University of Texas at Austin

Problem set 2

Loss elimination ratio. Policy modifications.

Problem 2.1. *Source: Sample STAM Exam Problem #87.*
Let X be the ground-up loss random variable whose density is given by

$$f_X(x) = \begin{cases} 0.01, & 0 \le x \le 80, \\ 0.03 - 0.00025x, & 80 < x \le 120. \end{cases}$$

Let there be an ordinary deductible of $d = 20$.
Calculate the **loss elimination ratio.**

Problem 2.2. *Source: Sample STAM Exam Problem #127.*
Losses in 2003 follow a two-parameter Pareto distribution with $\alpha = 2$ and $\theta = 5$. Losses in 2004 are 20% uniformly higher than in 2003. An insurance covers each loss subject to a deductible of 10. Calculate the loss elimination ratio in 2004.

Problem 2.3. *Source: Two old exams* 3*; I forgot to note the years.*
A jewelry store purchases two separate insurance policies that together provide full coverage. You are given:

- The expected ground-up loss is $11,100$.
- Policy A has an ordinary deductible of $5,000$ and **no** policy limit.
- Under policy A, the expected amount paid per loss is $6,500$.
- Under policy A, the expected amount paid per payment is $10,000$.
- Policy B has **no** deductible and has a policy limit of $5,000$.

i. **Given** that a loss has occurred, find the probability that the payment under policy B equals $5,000$.
ii. **Given** that a loss less than or equal to $5,000$ has occurred, what is the expected payment under policy B?

Problem 2.4. Let the ground-up loss X be exponentially distributed with mean \$500. An insurance policy has an ordinary deductible of \$50 and a policy limit of \$2000. Find the expected value of the amount paid (by the insurance company) per positive payment.

Problem 2.5. An insurance policy on a ground-up loss X has:

- no deductible;
- a coinsurance of 50%; and
- a maximum policy payment per loss of 5000

Let X be modeled using a two-parameter Pareto distribution with $\alpha = 2$ and $\theta = 10000$. What is the expected payment per loss for the insurer?

Problem 2.6. *Source: Sample STAM Problem #279.*
Loss amounts have the distribution function

$$F_X(x) = \begin{cases} \left(\frac{x}{100}\right)^2, & 0 \le x \le 100 \\ 1, & x > 100 \end{cases}$$

An insurance pays 80% of the amount of the loss in excess of an ordinary deductible of 20, subject to a maximum payment of 60 per loss. Calculate the conditional expected claim payment, given that a payment has been made.