Module 13: Information Disclosure

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Unraveling and the Full Disclosure Theorem

- Informed seller and 2 risk-neutral uninformed buyers (Bertrand competition).

- Quality $\theta_i \in \{\theta_1, \ldots, \theta_N\}$ of product is known privately by the seller
  - Buyers hold probability distribution over $\theta_i$ and $\mathbb{E}[\theta_i] = \bar{\theta}$.

- Seller can make verifiable costless disclosure about product quality.
  - Seller cannot make manifestly false claim (as opposed to cheap talk).
  - If quality is $\theta_i$ then can report $r_i = \{\theta_i, \ldots, \theta_N\}$ (“quality of my product is at least $\theta_i$”) or not disclose $r_i = \emptyset$.

- Buyer observes disclosure and chooses to offer price $p$.

- Final payoffs are
  - Buyer: $U_S = p$
  - Seller: $U_B = \theta - p$

- Equilibrium price (due to Bertrand competition): $p(r_i) = \mathbb{E}[\theta_i | r_i]$

Analysis

- Consider seller of the highest quality $\theta_N$.
  - Strict incentive to disclose quality since $\mathbb{E}[\theta_i | r_i = \emptyset] < \theta_N$
If the highest-quality seller discloses, then if a seller does not disclose, his quality can be at most $\theta_{N-1}$.

- Now, consider seller of second-highest quality $\theta_{N-1}$.

  - Strict incentive to disclose since $\mathbb{E}[\theta_i \mid r_i = \emptyset] < \theta_{N-1}$.
  - Therefore, if a seller does not disclose, his quality can be at most $\theta_{N-1}$.

- ... and so on!

**Full Disclosure**

- To complete induction argument, suppose that seller of quality $\theta_i > \theta_1$ does not disclose.

- Consider choice of the seller of quality $\theta_j \geq \theta_i$

  - Disclose quality $\theta_j$: receive $p = \theta_j$
  
  - Do not disclose: get pooled with $\theta_i$ and $\theta_1$ (for whom disclosing is weakly dominated) and receive lower price.

- *Result*: Unraveling and full disclosure!

  - Why do we need mandatory disclosure laws?

- ... but it relies heavily on rather strong assumptions!

  - Sellers must always be perfectly informed about their quality.
  
  - Absence of disclosure costs.

**Imperfectly Informed Sellers**

- Simplified setting where $\theta_i \in \{\theta_B, \theta_G\}$ and $\theta_B < \theta_G$ with $\Pr(\theta_i = \theta_G) = \beta$.

  - Seller can disclose type or not disclose.

- Sellers are imperfectly informed:

  - with probability $\gamma < 1$, seller is informed ; and
  
  - with probability $1 - \gamma$, seller is uninformed (like buyer).
Analysis

- Consider the following strategy:
  - sellers of good quality $\theta_G$ disclose their type
  - sellers of bad quality $\theta_B$ do not disclose their type (and pool with uninformed)

- Equilibrium price is then given by

$$p(r_i = \theta_G) = \theta_G$$
$$p(r_i = \emptyset) = \frac{(1-\gamma)[\beta \theta_G + (1-\beta)\theta_B] + \gamma(1-\beta)\theta_B}{(1-\gamma) + \gamma(1-\beta)} > \theta_B$$

  - Why is this an equilibrium?

Information Acquisition

- What if the seller (or the buyer) can make a costly investment to become informed prior to the sale? (Shavel, RAND 1994)
  - Mandatory vs. voluntary disclosure.

- Mandatory disclosure:
  - $p_G = \theta_G$ or $p_B = \theta_B$ when informed (and is forced to disclose).
  - $p = \beta \theta_G + (1-\beta)\theta_B$ when uninformed.
  - No incentive to become informed since sellers get expected value anyway!

- Voluntary disclosure:
  - $p(r_i = \emptyset) = \frac{(1-\gamma)[\beta \theta_G + (1-\beta)\theta_B] + \gamma(1-\beta)\theta_B}{(1-\gamma) + \gamma(1-\beta)}$ when uninformed.
  - $p(r_i = \theta_G) = \theta_G$ or $p(r_i = \emptyset)$ when informed.
  - Benefit from becoming informed:
    $$\beta \theta_G + (1-\beta)p(r_i = \emptyset) - p(r_i = \emptyset) = \beta [\theta_G - p(r_i = \emptyset)] > 0$$
  - But incentives are socially inefficient because $p(r_i = \emptyset) > \theta_B$. 
References


