

Workers Compensation Ratemaking— An Overview

Insurance Company Perspective
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Insurance Company Perspective Outline

- Expenses
- Loss Cost Multipliers
- Company Pricing Programs
- Predictive Modeling
- Current Workers Compensation Market

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Components of a Rate

- Losses
- Loss Adjustment Expenses
- Loss-Based Assessments
- Expenses and Profit



Full Rate	
Profit & Contingencies	
Taxes, Licenses & Fees	
Production & General Expense	
Loss Adjustment Expense	
Developed and Trended Losses	

A provision for each expense item is added to the final loss cost to produce a full manual rate

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Expense Components

- **Production** – commissions, premium collection, underwriting
- **Taxes, Licenses, and Fees** – various premium taxes, bureau and filing fees
- **General** – policy processing, overhead, premium audits, actuarial
- **Profit and Contingencies** – combined with investment income

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Evaluation of the Needs Outside of the Loss Cost

- Items Always Outside of the Loss Cost
 - Production
 - Taxes, Licenses, and Fees
 - General
 - Profit and Contingencies
- Items Sometimes Outside of the Loss Cost
 - Loss Adjustment Expenses
 - Loss-Based Assessments
- Items Rarely Outside of the Loss Cost (MN)
 - Trend
 - Loss Development beyond 8th report

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Costs as a Percentage of Standard Premium



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How to Account for Items Outside of the Loss Cost

The Loss Cost Multiplier (LCM)

- Also known as a Pure Premium Multiplier
- $\text{Loss Cost} \times \text{LCM} = \text{Rate}$
- Factor to load loss costs for insurer's expense and profit
- Must also consider other items not included in the Loss Cost (trend, development, etc.)
- Insurance companies must file LCMs for approval in loss cost states

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Derivation of a Loss Cost Multiplier

- **State A:** Loss Cost includes Loss, Loss Adjustment Expense, and Assessments
- **State B:** Loss Cost includes Loss and Loss Adjustment Expense
- **State C:** Loss Cost includes Loss Only

In all three cases, loss includes full trend and loss development

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Derivation of a Loss Cost Multiplier

	Portion of Standard Premium		
	<u>A</u>	<u>B</u>	<u>C</u>
Expenses	.275	.275	.275
Profit	.025	.025	.025
Loss Assessments (% Prem)		.020	.020
Loss Adj. Expense (% Prem)			.080
Total of Items to Load on Loss Cost	.300	.320	.400
Indicated Loss Cost Multiplier	1.429	1.471	1.667
= 1/(1 - Load Needed)			

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Derivation of the LCM— Alternative Approach

- Prior methodology assumes that all items included in the LCM are related to Premium
- Loss Adjustment Expenses and Assessments may not have a stable relationship to Premium
- An alternative approach for states that require a loading for “loss-related” items is:

$$\text{LCM} = \frac{1 + \text{Loss Related Items (\% Loss)}}{1 - \text{Premium Related Items (\% Premium)}}$$

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Derivation of the LCM— Alternative Approach

For State C in the Prior Example

- Loss-related expenses total 10% of premium
- Loss equals 60% of premium
- Premium-related expenses total 30% of premium

$$\text{LCM} = \frac{1 + (10\% / 60\%)}{1 - (30\%)} = 1.667$$

The two methods are mathematically equivalent, but this approach may produce more stable results over time

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Derivation of the LCM— Alternative Approach

For State D, a new Example

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Average</u>	<u>Selection</u>
Loss Ratio	58.5%	87.8%	52.0%	65.0%	
LAE Ratio	11.7%	17.6%	10.4%	13.0%	13.0%
% Loss	20.0%	20.0%	20.0%	20.0%	20.0%
Commission	8.0%	8.0%	8.0%	8.0%	8.0%
U/W Exp	11.0%	11.0%	11.0%	11.0%	11.0%
<u>Tax</u>	<u>3.0%</u>	<u>3.0%</u>	<u>3.0%</u>	<u>3.0%</u>	<u>3.0%</u>
Profit	7.8%	-27.3%	15.6%	0.0%	2.5%
LCM using premium-based method:				1.538	1.600
LCM using alternative method:				1.538	1.589

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The LCM +

- The LCM, as originally defined, requires the use of expense constants and premium discounts to more accurately charge for individual risks
- There is a method that can accomplish the same goal without the need for these two other components and can be developed by individual companies
- Disclaimer: All of the information that follows is completely fictitious and is not meant to resemble any actual carrier's data or experience

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The LCM +

- First, let's make some basic assumptions

General Information

Class code	1234
Bureau Loss Cost	\$5.00
Loss Adj Exp	17.0% as pct of loss
Other expenses/ costs	
Premium tax	3.0% as pct of final premium
Variable U/W	5.0% as pct of final premium
Fixed U/W	\$700 per policy
Profit	0.0% as pct of final premium

U/W expense = production and general expense

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The LCM +

Policy Specific Information

<u>Policy Number</u>	<u>Exposure (Payroll)</u>	<u>Commission (% final prem)</u>
1	50,000	12.0%
2	100,000	12.0%
3	150,000	12.0%
4	200,000	12.0%
5	500,000	9.0%
6	600,000	9.0%
7	700,000	9.0%
8	800,000	9.0%
9	1,000,000	6.0%
10	1,500,000	6.0%
11	2,000,000	6.0%
12	2,500,000	6.0%

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The LCM +

Premium development formula

$$\text{Premium} = \frac{\text{Payroll} / 100 \times \text{Loss Cost} + \text{Fixed Expense}}{1 - \text{sum of Premium variable items}^*}$$

* Premium variable items are variable underwriting expense, tax, commission, and profit.

The LCM +

<u>Policy Number</u>	<u>Implied Loss+LAE</u>	<u>Fixed Expense</u>	<u>Variable Expense</u>	<u>Tax</u>	<u>Commission</u>	<u>Needed Premium</u>
1	2,500	700	200	120	480	4,000
2	5,000	700	356	214	855	7,125
3	7,500	700	513	308	1,230	10,250
4	10,000	700	669	401	1,605	13,375
5	25,000	700	1,548	929	2,787	30,964
6	30,000	700	1,849	1,110	3,329	36,988
7	35,000	700	2,151	1,290	3,871	43,012
8	40,000	700	2,452	1,471	4,413	49,036
9	50,000	700	2,948	1,769	3,537	58,953
10	75,000	700	4,401	2,641	5,281	88,023
11	100,000	700	5,855	3,513	7,026	117,093
12	<u>125,000</u>	<u>700</u>	<u>7,308</u>	<u>4,385</u>	<u>8,770</u>	<u>146,163</u>
Total	505,000	8,400	30,249	18,149	43,184	604,983

The LCM +

Determination of LCM - Traditional Method

Premium	604,983		
		<u>Pct of Prem</u>	
UW Expense	38,649	6.4%	
Tax	18,149	3.0%	
<u>Commission</u>	<u>43,184</u>	<u>7.1%</u>	
Total	99,983	16.5%	
 Implied LCM	 1.198	 = 1 / (1 - 16.5%)	

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The LCM +

<u>Policy Number</u>	<u>Implied Loss+LAE</u>	<u>LCM</u>	<u>Resulting Premium</u>	<u>Needed Premium</u>	<u>Percent Difference</u>
1	2,500	1.198	2,995	4,000	-25.1%
2	5,000	1.198	5,990	7,125	-15.9%
3	7,500	1.198	8,985	10,250	-12.3%
4	10,000	1.198	11,980	13,375	-10.4%
5	25,000	1.198	29,950	30,964	-3.3%
6	30,000	1.198	35,940	36,988	-2.8%
7	35,000	1.198	41,929	43,012	-2.5%
8	40,000	1.198	47,919	49,036	-2.3%
9	50,000	1.198	59,899	58,953	1.6%
10	75,000	1.198	89,849	88,023	2.1%
11	100,000	1.198	119,799	117,093	2.3%
12	<u>125,000</u>	1.198	<u>149,748</u>	<u>146,163</u>	2.5%
Total	505,000		604,983	604,983	

Note: This is why there are premium discounts and expense constants in Workers Compensation. However, the following will show a direct method to calculate these and the final premium.

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The LCM +

Expenses come in two forms: those that vary with premium and those that are fixed with the policy. They are accounted for by the **Variable Expense Multiplier** and the **Fixed Expense Load**.

The Variable Expense Multiplier (VEM) accounts for expenses that vary with premium.

$$\text{VEM} = \frac{1}{1 - \text{sum of Premium variable items}}$$

<u>Policy Number</u>	<u>Variable Expenses</u>	<u>VEM</u>
1 - 4	20.0%	1.250
5 - 8	17.0%	1.205
9 - 12	14.0%	1.163

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The LCM +

The Fixed Expense Load (FEL) is designed to account for expenses that are fixed with the policy.

$$\text{FEL} = \frac{\text{Fixed expense dollars per policy}}{1 - \text{sum of Premium variable items}}$$

or

$$\text{FEL} = \text{Fixed expense dollars per policy} \times \text{VEM}$$

The VEM is needed to reflect the fact that we will still pay tax, commissions, etc. on the premium collected due to the fixed expense load.

<u>Policy Number</u>	<u>Fixed Expenses</u>	<u>VEM</u>	<u>FEL</u>
1 - 4	700	1.250	875
5 - 8	700	1.205	843
9 - 12	700	1.163	814

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The LCM +

Final premium can be developed several ways, which are algebraically equivalent.
Using the newly developed components yields the following formula:

$$\text{Premium} = \text{Payroll} / 100 \times \text{Loss Cost} \times \text{VEM} + \text{FEL}$$

Alternatively, the step of calculating the FEL can be skipped simply by using this formula:

$$\text{Premium} = (\text{Payroll} / 100 \times \text{Loss Cost} + \text{Fixed expense dollars per policy}) \times \text{VEM}$$

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The LCM +

<u>Policy Number</u>	<u>Implied Loss+LAE</u>	<u>VEM</u>	<u>FEL</u>	<u>Resulting Premium</u>	<u>Needed Premium</u>
1	2,500	1.250	875	4,000	4,000
2	5,000	1.250	875	7,125	7,125
3	7,500	1.250	875	10,250	10,250
4	10,000	1.250	875	13,375	13,375
5	25,000	1.205	843	30,964	30,964
6	30,000	1.205	843	36,988	36,988
7	35,000	1.205	843	43,012	43,012
8	40,000	1.205	843	49,036	49,036
9	50,000	1.163	814	58,953	58,953
10	75,000	1.163	814	88,023	88,023
11	100,000	1.163	814	117,093	117,093
12	<u>125,000</u>	1.163	814	<u>146,163</u>	<u>146,163</u>
Total	505,000			604,983	604,983

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The LCM +

- Therefore, we should be able to solve for an accurate premium directly, without extra rating factors
- In addition, this would allow for a more company- and insured-specific price

But,...

- This method requires a fixed/variable expense analysis, similar to what would go into the development of premium discount tables and expense constants. This is not a trivial task.

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Additional Considerations for the LCM

- Bureau Rates vs. Loss Costs
- Evaluation of the Bureau Loss Cost Filing
 - Do you agree with the various assumptions?
 - How does your book compare?
 - Is there additional, more current info?
- Consideration of the company's experience
 - How does your experience compare?
 - Are there changes in your company's operations to consider?
 - When will you implement the change?

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Manual Rates Are Just the Beginning

Additional Pricing Elements Are an Individual Company Decision

- Deviations
- Premium Discount
- Expense Constant
- Schedule Rating
- Experience Rating
- Dividend Plans
- Retrospective Rating
- Deductibles (Small and Large)

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Additional Pricing Elements

- **Deviations** – filed by companies to reflect anticipated experience differences (rate or LCM)
- **Premium Discount** – by policy size; reflects that relative expense is less for larger insureds
- **Expense Constant** – reflects that relative expense is greater for smaller insureds
- **Schedule Rating** – recognizes characteristics not reflected in experience rating

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A Predictive Modeling Application

Schedule rating is defined as:

“The premium for a risk may be modified according to the Schedule Rating Table to reflect such characteristics of the risk that are not reflected in its experience. Seven categories are considered when determining any credit or debit under this Plan:

- Premises
- Classification Peculiarities
- Medical Facilities
- Safety Devices
- Employees —Selection, Training, Supervision
- Management —Cooperation With Insurance Carrier
- Management —Safety Organization

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A Predictive Modeling Application

- Schedule rating table provides a range of credits/debits for each of the seven categories
- Quantifying specific characteristics within each category allows for more accurate account specific pricing
- May also be able to identify other characteristics that may not traditionally be considered in the seven categories
- The end result is to enhance the experience mod with an additional mathematical model

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Programs That Adjust Premium to Reflect Actual Loss Experience

- **Experience Rating** – Mandatory tool that compares actual and expected losses
- **Dividend Plans** – Meant to reflect favorable experience
- **Retrospective Rating** – Premium is adjusted based on insured's experience during the time the policy is in force
- **Large Deductibles** – The employer opts to pay claims below a certain threshold (usually \$100,000 or greater)

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Workers Compensation Climate and the Role of the Actuary

- Beginning in 2008, underwriting gains were no longer present on either a calendar year or an accident year basis
- During NCCI's 2010 filing season, for those states in which NCCI provides ratemaking services, just more than half of the filed rate / loss cost level changes were decreases; the remainder either had no change or were increases
- Current economic and market conditions may impact workers compensation results
- Actuaries must be aware of changing environments, how pricing tools are used, and how that will impact results
- Actuaries must communicate findings with management

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Thank You for Your Attention!

Questions/Comments?

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