Asymmetric information and agency. Folland *et al* Chapter 10

Chris Auld
Economics 317

February 16, 2011

Information

- We discussed uncertainty in Chapter 8: people did not know if their houses would burn down, or if they would become ill, and we had to modify our model of consumer behavior.
- In this chapter, we extend this discussion to consider **asymmetric information**, circumstances in which (1) there is uncertainty and (2) one person has more information than another person.

Examples of asymmetric information.

1. You take your car to the mechanic and she tells you that you need a new engine. You face uncertainty over the true mechanical state of your car and the appropriate remedy. The mechanic faces no (or less) such uncertainty.
2. Your Economics 317 instructor tells you to go home and study. Your instructor faces uncertainty over your true effort level in the course, but you face no such uncertainty.
3. A labour union demands a raise but the employer insists business is bad. The union faces uncertainty over the true profitability of the firm, but the firm does not.

Information problems in the health sector.

- Uncertainty and asymmetric information issues are very severe in the context of health and health care.
- People do not know their health status and do not know the effects of various treatments nor the effects of health–affecting behaviors.
- Physicians also face uncertainty over which treatment is most effective, but physicians often have more information than patients.
- Insurers (private or government) do not know people's health status nor expected expenditures.

The Market for lemons

- Why do cars plummet in value as soon as you drive them off the lot?
- Basic idea: someone is trying to sell you a used car. You would be right to suspect that there's some hidden problem with the car, a problem you cannot easily find but which prompts the sale. You should take that into account when making an offer, and it turns out this information asymmetry may have large effects on the market for used cars.

A model of the used car market.

- There are 9 used cars for sale. These cars have qualities $Q \in \{0, \frac{1}{4}, \frac{1}{2}, ..., 1\frac{3}{4}, 2\}$
- Sellers value cars at \$7,500Q, buyers at \$5,000Q.
- That is, sellers value the 9 cars $\{0, 1250, 2500, 3750, ..., 8750, 10000\}$ and buyers value the cars $\{0, 1875, 3750, 5625, ..., 13125, 15000\}$.

model cont.

- If everyone could observe the quality of the cars Q, all cars would be sold for somewhere between $5000Q$ and $7500Q$.
- Buyers and sellers are both better off given a market forms and they trade with one another.
- e.g., if the $Q = 1$ car sells for \$6,000, the buyer is better off because he was willing to pay \$7,500 and the seller is better off because he was willing to accept \$5,000.

model continued: uncertainty but no asymmetric info case

- Suppose that there is uncertainty, but everyone has the same information: no one knows which car is which.
- Both buyers and sellers know the average car among the 9 has quality $Q = 1$.
- First consider $p = 10,000$. At this price all sellers offer their cars for sale, because sellers value any car (given they cannot observe Q) at 5,000. But buyers value any car at 7,500, so no one buys.
- At a price of $p = 7500$, all sellers are willing to sell, and all buyers are willing to buy.
- The market clears: all cars are sold.

model continued: Asymmetric case.

- Now suppose that only sellers know the quality of the cars for sale.
- That is, a seller knows Q for his car, but the buyer has no information at all on quality except its distribution.
- That is, sellers do not know which car is which, but they do know that Q is equally likely to be any of the 9 values listed above.
- There is uncertainty—buyers do not know Q—and there is asymmetric information as sellers do know Q.

model cont.

- What happens to prices and quantities?
- Suppose the price is $p = 10,000$.
- At this price, every seller is willing to sell his car.
- Buyers see every car is for sale but cannot tell which is which.
- If buyers are risk neutral, they are willing to pay for the average car offered for sale.
- The average car for sale has quality $Q = 1$, so buyers are willing to pay \$7,500. No trade takes place at this price.

model cont.

- So what if the price is \$7,500?
- At this price the two sellers with the highest quality cars (which the sellers value at \$8,750 and \$10,000) refuse to sell.
- Among the remaining 7 cars which are offered for sale at this price, the average quality is $Q = 3/4$ and buyers are willing to offer $(3/4)(7500) = \$5,625$.
- No trade takes place at this price either.

model cont.

- As we keep trying lower prices, more and more sellers refuse to sell, and the average quality of cars for sale falls.
- As the average quality of cars for sale falls, buyers are willing to pay less and less.
- In this example there is no price which clears the market.
- That is, no market forms and no trade takes place, even though we saw that everyone can be made better by trade in this environment.
- Upshot: Asymmetric information can really mess up markets!

Adverse selection in insurance markets.

- The market for insurance is like the market for used cars, with insurance buyers taking the place of car sellers, and insurance companies taking the place of car buyers.
- Consumers know more about their own health status than insurance companies do.
- At a given price for insurance, "high quality" consumers (consumers with low expected health expenditures) will refuse to buy insurance much like high quality cars are withheld from the used car market: "high quality" consumers select out of the market, so the remaining consumers are *adversely selected.*

- We could use exactly the same model as before: let Q now represent health status; a person with health Q is willing to pay $7500Q$ for insurance and an insurance company is willing to accept $5000Q$. We conclude that no market forms.
- Textbook slightly modifies, adds more notation....

- Suppose there is a large population of people who vary in health expenditures. Expenditures are uniformly distributed between 0 and M.
- People know the value of their expected health expenditures, insurers do not.
- A person chooses to buy insurance if the price is less than their expected expenditures.

- Suppose first $p = 0$. All buyers would like to buy, so average expenditures are $(1/2)M$. Firms lose money.
- Suppose $p = \frac{1}{2}M$. Now only the buyers with expenditures greater than $\frac{1}{2}M$ choose to purchase. In this group average expenditures are $\frac{3}{4}M$, so again firms lose money.
- There is no price which clears this market. The market fails to form.