Asymmetric Information and Uncertainty

Xi Wang

University of Georgia

Asymmetric Information

- Perfect formation about the qualities of the group of goods.
  - The market is good at moving goods from consumers who place a lower value on a good to consumers with higher values.
- In some markets, consumers and firms have quite limited information about good's quality.
  - Market might not move a good from consumers who have lower value on it to consumers with higher values. (Market fails)
- **Asymmetric information**: One of the parties to a transaction has information relevant to the transaction that the other party does not have.

Adverse Selection

Adverse Selection[1]

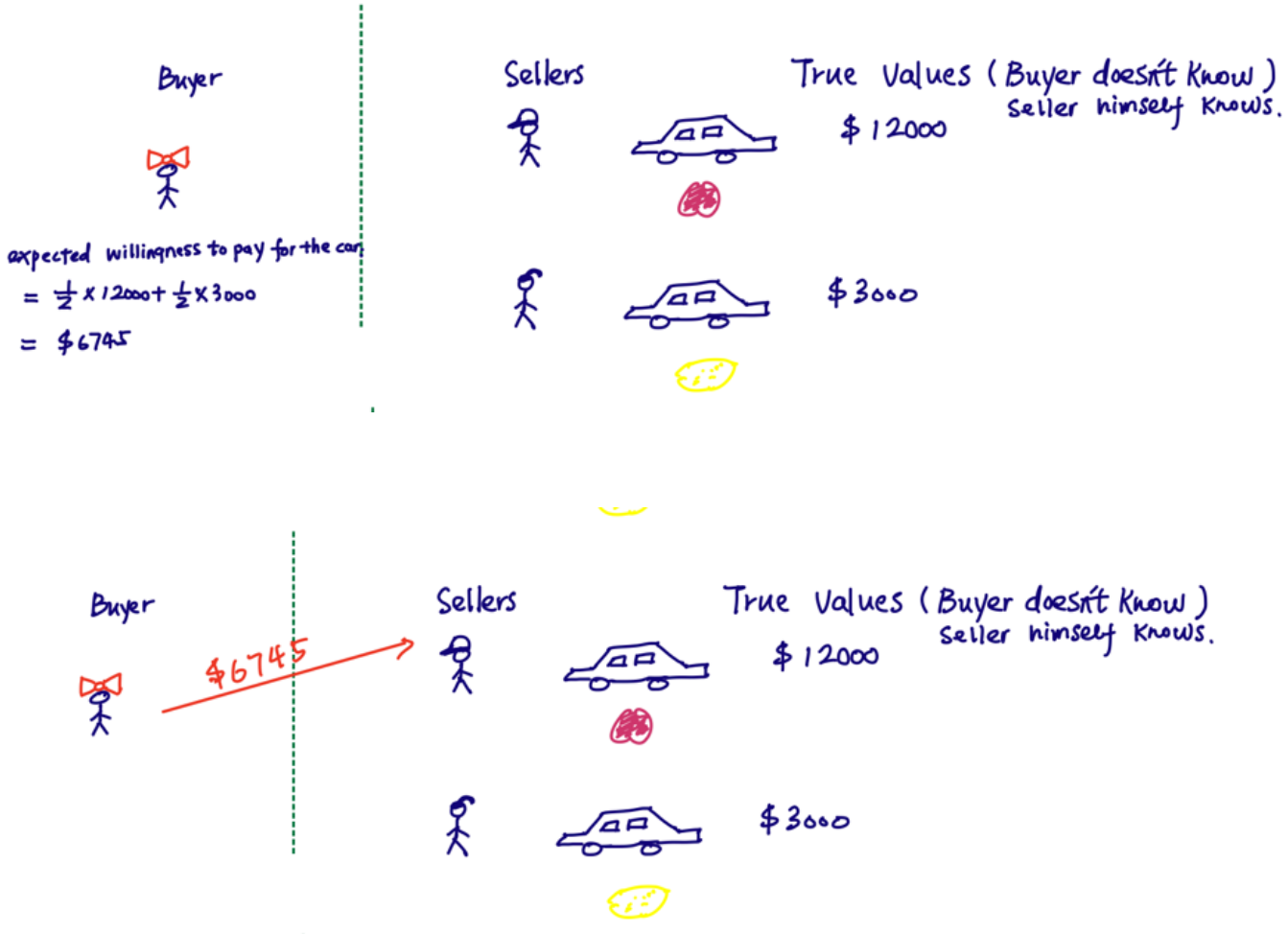
- *Adverse selection*: A situation in which asymmetric information results in high-quality goods or high-quality consumers being squeezed out of transactions because they cannot demonstrate the quality of the product they are offering to sale.
- In adverse selection, the quality of what is being offered in a transaction matters and is not easily demonstrated.

[1] George Akerlof, 1970, *The Market for Lemons*

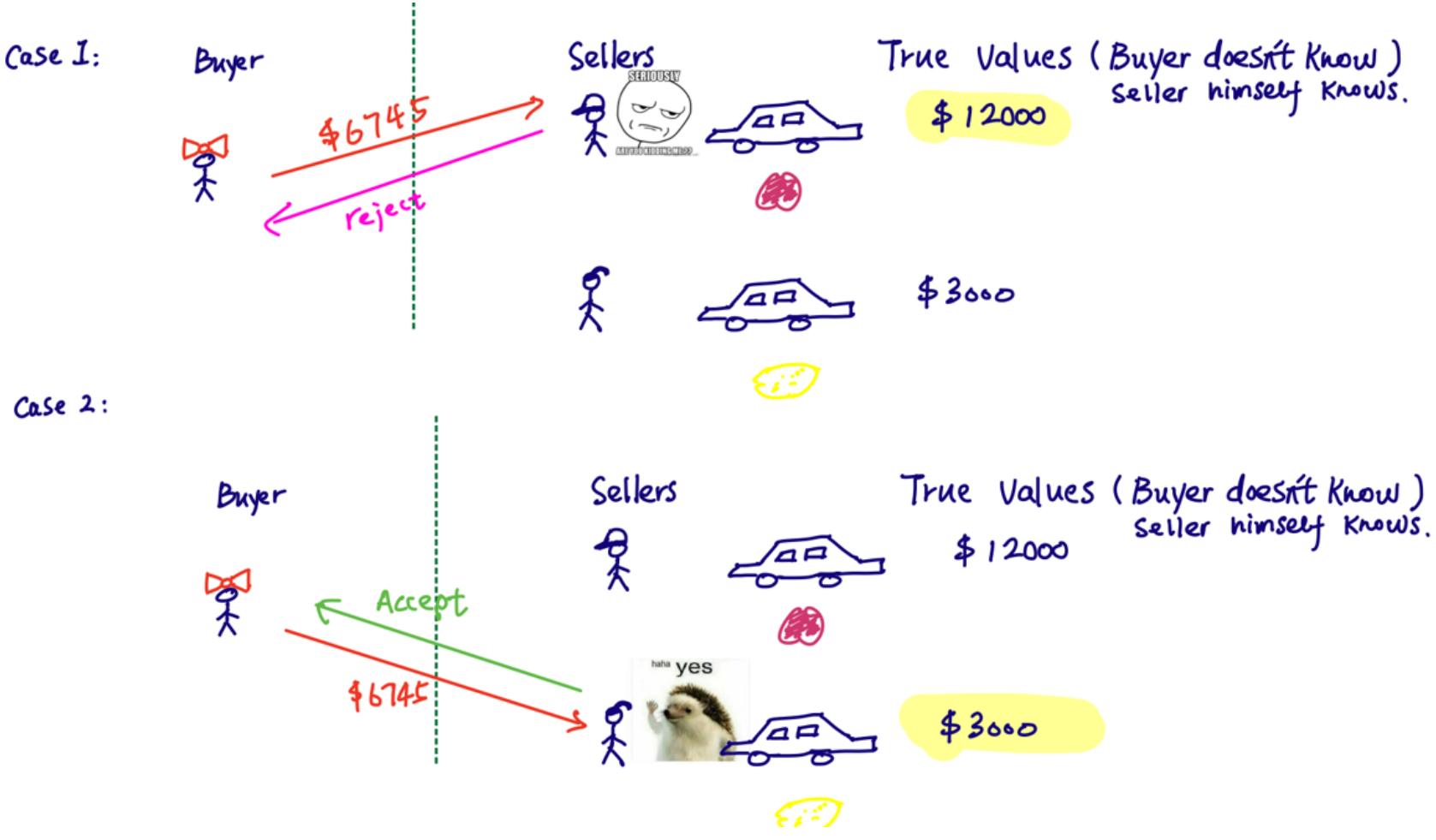
The Market for Lemons

- *Setting*: Used cars market.
- *Goods*: Half of these cars are high-quality cars (Peaches), and half are low-quality cars (Lemons).
- *Players*: Buyers and sellers.
- *Problem*: All used cars look similar, buyers cannot tell a lemon from a peach.
- Buyers think: Price could reflect the car's quality.
- *Results*: Only lemons would be sold in this used car market. Besides, although there are buyers who value a peachy used car more than its current seller, no transaction will occur.

The Market for Lemons



The Market for Lemons



The Market for Lemons

- High-quality car's owner would quit from the market because buyer's offer is too low.
- Given that only lemon owners will offer their cars for sale, over time, buyers come to understand that: Pr(Get a peach) < Pr(get a lemon).
- Consumer would like to pay less and less.
- Relative higher quality cars will not be sold, and only low-quality cars will be sold.
- Consumers who might have high values on a car could not buy the car from a seller.
- Market failure: Market does not move a car from consumers who have low values on cars to consumers who have high values on cars.

Health Insurance Market

- Individuals often know more about their health than anyone else. $\Rightarrow$ Asymmetric information.
- How does health insurance company earn profits?
- Different consumers pay different premium fees.
- Imagine a case:
  - Alice: A 66 years old female, who smokes everyday. Her genetic test shows that she has no inherit disease.
  - Cindy: A 66 years old female, who smokes everyday. Her genetic test shows that she has 50% to have a cancer.
- The health insurance company is not allowed to see one's genetic test so could not tell the difference between Alice and Cindy.
- Given the above information, could you tell me what the adverse selection is in this example?

Health Insurance Market

- Health insurance company might charge the same amount of high premium fees on both persons because they have asymmetric information about insurees real health situation.
- It is not good for Alice.
- Alice might choose not to buy any health insurance plans because she is trading-off: between the benefits obtained from the health insurance and the premium fees that she has to pay.
- $\Rightarrow$ Only bad health consumers are purchasing plans in this market. $\Rightarrow$ Adverse selection.

Health Insurance Market

- The story does not end. Cindy has purchased the health insurance, and she might feel that:
- "I do not need to worry about the future health shock, because I bought a health insurance plan. Why not smoke one more cigarettes?"
- Her health becomes worse.
- It is very likely that the insurance company in the future has to cover Cindy's expensive medical expenditures.
- **Moral hazard**: Arises when one party to a contract changes behavior in response to that contract and thus passes on the costs of that behavior change to the other party.

Market Signaling

Market Signaling

- To reduce asymmetric information problem , we could use “signals” to tell the quality of a good.
- **Market signaling**: Actions taken by buyers and sellers to communicate quality in a world of uncertainty.
- Example: College-admission process.
- Colleges have asymmetric information about their students’ “qualities”. To select students, colleges must look for signals to indicate the potential qualities of students.

Market Signaling

- Colleges want students who are likely to be successful: work hard, do well academically, contribute to society by becoming good scientists, dancers, musicians, leaders...
- Colleges develop a set of signals for identifying quality in admissions candidates.
  - Standardized tests
  - Extracurricular activities
- Most high school students recognize that colleges reward extracurricular activities
- This knowledge increases the incentive of all students to engage in such activities.
- Question: How can extracurricular activities be a good signal of productivity if everyone begins to do them?

Market Signaling

- For a signal to reduce the problem of adverse selection, then, it must be less costly for the high-quality persons to obtain.
- Extracurricular activities work as a strong signal when the most committed students are most able to do activities and do well at school.

Uncertainty

Uncertainty, Evolution, and Economic Theory[2]

- "Uncertainty, evolution, and economic theory",
- Written by Armen A. Alchian. (UCLA, 1914-2013)
- A modification of economic analysis to incorporate incomplete information and uncertain foresight is suggested here.
- The suggested approach embodies the principles of biological evolution and natural selection as an adoptive mechanism which chooses among exploratory actions generated by the adaptive pursuit of success.
- Where foresight is uncertain, "profit maximization" is *meaningless* as a guide to specifiable action.
- Environmental adoption

[2] Alchian, Journal of Political Economy , 1950.

Uncertainty, Evolution, and Economic Theory

- "Profit maximization" not a guide to action.
  - Profit maximization
  - Utility maximization
- "But nobody is able really to optimize his situation according to these diagrams and concepts because of uncertainty about the position."
- However, the economist interprets and predicts the decisions of individuals in terms of these diagrams, because it is alleged that individuals use these concepts implicitly.

Uncertainty, Evolution, and Economic Theory

- G. Tintner: He denies that profit maximization makes any sense where there is uncertainty.
- Uncertainty arises from at least two sources:
  - Imperfect foresight
  - Human inability to solve complex problems.

Uncertainty, Evolution, and Economic Theory

- Success is based on results, not motivation.
  - In an economic system the realization of profits is the criterion according to which successful and surviving firms are selected.
  - This criterion is applied primarily by an impersonal market system and may be completely independent of:
    1. The decision processes of individual units
    2. The variety of inconsistent motives and abilities
    3. The individual's awareness of the criterion

Uncertainty, Evolution, and Economic Theory

- Positive profits accrue to those who are better than their actual competitors, even if the participants are ignorant, intelligent, skilful..
- The crucial element is one's aggregate position relative to actual competitors, not some hypothetically perfect competitors.
- As in a race, the award goes to the relatively fastest, even if all the competitors loaf.
- The greater the uncertainties of the world, the greater is the possibility that profits would go to venturesome and lucky rather than to logical, careful, fact-gathering individuals.

Uncertainty, Evolution, and Economic Theory

- Chance or luck is one method of achieving success.
  - Sheer chance is a substantial element in determining the situation selected and also in determining its appropriateness or viability.
  - A second element is the ability to adapt one's self by various methods to an appropriate situation.
  - Example:
    1. Plants grow to the sunny side of buildings not because they "want to" in awareness of the fact that better conditions prevail.
    2. Assume that thousands of travelers set out from Chicago, selecting their roads completely at random. Some travelers might be so fortunate as to have picked the right road wise. The really possible paths have changed with the changing environment. All that is needed is a set of varied, risk-taking travelers.

Uncertainty, Evolution, and Economic Theory

- Neither perfect knowledge of the past nor complete awareness of the current state of the arts gives sufficient foresight to indicate profitable action.
- Now the consequence this is that modes of behavior replace optimum equilibrium conditions as guiding rules of action.
- Individual adapting via imitation and trial and error.
  - Imitation of observed success.
  - Even innovation is accounted for by imitation.
  - Trial and Errors

Uncertainty, Evolution, and Economic Theory

- Trial and Errors
  1. A trail must be classifiable as a success or failure. The position achieved must be comparable with results of other potential actions.
  2. For the convergence via trail and error is the continual rising toward some optimum optimorum without intervening descents.
- However, these convergence conditions do not apply to a changing environment, for there can be no observable comparison of the result of an action with any other.
- Success is discovered by the economic system through a "Blanketing shotgun process"
  - A multitude of agents randomly select strategies, without assuming any intentional decision making at the individual level, and the market selects the best-performing behaviors by excluding the unsuccessful ones.