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Hidden Characteristics I: Lemons market example

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Problem: Purchase durable good in second-hand market (e.g., car). Seller has personal knowledge about quality of good that is very costly or impossible for buyer to uncover through inspection. (THINK eBay)

Model

Car quality \( k \sim U[0,1] \), 0 is worst quality
Seller willing to accept \( p_0 k \)
Buyer willing to pay \( p_1 k \)
For any transactions to occur, necessary that \( p_1 > p_0 \)

Simplify: \( p_1 = \frac{3}{2} p_0 \)

ASK QUESTION: If quality can be determined? Cars of type \( k \) would sell for \( P \in [p_0 k, p_1 k] \), depending on relative bargaining power.

ASK QUESTION: If quality cannot be determined by buyer? Buyer calculates average (expected) quality, conditional on offered selling price, decides to buy based on average quality.

Reasoning

- If price is \( P \), then only sellers would be those for whom \( P \geq p_0 k \), so only qualities offered will be \( k \leq P/p_0 \)
- Since we assumed qualities were evenly distributed, the average will be the midpoint between 0 and \( P/p_0 \); average quality offered at \( P \) will be \( P/(2p_0) = k \)
- At that average quality, buyers receive average utility \( p_1 k = (p_1/2p_0)P = \frac{3}{4}P \)
- But price greater than expected utility: \( P > \frac{3}{4}P \), so no transactions take place.
- True for any price \( P \) except \( P = 0 \) (only cars of lowest quality sell)

Comments

- Crucial insight: The sellers know their quality, so they don't offer qualities that have right average for \( P \), but instead offer qualities less than or equal to quality associated with \( P \): they offer the lemons only
• Result in this example is not just an inefficiency, but disappearance of market!
• But strong assumption: there is no information to help buyers distinguish quality
• If there is some discriminating information, can have transactions, but inefficient (some valuable transactions don't occur)

What to do? Warranty

• A low quality seller less willing to offer long warranty since breakdown soon is likely
  • If cost of servicing warranty is more than gain from selling at "peach" (high quality) price, don't offer warranty
• This might sort out good and bad cars
  • To sort multiple levels of quality would need multiple types of warranty
  • For warranty to work, depends on two things: price premium for peaches, and cost differential for servicing warranties