ASYMMETRIC INFORMATION – CONCEPTS

Moral Hazard
One party’s (costly to it) actions affect risky outcomes
(exercising care to reduce probability or size of loss,
making effort to increase productivity, etc.)
Actions not directly observable by other parties,
nor perfectly inferred, by observing outcomes
So temptations for shirking, carelessness

Adverse Selection
One party has better advance info. re. future prospects
(innate skill in production, driving; own health etc.)
So employment or insurance offers can attract
adversely biased selection of applicants

General “amoral” principle – more informed party will
exploit its advantage; less-informed must beware
Can use direct monitoring, investigation, but costly
So other strategies to cope with information asymmetry:
Moral hazard – incentive schemes to promote effort, care
Adverse selection – signaling by more informed
screening by less informed

Coping with information asymmetry creates costs
Negative spillovers (externalities) across participants
Market may not be Pareto efficient; role for policy
INSURANCE WITH MORAL HAZARD

Probability of loss depends on effort; this is costly for insured

If usual competitive insurance market
with premium $p$ per dollar of coverage,
customer chooses coverage $X$, effort $e$ to max

$$[1 - \pi(e)] U(W_0 - pX) + \pi(e) U(W_0 - L + (1 - p)X) - c(e)$$

$X$-FONC as before

$$- p [1 - \pi(e)] U'(W_1) + (1 - p) \pi(e) U'(W_2) = 0$$

But new $e$-FONC with complementary slackness

$$[U(W_1) - U(W_2)] [-\pi'(e)] - c'(e) \leq 0, \ e \geq 0$$

If competition among insurance companies $\Rightarrow$ fair insurance,
$p = \pi(e), W_1 = W_2$, so LHS of $e$-FONC $\leq 0$, so $e = 0$
More generally – better insurance $\Rightarrow$ less effort
Restricting insurance creates incentive to exert care
To find optimal restrictions on insurance:
Coverage not customer’s choice: contract is package \((p, X)\)
Customer takes the contract as given, chooses \(e\) to max EU

\[
= [1 - \pi(e)] U(W_0 - pX) + \pi(e) U(W_0 - L + (1 - p)X) - c(e)
\]

Result: function \(e(p, X)\). Knowing this function,
risk-neutral insurance company chooses contract
to max expected profit \(E\Pi = [p - \pi(e(p, X))] X\)
subject to customer’s \(EU \geq u_0\), where
\(u_0 = \) the customer’s outside opportunity
(best offer from other insurance companies?)

Competition among companies keeps raising \(u_0\)
so long as expected profit \(\geq 0\)
So equilibrium maxes \(EU\) subject to \(E\Pi \geq 0\)
This is information-constrained Pareto optimum

1. In this equilibrium, \(0 < X < L\) : restricted insurance
2. Need “exclusivity”, else customer would buy contracts
   from several companies and defeat restriction
   Achieved by “secondary insurance” clause
3. Government policy can improve outcome by
taxing insurance, subsidizing complements to effort
4. Nature of competition – firms are “EU-takers”
   not conventional price-takers
INSURANCE WITH ADVERSE SELECTION
ROTHSCHILD-STIGLITZ (SCREENING) MODEL

Reminders: Initial wealth $W_0$, loss $L$ in state 2
Budget line in contingent wealth space $(W_1, W_2)$:

$$(1 - p) W_1 + p W_2 = (1 - p) W_0 + p (W_0 - L)$$

Slope of budget line $= (1 - p)/p$, where
$(p = \text{premium per dollar of coverage})$

$$EU = (1 - \pi) U(W_1) + \pi U(W_2)$$

Slope of indifference curve on 45-degree line $= (1 - \pi)/\pi$.
where $\pi = \text{probability of loss (state 2 occurring)}$

In competitive market, fair insurance: $p = \pi$
Then tangency on 45-degree line,
customer buys full coverage

TWO RISK TYPES, SYMMETRIC INFORMATION

Loss probabilities $\pi_L < \pi_H$
Indifference curves of L-type steeper than of H-type
Mirrlees-Spence single-crossing property
Crucial for screening or signaling
In competitive market, each type gets separate fair premium, takes full coverage.
ASYMMETRIC INFORMATION
– SEPARATING EQUILIBRIUM

Full fair coverage contracts $C_H$, $C_L$ are not incentive-compatible: $H$ will take up $C_L$

Competition requires fair premiums; then must restrict coverage available to L-types

Contract $S_L$ designed so that H-types prefer $C_H$ to $S_L$
L-types prefer $S_L$ to $C_H$ by single-crossing property
So separation by self-selection (screening)
But at a cost: L-types don’t get full insurance
H-types exert negative externality on L-types
ASYMMETRIC INFORMATION – POOLING?

Population proportions $\theta_H, \theta_L$

Population average $\pi_M = \theta_H \pi_H + \theta_L \pi_L$

Any point on “average fair budget line”

(slope = $(1 - \pi_M)/\pi_M$), and between $P_1$ and $P_2$

is Pareto-better than separate contracts $C_H, S_L$

This is more likely the closer is $\pi_M$ to $\pi_L$

that is, the smaller is $\theta_H$

A new firm can offer pooling contract that will

attract full sample of pop’n and make profit

Then separation cannot be an equilibrium
Can pooling be an equilibrium? Never.
Example - consider full insurance $P_F$
at population-average fair premium $= \pi_M$
Company breaks even, so long as clientele
is random sample of full pop'n

But because of single-crossing property
can find $S$ that will appeal only to L-types
therefore will make a profit as premium $> \pi_L$
Entry of such insurers will destroy pooling

Then equilibrium may not exist at all – cycles
Govt. policy can simply enforce pooling