Policy Excess

1. The idea:
   - Claim X occurs:
     · policyholder pays up to L
     · insurer pays remainder, if any.
   - Benefits - Small claims not reported:
     · Overhead/Administration costs reduced
     · Premiums lower

2. Relationship to excess-of-loss reinsurance:
   - $Y = (X - L)I_{(X>L)}$
     · Policy excess from insurer's perspective
     $\approx$ excess-of-loss reinsurance from reinsurer's perspective

3. An Inconsistency?:

- Policyholder Perspective
  - · Expected Payment on a Claim:

$$E\{(X-L)I_{(X>L)}\} = \int_0^\infty (x-L)I_{(x>L)}f_X(x)dx$$
$$= \int_L^\infty (x-L)f_X(x)dx,$$

  - · $X \sim f_X(x)$
  - · Policyholder knows of ALL claims (even those less than L)

- Insurer Perspective
  - · Expected Payment on a Claim:

$$E(X-L|X>L) = \int_L^\infty (x-L)\frac{f_X(x)}{1-F_X(L)}dx.$$

  - · $X \sim f_X(x) \quad \Longrightarrow \quad X|X>L \sim f_X(x)\{1-F_X(L)\}^{-1}$
  - · Insurer (usually) knows ONLY of claims greater than L

- The problem, expectation from insurer's perspective greater
  - · Premiums based on this may seem high to policyholder.

- The resolution
  - · The NUMBER of claims made per period is different.
    - · Claim frequency higher for policyholder (knows all claims)
  - · Expected TOTAL claim amount:
    - · $E(Claim\ Number) \times E(Claim\ Amount)$
    - · Same from both perspectives