlating loss ratios in a multi-year model is ignoring one of the biggest risks to capital – multiple concurrent years of unprofitable loss ratios.

12. These are correlations with p-values less than 5 percent. 13. These are correlations with p-values less than 5 percent.

3.4 CYCLES

G 11 ACTUAL ULTIMATE LOSS RATIO BY ACCIDENT YEAR, UK INDUSTRY IN AGGREGATE, ALL LINES OF BUSINESS COMBINED, GROSS OF REINSURANCE



Guy Carpenter and Oliver Wyman

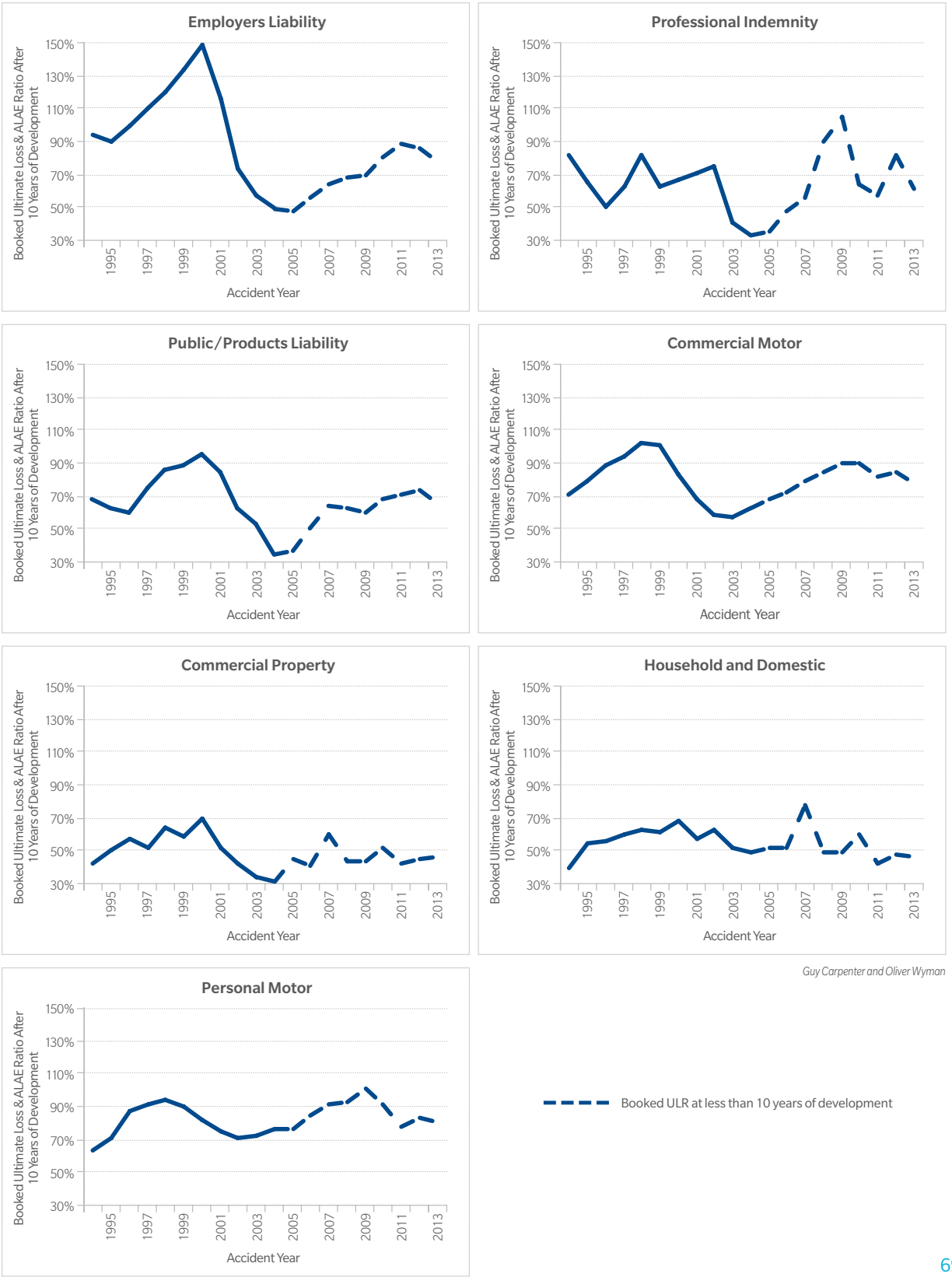
What is it?

The underwriting cycle shown in G11 illustrates the actual ultimate loss ratio for all lines of business by accident year. The actual ultimate loss ratio is the booked ultimate loss ratio after 10 years of development.

How can it be used?

Currently, the underwriting cycle is not a feature of many insurers' economic capital models. Loss ratios are not commonly modeled with auto-correlation – an upward movement in loss ratios in one year has no bearing on whether there is an upward movement in the following year. However, the existence of the underwriting cycle is undeniable. G11 shows that in real life, a series of unprofitable years is reasonably likely, and, for many insurers, this is the scenario of greatest concern. A series of unprofitable years is highly unlikely in a model with no underwriting cycle. This model will, perhaps materially, underestimate risk.

G 12 | ACTUAL ULTIMATE LOSS RATIO BY ACCIDENT YEAR, UK INDUSTRY IN AGGREGATE, GROSS OF REINSURANCE



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4 RESERVING RISK

4.1 ULTIMATE DEVELOPMENT

T19 | ULTIMATE DEVELOPMENT OF A SINGLE ACCIDENT YEAR, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Mean	CV = St Dev/Mean	75th Percentile	Maximum
	(1)	(2)	(3)	(4)
Employers Liability	1.00	20%	1.12	1.33
Professional Indemnity	1.10	30%	1.22	1.73
Public/Products Liability	1.01	21%	1.13	1.39
Commercial Motor	0.96	13%	1.04	1.15
Commercial Property	0.85	9%	0.92	0.94
Household and Domestic	0.90	10%	0.96	1.02
Personal Motor	0.96	6%	1.01	1.04

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What is it?

The reserve is an estimate of future claim payments. Eventually, we will know what these future payments amount to, and with hindsight, we will know what the reserve should have been. We call this the '*actual*' reserve. We can calculate how different this actual reserve is from our initial estimate. For example, if the actual reserve is 20 percent higher than the initial estimated reserve, then we calculate a factor of 1.20. This answers the question, "How wrong could my reserve estimate be?"

In T 19, we show the statistics of the distribution of these factors for single accident years. For each accident year the estimated reserve is calculated from the booked ultimate loss at 12 months of development and the actual reserve is calculated from the booked ultimate loss at 120 months of development.

$$\text{Statistic} = \frac{\text{Booked Ultimate Loss at 120 months} - \text{Paid Loss at 12 months}}{\text{Booked Ultimate Loss at 12 months} - \text{Paid Loss at 12 months}}$$

$$= \frac{\text{Actual Reserve}}{\text{Initial Reserve}}$$

How can it be used?

Insurers looking to estimate the reserve distribution to ultimate for one accident year at 12 months of development can use this as a benchmark.

T 20 | CORRELATION BETWEEN LINES OF BUSINESS OF THE ULTIMATE DEVELOPMENT OF A SINGLE ACCIDENT YEAR, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Employers Liability	Professional Indemnity	Public/Products Liability	Commercial Motor	Commercial Property	Household and Domestic	Personal Motor
Employers Liability	100%	43%	**76%**	51%	**74%**	**76%**	-8%
Professional Indemnity	43%	100%	11%	12%	41%	2%	-24%
Public/Products Liability	**76%**	11%	100%	45%	39%	**76%**	1%
Commercial Motor	51%	12%	45%	100%	**77%**	**71%**	54%
Commercial Property	**74%**	41%	39%	**77%**	100%	**74%**	29%
Household & domestic	**76%**	2%	**76%**	**71%**	**74%**	100%	30%
Personal Motor	-8%	-24%	1%	54%	29%	30%	100%

(Correlations that are significantly different from zero are in bold[14].)

Guy Guy Carpenter and Oliver Wyman

What is it?

T 20 shows the correlations between reserve estimate movements by line of business. In this instance, the reserve movement measures the change from the initial estimate of the reserve to the final actual reserve for each accident year. For example, if the initial estimate of the reserve is GBP500 million, but it turns out 120 months later it should have been GBP700 million, then we calculate a reserve movement of 1.40 for this accident year. If two lines of business have reserves that increase or decrease in sync, then they will be highly correlated.

How can it be used?

It can be used to populate a correlation matrix to aggregate reserve distributions for single accident years at 12 months of development, on an ultimate time horizon.

T 21 | AUTO-CORRELATION OF THE ULTIMATE DEVELOPMENT OF A SINGLE ACCIDENT YEAR, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Auto-correlation
	(1)
Employers Liability	**73%**
Professional Indemnity	**14%**
Public/Products Liability	69%
Commercial Motor	**83%**
Commercial Property	54%
Household and Domestic	40%
Personal Motor	**72%**

(Correlations that are significantly different from zero are in bold[15].)

Guy Carpenter and Oliver Wyman

What is it?

We generally find that reserve deterioration and release happen in cycles, that is, if one year experiences reserve deterioration then it is likely the next year will also bring reserve deterioration.

This is borne out in the high reserve risk auto-correlations shown below. For the reserve risk of the ultimate development of a single accident year, we show the auto-correlation of one accident year with the next. If one accident year's reserve deterioration is followed by another accident year's reserve deterioration, then the auto-correlation is high.

14. These are correlations with p-values less than 5 percent. 15. These are correlations with p-values less than 5 percent.

4.2 ONE-YEAR DEVELOPMENT

T 22 | ONE-YEAR DEVELOPMENT OF A GROUP OF TEN ACCIDENT YEARS, UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2013, GROSS OF REINSURANCE

Line of Business	Mean	CV = St Dev/Mean	75th Percentile	Maximum
	(1)	(2)	(3)	(4)
Employers Liability	-3%	2%	-1%	1%
Professional Indemnity	-1%	5%	2%	7%
Public/Products Liability	-3%	4%	-1%	5%
Commercial Motor	-3%	4%	0%	3%
Commercial Property	-9%	6%	-7%	6%
Household and Domestic	-8%	5%	-7%	3%
Personal Motor	-1%	11%	-2%	29%

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What is it?

For a book of business spanning ten accident years, we can measure the change in the booked ultimate loss from year XX to XX+1. That is, we calculate (for example):

$$\text{Statistic} = \frac{\text{Booked Ultimate Loss at 12/2013}^{16} - \text{Booked Ultimate Loss at 12/2012}}{\text{Booked Ultimate Loss at 12/2012} - \text{Paid Loss at 12/2012}}$$

where the set of accident years used for each calculation is consistent (e.g. 2004 - 2013 above).
We repeat this calculation for all periods: 2012 – 2011, 2011-2010, 2010 – 2009...

How can it be used?

Insurers looking to estimate their one-year reserve risk for a book of business spanning 10 accident years could use this as a benchmark.

16. *It is assumed the booked ultimate loss for the oldest accident year remains unchanged from development period 10 to development period 11.*

T 23 | CORRELATION OF THE ONE-YEAR DEVELOPMENT OF A GROUP OF TEN ACCIDENT YEARS[17], UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2013, GROSS OF REINSURANCE

Line of Business	Employers Liability	Professional Indemnity	Public/Products Liability	Commercial Motor	Commercial Property	Household and Domestic	Personal Motor
Employers' Liability	100%	17%	37%	**71%**	2%	-22%	-38%
Professional Indemnity	17%	100%	51%	**65%**	-4%	-5%	**64%**
Public/Products Liability	37%	51%	100%	62%	-55%	-18%	4%
Commercial Motor	**71%**	**65%**	62%	100%	7%	8%	17%
Commercial Property	2%	-4%	-55%	7%	100%	23%	1%
Household & domestic	-22%	-5%	-18%	8%	23%	100%	-5%
Personal Motor	-38%	**64%**	4%	17%	1%	-5%	100%

(Correlations that are significantly different from zero are in bold[18].)

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What is it?

T 23 shows the correlations of the one-year change in reserve between lines of business. This measures the amount of co-movement in reserves for different lines of business over a calendar year. If reserves for a group of accidents tend to move together for different lines of business, significant positive correlation coefficients will be observed.

How can it be used?

It can be used to correlate one-year reserve movements of the total reserve for a book of business.

T 24 | AUTO-CORRELATION OF THE ONE-YEAR DEVELOPMENT OF A GROUP OF TEN ACCIDENT YEARS[19], UK INDUSTRY IN AGGREGATE, ACCIDENT YEARS 1994 TO 2004, GROSS OF REINSURANCE

Line of Business	Auto-correlation
	(1)
Employers Liability	25%
Professional Indemnity	28%
Public/Products Liability	33%
Commercial Motor	**74%**
Commercial Property	-15%
Household and Domestic	1%
Personal Motor	6%

(Correlations that are significantly different from zero are in bold[20].)

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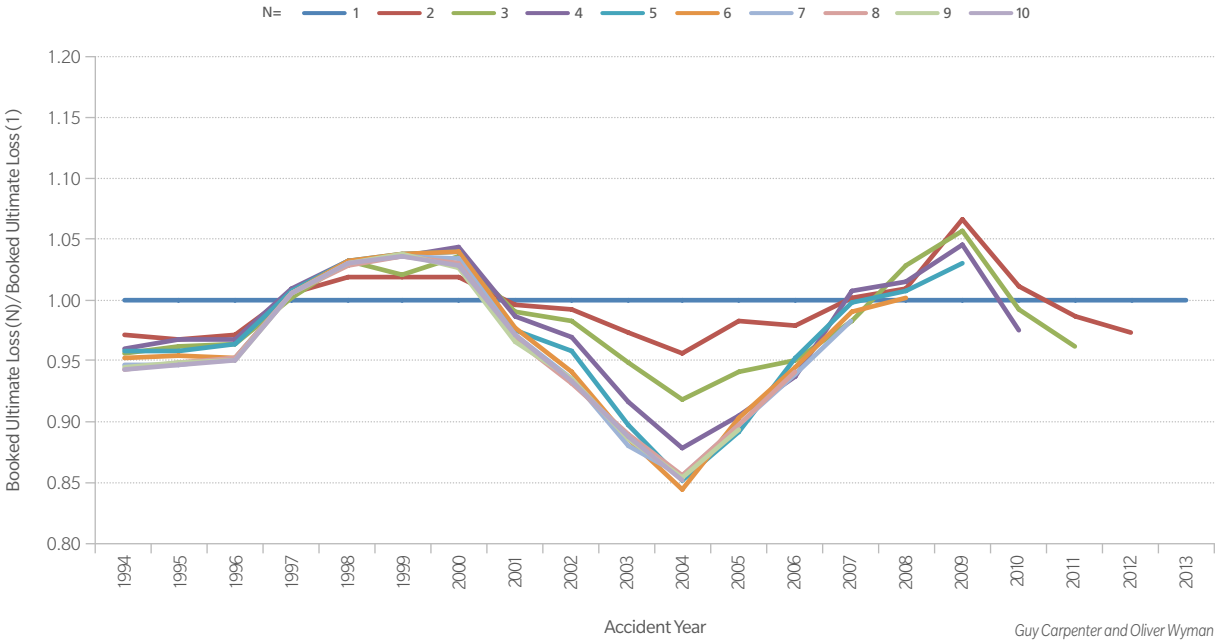
What is it?

For the reserve risk of one year development of a group of ten accident years, if reserve deterioration for one financial year is followed by another year of reserve deterioration, then the auto-correlation will be high.

17. *It is assumed the booked ultimate loss for the oldest accident year remains unchanged from development period 10 to development period 11.*
18. *These are correlations with p-values less than 5 percent.*
19. *It is assumed the booked ultimate loss for the oldest accident year remains unchanged from development period 10 to development period 11.*
20. *These are correlations with p-values less than 5 percent.*

4.3 CYCLES

G 13 | BOOKED ULTIMATE LOSS AFTER N YEARS OF DEVELOPMENT/BOOKED ULTIMATE LOSS AFTER ONE YEAR OF DEVELOPMENT, BY ACCIDENT YEAR, UK INDUSTRY IN AGGREGATE, LINES OF BUSINESS COMBINED, GROSS OF REINSURANCE



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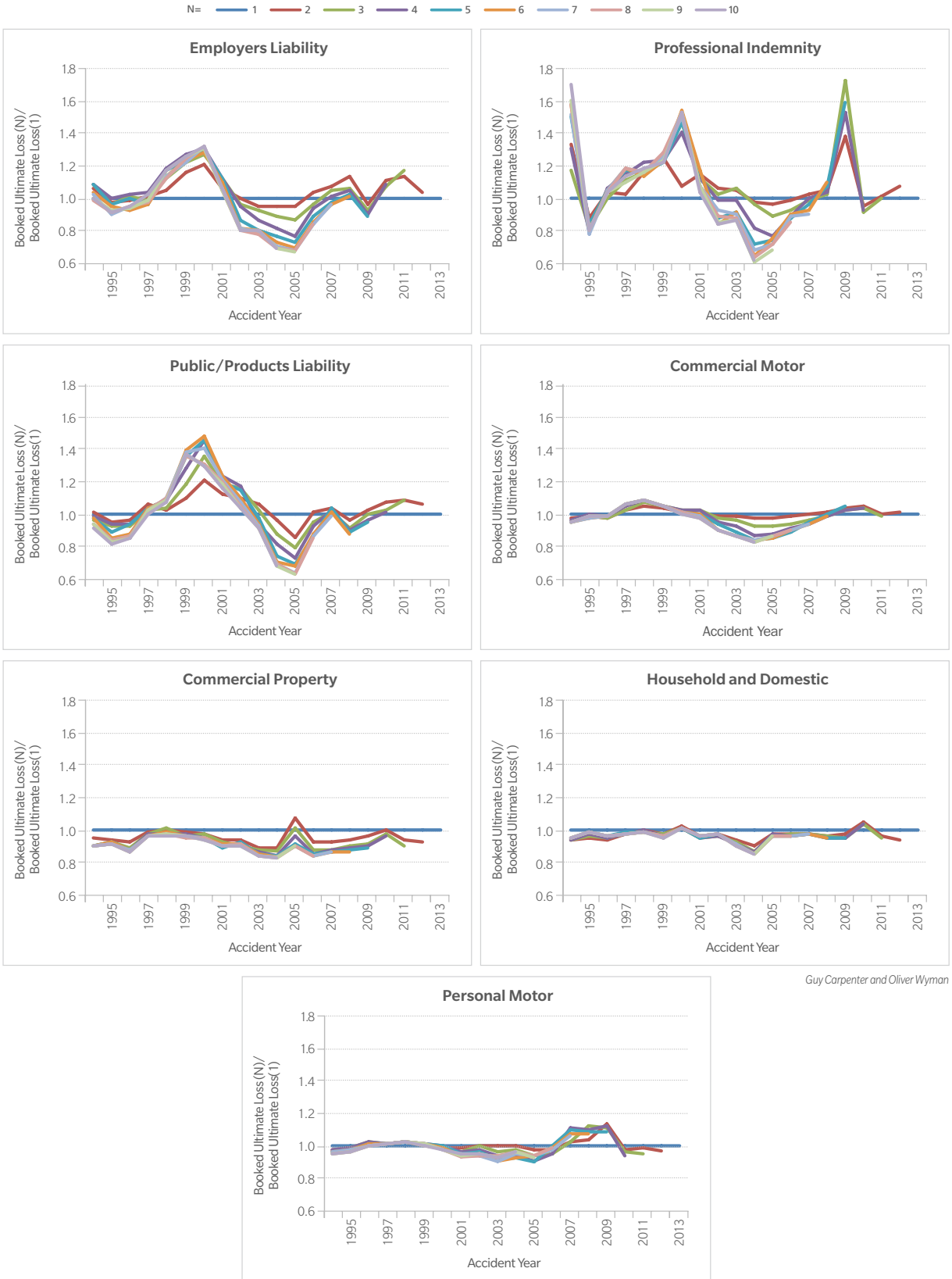
What is it?

The reserve for a particular accident year is re-estimated periodically. The reserving cycle in G 13 above illustrates these re-estimates, where each line is the booked ultimate loss at subsequently older evaluations, indexed on the initial booked ultimate loss at 12 months of development, set at 1.00.

How can it be used?

We are developing realistic models for the reserving cycle by line of business that will not only reflect auto-correlation but also induce correlation between lines of business. G 14 displays the reserve cycle by line of business showing that the cycle is prominent in long tailed casualty lines not in short tailed property lines. The cycle shows that groups of adjacent accident years end up with either worse or better results than initially thought. Not modeling this phenomenon significantly underestimates the risk to capital posed by casualty lines. In casualty lines it is not one but multiple years of reserve deterioration that pose a threat to capital, making multi-year capital modeling a priority for those who want to capture the true risk of these lines.

G 14 | BOOKED ULTIMATE LOSS AFTER N YEARS OF DEVELOPMENT/BOOKED ULTIMATE LOSS AFTER ONE YEAR OF DEVELOPMENT, BY ACCIDENT YEAR, UK INDUSTRY IN AGGREGATE, GROSS OF REINSURANCE



Guy Carpenter and Oliver Wyman

CONTACTS

The Insurance Risk Benchmarks Research is supported by a large working group of experts and professionals at Guy Carpenter and Oliver Wyman. Please contact any member of this network with questions and feedback

For the US Section:

New York City
Blake Berman, ACAS
AVP, ERM Services, Strategic Advisory
Blake.Berman@guycarp.com
+1 (917) 937 3272

Minneapolis
Gina Carlson, CPA
SVP, ERM Services, Strategic Advisory
Gina.Carlson@guycarp.com
+1 (952) 832 2235

New York City
Phil Lee, ARe, FRM, CPCU
VP, ERM Services, Strategic Advisory
Phil.Lee@guycarp.com
+1 (347) 237 3305

Princeton, NJ
Rich Lino, FCAS, MAAA
Partner
Richard.Lino@oliverwyman.com
+1 (609) 520 2985

New York City
Don Mango, FCAS, MAAA
Head of Enterprise Analytics
Donald.F.Mango@guycarp.com
+1 (973) 285 7941

Atlanta
Bonnie Maxie, FCAS, MAAA
Principal
Bonnie.Maxie@oliverwyman.com
+1 (415) 279 9342

Morristown, NJ
Tim Porter, FCAS, CPCU, RPLU, MAAA
Senior Consultant
Tim.Porter@oliverwyman.com
+1 (973) 401 5321

New York City
Paul Silberbush, FCAS, MAAA
Strategic Advisory
Paul.Silberbush@guycarp.com
+1 (917) 937 3251

Morristown, NJ
Joel Vaag, FCAS, MAAA
Principal
Joel.Vaag@oliverwyman.com
+1 (973) 401 5142

Seattle
Steve White, FCAS
Chief Actuary
Steve.White@guycarp.com
+1 (206) 621 3096

New York City
Micah Woolstenhulme, FCAS
Manager, ERM Services, Strategic Advisory
Micah.G.Woolstenhulme@guycarp.com
+1 (917) 937 3133

For the UK Section:

Andrew Cox, MMath, MSc, FIA
London Head of Advisory, International
Andrew.P.Cox@guycarp.com
+44 (0)20 7357 5165

Chris Apps, MPhys
London Innovation Consultant, Technical Innovation
Christopher.Apps@guycarp.com
+44 (0)20 7357 5819

Matthew Counsell
London Actuarial Analyst
Matthew.Counsell@guycarp.com
+44 (0)20 7178 5320

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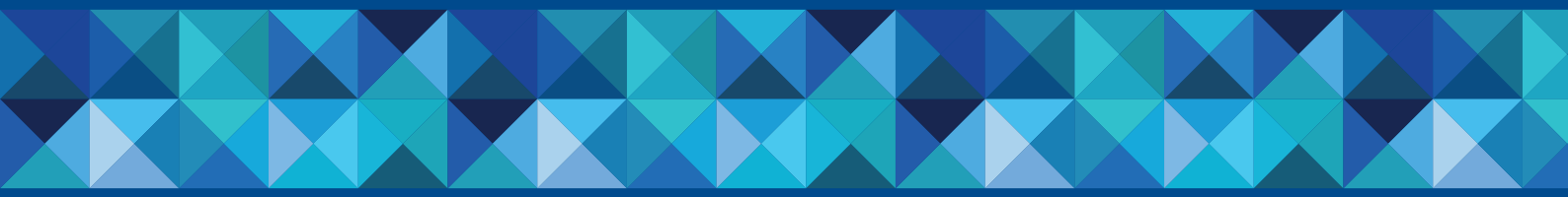

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