

**RPM Workshop 1:  
BASIC RATEMAKING**

Development of an Overall Indication

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**AGENDA**

- BASIC RATEMAKING EQUATION
- UNDERLYING DATA MANIPULATION
- PROFIT AND CONTINGENCY PROVISIONS
- EXAMPLE

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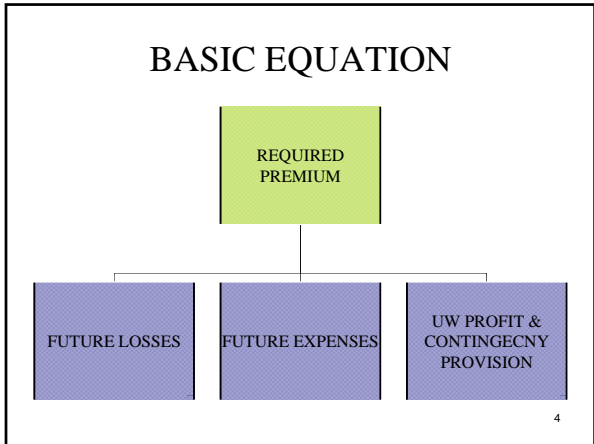
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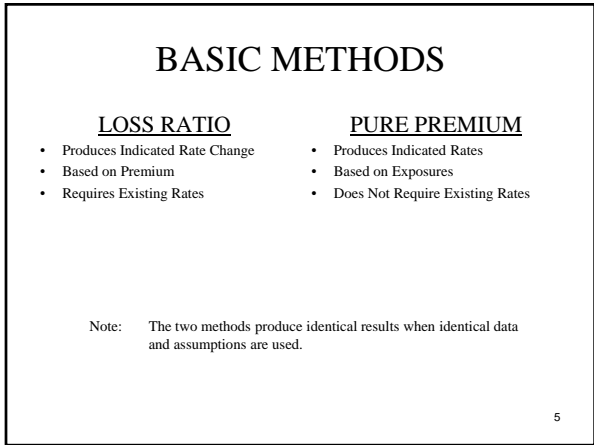
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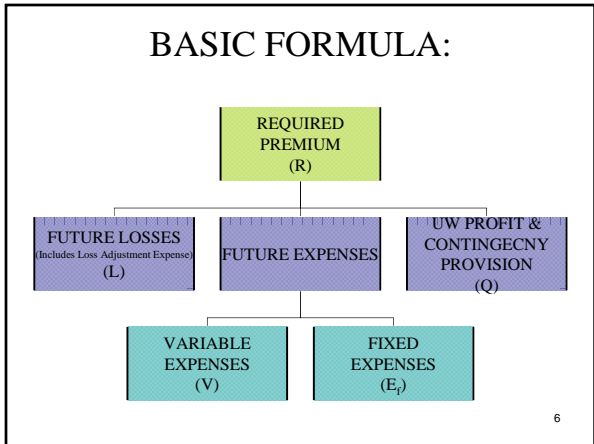
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**BASIC FORMULA**

$R = L + V \cdot R + E_F + Q \cdot R$   
 Solve for R:  
 $R - V \cdot R - Q \cdot R = L + E_F$   
 $R \cdot (1 - V - Q) = L + E_F$   
 $R = \frac{L + E_F}{(1 - V - Q)}$

Variable Permissible Loss Ratio =  $1 - V - Q$   
 - The percentage of each premium dollar that is intended to pay for the projected loss and fixed expense components.

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**BASIC FORMULA:**  
Loss Ratio

Indicated Change =  $\frac{\text{Loss Ratio} + \text{Fixed Expense Ratio}}{\text{Variable Permissible Loss Ratio}}$

$(R_1 - R_0) / R_0 = \frac{(L/R_0 + E_F/R_0)}{(1 - V - Q)}$

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**BASIC FORMULA:**  
Pure Premium

Indicated Rate =  $\frac{\text{Pure Premium} + \text{Fixed Expense}}{\text{Variable Permissible Loss Ratio}}$

$R_1 / X = \frac{(L/X + E_F/X)}{(1 - V - Q)}$

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**DATA CATEGORIZATION**

- CALENDAR YEAR
- POLICY YEAR
- ACCIDENT YEAR

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**CALENDAR YEAR**

Premium and Loss transactions that occur during the year.

- Advantages:
  - Data is available quickly
  - **FIXED AT YEAR END**
    - Consistent with Financial Statements
- Disadvantage:
  - Premium and Loss Transactions **DO NOT** match.
    - Loss data includes payments and changes to reserves for policies whose premiums were earned in prior periods.

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**POLICY YEAR**

Premium and Loss transactions on policies with effective dates (new or renewal) during the year.

- Advantages:
  - Premium and Loss transactions **DO** match.
    - Transactions from policies effective in prior years do not distort the data for ratemaking.
- Disadvantage:
  - Data is not available until one term after the end of the policy year.
  - Losses are **NOT** fixed at year end.

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## ACCIDENT YEAR

Loss transactions for accidents occurring during the year, and Premium transactions during the same 12 months.

- Advantages:
  - Represents a better match of premium and losses than Calendar Year aggregation.
    - Transactions from accidents occurring in prior years do not distort the data for ratemaking.
- Disadvantage:
  - Data with slight time lag.
  - Losses are NOT fixed at year end.

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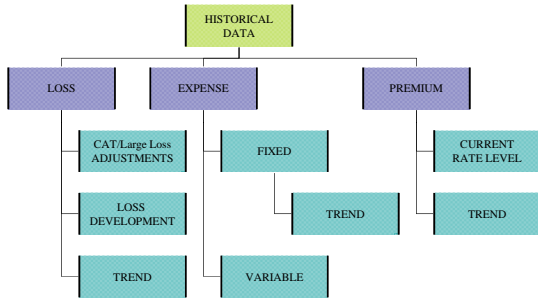
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## UNDERLYING DATA MANIPULATION



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## TREND

Historical loss, premium and exposure data is trended to reflect the level predicted to exist during the pricing period.

- to account for expected difference between the historical period and the future period.

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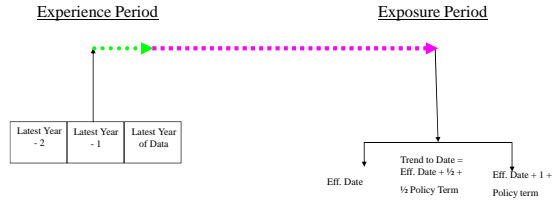
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### TREND PERIOD



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### CATASTROPHE/Large Loss

- Catastrophe losses are very volatile from year to year, and should be removed from the underlying data because of their large size and infrequency of occurrence.
  - Recognition of exposure is appropriate and can be incorporated using various methods.
    - Long-Term Average, Catastrophe Simulation Modeling.
- Appropriate to give consideration to the impact of other non-catastrophe large losses on underlying data and analysis.

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### LOSS DEVELOPMENT

Adjustment made to underlying accident year loss data to reflect an expected ultimate value.

- 2 reasons for Accident Year losses to develop
  - New Losses emerge after year-end (IBNR)
  - Development on known claims

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### LOSS DEVELOPMENT FACTOR (LDF) METHOD

ACCIDENT YEAR	@ 12mo	@ 24mo	@ 36mo
2008	\$1,000	\$2,000	\$2,500
2009	\$2,000	\$3,000	
2010	\$2,500		X?

ACCIDENT YEAR	12-24	24-36
2008	2.00	1.25
2009	1.50	
LDF	1.75	1.25

Estimated Ultimate 2010 AY Loss = \$2,500 x 1.75 x 1.25 = \$5,469

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### CURRENT RATE LEVEL

- Adjustment to reflect rate changes that are not already included in the historical recorded premium.
  - Common Techniques:
    - Extension of Exposures
    - Parallelogram Method

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### PARALLELOGRAM METHOD

Rate Change = 10% on 1/1/2010

100% Earned

1.00	A /	1.10	
1.00	B	1.10	

0% Earned

	2009	2010	2011	2012
Area		Percent of 2010	Rate Index	
A		.50	1.00	
B		.50	1.10	
2010		1.00	1.05	

2010 FCRL = (1.10/1.05) = 1.048

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## PROFIT & CONTINGENCY

- UNDERWRITING PROFIT PROVISION
  - Basic Selection = 5%
  - More Complex Calculation
    - Consideration of Investment Income
  
- CONTINGENCY
  - Provision for expected differences, if any, between the estimated costs and the average actual costs, that cannot be eliminated by changes in the other components of the ratemaking process.

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## ? QUESTIONS ?

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