

Uncertainty II

ECON 420: Game Theory

Spring 2018

Market for Lemons (Akerlof, 1970)

- ▶ Two types of used cars: high quality and low quality ("lemons")
- ▶ Buyers cannot directly observe car quality
 - ▶ Willing to pay \$6,000 for low quality
 - ▶ Willing to pay \$16,000 for high quality
- ▶ Sellers know quality of their car
 - ▶ Value of high quality: \$12,500
 - ▶ Value of low quality: \$3,000

Buyers

- ▶ Single market price for both cars p
 - ▶ Buyers can't observe quality, so only one market
- ▶ Suppose buyers can observe fraction of high quality cars in the market f
- ▶ Buyers will purchase a used car if $EV > p$

Sellers

- ▶ High quality owners sell if $p > 12,500$
- ▶ Low quality owners sell if $p > 3000$
- ▶ When will high-quality cars be bought and sold on the market?

Market for high quality cars

- ▶ What happens if f falls below the critical value?
- ▶ Consumers would be willing to pay $p > 12,500$ (if they were assured of getting high quality car)
- ▶ But sellers unable to find buyers at that price
- ▶ No high quality cars will be bought or sold!
 - ▶ $f = 0$
- ▶ Market price: $3,000 < p < 6,000$

Market failure

- ▶ Sellers willing to sell high quality for $p > 12,500$
- ▶ Buyers willing to buy high quality for $p < 16,000$
- ▶ Market equilibrium is *inefficient*
 - ▶ Buyers *and* sellers could be made better off without making anyone worse off

Adverse selection

- ▶ Market for lemons is an example of *adverse selection*
- ▶ With imperfect information, one side must form expectations
- ▶ This can make p low enough that some high-quality goods (or services) exit the market
- ▶ This reduces EV, further reducing price
- ▶ Only products that remain in market are low quality

Example: Health insurance

- ▶ Health insurance providers do not know consumers' health as well as the individual
- ▶ Offer a single price to "similar" consumers
- ▶ Healthiest consumers may find price to be too high (expected utility greater without insurance)
- ▶ This reduces the average health of remaining consumers
- ▶ Insurance companies raise price to account for higher risk
 - ▶ Process repeats
- ▶ "Death spiral" – market collapses
 - ▶ Rationale behind "individual mandate" and universal systems

Signalling

- ▶ How do we overcome uncertainty and adverse selection?
- ▶ "Cheap talk" insufficient, no cost to lying about quality
- ▶ Quality signals must impose a cost on the player signalling in order to prevent "cheaters"
- ▶ Example: Product warranties
 - ▶ Used car dealers sometimes offer promises to repair a car if it breaks down
 - ▶ Unlikely to offer warranty for lemons
- ▶ Example: Product design and marketing
 - ▶ Producers of high-quality products can "afford" fancy design and marketing

Screening

- ▶ Why do employers value some majors higher than others?
- ▶ In general, degrees that are harder result in higher wages
- ▶ Employers know that "low quality" workers are unlikely to take hard classes
 - ▶ High quality workers may have an easier time, less of an investment
- ▶ This separates high-quality from low-quality workers
- ▶ Major choice is (partly) a *signal* to employers

Separating vs pooling equilibrium

- ▶ Screening costs must be high enough to prevent low-quality players from cheating
- ▶ But screening costs must be *low* enough to make it worth it for high-quality players to join
- ▶ If the screening costs are too high or too low, then all players will *pool* together and be indistinguishable
- ▶ Examples: California food labeling laws vs "certified organic" labels