

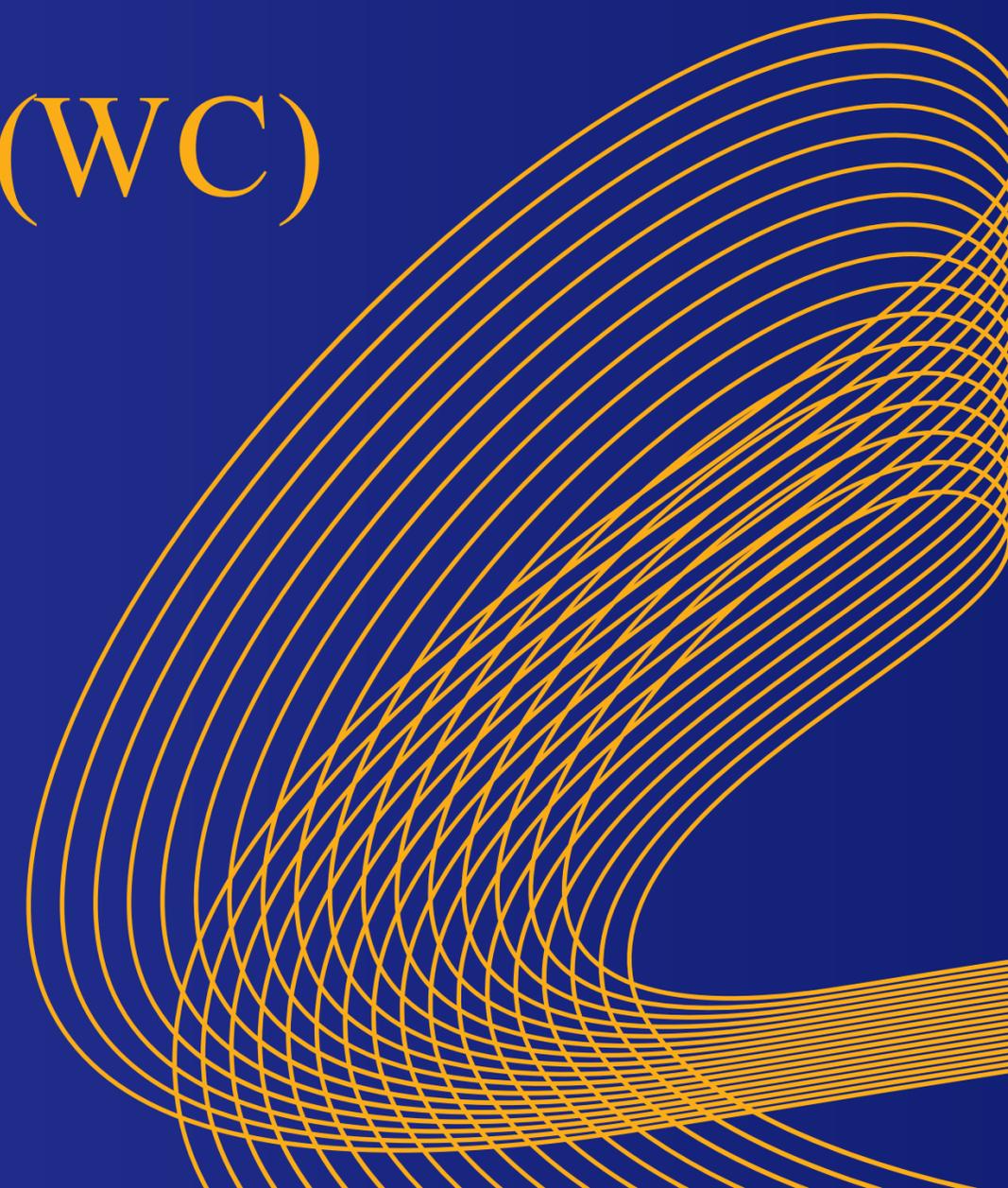


LEWIS & ELLIS, INC.

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# WORKERS' COMPENSATION (WC) RATEMAKING

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# AGENDA

Overview of WC Ratemaking process

Overview of State regulatory environment

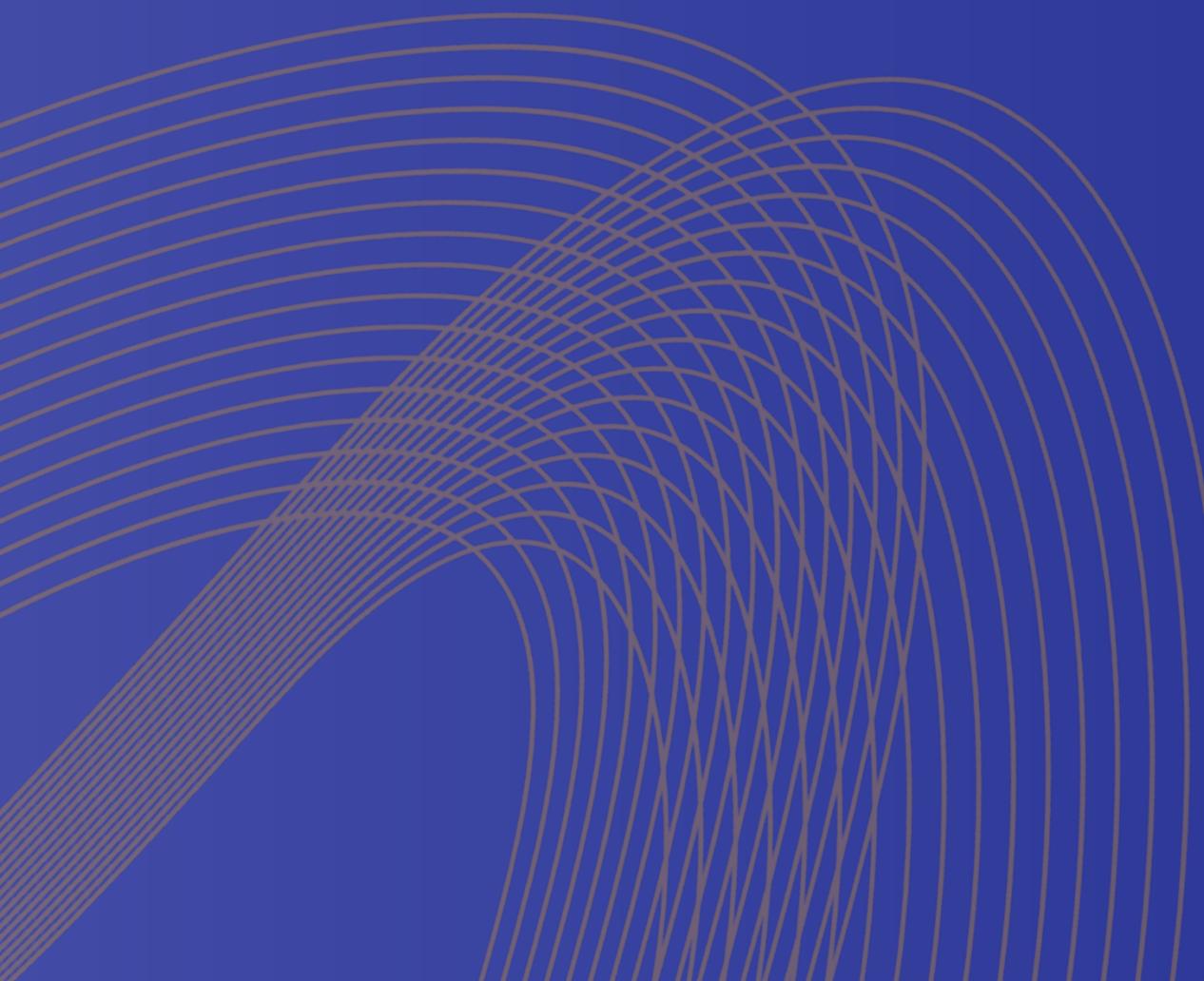
Definition of a model

Model usage in personal lines insurance products

Model usage in workers compensation

Hurdles to model roll outs in WC

Impacts from model usage in WC



# L&E DISCLAIMER AND LIMITATIONS

- Any views either written or presented verbally herein are those of the presenter only and should not be construed as the views of L&E as an organization or any other state department of insurance or insurance company entity.
- There is risk and uncertainty in the workers' compensation ratemaking processes. Processes rely on assumptions and methods that are, by their nature, subject to uncertainty. Workers' Compensation cost estimates made based on historical information will not precisely mimic future cost outcomes.



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# OVERVIEW OF WC RATEMAKING PROCESS

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# L&E OVERVIEW OF WC RATEMAKING PROCESS

- In the past, the National Council on Compensation Insurance (NCCI) and regional bureaus developed **advisory rates** that were widely adopted by carriers.
- The introduction of **open competition** in the Workers' Compensation market led to a reevaluation of pricing procedures.
- Now, NCCI and state bureaus typically provide only **loss costs instead of advisory rates**. Carriers must independently justify various components of the premium rate, including profit and contingency provisions, expense loads, investment income offsets, and other loss cost deviations.

# L&E OVERVIEW OF WC RATEMAKING PROCESS

Workers' compensation rating bureaus, such as the National Council on Compensation Insurance (NCCI), play a significant role in workers' compensation insurance ratemaking.

- **Workers' Compensation Rating Bureaus:** Rating bureaus are organizations that collect and analyze data related to workers' compensation claims, costs, and other relevant factors. They develop and maintain statistical data and actuarial methodologies to determine appropriate premium rates for different industries and classifications. These bureaus are generally state specific.
- **National Council on Compensation Insurance (NCCI):** The NCCI is a widely recognized rating bureau in the United States. It operates in many states and serves as the rating bureau for approximately 35 states. NCCI collects data from insurance companies, analyzes it, and proposes loss costs and rating values that insurance carriers use to calculate premiums. NCCI's role extends to areas such as classification systems, experience rating plans, and other aspects of workers' compensation insurance.

# L&E OVERVIEW OF WC RATEMAKING PROCESS

- **Data Collection and Analysis:** Rating bureaus like NCCI collect large amounts of historical claims' experience data from insurance carriers. This data is analyzed to determine loss costs, which represent the projected claim costs associated with different job classifications. These loss costs serve as the basis for determining premium rates.
- **Rate Filings:** Rating bureaus, including NCCI, prepare rate filings that propose changes to premium rates based on their data analysis and actuarial calculations. These rate filings are submitted to state regulatory authorities for review.
- **Advisory Role:** Rating bureaus also provide guidance and recommendations to insurance carriers and regulatory authorities regarding workers' compensation insurance. They offer expertise on issues such as classification systems, rate methodologies, experience rating plans, and other aspects of the insurance system.

# L&E OVERVIEW OF WC RATEMAKING PROCESS

- Loss cost deviations include experience rating modifications and schedule rating.
- Carriers must consider expense costs related to involuntary pools and special fund assessments.
- The industry evaluates the cost implications of Workers' Compensation reforms enacted in state legislatures.

# L&E OVERVIEW OF WC RATEMAKING PROCESS

- A pricing actuary is often involved for determining premium rates that cover expected losses and expenses during the policy period while allowing the insurer to make a reasonable profit.
- There are two main methods for determining rates:
  - 1) The loss ratio method: quantifies the needed revision from current rates
  - 2) The pure premium method: quantifies the required rate per unit of exposure and can be used in the derivation of rating factor relativities
- Workers' Compensation often sees entities using the loss ratio method for **overall statewide rate indications** and the pure premium method for **classification ratemaking**.

# L&E OVERVIEW OF WC RATEMAKING PROCESS

- “The published rate is not the final price paid by most insureds. The application of experience rating plans, schedule rating plans, and dividend plans plays a significant role in the ultimate price paid. The prevalence of large-deductible policies and retrospective rating plans also has a significant impact on the final amount paid by employers, whether through costs retained by the employer or through premiums paid to insurers. Consideration should be given to these various elements that affect the final price.” – American Academy of Actuaries, Workers’ Compensation Committee  
[https://www.actuary.org/sites/default/files/files/publications/Workers\\_Compensation\\_State\\_Rate\\_Comparisons\\_03.16.2018.pdf](https://www.actuary.org/sites/default/files/files/publications/Workers_Compensation_State_Rate_Comparisons_03.16.2018.pdf)

# L&E OVERVIEW OF WC RATEMAKING PROCESS

- **Experience rating:** Considers the actual loss history of the insured employer and makes a rate adjustment utilizing a measure of how the insured employer's loss experience performed relative to the industry.
- **Retrospective Rating:** Could be selected as an endorsement to a policy. A Retrospective Rating Plan is a rating program in which the final premium is based on an employer's actual incurred losses during the policy period.
- **Schedule Rating:** modification of manual rates either upward (debits) or downward (credits) to reflect the individual risk characteristics of the subject of insurance.

# L&E OVERVIEW OF WC RATEMAKING PROCESS

- “In most states, rating bureaus file pure premiums rather than final rates. When including those states in a comparison, it is important to carefully consider the need to add on provisions for the additional costs of providing coverage. These additional costs include commission and brokerage expense; other acquisition and general expenses; taxes, licenses, and fees; and a provision for profit and contingencies; and differ by insurer. Consideration should be given to the variation in these additional costs.” American Academy of Actuaries, Workers’ Compensation Committee [https://www.actuary.org/sites/default/files/files/publications/Workers Compensation State Rate Comparisons 03.16.2018.pdf](https://www.actuary.org/sites/default/files/files/publications/Workers%20Compensation%20State%20Rate%20Comparisons%2003.16.2018.pdf)



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# OVERVIEW OF STATE REGULATORY ENVIRONMENT

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# OVERVIEW OF STATE REGULATORY ENVIRONMENT

- Bureau/NCCI Overall Loss Cost Level and Loss Costs by Industry Class Code → FOUNDATIONAL; generally reviewed and revised once per year at the individual state level
- Companies permitted to use their own Loss Cost Multipliers, which includes a Company specific provision for expenses
- Companies may be permitted to use a Loss Cost Modification Factor (LCMF), which is an adjustment to the rate level in consideration of Company specific loss experience.
- There are often limitations on the degree to which a LCMF in a specific program is permitted to deviate (e.g., one LCMF to one program, or perhaps additional segmentation is permitted)

# OVERVIEW OF STATE REGULATORY ENVIRONMENT

- Most states permit experience rating and schedule rating, which facilitates additional rate segmentation, but there may be some state differences in specific rules (e.g., schedule rating may have state maximum and minimum cumulative debits/credits permitted)
- Administrative Pricing states may be the most restrictive in permitting insurers to deviate from a Bureau filing
- The Workers Compensation Research Institute maintains a lot of information on state differences in both laws and benefits. <https://www.wcrinet.org/>

# OVERVIEW OF STATE REGULATORY ENVIRONMENT

Workers' compensation rating laws can vary by state in terms of the specific regulations and methodologies used to determine premium rates.

- **Classification Systems:** Are used to determine the level of risk associated with each occupation, which influences the premium rates. Many states have similar classification systems, others may have unique or more detailed classifications.
- **Experience Rating:** Many states permit the use an experience modification factor or an experience rating system to adjust an employer's premium based on their historical claim experience. The experience modification factor compares an employer's actual claims history with the expected claims for that industry. A factor above 1.0 indicates higher-than-average claims, resulting in higher premiums, while a factor below 1.0 indicates lower-than-average claims, leading to reduced premiums.

# OVERVIEW OF STATE REGULATORY ENVIRONMENT

- **Competitive vs. Monopolistic States:** Some states have a competitive market where multiple insurance carriers can provide workers' compensation insurance. In these states, insurance companies compete for business. Some states operate in a monopolistic system, where a state fund or agency is the sole provider of workers' compensation insurance.
- **Benefit Levels:** The benefits provided under workers' compensation insurance, such as medical coverage, disability payments, and vocational rehabilitation, can vary by state. Benefit levels may be influenced by factors like average wage levels, cost of living, and specific state regulations.
- **Rate Formulas:** Workers compensation rating formulas consider factors such as the industry classification, claims history, payroll, and other factors believed to be relevant. The specific components and weighting of these formulas can differ between states although many states have similarities in risk classification plans.



# OVERVIEW OF STATE REGULATORY ENVIRONMENT

## STATES WITH A STATE-RUN WORKERS COMPENSATION FUND

| Competitive with Private Insurers |            | Exclusive    |              |
|-----------------------------------|------------|--------------|--------------|
| Arizona                           | Maine      | Oklahoma     | North Dakota |
| California                        | Maryland   | Oregon       | Ohio         |
| Colorado                          | Minnesota  | Pennsylvania | Washington   |
| Hawaii                            | Missouri   | Rhode Island | Wyoming*     |
| Idaho                             | Montana    | Texas        |              |
| Kentucky                          | New Mexico | Utah         |              |
| Louisiana                         | New York   |              |              |

\*Compulsory for extra hazardous operations only. Employers with nonhazardous operations may insure with the state fund or opt to go without coverage.

Source: <https://www.iii.org/article/spotlight-on-workers-compensation>



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# OVERVIEW OF A MODEL

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## L&E DEFINITION OF A MODEL

- "A predictive model is a statistical or machine learning model that is constructed to make predictions or forecasts about future outcomes based on historical data and known explanatory variables." - Source: Investopedia
- "A predictive model is a mathematical representation of a system or process that uses historical data to predict future behavior or outcomes. It aims to capture the underlying patterns and relationships in the data to make accurate predictions about future observations." - Source: SAS
- "In statistics, a predictive model refers to a mathematical or statistical model that is used to predict future outcomes or estimate unknown values based on available data. It involves using observed data to develop a model that can generalize to make predictions about unseen data." - Source: Towards Data Science
- "A predictive model is a statistical tool or algorithm that leverages patterns and relationships in historical data to make predictions or forecasts about future events. It involves training a model on a dataset and then using that model to make predictions about new, unseen data." - Source: IBM

# MODEL USAGE IN PERSONAL LINES INSURANCE PRODUCTS

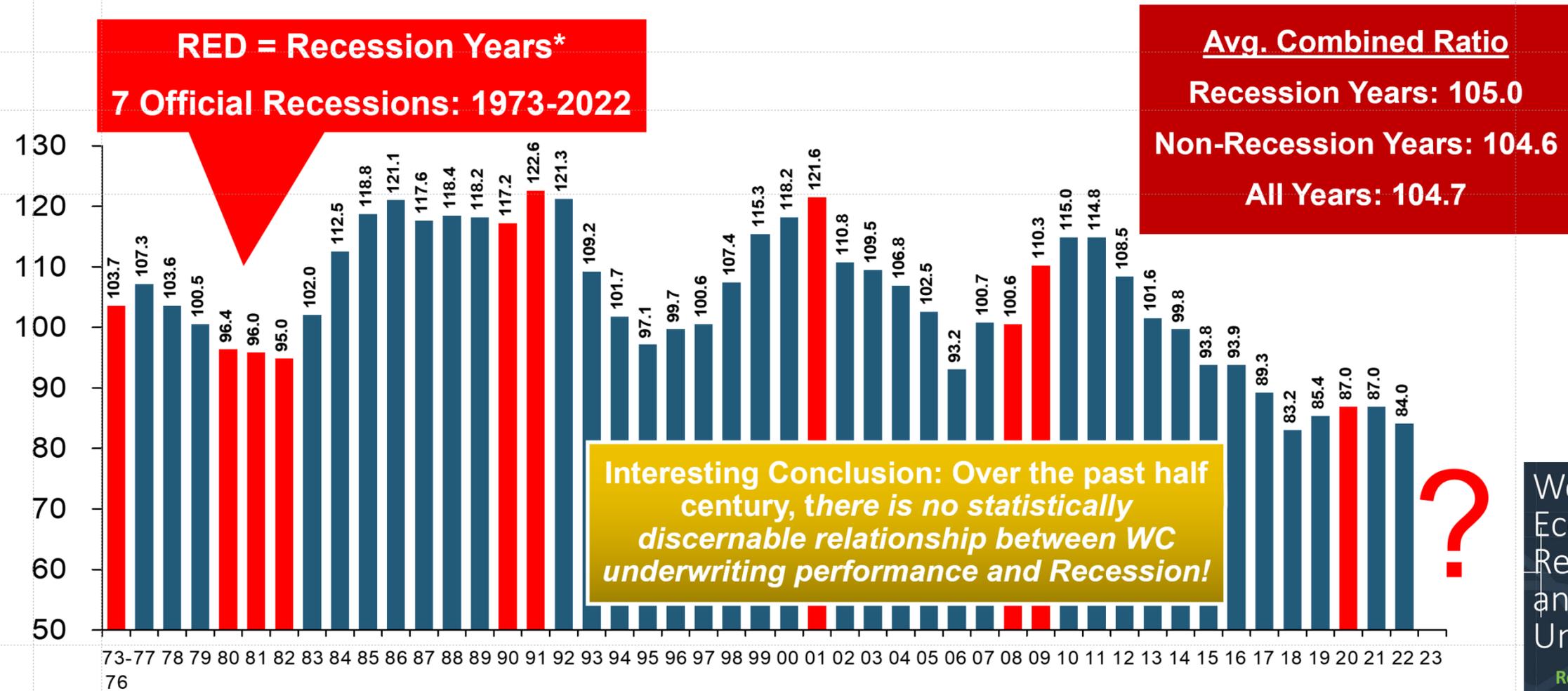
- Fairly commonly used in the industry
- Purpose is to promote more accurate risk segmentation that is correlated with expected costs
- Requires a robust historical dataset
- Interactions; goal of avoiding risk of double counting rate effects

# L&E MODEL USAGE IN WORKERS COMPENSATION

- May be less common relative to personal lines in rate filings
- NCCI and rate bureau ratemaking methods are not typically interpreted as applying the “model” definition as we have defined earlier
- May have some unique considerations in the modeling process to manage unique aspects of the WC line of business

# L&E MODEL USAGE IN WORKERS COMPENSATION

## Workers Comp Combined Ratios: 1973 – 2022p



\*Years in which 3 or more months of the year were in recession plus 2020 (Covid-related recession) which lasted 2 months. Recession dates from NBER: <https://www.nber.org/research/data/us-business-cycle-expansions-and-contractions>  
 Note: Data for 1973-1984 are calculated from incurred loss and expense data, excluding policyholder dividends, as sourced below, and are for stock companies only.  
 Sources: Social Security Bulletin, July 1988 (v. 51, n. 7) accessed at: <https://www.ssa.gov/policy/docs/ssb/v51n7/v51n7p4.pdf>; NAIC Annual Statement (1985-2021); NCCI (2022p); University of South Carolina, Risk and Uncertainty Management Center.

Workers Comp at the Economic Crossroads: Recession, Inflation and Economic Uncertainty



**Robert P. Hartwig, PhD, CPCU**  
 Clinical Associate Professor of Finance  
 Darla Moore School of Business  
 University of South Carolina

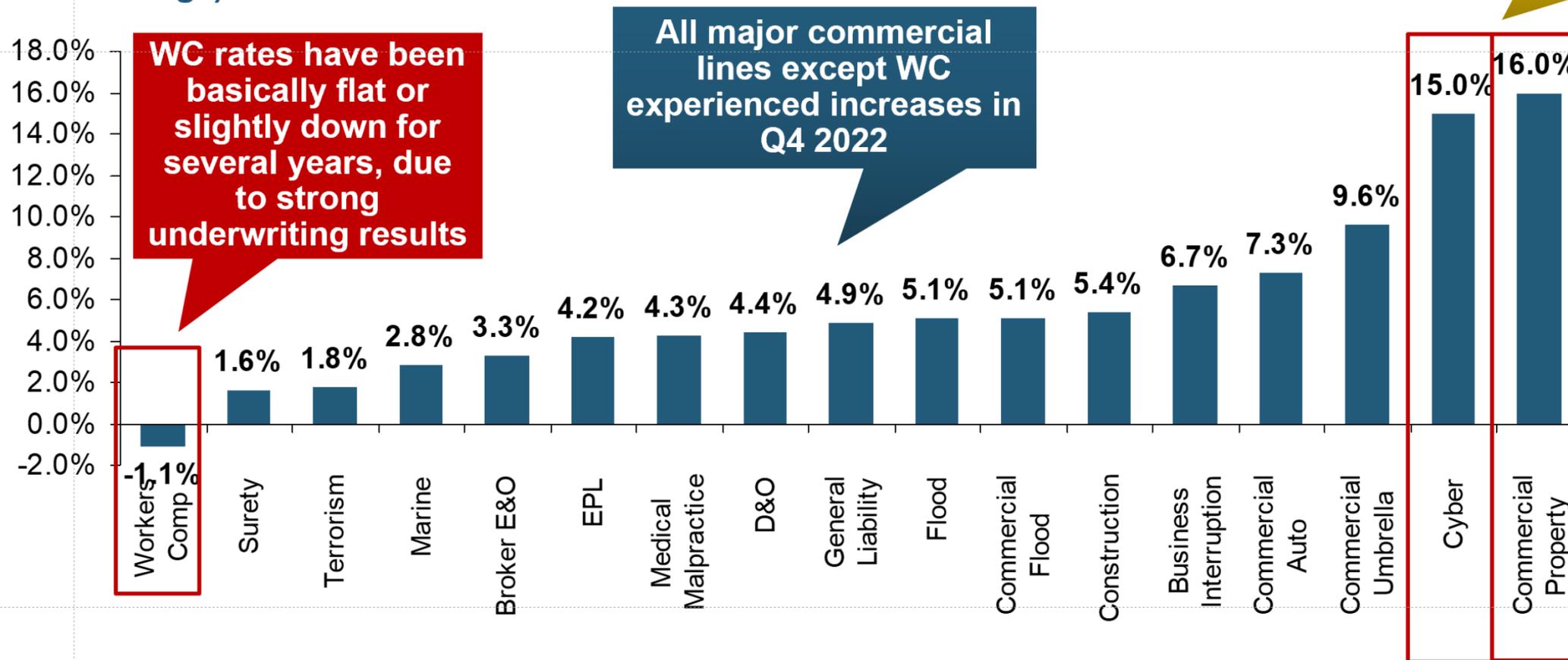
May 2023

# L&E MODEL USAGE IN WORKERS COMPENSATION

## Change in Commercial Rate Renewals, by Line: 2022:Q4

Commercial property is up sharply as CAT losses and inflation continue to take their toll, overtaking Cyber, which is up in response to major breaches in recent years.

(Percent Change)



WC rates have been basically flat or slightly down for several years, due to strong underwriting results

All major commercial lines except WC experienced increases in Q4 2022

Workers Comp at the Economic Crossroads: Recession, Inflation and Economic Uncertainty



Robert P. Hartwig, PhD, CPCU  
 Clinical Associate Professor of Finance  
 Darla Moore School of Business  
 University of South Carolina

Note: CIAB data cited here are based on a survey. Rate changes earned by individual insurers can and do vary, potentially substantially.

Source: Council of Insurance Agents and Brokers; USC Center for Risk and Uncertainty Management.

May 2023

# L&E HURDLES TO MODEL ROLL OUTS IN WC

- Internal resource constraints and prioritization
- Regulatory and company management acceptance
- Cost to invest in model development
- Complexity potentially added to modeling process due to state differences and the nature of the current WC ratemaking structure

## L&E IMPACTS FROM MODEL USAGE IN WC

- If permitted by the regulatory framework, companies can conceivably use models to deviate from Bureau loss cost plans and the current rating structure
- Could potentially modify risk segmentation based on cost expectations
- Could have unique complexities that differ from personal lines pricing models due to state differences
- Could offer insights into risk management and pricing

# L&E WHAT MAKES A GOOD PRICING MODEL?

- Compliant with state laws and regulations
- Is predictive of the target variable - claim severity, claim frequency, pure premium, loss ratio on a dataset not used in building the model
- Is designed in consideration of the dataset size; larger dataset may permit a more complex model structure than a smaller dataset.
- Uses appropriate input characteristics that meaningfully contribute to a model's ability to predict the target variable. For example, the input variable can be demonstrated to have statistical significance or influence on a model.

# L&E WHAT MAKES A GOOD PRICING MODEL?

- Has appropriate control and offset variables in place to mitigate the risk of predictions being influenced by certain variable's model contributions. (e.g., policy year and state)
- **Control and offset variables:** Variables that the modeler does not want to influence target variable predictions.
- **Integrated Modeling Process:** Often a modeling process will involve modeling steps and potentially combining multiple models. Want to see a process that is appropriately combining models.

# L&E WHAT MAKES A GOOD PRICING MODEL?

What can help stakeholders when there are concerns about the black box aspect of pricing models?

- Understanding the data underlying the model
- Model validation
- Model memorandum
- Intuitive results
- Measured reliance

What are at least some concerns companies have about revealing the black box aspect of pricing models?

- Proprietary information management
- Time and speed to market/ compliance costs



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THANK YOU

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