

2.3.2 → Developing Premiums

→ May need to develop premiums for when 1) an incomplete year of data is used or 2) loss of data

2.3.3 → Developing Losses

→ Summary → claim ladder method (development technique) steps

→ If using a straight average for a selection, write "Xxx has remained stable across all periods. Assuming this will remain consistent in the future, I will take a straight average."

- 1) Compile claims data
- 2) Calculate age-to-age factors
- 3) Calculate averages
- 4) Select claim development factors
- 5) Select tail factor
- 6) Calculate cumulative claim development factors
- 7) Project ultimate claims

Ideas to keep in mind when selecting: smooth progression, stability, credibility of experience, change in patterns, applicability of the historical period, shock losses/cut losses

⇒ Note on selecting factors ⇒ JUSTIFY EVERY SELECTION

You can select anything that seems reasonable, whether that's an average, a particular age-to-age factor, or anything else. Use your actuarial judgement when selecting factors. And remember, you don't have to make the same type of selection at each maturity either. If the age-to-age factors look unstable at 12 months but fairly stable for other maturities, it might be reasonable to select the medial average at 12 months and the straight average for other maturities.

On the exam in general, there are no strict rules for what factor to select as long as you make a reasonable choice. The default selection would be the straight average, but if there's a reason to not do that, make a different selection and explain your reasoning for doing so.

If given selections for LPFS, choose from only them ⇒ don't freestyle

2.4 → Trends

2.4.1 → Actuarial standards of practice no. 13

→ Read this before exam

- Definitions →
- Experience period: the time period in which the historical data occurs.
 - Forecast period: the future time period to which historical data is projected.
 - Social influences: the impact on insurance costs of changes in claim consciousness, court practices, legal precedents, and other non-economic factors.
 - Trending period: the time over which the trend is applied when projecting from the experience period to the forecast period.
 - Trending procedure: a process that involves estimating future values by analyzing changes between exposure periods that can impact claim costs and frequencies, exposures, premiums, expenses, retention rates, marketing/solicitation response rates, and economic indices.

2.4.2 → Selecting data for trending

→ Exposure data → focus LPFS rely on exposure measures, such as payroll or sales revenue, which can be influenced by time-related factors like inflation. May need to account for this w/ exposure trends

→ Premium data → The average premium level can change over time due to inflationary pressure as well. Another type of change over time to the premium level is a distributional change, which is a change in the characteristics of the policies written. This resulting change in the premium level is known as premium trend.

→ Other characteristics such as amount of insurance for a homeowners policy increases w/ inflation ⇒ and premium increases shift w/ deductibles or renewal carries premium shift (ex. USD)

→ Loss data → Changes over time in the exposure levels w/ claim frequency & severity are known as loss trends. Loss trends can be driven by many different factors, such as: inflation, increasing medical costs, advancements in safety tech, distributional changes (like a growing population w/ older patients) or other factors (as they may have different injuries)

→ Order of operations → Trends are typically performed after adjusting the data for anomalies like catastrophes & rate or benefit changes, removing any distortions to the true trend are eliminated.

→ Additionally, trends can be applied either before or after the data is developed to ultimate values

2.4.3 → Estimating & trend

→ Methods for determining trends

→ There are multiple methods for calculating trends. The choice of method depends on the stability of the data & the type of trend being measured.

→ Simple average of recent changes → this can be for premium trends that are stable

→ Linear & exponential trend fitting → - - - loss trends - - - volatile

→ $(1 + \text{pure premium trend}) = (1 + \text{frequency trend}) \times (1 + \text{severity trend})$ ⇒ If estimating PP trend, est w/ claims like usual, then divide by exposures at end & calculate $\Delta\%$ to pure trend

→ Example → To identify the rate of change, calculate quarterly percentage changes & annual percentage changes in average WP

↳ $\frac{\text{Q4 Q3}}{\text{Q3 Q2}} \text{ or } \frac{\text{Q4 Q1}}{\text{Q1 Q2}}$ is the most popular & is the most accurate

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Number of Points	Annual Exponential Trend Fit
12 point	-0.8%
8 point	3.1%
6 point	4.1%
4 point	4.0%

Calendar Quarter	WP at Current Rate Level	Written Exposures	Avg WP at Current Rate Level	Quarterly % Change	Annual % Change
2016Q1	68,409.73	132	518.26		
2016Q2	69,933.21	134	521.89	0.7%	
2016Q3	70,910.48	135	525.26	0.6%	
2016Q4	72,977.61	138	528.82	0.7%	
2017Q1	74,634.01	140	533.10	0.8%	2.9%
2017Q2	75,774.76	141	537.41	0.8%	3.0%
2017Q3	77,435.68	143	541.51	0.8%	3.1%
2017Q4	78,323.20	144	543.91	0.4%	2.9%
2018Q1	80,263.03	146	549.75	1.1%	3.1%
2018Q2	81,959.37	148	553.78	0.7%	3.0%
2018Q3	83,634.55	150	557.56	0.7%	3.0%
2018Q4	84,526.43	151	559.78	0.4%	2.9%

→ Use these to set the trend of XX% for we apply later

→ Example →

You are given the following information:

- The annual premium exponential trend based on data for the 12 months ending each quarter evaluated through December 31, 2017 is:

Year Ending Calendar Quarter	Avg Earned Premium at Current Rate Level
2015Q1	497.30
2015Q2	499.70
2015Q3	497.00
2015Q4	476.80
2016Q1	469.00
2016Q2	461.20
2016Q3	465.60
2016Q4	469.50
2017Q1	474.80
2017Q2	480.20
2017Q3	483.60
2017Q4	489.50

- All policies are annual.
- Proposed rates will be in effect from January 1, 2019 to January 1, 2020.
- Starting with July 1, 2015 renewals, the minimum deductible was increased from \$500 to \$1,000.

Select the trend to be applied to CY2017 earned premium. Include justification of the premium trend selection.

- Since the deductible change was implemented starting w/ policies renewing on July 1, 2015, the last possible date a policy could be written w/ the old deductible is June 30, 2016. So, there will be a mix of the old deductible earning premium as late as June 30, 2016.
- The trend will be applied to CY2017 EP, so we want to select a trend that is not as affected by the deductible change. However, we also want to include as much data as possible.

→ B/c the 6-point trend avoids most of the influence of the deductible change, & the data points stabilize at this point, select a trend of 4.1%

→ Since all of the trends will at least 4 data points, all will still be impacted by the old deductible. So, we want to choose a value where the impact is minimal as the data has stabilized.

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