4. (2.25 points)

An actuary is calculating a rate change to be effective July 1, 2016. Given the following:

- Policies are written on a semi-annual basis.
- Rates are expected to be in effect for one year.
- The exposure base is non-inflationary.
- The annual frequency and severity exponential trend fits based on data for the 12 months ending each quarter evaluated through December 31, 2014 are as follows:

Number of Points	Frequency Exponential Fit	Severity Exponential Fit
20 point	-2.9%	3.4%
16 point	-3.2%	3.0%
12 point	-2.5%	2.8%
8 point	-0.5%	2.9%
6 point	3.0%	3.1%
4 point	2.8%	3.3%

Calculate a pure premium trend factor for accident year 2012, justifying the selected trends and methodology.

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EXAM 5 SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 4	
TOTAL POINT VALUE: 2.25	**LEARNING OBJECTIVE: A4**
SAMPLE ANSWERS	

2-Step Method:

Sample Answer 1

Frequency: 2 Step Trend – change in freq trend
Trend period: 7/1/12 to 7/1/14 (step 1), AAD AY12 to AAD for most recent avail data
➔ select 12pt freq trend: -2.5%
Trend period: 7/1/14 to 4/1/17 (step 2), AAD future period = 7/1/16 + 12mo/2 (to AWD) + 6mo/2 (to mid pt of policy)
➔ select 3% proj trend – freq looks stable 6pt onward
Severity: select 3.4% – looks stable, include as much data as possible

PP Trend Factor = (0.975)^2 x (1.03)^2.75 x (1.034)^4.75 = 1.2086

Sample Answer 2

The frequency trend has changed significantly. I will therefore use a different trend for different periods. I'll pick -2.5% to go from 2012 to 2014, and then (3+2.8)/2 = 2.9% to go from 2014 to prospective period.

Sev trend is stable, I will select all year avg = (3.4 + 3.0 + … + 3.3)/6 = 3.08%.

First step we go from AAD AY12 = 7/1/12 to AAD AY14 = 7/1/14
Trend = (1 – 0.025)^2 x (1 + 0.0308)^2 = 1.01 = A

Second step go from AAD of AY2014 = 7/1/14 to AAD of exp period = 3/31/17 = 2.75yrs
Trend = (1 + 0.029)^2.75 x (1 + 0.0308)^2.75 = 1.175904 = B

So overall trend is A x B = 1.188

1-Step Method:

Sample Answer 3

For frequency trend, I'm going to use 0%. There has been a large spike in frequency over the past two years, which could be the cause of changing legal environments. I don't expect this to continue indefinitely especially since there is a longer term decreasing trend. Without more information, I am most comfortable with 0%.

Severity: use 3.4% (20 point trend) – largest term trend we have and it's been pretty stable.

Trend dates: 7/1/2012 to 4/1/2017 (4.75 years).

7/1/2012 is avg acc date in 2012, 4/1/17 is avg acc date in future period (7/1/2016 + 6 months + 3 months, where 6 month = avg written date, and 3 month = avg acc date on 6-mth policy)

Trend factor: (1.00 x 1.034)^4.75 = 1.172

Sample Answer 4

For the severity trend, I will select a 3% trend because all of the indicated trend values seem to hover around this value (avg of trend is 3.08%).

For the frequency trend, I will select a trend factor of 1%. This is because the trend value from year end 2012 (8 point trend) is negative, but there appears to be a positive trend going into the future. As such I judgmentally selected a factor in between instead of doing a 2 step trend.

Trend from: 7/1/2012
Trend to : 4/1/2012
Trend length = 4.75 years

LC Trend Factor for AY12 = (1.01 x 1.03)^4.75 = 1.206

Sample Answer 5

We know policies are semi-annual and rates will be in effect 1 year. Given that info, the avg earned date of a policy in the effective policy period would be 9 months past the effective date of 7/1/16, which is 4/1/17. The amount of time the pure premium must be trended is from 7/1/12 to 4/1/17.

Looking at the severity exponential fits the data is steady from year to year, so I will select a straight average from all of the data points for the severity trend which is 3.1%.

Looking at the frequency exponential fits, we see a clear change in trend starting with the 8 point trend. The trend graph would look something like this

Since we are projecting the premium from 2012 to 2017. We may want to select a less positive trend from the 4 point or 6 point trend since the date is coming from a higher starting point. I also assume the premium will continue to trend up and not change its trend again. So I will select a premium trend of 1% for frequency.

The total pure premium trend is =(1.01 * 1.031)^ 4.75 = 1.212

EXAMINER'S REPORT

Candidates were expected to demonstrate their knowledge and understanding of loss trend as well as the approaches to determine trend.

To score full credit, candidates are expected recognize the shift in frequency trend and the

consistency in severity trend. Candidates are also expected to make appropriate trend selections and justify them, determine the trend period, and finally, calculate the pure premium trend factor for trending AY2012 loss data. A range of reasonable answers were accepted.

Overall, candidate scored well on trend selections and trend factor calculations but scored poorly on justifying their selections and trending methodology. Candidates who chose 2-step method generally answered well. Many 1-step candidates simply picked the most recent trends and ignored data credibility and the fact that the historical period 2012 – 2014 needs to be considered when trending AY 2012 data.

Other common mistakes included:

- Selecting frequency trend solely based on 4 and 6 point in 1-step trending
- Forgetting to provide justifications
- Describing that frequency was increasing where in fact, frequency was decreasing first then reversed to increasing in recent data
- Attempting to annualize trends when trends provided are already annual fits
- Determining incorrect trend periods
- Incorrectly handling semi-annual policies
- Using average written dates instead of average accident dates to determine trend period