13. (5.5 points)

Given the following information for a book of business as of December 31, 2016:

Calendar Year	Earned Premium ($000)
2015	3,910
2016	4,410

Rate Change History	
Effective Date	Average Rate Change
July 1, 2014	-2.0%
July 1, 2015	4.2%
July 1, 2016	3.6%

Accident Year	Reported Loss and ALAE ($000) Capped at $100,000 as of (months)		
	12	24	36
2014	1,116	1,448	1,610
2015	1,975	2,572	
2016	2,145		

Excess Loss and ALAE ($000) History		
	Trended Reported Loss and ALAE	
Accident Year	Unlimited	Excess of $100,000
2009	3,538	718
2010	3,193	130
2011	1,990	234
2012	4,580	1,949
2013	2,369	120

- All policies are annual.
- Exposures are written evenly throughout each calendar year.
- Annual premium trend = 2.8%.
- Annual frequency trend = -2%.
- Annual severity trend capped at $100,000 = 4%.
- Fixed expense ratio = 4%.
- Variable expense ratio = 22%.
- Profit and contingencies provision = 6%.
- ULAE provision = 6% of loss and ALAE.
- Rates are to be in effect for one year.
- There is no loss development beyond 36 months.
- Assume full credibility.

<QUESTION 13 CONTINUED ON NEXT PAGE>

13. (continued)

a. (0.75 point)

Calculate the ultimate loss and ALAE capped at $100,000 for accident years 2015 and 2016.

b. (4.5 points)

Determine the indicated rate change effective July 1, 2017 using the results from part a. above.

c. (0.25 point)

Briefly describe one reason the insurer might not take the full rate change determined in part b. above.

CONTINUED ON NEXT PAGE

QUESTION 13

TOTAL POINT VALUE: 5.5 | **LEARNING OBJECTIVE(S): A2, A3, A5, A6, B3**

SAMPLE ANSWERS

Part a: 0.75 point

Sample 1

LDF's based on capped losses to avoid instability from large claims.

AY	12-24	24-36	36-Ult
2014	1.297	1.112	1.00
2015	1.303		
Avg	1.3	1.112	1.0
selected	1.3	1.112	1.0

ult loss+ALAE for AY 15 = 2572 x 1.112 x 1.0 = 2860
ult loss+ALAE for AY 16 = 2145 x 1.3 x 1.112 x 1 = 3101

Sample 2

Loss capped $100K LDFs

AY	12-24	24-36
2014	1.297	1.112
2015	1.302	
select avg	1.299	1.112
	1.445	1.112

AY	Trends	CDF	Ultimate (Develop) Loss	Ultimate Trended
2015	[(1.04)(0.98)]^3	1.112	2860	3028
2016	[(1.04)(0.98)]^2	1.445	3100	3220

Part b: 4.5 points

Sample 1

AY	capped loss = unlimited - excess	XS loss	XS/capped loss
09	3538 - 718 = 2820	718	
10	3063	130	
11	1756	234	
12	2631	1949	
13	2249	120	
Total	12519	3151	0.252

XS loss factor = 1.252 ← apply to capped loss to bring to uncapped level.

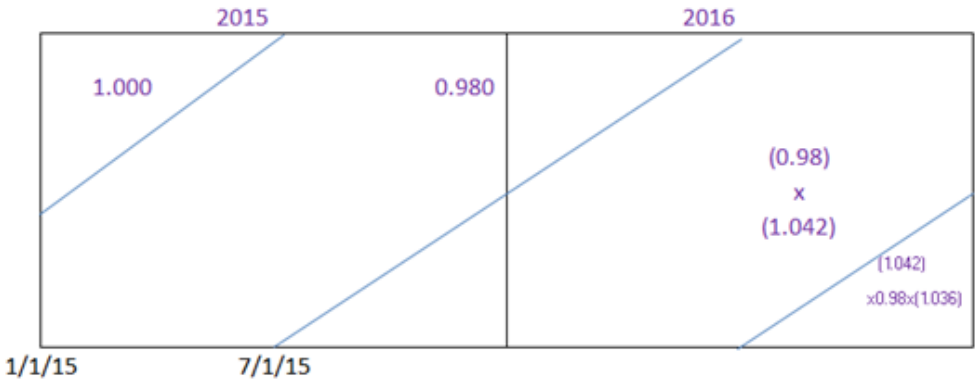
Trend periods for loss: average accident date of exp period = 7/1/XX

" future " = 7/1/18

Trend periods for prem: average accident date of exp period = 7/1/XX

" future " = 7/1/18

On-leveling:



CRL = (0.98) x (1.042) x (1.036) = 1.058

Avg Rate level for CY15 = 0.125x(1.0) + 0.125x(0.98)x(1.042) +0.75x0.98

= 0.987645

On-level factor = 1.058 / 0.987645 = 1.071

Avg RL for CY16 = 0.125x0.98 + 0.125xCRL + 0.75x1.042x0.98

= 1.0206

OLF CY 16 = 1.037

CY	(1) EP	(2) on level factor	(3) trend factor	(4) = (1) x (2) x (3) on level trended prem
15	3910	1.071	(1.028)^3	4549

16	4410	1.037	(1.028)^2	4833

CY	(5) capped loss ult	(6) trend factor	(7) XS loss factor	(8) ULAE factor
15	2860	[(0.98)(1.04)]^3	1.252	1.06
16	3101	[(0.98)(1.04)]^2	1.252	1.06

CY	(9) = (5)(6)(7)(8) ult trended loss	(10) = (9)/(4) loss ratio
15	4018	88.3%
16	4275	88.6%

Total LR (weighted all year) = 88.4%

indicated rate change

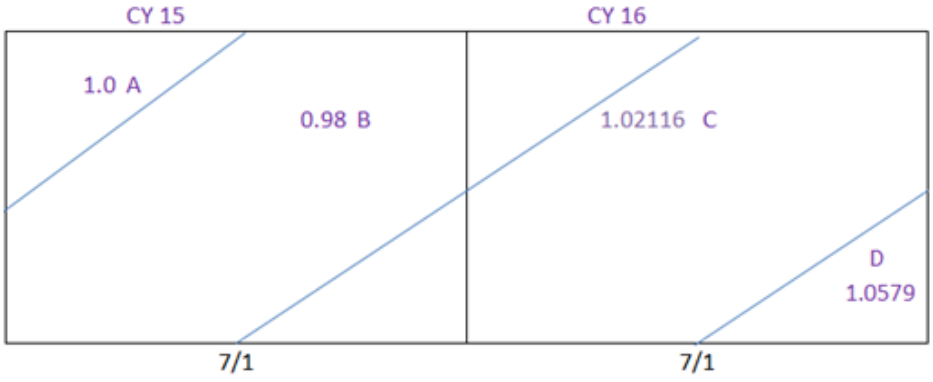
$$= \frac{0.884 + .04}{1 - 0.06 - 0.22} - 1 = 28.3\%$$

Sample 2

AY	Trends	CDF	Ultimate (Develop) Loss	Ultimate Trended
2015	[(1.04)(0.98)]^3	1.112	2860	3028
2016	[(1.04)(0.98)]^2	1.445	3100	3220

Rate eff 7/1/17 – 7/1/18

Avg Written Dt 1/1/18 Avg Earned/Accident 7/1/18



CY	A	B	C	D	Avg RL	OLF
15	0.125	0.75	0.125	0	0.9876	1.0712
16	0	0.125	0.75	0.125	1.0206	1.0365

CY	OLF	Prem Trend	Trended OLEP	capped loss ratio
15	1.0712	(1.028)^3	4550	0.665
16	1.0365	(1.028)^2	4831	0.667
			stable, select avg	66.6%

XS loss load:

$$\text{XS ratio} = \frac{\text{XS loss}}{\text{non XS loss}} = \frac{\text{XS loss}}{\text{(unlim - XS)}}$$

AY	XS loss ratio
09	0.255
10	0.042
11	0.133
12	0.741
13	0.053
select avg	24.5%

Loss Ratio Method

$$\text{Indic rate chg} = \frac{0.666(1.06)(1.245) + .04}{1 - 0.22 - .06} - 1 = 27.6\%$$

Part c: .25 point

Sample 1
Insurer may not decide to take full rate to be competitive in market.

Sample 2
This rate change is quite high compared to industry usual rate filings. Insurer may want to continue growing and cap rate changes to maintain/grow market share.

Sample 3
Regulators may not allow rate change.

Sample 4
Insurer may not have computer system resources to implement rate change.

EXAMINER'S REPORT

Candidates were expected to calculate ultimate losses given a loss development triangle, and use these losses (along with other information) to calculate an overall rate change indication. Lastly,

candidates were expected to explain one reason an insurer might not take the full rate change indication.

Part a

Candidates were expected to calculate ultimate losses, given a loss development triangle. Candidates were expected to calculate age-to-age loss development factors, cumulative development factors, and apply these factors to the correct losses.

Common errors included:

- Applying the correct CDFs to the incorrect losses.
- Applying the incorrect LDFs or only the latest year LDF to the losses instead of CDFs.
- Applying the excess loss provision to losses, as it was specifically stated in the question to cap losses at $100,000.

Part b

Candidates were expected to calculate the rate change indication with the given loss, premium, and expense information provided. The question included several pieces, including current rate leveling, trending, application of excess loss, and the inclusion of each piece in the final indication formula.

Common errors included:

- Using an incorrect trend period.
- Failing to apply trend factors.
- Missing a rate change in the calculation of the average rate level, or failing to calculate the correct areas associated with each rate change.
- Using a non-excess/unlimited loss ratio in the indication; as non-excess losses were provided, the ratio needed was a ratio of excess to non-excess losses.
- Failing to incorporate excess losses in the indication.
- Applying fixed expenses to the denominator (vs. the numerator).
- Not calculating a final indication amount.
- Failing to subtract '1' from the indication formula at the very end.

Part c

Candidates were expected to briefly describe one reason the insurer might not take the full rate change determined in part b.

Common errors included:

- Stating that the excess loss provision was volatile so the full indication shouldn't be taken.
- Stating that only 2 years were used so the indication is not credible enough. The question provided an assumption of full credibility.