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

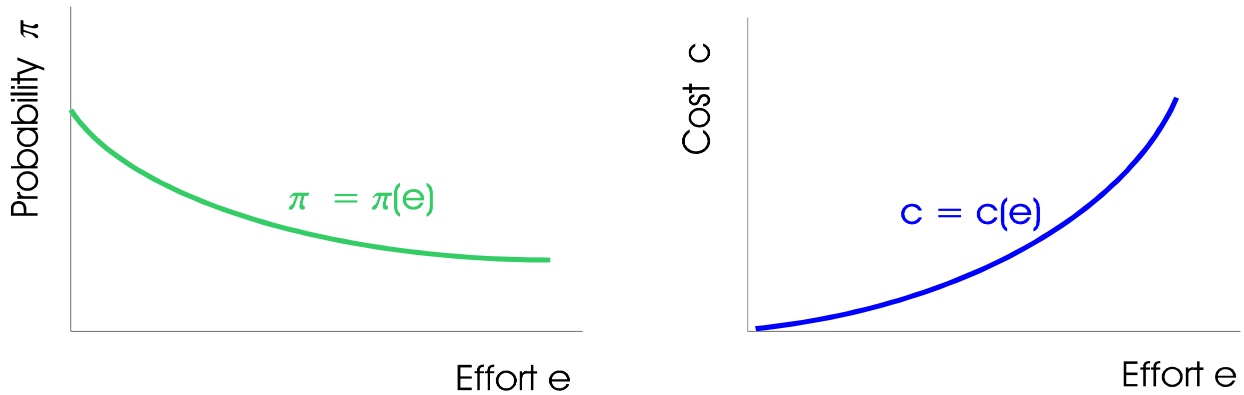
Can use direct monitoring, investigation, but costly

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

$$[1-\pi(e)]\, U(\underbrace{W_0 - p\,X}_{W_1}) + \pi(e)\, U(\underbrace{W_0 - L + (1-p)\,X}_{W_2}) - c(e)$$

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 ≤ 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

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

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 ≥ 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
($p =$ premium per dollar of coverage)

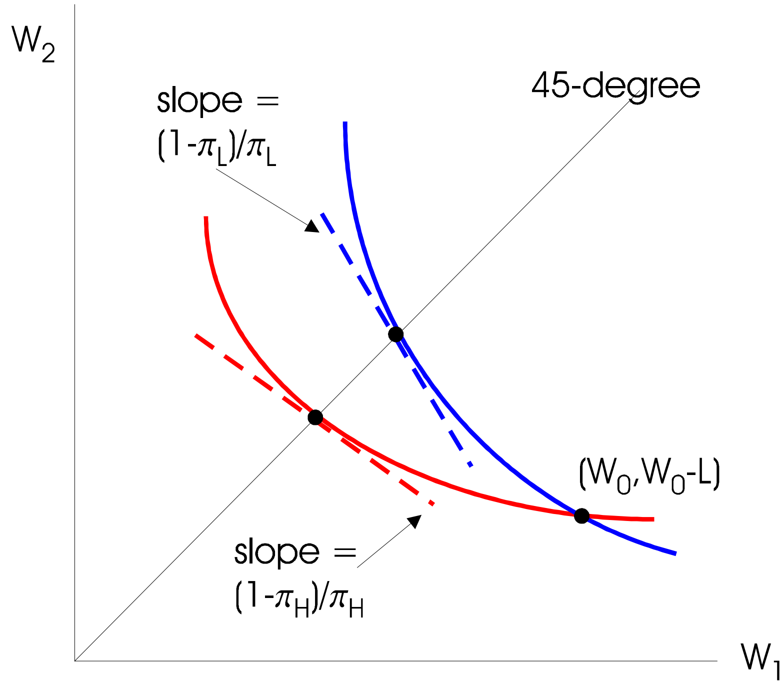
$$EU = (1-\pi)\ U(W_1) + \pi\ U(W_2)$$

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

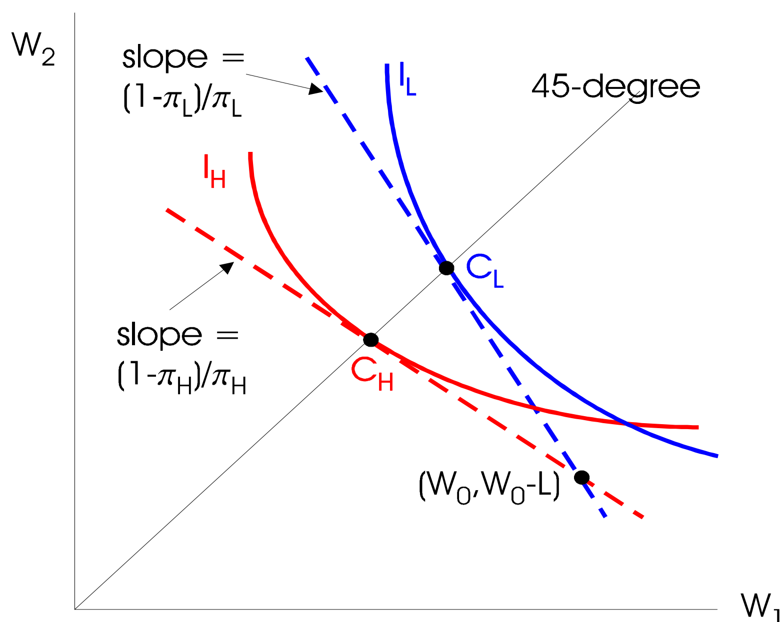
In competitive market, fair insurance: $p = \pi$
Then tangency on 45-degree line,
customer buys full coverage

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



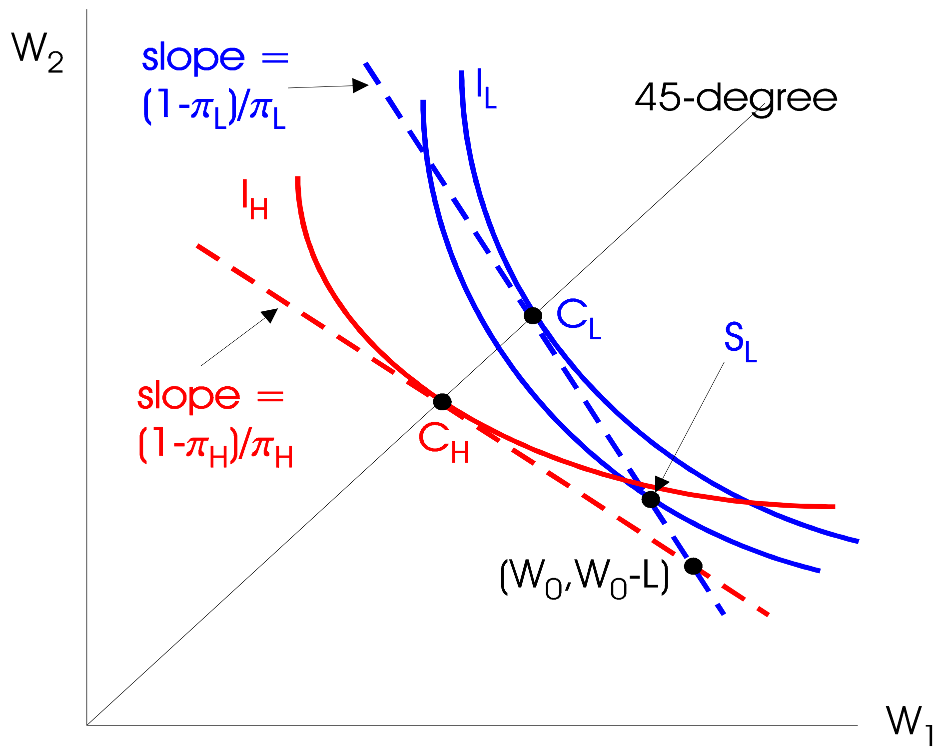
In competitive market, each type
gets separate fair premium, takes full coverage



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?

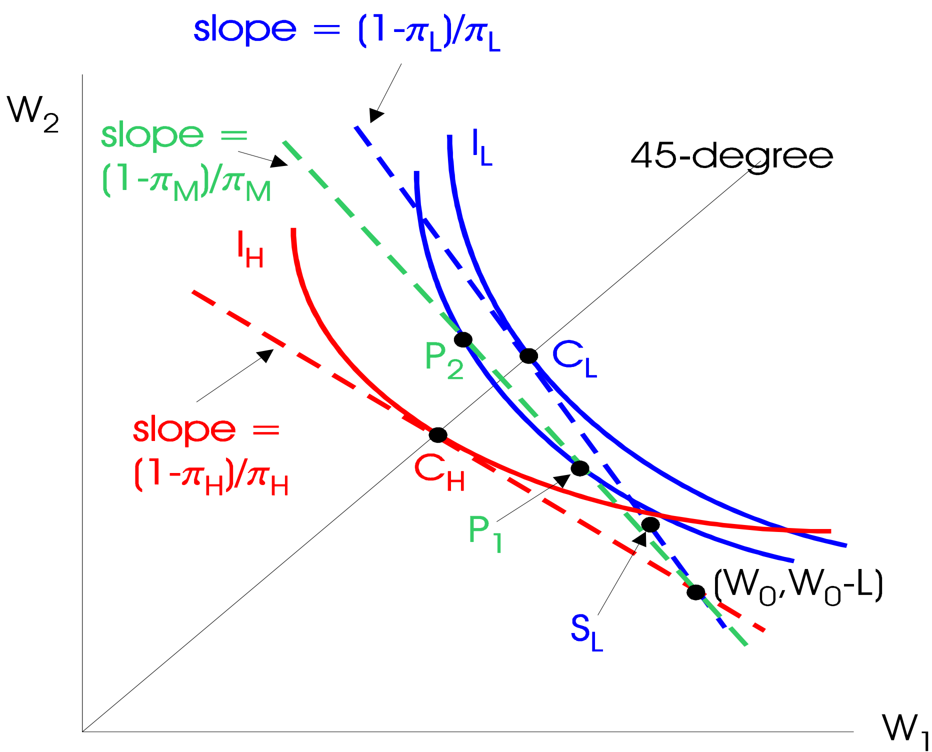
Population proportions θ_H, θ_L

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 π_M to π_L

that is, the smaller is θ_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

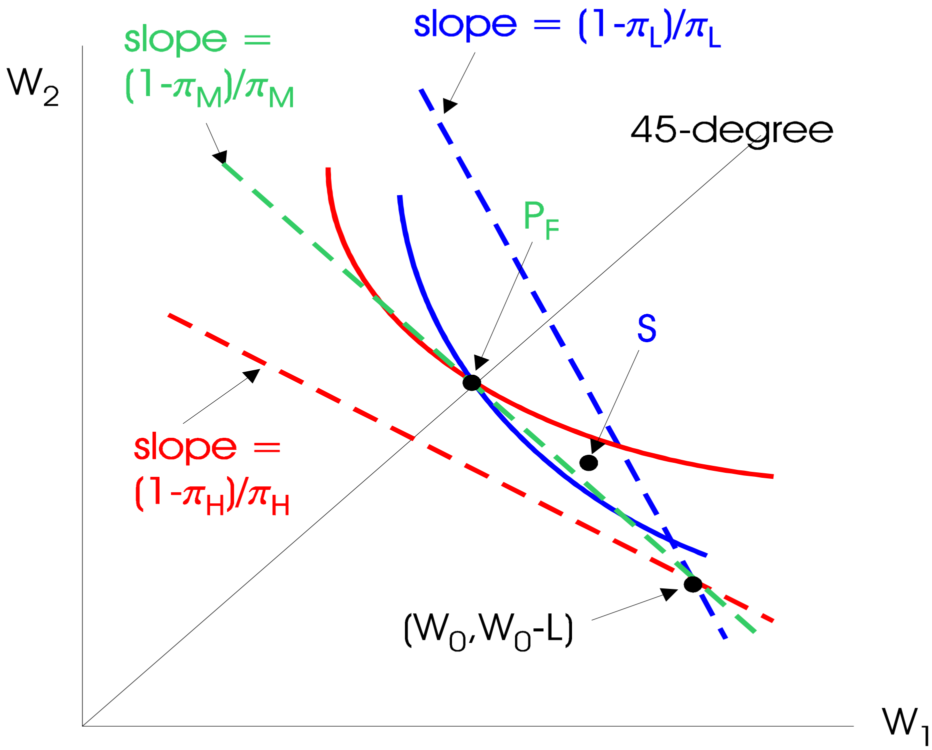
Can pooling be an equilibrium? Never.

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