Welfare Properties of Product Certification

by

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1). Background

- Information asymmetries and adverse selection problem.

- Distortions mitigated through certification intermediary.

- **Certification intermediary**: third party who observes information concerning the hidden quality of a good.

- e.g. ISO 9000, Consumer Reports, etc.

- Categories of certification intermediaries.
- Revelation methods of certification intermediaries:
  - Service to producers.
  - Service to consumers.

2). Objective and Contribution

- Behavior of profit maximizing CI who sells services to producers.

- This paper:
  
  - Specific form of uncertainty but richer set of market structures. (e.g. sorting effect of certification).
  
  - Effect of product market structure on CI’s choices and socially optimal choices. (local monopoly and Bertrand).
  
  - Effect of risk aversion on incentives of profit-max CI.
  
  - Effect of potential entry on behavior of the incumbent CI.
3). Model

- 2 firms producing vertically, horizontally differentiated good.

- CI ascertaining and revealing quality of goods submitted for testing.

- A continuum of consumers deciding which good to consume. Half located in the same town as firm 1 and the other half as firm 2.

- If buy from firm in the other town, incur a switching cost $t$.

- Firms max profit and consumers max expected utility.
- $E[U] = \begin{cases} 
0 \\
\theta E[s_i:] - p_i \\
\theta E[s_{-i}:] - p_{-i} - t
\end{cases}$

- $\theta \sim U(0,1)$

- **Timing:**

  - Nature chooses the qualities of the two producers. $s_h$ with probability $\rho$ and $s_l$ with probability $(1-\rho)$. Then CI announces disclosure rule and fee.

  - Producers simultaneously decide whether to submit product. Submit only if it will pass the test.
○ CI accepts goods for testing, tests, and reveals. Consumers update believes based on signals.

○ Firms set prices to max profits, given the info consumers have received on their qualities.

4). Local Monopoly \((t = \infty)\)

- Demand and profit:

○ Both sell only to their home town market.

\[
D_i = \frac{1}{2} \left\{ 1 - \frac{p_i}{E[s_i|.]} \right\} 
\]

○ \(\max \Pi_i = p_i D_i \rightarrow p_i^* = \max\{0, (E[s_i|.] \} \)

\[
\Pi_i = \max\{0, (E[s_i|.] / 8)\}
\]
- **Certification behavior:**

  - If CI sets a high standard and a fee that extracts all producer surplus associated with certification.
    - Expected profit of CI: $E[\Pi_{h}^{CI}] = 2\rho(s_h - s_l)/8$.

  - If CI sets a low standard and a fee that extracts all surplus associated with certification.
    - Expected quality of a certified good: $\hat{s} = \rho s_h + (1-\rho)s_l$
    - Expected profit of CI: $E[\Pi_{l}^{CI}] = 2(\hat{s} - s_0)/8$. 
- **Lemma 1**: In the absence of a certification intermediary, both local monopolists will set \( p = (\rho s_h + (1-\rho)s_l)/2 \), and expected welfare is \( E[W] = 3(\rho s_h + (1-\rho)s_l)/8 \).

- **Proposition 1**: If the market structure is local monopoly, the CI will (weakly) prefer to set a high standard.

  - 2 effects against one another: low standard ensures all producers seek certification. However, the firm’s willingness to pay for certification goes down.

- **Corollary 1**: If \( s_l < 0 \), then a welfare maximizing certification intermediary would set a high standard, whereas if \( s_l >0 \) then a welfare maximizing certification intermediary would be indifferent between a high and a low standard.
5). Conclusion (local monopoly)

- The action of CI is first best: setting a high standard in proposition 1 and corollary 1.

- Setting a high standard has no effect on the market power the producers have: welfare in lemma 1 and welfare in proposition 1 are the same. (consumers are risk neutral).