

1. (6.75 points)

An insured is deciding between purchasing a large deductible plan or a retrospective rating plan. The following information is provided:

Expected Annual Loss Amount Before Modification	\$339,232
Annual Loss Trend Rate	4%
Limited LDF to Ultimate (18-Ult)	1.455
Limited LDF to Ultimate (30-Ult)	1.213
Limited LDF to Ultimate (42-Ult)	1.103
Excess Ratio @ \$100,000	0.720
Actual Losses Capped @ \$100,000 – 2 <sup>nd</sup> prior policy period	\$73,769
Actual Losses Capped @ \$100,000 – 3 <sup>rd</sup> prior policy period	\$53,417
Actual Losses Capped @ \$100,000 – 4 <sup>th</sup> prior policy period	\$44,783
Z (Credibility)	80%
Loss Adjustment Expenses as a Percentage of Loss	10%
Premium Tax as a Percentage of Premium	2%
Commission as a Percentage of Premium	12%
Fixed Overhead Expenses	\$25,000
Underwriting Profit as a Percentage of Excess Loss	8%
Per Occurrence Deductible	\$100,000
Aggregate Deductible Limit	None
Maximum Ratable Loss	None
Minimum Ratable Loss	None

The experience modification is based on three years of reported losses with individual claims capped at \$100,000.

a. (2.5 points)

Calculate the experience modified expected losses for the account.

b. (1.5 points)

Calculate the premium under a large deductible plan for the account.

c. (1.75 points)

Calculate the premium under a retrospective rating plan for the account.

d. (1 point)

Describe two reasons why the insured might choose the policy with the higher premium.

a. Step 1 – Calculate the expected reported limited losses for the three policy periods

Policy Period	Expected at ultimate, prospective policy period	Loss Trend	LDF	Limited Loss as % of Total Loss	Expected reported limited loss, for historical policy periods
2nd Prior	339,232	1.082	1.455	0.280	60,357
3rd Prior	339,232	1.125	1.213	0.280	69,613
4th Prior	339,232	1.170	1.103	0.280	73,611
Total					203,581

Calculate Experience Mod

Actual Losses:  $\$73,769 + \$53,417 + \$44,783 = \$171,969$

Expected Losses:  $\$203,581$

Ratio:  $\$171,969 / \$203,581 = 0.84$

Credibility: 0.80

Complement of Credibility: 1.00

Experience Mod:  $0.84 * 0.80 + 0.20 * 1 = 0.872$

Modified Expected Losses =  $\$339,232 * 0.872 = \$297,090$

b.

Start with experience modified expected losses -  $\$297,090$

Multiply by excess ratio @ 100,000 =  $\$297,090 * .720 = \$213,905$

Calculate Loss Adjustment Expense =  $\$297,090 * 10\% = \$29,709$

Total Losses =  $\$213,095 + \$29,709 = \$243,614$

UW Profit =  $.08 * \$213,905 = \$17,112$

Premium = Losses + UW Profit + Fixed Expense + LAE / (1 – commission – premium tax)

Premium -  $\$213,905 + \$17,112 + \$25,000 + \$29,709 / (1 - .02 - .12) = \$332,240$

c.

Loss Conversion Factor =  $1 + .10 = 1.10$

Tax Multiplier =  $1 / (1 - .12 - 0.02) = 1.163$

Basic Premium = expenses + UW Profit + converted losses =  $\$25,000 + (.08)*(\$213,905) + (1.1)*(\$213,905) = \$277,408$

Retrospective Premium = (Basic Premium + Loss Below limit \* LCF)\*Tax Mult

Loss Below Limit = Expected Losses – Expected Excess Losses =  $\$297,090 - \$213,905 = \$83,185$

Retro Premium =  $(\$277,408 + \$83,185*1.10)*1.163 = \$428,967$

d.

If candidate calculates that LDD premium is higher than Retro premium

- 1.) A company might be willing to pay more for the certainty of a fixed premium amount.
- 2.) The insured may not have the capability to handle and process claims and may wish the insurance company to do that work which is what happens with a LDD policy.

If candidate calculates that the Retro premium is higher than the LDD premium

- 1.) The insured may have made changes to their safety procedures, meaning that they would have lower losses in future periods, and the higher retrospective premium will eventually adjust downward, saving the company money
- 2.) The insured may be in the type of business that generates a large number of very small losses, so a large deductible policy would require the insured to pay most of their losses.