

Data aggregation & organization is essential for both ratemaking and reserving. For ratemaking specifically, there are 3 objectives of data organization:

- (MMR) • **Match** losses & premiums as closely as possible
- **Minimize** the cost of collecting the data
- **Recent** data

Key Dates:

- Policy effective/expiration dates
- Accident date (coverage trigger)
- Report/notice date
- Accounting date
- Valuation Date

CALENDAR YEAR

- Considers all policies or loss transactions during a year, regardless of transaction date
- Typically used for financial reporting
- Usually most appropriate for short-tailed lines of business is used in ratemaking
- Used more for premium/exposure over loss aggregation
- Viewpoint of finance/accounting
- Sometimes called calendar/accident year

Advantages

Disadvantages

<ul style="list-style-type: none"> • Recent: doesn't develop after YE and is available immediately • Low cost & readily available 	<ul style="list-style-type: none"> • Losses & premium are not well matched
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POLICY YEAR

- Considers all policies or loss transactions of policies with effective dates during the year
- Will change after the year is over, but finalized within 24 months
- Great for self insurers
- Also called underwriting year
- Viewpoint of an underwriter

Advantages

Disadvantages

<ul style="list-style-type: none"> • Perfect match b/w premium & loss • Easier to isolate effects of policy changes 	<ul style="list-style-type: none"> • Extended time frame (not recent) • Hard to isolate effects of CATs or court rulings • Higher cost since PY is specific to insurance
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ACCIDENT YEAR

- Measures all transactions with an accident or occurrence date within the year
- Will continually develop as more losses are reported
- Viewpoint of an actuary

Advantages

Disadvantages

<ul style="list-style-type: none"> • Accepted norm in US for loss • Easy to obtain & understand • Industry benchmarks are available • Premium & loss are better matched than CY 	<ul style="list-style-type: none"> • Mismatch b/w premium which is aggregated at CY level • May contain policies written at different price or retention level • Higher cost than CY data since is it specific to insurance
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REPORT YEAR

- Measures all transactions that are reported within a given year
- Mostly helpful for data organization for claims-made lines of business
- Viewpoint of an actuary

Advantages

Disadvantages

<ul style="list-style-type: none"> • Fixed at YE - so data is available sooner • Development patterns are more stable 	<ul style="list-style-type: none"> • Only measures development on known claims (no pure IBNR) • Higher cost as RY is specific to insurance
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TYPES OF EXTERNAL DATA

- Statistical Plans
 - ISO and NCCI collect data from insurers and aggregate it. It is mandatory for insurers to submit and must be in a standard format.
- Other aggregated industry data
 - Ex: Fast Track Monitoring System is a voluntary reporting system used to analyze frequency & severity trends.
- Competitor information
 - Rate filings can help an insurer understand their competition. However, it's important to understand each insurer has different customers, goals, expenses and operating procedures.
- Other 3rd Party Data
 - Such as economic, demographic and credit data (Ex: Consumer Price Index might have a connection to severity trends)

Fundamental Insurance Equation:

$$\text{Premium} = \underbrace{\text{Losses} + \text{LAE} + \text{U/W Expense}}_{\text{cost}} + \underbrace{\text{U/W Profit}}_{\text{profit}}$$

<p>LOSS RATIO</p> $\frac{\text{Total Losses}}{\text{Total Premium}}$ <ul style="list-style-type: none"> • Portion of each premium dollar used for losses • Primary rate adequacy measure 	<p>COMBINED RATIO</p> $\text{Loss Ratio} + \frac{\text{LAE}}{\text{Earned Prem}} + \frac{\text{U/W Expenses}}{\text{Written Prem}}$ <ul style="list-style-type: none"> • Portion of each premium dollar used for U/W expense • Most common measure of profitability • U/W Profit = 1 - Combined Ratio
<p>FREQUENCY</p> $\frac{\# \text{ of Claims}}{\# \text{ of Exposures}}$ <ul style="list-style-type: none"> • Rate at which claims occur • Changes in frequency can point out claim trends • Can help measure effectiveness of U/W strategy changes 	<p>SEVERITY</p> $\frac{\text{Total Losses}}{\# \text{ of Claims}}$ <ul style="list-style-type: none"> • Average loss per claim • Can be calculated several different ways in practice
<p>PURE PREMIUM</p> $\frac{\text{Total Losses}}{\# \text{ of Exposures}}$ <ul style="list-style-type: none"> • Also referred to as "loss cost" • Frequency x severity 	<p>AVG PREM PER EXPOSURE</p> $\frac{\text{Total Premium}}{\# \text{ of Exposures}}$ <ul style="list-style-type: none"> • Numerator and denominator must be on the same basis (accident year, policy year, calendar year, report year, etc)
<p>LAE RATIO</p> $\frac{\text{LAE}}{\text{Total Losses}}$ <ul style="list-style-type: none"> • Used to monitor claims department costs 	<p>OPERATING EXPENSE</p> $\text{U/W Expense Ratio} + \frac{\text{LAE}}{\text{Earned Prem}}$ <ul style="list-style-type: none"> • Underwriting expense ratio + LAE ratio
<p>RETENTION RATIO</p> $\frac{\# \text{ of Policies Renewed}}{\text{Policies Eligible for Renewal}}$ <ul style="list-style-type: none"> • Market competitiveness measure • Can vary by insurer or line of business 	<p>CLOSE or HIT RATIO</p> $\frac{\# \text{ Accepted Quotes}}{\# \text{ of Quotes}}$ <ul style="list-style-type: none"> • Percent of quotes converted to policies
<p>U/W EXPENSE RATIO</p> $\frac{\text{Comm+ Taxes/Fees} + \text{Oth Acq}}{\text{Written Prem}} + \frac{\text{General Expenses}}{\text{Earned Prem}}$ <ul style="list-style-type: none"> • Portion of the premium dollar that is used for U/W expenses such as XYZ 	