**Reading:** Fisher.LimitedTableM

Fisher_Ch3Q13 (Problem 1)

**Model:** Source Text Chapter 3 Q13

**Problem Type:** Calculate the total loss cost for the policy

**Given** The following is a table of insurance charges by per-occurrence deductible.

| r | $10,000 Deductible | $20,000 Deductible |
|---|---|---|
| 1.0 | 0.20 | 0.22 |
| 1.5 | 0.10 | 0.12 |
| 2.0 | 0.04 | 0.05 |
| 2.5 | 0.02 | 0.03 |

| | |
|---|---|
| $40,000 | Expected unlimited loss |
| $20,000 | Expected primary loss at a per-occurrence limit of $10,000 |
| $30,000 | Expected primary loss at a per-occurrence limit of $20,000 |
| $40,000 | Aggregate deductible limit |

**Find**

(a.) Suppose a policy has a $10,000 per-occurrence deductible. Calculate the following:

i. The cost of the $40,000 aggregate deductible limit

ii. The cost of the $10,000 per-occurrence deductible

iii. The total cost of the policy

(b.) Suppose a policy has a $20,000 per-occurrence deductible. Calculate the following:

i. The cost of the $40,000 aggregate deductible limit

ii. The cost of the $20,000 per-occurrence deductible

iii. The total cost of the policy

**Solution**

(a.) First we need to calculate the entry ratio(s) which characterises the policy. Here there's only one since there's an aggregate limit but no minimum.
The (characteristic) entry ratio is the ratio of the aggregate deductible limit to the expected primary loss at the per-occurrence limit.

Entry Ratio = $40,000 / $20,000 = 2

Now we can look up the insurance charge in the Limited Table M.
ϕ(2) = 0.04

i. The cost of the aggregate deductible limit is then: $E[A_D] \cdot \phi(r)$ = $20,000 * ϕ(2) = $800

ii. The cost of the per-occurrence deductible is: $E[A] - E[A_D] =$ $40,000 - $20,000 = $20,000

iii. The total cost of the policy is then: $20,000 + $800 = $20,800

(b.) We now repeat the process using the $20,000 per-occurrence deductible.
The (characteristic) entry ratio is: $40,000 / $30,000 = 1.3333

Now look up the insurance charge in the Limited Table M. We'll need to use linear interpolation between r = 1 and r = 1.5.

ϕ(1.3333) = 0.1533

i. The cost of the aggregate deductible limit is then: $E[A_D] \cdot \phi(r)$ = $30,000 * ϕ(1.3333) = $4,600

ii. The cost of the per-occurrence deductible is: $E[A] - E[A_D] =$ $40,000 - $30,000 = $10,000

iii. The total cost of the policy is then: $10,000 + $4600 = $14,600