



Workers Compensation Industry Report

Year-End 2024

Including Sample Carrier Report

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1 Executive Summary

This report delivers an analysis of workers' compensation loss ratios, reserve adequacy, and performance forecasts using the latest Schedule P data. It examines industry-wide trends and benchmarks carrier-specific performance.

Four years after the pandemic-era disruptions, the U.S. workforce has undergone a lasting transformation. Remote and hybrid work arrangements have become standard in many sectors, while industries such as healthcare, logistics, and construction continue to experience labor shortages and elevated turnover. These structural shifts are materially affecting workers' compensation exposures, frequency patterns, and severity trends.

To capture these changes, we apply a state-of-the-art modeling framework designed to use all observable trends across the available Schedule P data. This approach allows us to assess both current performance and forward-looking risk for individual carriers and the industry as a whole.

1.1 Key Findings

- **Workers' compensation loss ratios have risen steadily over the past five years**, reversing the trend of low ratios during the mid-to-late 2010s.
- **The rise in loss ratios may be leveling off**, and there is a meaningful chance that this is the beginning of a return to lower loss ratios.
- **The industry remains strongly reserved in aggregate**, driven by a subset of large carriers holding reserve margins well above model estimates.
- **However, there are still many carriers that appear under-reserved**, exposing them to potential adverse development, particularly on older accident years.
- **Implied tail factors vary significantly**, reflecting differing assumptions about unknown future developments.
- **Larger carriers generally have lower loss ratios than small to midsize ones**, likely due to greater scale, better data and analytics, and more effective claims management infrastructure.

2 Methodology

The modeling framework in this report is based on an advanced statistical approach adapted from the forthcoming paper *Multioutput Gaussian Process for Loss Ratio Development* in Variance. This model reimagines the traditional loss development triangle as a continuous surface, capturing trends across both accident and development years while modeling dependencies across multiple dimensions.

Unlike classical methods, this approach jointly models incremental paid loss ratios, case loss ratios, and carrier group structures, allowing for a more integrated and nuanced understanding of development dynamics.

A key advantage of the model is its ability to capture uncertainty at all levels—from individual triangle cells to aggregate reserves—delivering more accurate, probabilistic estimates of loss ratios and reserve adequacy. The incorporation of dependency structures reduces noise and leads to significantly improved trend detection, both for industry aggregates and individual carriers. Forward simulations from the model enable stress testing and provide insight into a range of plausible future outcomes.

This methodology offers a modern, comprehensive view of loss development, equipping insurers and analysts with more informative metrics for decision-making under uncertainty.

2.1 Performance Testing

To validate the model, we analyze the reserve distribution for 57 workers' compensation carriers as of year-end 1997, projecting outcomes through calendar year 2007. This period includes a well-documented rapid decline in loss ratios across much of the industry. Despite having access to only 45 development cells per triangle, the model, Proxima, accurately captured the trend and distributional shape.

We evaluate model performance against the traditional Mack Chain Ladder approach using a comprehensive suite of metrics:

- **Weighted Root Mean Squared Error (WRMSE):** Measures the difference between predicted and actual values, giving more weight to larger deviations.
- **Negative Log Predictive Density (NLPD):** Assesses the likelihood of observed data under the model's predictions.
- **90% Coverage Probability (COV 90):** The proportion of test cases where the true value lies within the 90% prediction interval.
- **Kolmogorov-Smirnov Distributional Test (KS):** Evaluates the goodness of fit between the observed and predicted distributions.

Table 1: Incurred Performance Metrics

Model	WRMSE	NLPD	COV_90	KS
Mack Chain Ladder	0.061	1145	63.2%	0.316
Proxima	0.048	995	89.5%	0.068

Table 2: Paid Performance Metrics

Model	WRMSE	NLPD	COV_90	KS
Mack Chain Ladder	0.049	1493	56.1%	0.315
Proxima	0.037	972	89.5%	0.052

Across all metrics, Proxima demonstrates clear and consistent improvement over traditional methods, particularly in modeling both paid and incurred losses. A P–P (probability–probability) plot confirms that the model’s predicted distributions are well-calibrated, with observations falling in line with theoretical expectations.

2.2 Tail Factors

For the projections in this report, tail factors are simulated from a selected distribution that reflects both industry data and bureau benchmarks. Rather than applying a fixed tail factor, we draw from a distribution that varies in relationship to the percentile rank of the pre-tail reserve simulation. In other words, simulations with higher pre-tail development tend to receive larger tail factors, and vice versa.

This approach results in a wider, more skewed distribution of ultimate reserves, more accurately capturing uncertainty in the tail. It also reflects a key empirical insight: higher-than-expected development in observed years tends to persist, with positive correlation across both development and accident years.

By linking the tail factor to the emerging development pattern, this method introduces a realistic dependency structure best suited for predictive power.

2.3 Data

The Schedule P data underlying this report was obtained from the National Association of Insurance Commissioners (NAIC), with a data cutoff date of March 9, 2025. Any revisions or restatements made after this date are not reflected in the analysis.

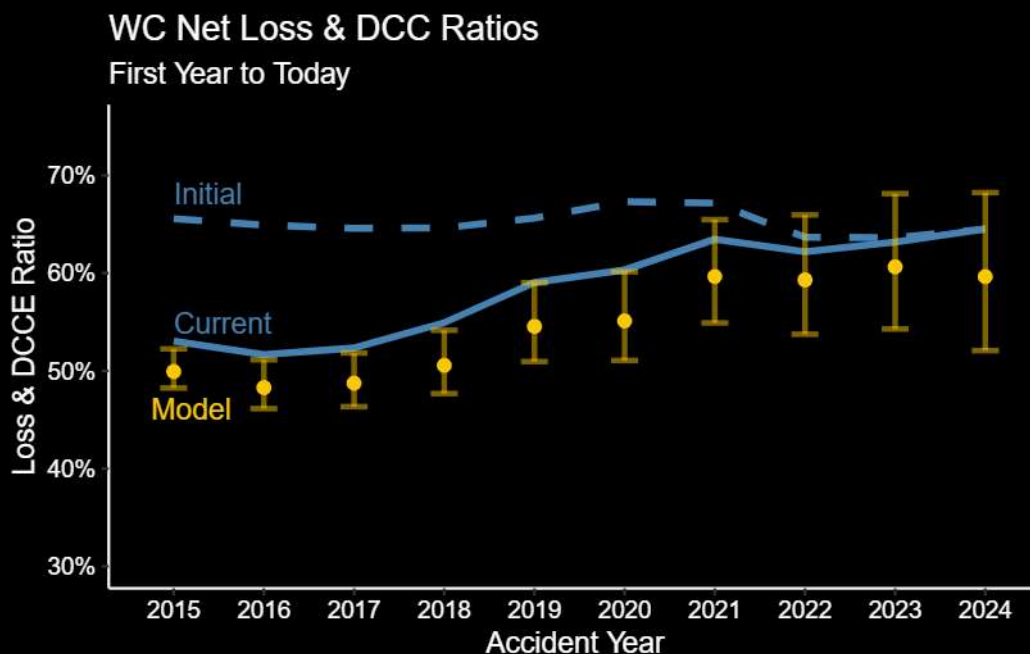
A small subset of carriers are not included in this report due to reported data unsuitable for modeling, accounting for less than 1% of industry premium.

3 Industry Results

3.1 Loss Ratios Selected vs. Modeled Ranges by Accident Year

This section presents industry-wide loss and defense and cost containment (DCC) ratios by accident year, comparing carrier-selected values with modeled ranges to assess variability, reserving behavior, and future outcomes. The shaded region represents the middle 90% of modeled outcomes (5th to 95th percentiles).

Each accident year also shows the initial selected loss ratio, as reported in the first year it was available. These early selections give insight into reserve evolution over time.



Since 2018, there has been a steady upward trend in loss ratios, moving from the ~50% range in the mid-2010s to modeled expectations closer to 60% for the early 2020s.

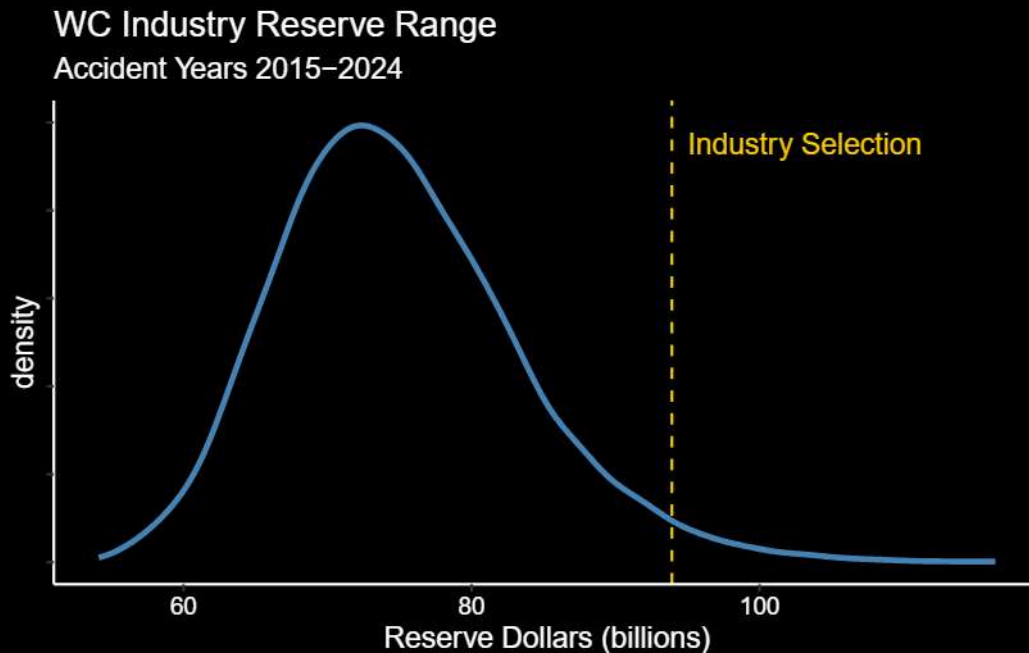
Initial carrier selections tend to begin in the mid-60% range, decreasing as more claims data emerges. Despite this pattern, carriers continue to set reserves conservatively near the upper end of the modeled outcome range.

Together, this likely signals a decline in the magnitude of reserve releases seen in prior years. While we expect further releases for years 2015 to 2020, more recent years appear more tightly reserved.

3.2 Reserve Range with Percentile

This section analyzes aggregate industry reserves, showing where total booked reserves fall within the modeled distribution. It aggregates reserves from accident years 2015 to 2024, the period for which data is adequately fit to the model.

As of the most recent evaluation, the industry's total reserve level ranks at the 97.6th percentile of the modeled distribution. This suggests that, in aggregate, carriers have booked reserves at the upper end of the plausible range.



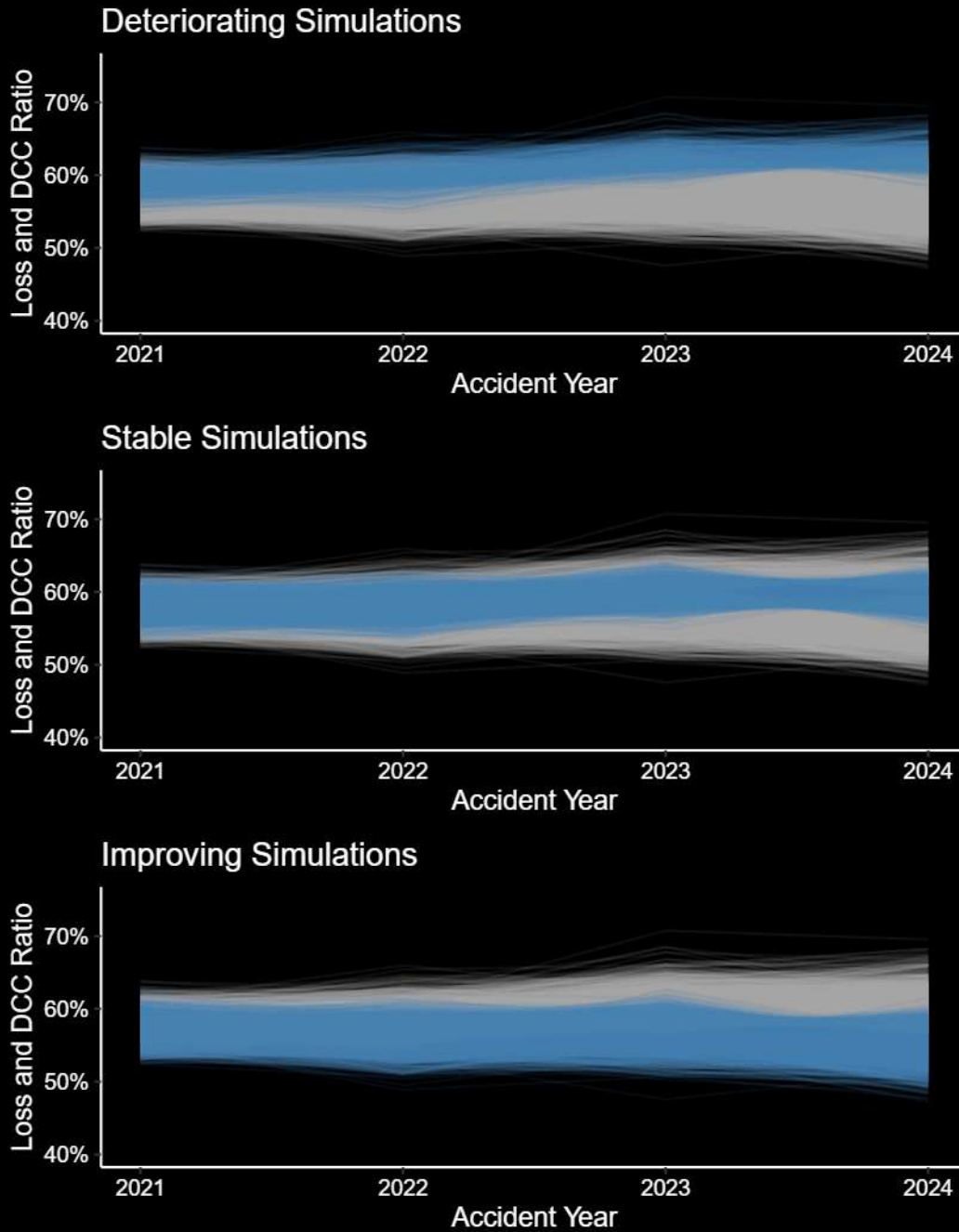
High-percentile selections at the accident-year level accumulate, pushing the industry-wide reserve position even further into the upper range. Even when individual carrier selections are reasonable in isolation, their aggregation can place the total reserve well into the tail of the modeled range.

This doesn't mean every carrier is strongly reserved. However, many of the largest are—and their size disproportionately skews the industry total. The result is a system that appears very well reserved in aggregate, even if not all participants meet that standard individually.

3.3 Recent Performance & Likelihood of Change

Here we examine the simulated paths of industry loss ratios to assess the short-term direction of claims experience. Each line below represents a single simulation across accident years.

Highlighted lines correspond to one of three categories:



The probability of each simulation outcome:

- Deteriorate: 11%

- Stabilize: 36%
- Improve: 53%

Simulations that deteriorate tend to show persistently higher loss ratios across accident years, indicating strong temporal correlation. This is slightly less apparent in the improving and stabilizing paths. This means, minimally, we will be able to tell if deterioration is likely sooner than the other scenarios.

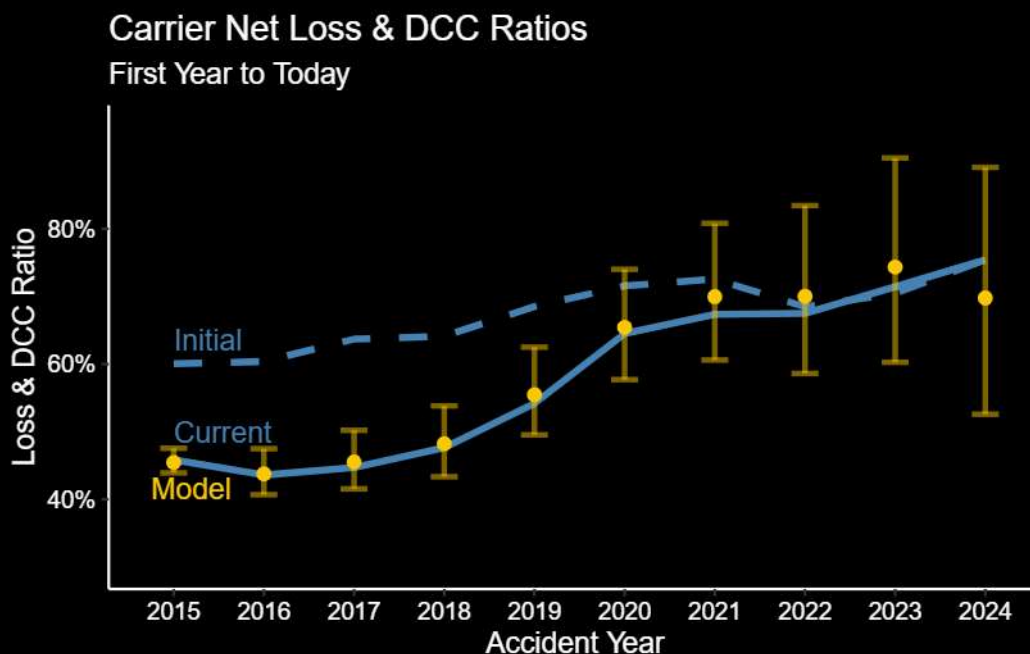
The fact that over half of scenarios indicate improvement supports the view that loss ratios may be flattening or reversing course, rather than continuing to rise.

4 Carrier Results

The following pages walk through an example carrier, illustrating how model insights apply at the company level. These views can be customized for any carrier and peer group.

4.1 Loss Ratios Selected vs. Modeled Ranges by Accident Year

This section compares each carrier's selected loss ratios with modeled expectations across accident years. The range shown represents the middle 90% of modeled outcomes, offering a clear view of variability and central tendency. This also serves as a diagnostic on the quality and consistency of a carrier's reserve-setting practices.



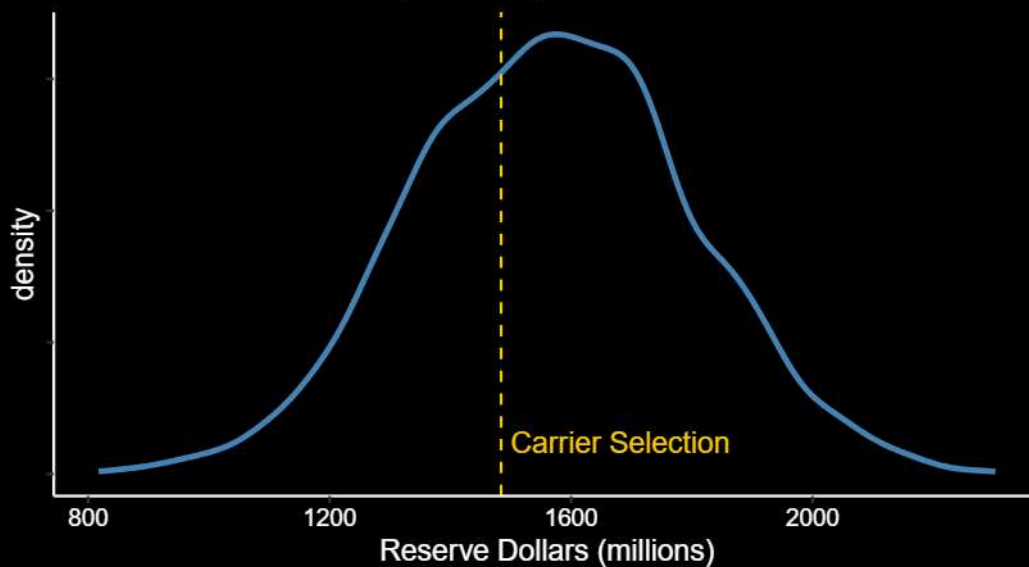
4.2 Reserve Range with Percentile

We evaluate the selected carrier's total reserve position relative to the modeled distribution. This view highlights carriers that may be under-reserved and exposed to adverse development or otherwise want to determine the risk of different future reserve changes.

Tail periods are not included in this example because carrier tail behavior and selections vary more widely than the industry aggregates. Including carrier-specific tail ranges can be requested.

WC Carrier Reserve Range

Accident Years 2015–2024; Excluding Tail Period



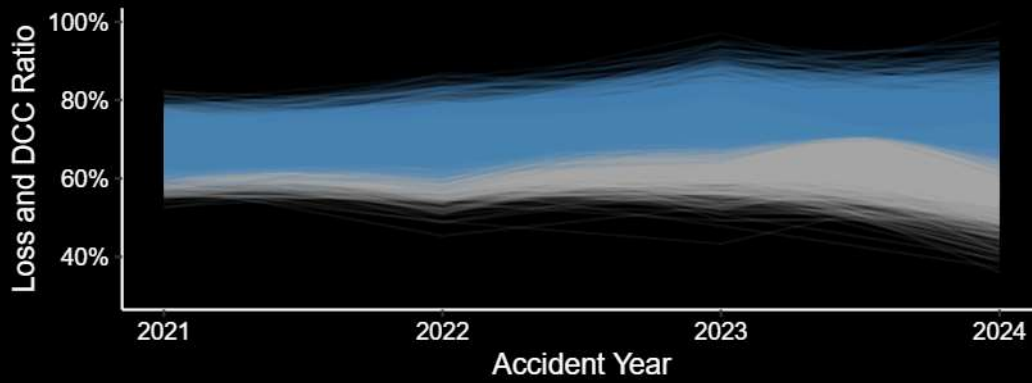
4.3 Recent Performance & Likelihood of Change

We evaluate each carrier's recent performance trajectory, based on simulations spanning the most recent three accident years. This allows us to assess short-term momentum in either direction.

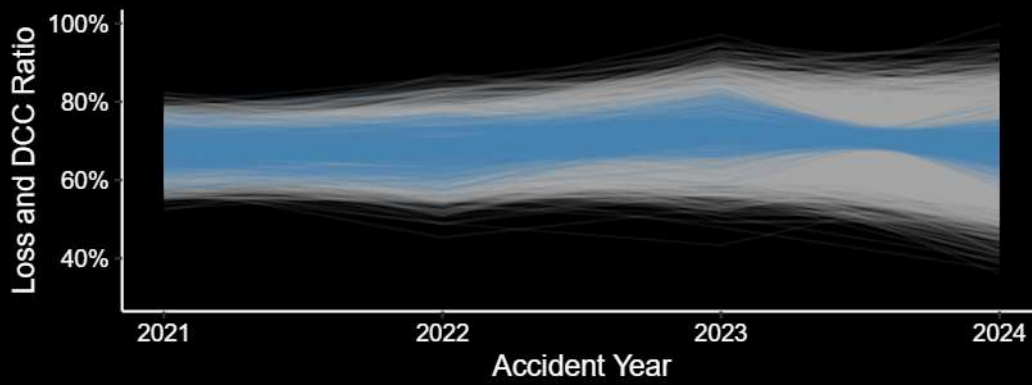
Each line represents a single simulation. The highlighted blue lines correspond to simulations falling into one of three qualitative buckets:

- Deteriorate: 37%
- Stabilize: 13%
- Improve: 50%

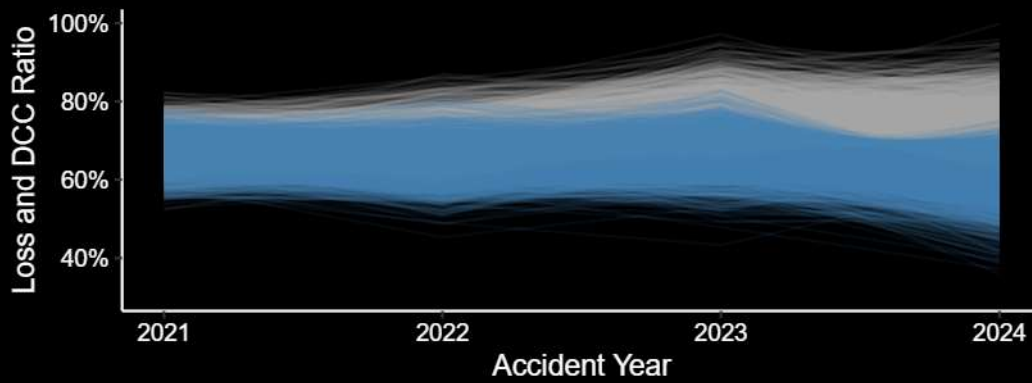
Deteriorating Simulations



Stable Simulations



Improving Simulations

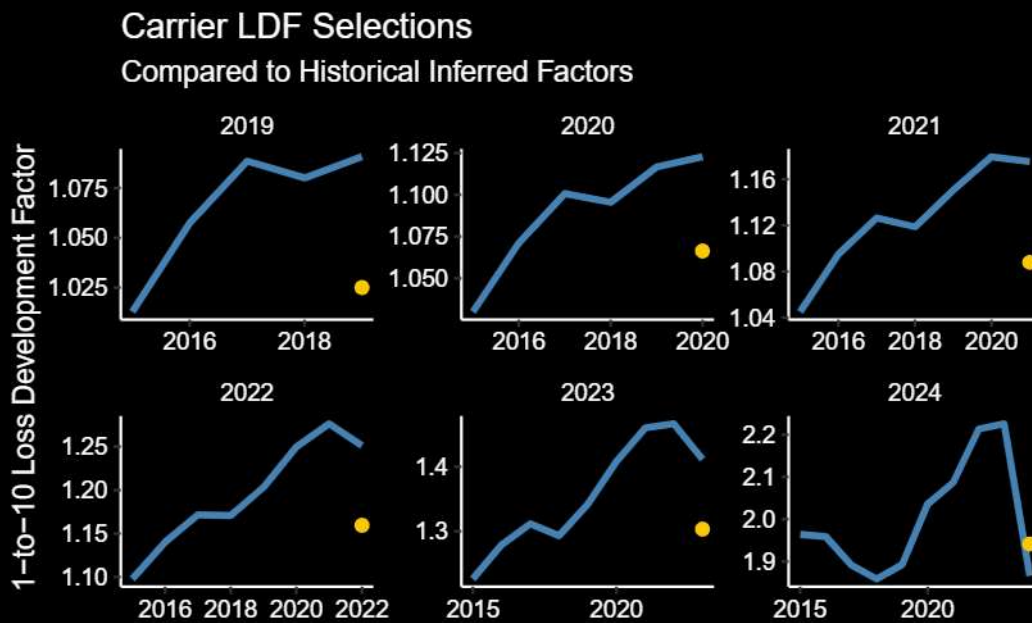


4.4 Loss Development Factors

This section compares each carrier's selected development factor to year 10 with a backward-looking estimate from the model.

This allows us to detect breaks in pattern or deviations from model trends, offering a view into carrier assumptions about claim development.

In the example below, we see a projected reduction in the 2024 development factor, consistent with prior years but steeper than historical averages. The carrier mirrors the direction of change but extends the break uniformly to other accident years—an assumption not supported by model trends.



4.5 Capital Adequacy and Risk-Adjusted Returns

Our model results can also support regulatory assessments and strategic decision-making across lines of business. Upon request, we can provide the following:

- **Tail Value at Risk (TVaR):** A tail-sensitive risk metric that captures not just the probability of loss, but the severity of extreme outcomes. Available at any specified percentile (e.g., 95%, 99%).

- Risk-Adjusted Return on Capital (RAROC): A performance measure comparing expected financial return to the risk inherent in reserve levels. We collaborate to calculate business-specific capital or return assumptions as needed.
- Stress Testing: Leveraging the model's simulated development paths, we can produce probabilistic evaluations under custom scenarios. These are useful for assessing reserve sensitivity, trend exposure, regulatory concerns, or strategic planning.

4.6 Full Data Extracts

The following datasets are available for each carrier and can be transformed as needed:

- Reserve simulations by accident year (2015–2024) and in aggregate
- Incremental paid loss ratio projections by accident year
- Incremental case loss ratio projections by accident year

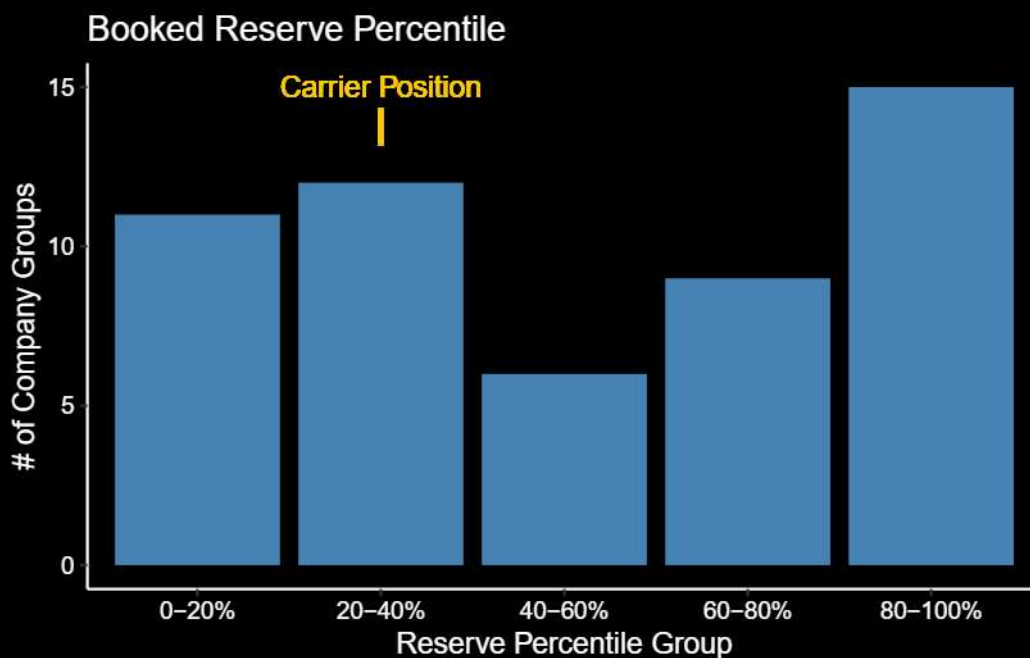
Additional formats—such as development factors—are available upon request.

5 Carrier Comparisons

We compare the example carrier in the prior section to a group of similarly sized carriers in the industry. We can also compare to a specified list of carriers or based on a Proxima clustering of historical development patterns.

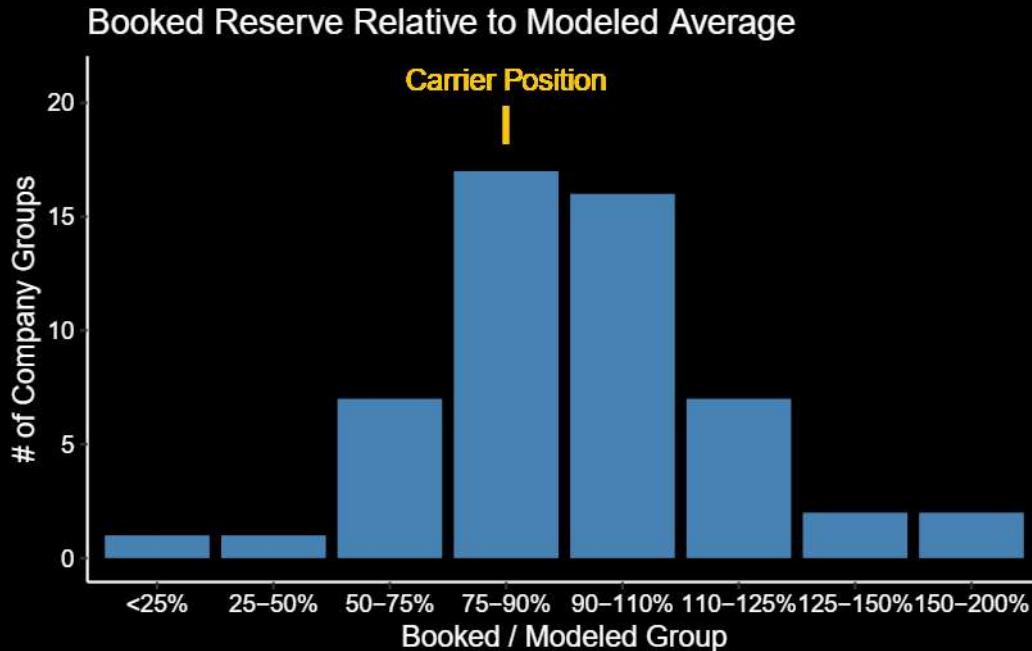
5.1 Reserve Percentile Compared to Other Carriers

This section compares each carrier's reserve percentile to that of other carriers. The goal is to identify whether a carrier is generally more aggressive or conservative in its reserve strategy relative to its direct competitors.



5.2 Reserve Relative to the Modeled Mean

This section provides another perspective on carrier reserving behavior that aligns with how many companies conduct their annual reserve reviews. Rather than focusing solely on percentile rankings, it assesses each carrier's reserves as a ratio to the modeled mean.

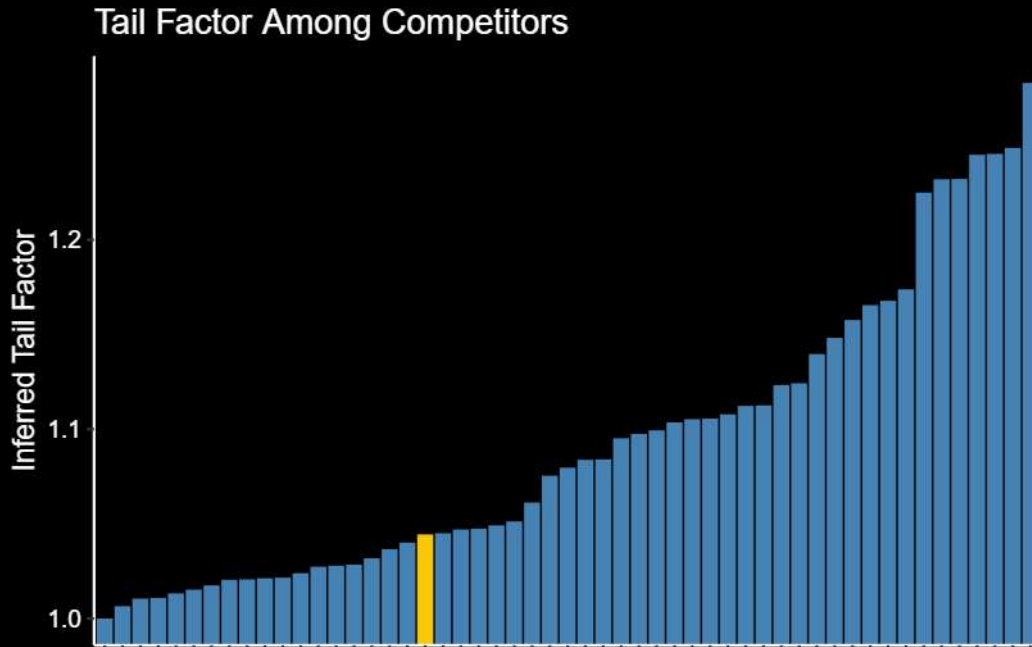


Many carriers aim to hold reserves within $\pm X\%$ of a reference estimate—often based on internal actuarial models or external benchmarks. This view offers a similar lens, comparing actual reserves to the model’s central estimate and allowing for easy identification of over- or under-reserving.

It also facilitates peer comparisons under the same framework, helping stakeholders see where their company stands relative to competitors using a common, quantitative anchor.

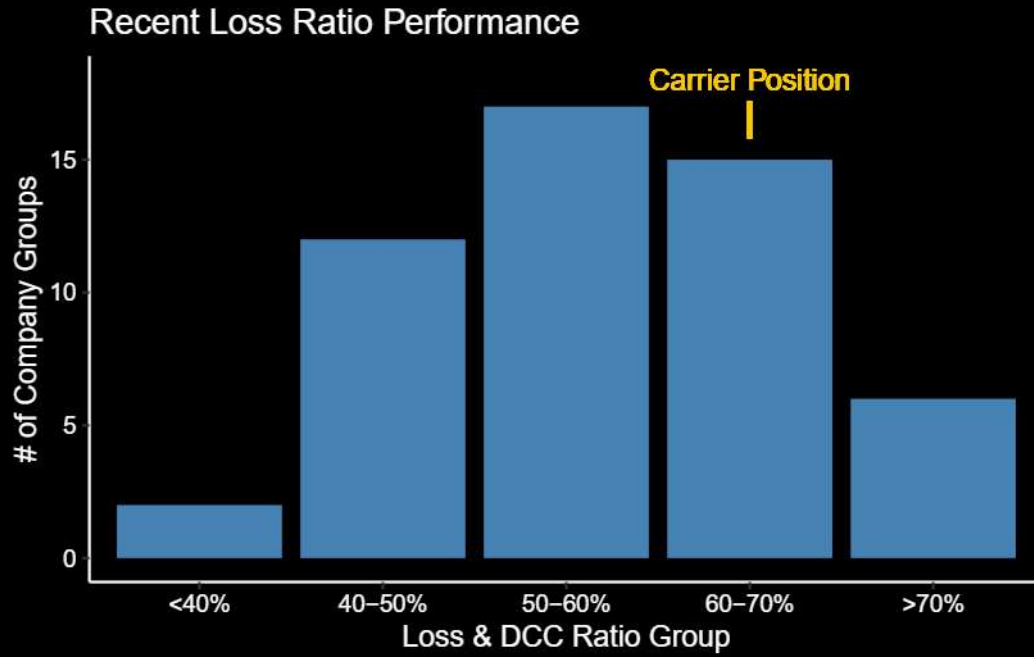
5.3 Tail Factors Compared Across Companies

Tail assumptions can significantly influence reserve adequacy, particularly in long-tailed lines like Workers’ Compensation. This view benchmarks each carrier’s tail factor against model expectations.



5.4 Performance Relative to Competitors

This section compares 3-year loss ratio performance across carriers. By focusing on recent accident years, it highlights short-term underwriting results and shows how each carrier's experience stacks up against peers.



6 Pricing

We offer flexible pricing based on the level of analysis and customization required. Below is the detailed pricing information for both **current year** reports and projections for **the subsequent two years**. Pricing varies depending on the complexity and scope of the analysis, as well as the number of reports requested.

Service	Current Year	Current + 2 Subsequent
Industry Analysis	Free	Free
Carrier Analysis	\$10,000	\$24,000
- Additional Line of Business	+\$5,000	+\$12,000
- Additional Company Group	+\$5,000	+\$12,000
- Split Company Group to Company	+\$10,000	+\$24,000
- Analysis Data Extract	+\$5,000	+\$12,000
Enterprise (Up to 20 Reports)	\$100,000	\$240,000
Per Request		
Custom Analysis	TBD	TBD

Further customization options and **tailored consulting services** are also available for carriers seeking additional insights.

Contact: contact@proximaanalytics.com