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Excluded Losses and the Demand for Insurance

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Independent Losses

Excluded Losses

Homeowner's Insurance: damage due to flood

Life insurance: death due to suicide

Product warranty: damage caused by tampering

Crop insurance: "not following good agricultural practices"

Two properties

- 1. unreimbursed
- 2. When an excluded loss occurs, a covered loss does not occur, and vice versa

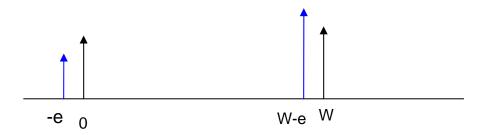
Let x_1 denoted a cover loss and x_2 an excluded loss

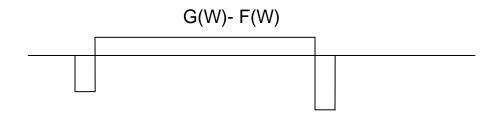
 $\alpha \cdot f_1(x)$ for $(x_1, x_2) = (x, 0)$ for all x in [0, b]

 $g(x_1, x_2) = (1 - \alpha) \cdot f_2(x)$ for $(x_1, x_2) = (0, x)$ for all x in [0, b]

0 for (x_1, x_2) = all other values in [0, b] X [0, b]

$$g(x_1, x_2) = h_1(x_1) \cdot h_2(x_2)$$





$$W = W_0 + V - x_1 + \theta(I(x_1) - P)$$

$$\mathsf{Eu}(\mathsf{W}) = \int_0^b u(\mathsf{W}_0 + \mathsf{V} - \mathsf{x}_1 + \theta(\mathsf{I}(\mathsf{x}_1) - \mathsf{P}))\mathsf{f}_1(\mathsf{x}_1)\mathsf{d}\mathsf{x}_1$$

$$W = W_0 + V - x_1 - x_2 + \theta(I(x_1) - P)$$

$$\mathsf{Eu}(\mathsf{W}) = \iint_{0 \le x_1 \le b, x_2 = 0} \mathsf{u}(\mathsf{W} + \mathsf{V} - x_1 - x_2 + \theta(\mathsf{I}(x_1) - \mathsf{P}))\mathsf{g}(x_1, x_2)$$

+
$$\iint_{0 \le x_2 \le b, x_1=0} u(W + V - x_1 - x_2 + \theta(I(x_1) - P))g(x_1, x_2)$$

+
$$\iint_{0 < x_1, 0 < x_2} u(W + V - x_1 - x_2 + \theta(I(x_1) - P))g(x_1, x_2)$$

$$\mathsf{Eu}(\mathsf{W}) = \int_0^b u(\mathsf{W}_0 + \mathsf{V} - \mathsf{x}_1 + \theta(\mathsf{I}(\mathsf{x}_1) - \mathsf{P})) \alpha \cdot \mathsf{f}_1(\mathsf{x}_1) d\mathsf{x}_1$$

+
$$\int_0^b u(W_0 + V - x_2 - \theta \cdot P)(1 - \alpha) f_2(x_2) dx_2$$

$$\frac{dEu(W)}{d\theta} = \int_0^b u'(W_0 + V - x_1 + \theta(I(x_1) - P))(I(x_1) - P)\alpha \cdot f_1(x_1)dx_1$$

+
$$\int_0^b u'(W_0 + V - x_2 - \theta \cdot P)(-P)(1 - \alpha)f_2(x_2)dx_2 = 0$$

<u>Theorem 1</u>: When excluded risks are present and full insurance is offered at an actuarially fair price, all risk averse decision makers choose less than full insurance.

<u>Theorem 2</u>: When excluded risks become larger, that is as α decreases, the decision maker chooses less insurance.