Module 13: Information Disclosure

Information Economics (Ec 515) · George Georgiadis

Unraveling and the Full Disclosure Theorem

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

- Quality $\theta_i \in \{\theta_1, ..., \theta_N\}$ of product is known privately by the seller
  - Buyers hold probability distribution over θ_i and $\mathbb{E}[\theta_i] = \overline{\theta}$.
- Seller can make verifiable costless disclosure about product quality.
  - Seller cannot make manifestly false claim (as opposed to cheap talk).
  - If quality is θ_i then can report $r_i = \{\theta_i, ..., \theta_N\}$ ("quality of my product is at least θ_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): $p(r_i) = \mathbb{E}[\theta_i \mid r_i]$

Analysis

- Consider seller of the highest quality θ_N.
  - Strict incentive to disclose quality since $\mathbb{E}[\theta_i \mid r_i = \emptyset] < \theta_N$

- If the highest-quality seller discloses, then if a seller does not disclose, his quality can be at most θ_{N-1}.

- Now, consider seller of second-highest quality θ_{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 θ_{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 θ_j: receive $p = \theta_j$
  - Do not disclose: get pooled with θ_i and θ_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 θ_G disclose their type
  - sellers of bad quality θ_B do not disclose their type (and pool with uninformed)

- Equilibrium price is then given by

$$
\begin{aligned}
p(r_i &= \theta_G) = \theta_G \\
p(r_i &= \emptyset) = \frac{(1-\gamma)\left[\beta\theta_G + (1-\beta)\theta_B\right] + \gamma(1-\beta)\theta_B}{(1-\gamma)+\gamma(1-\beta)} > \theta_B
\end{aligned}
$$

  - 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:

$$
\beta\theta_G + (1-\beta)\, p(r_i = \emptyset) - p(r_i = \emptyset) = \beta\left[\theta_G - p(r_i = \emptyset)\right] > 0
$$

  - But incentives are socially inefficient because $p(r_i = \emptyset) > \theta_B$.

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