Impacts Across the Firm: Commercial Lines Pricing Systems

Presentation by Dustin Duncan, Kevin Madigan, Steve Walsh
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Today's Speakers

Steve Walsh, FCAS, FSA
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Background and relevant experience
Steve's focus is applying predictive analytics and actuarial research to underwriting and pricing in property & casualty insurance. He has been working for over five years in consulting and works both with personal and commercial insurance companies. He has conducted a variety of projects, including:
- Applying advanced analytics for improved risk segmentation
- Developing new underwriting tools and guidelines in areas such as market analysis, risk and coverage, and improving underwriting
- Developing and implementing quantitative tools for distribution agents
- Managing regulatory relations and processes

Education and certifications
Steve is a former insurtech Chief Underwriting Officer, actuary (FCAS, FSA), and certified Data Scientist. He holds an MBA (Baker Scholar) from Harvard Business School, and BS (summa cum laude) from The Wharton School, University of Pennsylvania.

Kevin Madigan, ACAS, CERA, MAAA
Senior Consultant, Gross Consulting
Managing Principal, Genuine Risk Advisors LLC
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Background and relevant experience
Kevin focuses on the intersections of pricing, underwriting, reserving, and ERM. He has over twenty-five years of actuarial experience split between primary carriers, reinsurers, and run-off entities, including:
- Large account pricing for a top national carrier
- Reinsurance pricing (standard casualty, property, and multiline treaties; highly structured alternative risk transfer programs)
- Deputy CUO for a Bermuda based property reinsurer
- Designing, building, implementing, and/or validating dynamic risk models for pricing in a large US property carrier

Education and certifications
Kevin is an Associate of the Casualty Actuarial Society, a Chartered Enterprise Risk Analyst, and has served on and/or chaired several CAS, AAA, and ASB committees over his career. He holds a PhD and an MA in Mathematics from the University at Albany and a BS in Mathematics from Auburn University.

Dustin Duncan, FCAS, MAAA
Director, Head of US Operations, RPC Tyche
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Background and relevant experience
Dustin's focus is on helping insurers modernize and improve their systems and modeling processes. He has over seven years of experience in underwriting and claims.

Education and certifications
Dustin was formally a Principal at Oliver Wyman Actuarial Consulting. He is a Fellow of the Casualty Actuarial Society, a Member of the American Academy of Actuaries, a Member of the CAS Ratemaking, Product and Modeling Seminar Planning Committee, and holds a B.A.Sc. in Actuarial Science (magna cum laude) from Ball State University.
A Day in the Life of Your Underwriter

Speed Polling: Introduction

- Four consecutive polling questions
- Only 20 seconds per question
- Each question ends with the same choice:

  - Invest & Grow: Product
  - Curtail & Shrink: Product

Speed Polling: #1 of 4

- Your underwriting book has had stable performance for several years, and one of your products has begun selling more

  - Invest & Grow: Product
  - Curtail & Shrink: Product
Speed Polling: #2 of 4

- Your underwriting book has had stable performance for several years, and one of your products has begun selling more
- Your quote to bind ratio for the product increased from 25% to 35%, and your boss congratulates you as a top seller for the quarter

Speed Polling: #3 of 4

- Your underwriting book has had stable performance for several years, and one of your products has begun selling more
- Your quote to bind ratio for the product increased from 25% to 35%, and your boss congratulates you as a top seller for the quarter
- A major competitor exits the line, your submissions increase 15% from prior year, and your agents thank you for providing market stability

Speed Polling: #4 of 4

- Your underwriting book has had stable performance for several years, and one of your products has begun selling more
- Your quote to bind ratio for the product increased from 25% to 35%, and your boss congratulates you as a top seller for the quarter
- A major competitor exits the line, your submissions increase 15% from prior year, and your agents thank you for providing market stability
- Your actuary completes a study of 9 month old claim data and finds paid loss ratio is up 20% on this product
Speed Polling Results

Your underwriting book has had stable performance for several years, and one of your products has begun selling more.

Your quote to bind ratio for the product increased from 25% to 35%, and your boss congratulates you as a top seller for the quarter.

A major competitor exits the line, your submissions increase 15% from prior year, and your agents thank you for providing market stability.

Your actuary completes a study of 9-month-old claim data and finds paid loss ratio is up 20% on this product.

The polling questions simulated an actual case study (disguised data):

- We recently observed two insurers making different strategic moves in the same commercial lines segment. One insurer was exiting the segment while another was growing.
- The exiting insurer had the management information, underlying data, and operating governance to recognize and react to the emerging trends; the growing insurer did not.
- In this case, insureds within the segment were offering a new service with a different and much higher loss potential.

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<th>Underlying Data Structure</th>
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Commercial Auto provided a broader lesson between 2007 and 2008, the industry loss ratio rose from 66% to 76%. How did everyone miss it?

Data not considered by industry models:
- Increase in miles driven
- New vehicle impacts, which:
  - Increased distracted driving
  - Were more expensive to repair
- Hospital visits/diagnoses

Actuarial reserving and pricing modeling:
- Operate 4 to 6 times per year, leading to lags between market shifts, detection, and response
- Aggregate models are designed to assess changes, but not explicit or asset them

Limited (or poor) information flowing to operations leads to:
- Slow Underwriting response
- Reactive Claims activity
- Underwriting, Financial, and Risk Management appetites responding at different rates to changing conditions
- Imprecise communication
Commercial Auto showed the costs of limited information from staying within traditional routines

Not considering miles traveled, smartphone use, and other factors...

...led to significantly underpriced and under-reserved risk

Operational challenges make it difficult for underwriters to build additional skills on the foundation of managing risk

A number of leading practices ensure tools and information are easy to access for commercial underwriters
The downstream impacts of large account pricing and pricing system design

We will walk through three examples which show the importance of having integrated tools to not only improve underwriting & pricing decisions but to also improve the functions of other pillars of the organization.

- **Example 1**: Will focus on informing reserving.
- **Example 2**: Will focus on improving pricing analytics.
- **Example 3**: Will focus on informing capital modeling and business strategy.
- **Example 4**: Will focus on informing CAT modeling and management.

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**Example 1: Informing Reserving**

We will demonstrate how the detailed work coming from individual account pricing analyses can be utilized by reserving teams to better inform their view of future reserve volatility. Conversely, we will demonstrate how this view of reserve volatility should inform pricing and underwriting decisions.

When pricing individual accounts, loss cost expectations are often priced at a much more granular level than reserving is performed at. If a portfolio has shifts in the proportion of expected loss cost by peril, segment or CAT/non-CAT, this can have drastic impacts to reserve patterns and lead to reserving inaccuracies.
Example 1: Informing Reserving

By setting up an integrated ecosystem of tools which allows reserving to tap into detailed pricing / underwriting data, the reserving team can react to shifts much faster, leading to more accurate reserves and a better understanding of reserve volatility.

Recent shift towards longer-tail perils / sublines might not show in traditional reserving data until much later.

This new view of reserve volatility should in turn impact pricing / underwriting strategy to ensure the firm is writing within their risk appetite and appropriately reflecting this risk when pricing deals.

Example 1: Conclusion

Capturing transactional pricing data and information can help
• improve the predictive accuracy of the actuarial reserve analyses and
• improve understanding of reserve volatility

This improved understanding of reserve volatility can be used by the risk function to test alignment with the insurer’s risk appetite / tolerance, which in turn can inform
• Underwriting (new and renewal business) planning and strategy and
• Risk loadings and target returns used in pricing
Example 2: Better Pricing Analytics

How can this data be used to produce better tools?

- Loss development studies for key segments
  - Already alluded to in Example 1 above, use produces relevant benchmark LDFs
  - Collection of benchmark LDFs preloaded into experience pricing model for actuarial selection

- Trend analyses
  - Use actual experience to arrive at trend assumptions for various segments and coverages
  - Possible trend factors, based on these analyses, preloaded into experience model for actuarial selection

- Exposure curves
  - Collection of curves relevant to key segments informed by the enhanced development studies
  - Implicates produces a wider collection of ILFs
  - Exposure curves / ILFs preloaded into pricing system for actuarial selection

- Credibility of exposure and experience rating
  - Indicates credibility weights calculated automatically by pricing system, actuary selects actual weights to be applied when arriving at indicated technical price
  - Could be used for primary and first excess cat layers
Example 2: Conclusion
Capturing transactional pricing data and information can help insurers develop better benchmarks and algorithms for experience and exposure rating:
- Trend and Development benchmarks for use in developing exposure curves and inputs to experience pricing models – which in turn can be shared with the reserving and risk functions to inform selections made for their models
- Development of more granular and relevant exposure curves (and associated ILFs)
- Automation of credibility procedures and production of indicated credibility weights

Insights gained from the improved pricing process can also inform underwriting strategy and planning and assist in the production of risk metrics for the risk function’s management reporting.

Example 3: Informing Capital Modeling & Business Strategy
We will demonstrate how transactional pricing data can be utilized by the capital modeling team to improve their models and in turn allow the firm to make better business decisions. We will touch on the downstream impacts to reinsurance purchasing decisions and developing optimal underwriting and growth strategies. Similarly to Example 1, we will demonstrate how this more accurate view of capital utilization should inform pricing and underwriting decisions.

Capital models are a critical tool for companies in determining their reinsurance purchase strategy. More accurate capital models mean a more optimal outwards reinsurance portfolio.
Example 3: Informing Capital Modeling & Business Strategy

This more accurate capital model should in turn influence underwriting and growth strategy. Further, we now have a better understanding of the capital required to support different business segments, which should be appropriately reflected when pricing risks to ensure an appropriate return on capital.

Example 3: Conclusion

Capturing transactional pricing data and information can help
• improve capital model granularity and accuracy and in turn
• improve reinsurance purchasing decisions and
• improve underwriting strategy

The improved understanding of the allocated capital required to support different segments or even individual policies gained from a more accurate capital model can in turn inform more appropriate risk loadings and target returns used in pricing.

Example 4: Informing CAT modeling & management

We will demonstrate how individual deal pricing / underwriting information including CAT model results can be utilized to monitor in real-time as a portfolio grows and changes where a company stands relative to their risk appetite. Following suit with the other examples we will demonstrate how this monitoring should inform pricing and underwriting decisions.
Example 4: Informing CAT modeling & management

Continued monitoring of CAT exposure may require actions to be taken such as reinsurance purchasing or changing underwriting strategy to avoid over-exposure.

Example 4: Conclusion

Capturing transactional pricing data and information can help:
• improve the accuracy and timeliness of CAT modeling and in turn
• improve visibility into a firm's CAT exposure

This improved understanding of CAT exposure can be used by the risk function to test alignment with the insurer's risk appetite/tolerance, which in turn can inform:
• Facultative and treaty reinsurance purchasing and
• Underwriting (new and renewal business) planning and strategy and
• Risk loadings and target returns used in pricing (marginal CAT pricing)

An Example of a Fully Integrated Modeling Ecosystem

At the core of a fully integrated modeling ecosystem which fully leverages pricing/underwriting modeling and decisions is a large account pricing system with rich automated data capture that can inform other pillars of the organization.

Pricing System Database
- All policy information including lines and related data, premium data, and modeled losses used for pricing (e.g. "loss ratio")

Capital Model
- Reinsurance portfolio container of all Tyche products
- Can leverage individual policy details and curve fits from pricing

Business Optimization
- Optimize inwards and outwards (re)insurance portfolios
- Reinsurance portfolio container shared
- Full integration with TCM results

CAT Accumulation Management
- CAT accumulation modeling and analysis
- Policy portfolio can be pulled from TPS
- CAT accumulation container and analysis of individual contracts
- Reinsurance portfolio container shared at other Tyche products
Thank you!  Questions?