Screening in Markets with Competing Uninformed Parties

Timing: uninformed parties make offers; then privately-informed parties choose between these offers.

Applications:

- Insurance markets: purchasers privately informed about their risk status; policies specify premium and benefits.

- Product markets: buyers privately informed about their valuation; pricing policies specify how price varies with quantity or with quality.

- Credit markets: borrowers privately informed about distribution of returns, hence about their default risk; loan contracts specify interest rate and collateral.

Important distinctions in analyzing screening

1. Distinction between "optimal contracting" ("screening") and "competitive screening" hinges on whether or not there is *competition* among uninformed parties.

2. For markets with competitive screening, there is a further distinction between "competition with exclusive contracts" and "competition with non-exclusive contracts":

   - Exclusive contracts: buyer can purchase at most one contract. Exs.: market for car insurance, (some) labor markets
   - Non-exclusive contracts: buyer can purchase contracts from many different sellers. Exs.: financial markets, product markets

Screening in competitive markets with exclusive contracts

For ease of comparison, analyze same setting as for signalling. Players: privately-informed worker and large number of identical firms, with same preferences as in signalling analysis.

Timing of the model:

1. Worker privately observes ability $n \in L, H$; firms believe $Pr(n = H) = q$.

2. Each firm simultaneously and noncooperatively offers a "contract" (w, e). (With exclusive contracts, eqm. outcomes unaffected if each firm offers a menu of (w,e) pairs.)

3. Worker chooses his most-preferred contract.

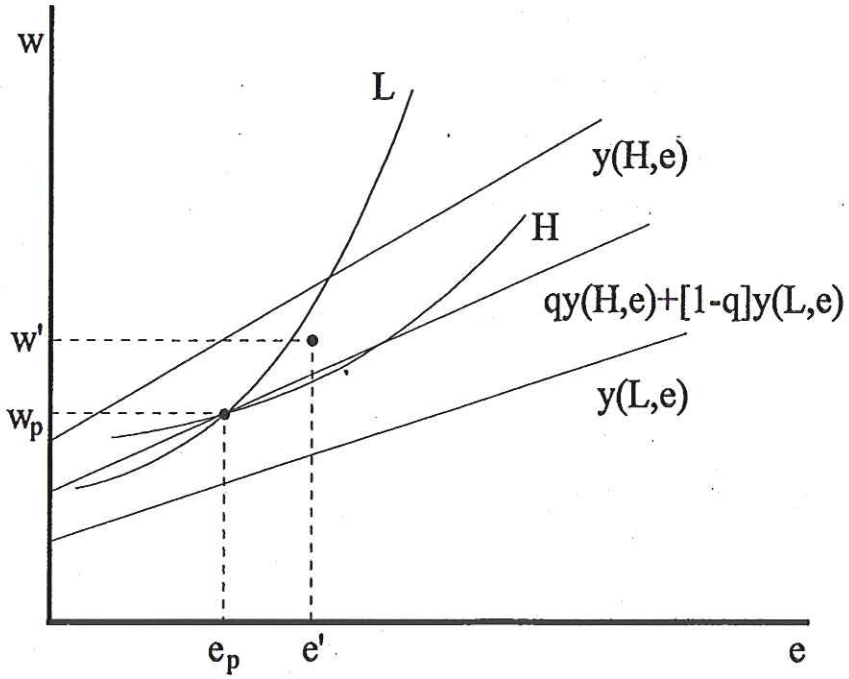
4. Worker acquires the education level and receives the wage specified in the contract he signed.

Strategies: firm i: (w_i, e_i); worker: (w, e) from among $\{(w_1, e_1), \ldots, (w_n, e_n)\}$.

Eqm. concept: subgame perfect Nash eqm. (SPE)

Equilibrium characterization

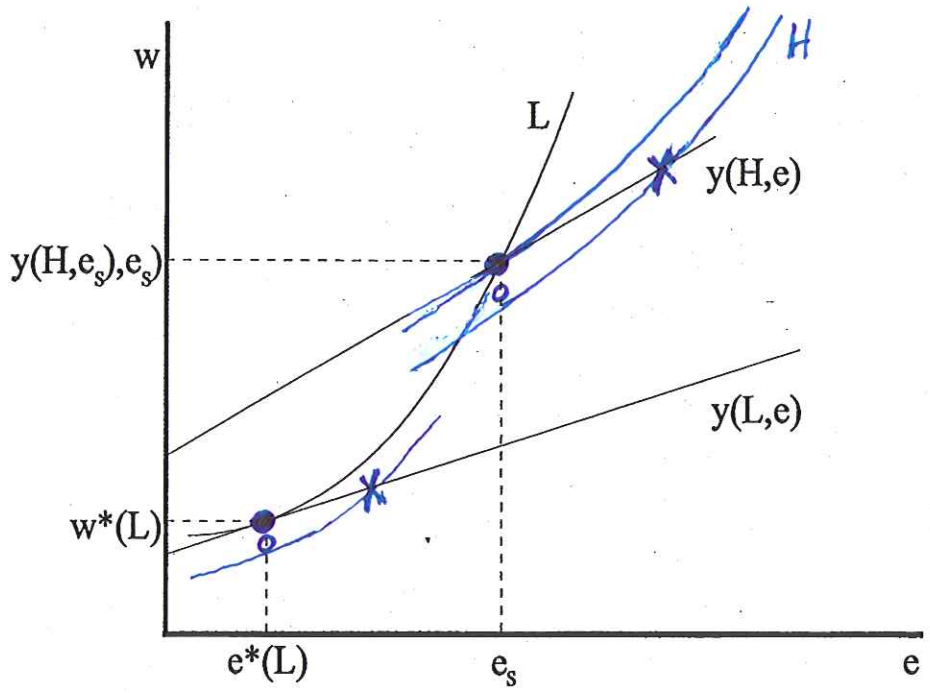
- *Proposition:* In a SPE, any contract that is chosen by worker must earn zero profit.
- *Proposition:* A SPE cannot be a pooling equilibrium.
  - Proof: A firm that offers (w', e'), given that other firm(s) offer (w_p, e_p), will attract only H-type and will make positive profits, since $y(H, e') > w'$.



- *Proposition:* In a SPE, no contract (w, e) can be chosen with positive probability by both types.

Unique equilibrium candidate

- *Proposition:* The only candidate SPE has L-type choosing $(w^*(L), e^*(L))$ and H-type $(y(H, e_s), e_s)$.

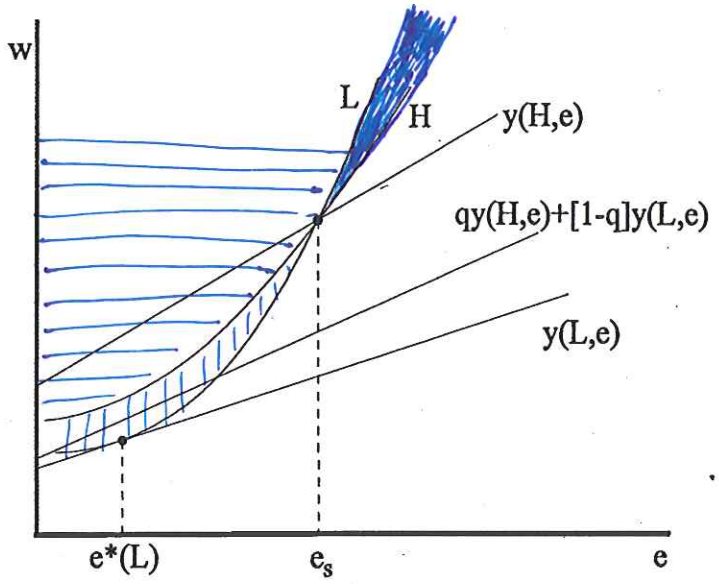


- *Proof:* If L-type does not get $(w^*(L), e^*(L))$, a firm could offer $(w^*(L) - \delta, e^*(L))$, with δ small enough that L-type would prefer this (for $\delta > 0$, contract earns positive profits). Similarly, if H-type does not get $(y(H, e_s), e_s)$, a firm could profitably offer $(y(H, e_s) - \delta, e_s)$ (since L-type gets $(w^*(L), e^*(L))$, contract does not attract L-type).

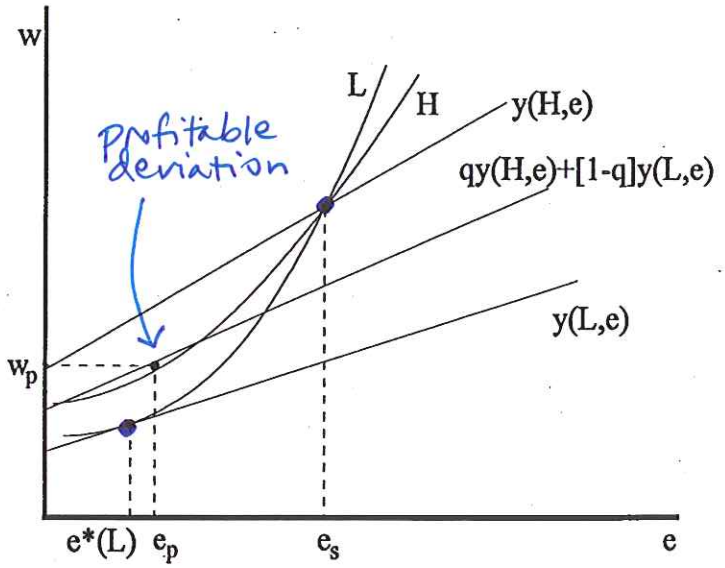
Existence of equilibrium

- *Proposition:* a) In Case A, there is a unique SPE. b) In Case B, no SPE exists.

Case A (q is 'low'):



Case B (q is 'high'):



- *Proof:* a) No new contract can be profitable: any contracts that attract both types must lie above $qy(H,e) + [1-q]\,y(L,e)$; any contract that attracts only H-type must lie above $y(H,e)$; and any contract that attracts only L-type must lie above $y(L,e)$. b) A firm that offered (w_p, e_p) would break the candidate SPE; it would attract both types and earn positive profits.

Implications

A competitive market with screening via exclusive contracts may have no equilibrium, and hence may be unstable (first shown by Rothschild and Stiglitz (1976) in context of insurance markets).

- Eqm. is less likely to exist when offering a pooling contract is attractive, that is, when $Pr(n = H)$ is high or H and L are close together.

- If there is a continuum of types, eqm. does not exist (Riley, 1979).

Recent analyses of competitive screening with non-exclusive contracts (e.g. Attar et al, 2008) suggest that i) eqm. existence is much less problematic and ii) outcomes can differ from those under exclusive competition.

So important for empirical studies and for policy analysis to model the appropriate type of competition.