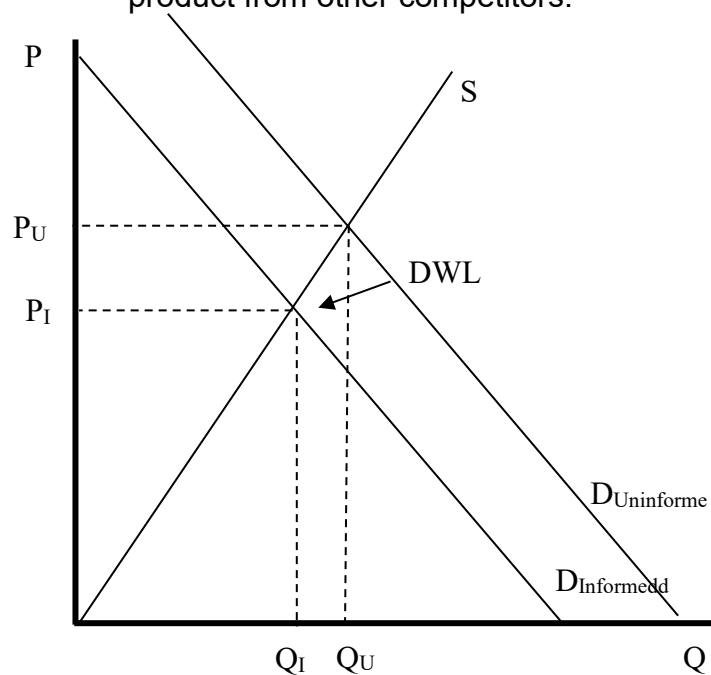


Lecture # 22 –Information Market Failures

I. Information Asymmetry

- The market depends on perfect information, so that everyone knows all of the options available to them. If this is not possible, people may not make optimal choices.
- Imperfect information occurs when different parties have different levels of information.
 - If no one realizes an activity is bad (e.g. Mercury pollution in Onondaga Lake in 1950s), imperfect information is not the problem.
 - It may be that the result is uncertain. Uncertainty is important, but is dealt with in other ways.
 - However, if all sides have the same knowledge, even if uncertainty exists, imperfect information is not a problem.
- Information asymmetry is about the differences in information that different parties have about a good
 - Thus, we aren't thinking about information as the good itself, but rather about what information people have about a good's attributes
- Search goods versus experience goods
 - A search good is a good that consumers can determine the characteristics of before purchase
 - Note that searching costs money
 - Spend more time researching a car than a sandwich
 - Effectiveness of information gathering depends on:
 - Variance in quality of goods
 - If there is more variance, less likely to find a match with your preferences before the cost of searching is too high
 - Frequency with which consumers make purchases
 - If you purchase the good frequently, you will gather information over time
 - Brands are used to reduce search costs
 - Brands establish a reputation
 - Information asymmetry rarely a problem for search goods

- An experience good is a good that consumers can only determine the characteristics of after purchase
 - E.g. you learn about the good by consuming it
 - Used cars
 - Meals
 - Hairstyling
 - Here you pay both the search costs and also the cost of the good.
 - The more heterogeneous the goods, the greater the potential inefficiency from information asymmetry.
 - The more heterogeneous the goods, the less one learns from any given experience
 - Thus, learning occurs more slowly
- Why is information asymmetry a market failure?
 - It is a market failure if the producer does not provide enough information to maximize the difference between the reduction in deadweight loss and the cost of proving this information.
 - If a buyer is uninformed about a good's quality, they may buy too much of the good or too little
 - If the true quality is worse, consumers buy too much of the good and pay too high a price
 - If the true quality is better, they consume too little, and the seller gets too low a price.
 - While the producer would have incentive to provide information to get the higher price, a market failure may occur because the producer is unable to distinguish her product from other competitors.



- The graph above represents a case where the actual quality is worse than the consumer expects.
 - In the graph above, $D_{\text{Uniformed}}$ shows how much the consumer would buy without perfect information.
 - D_{Informed} is how much the consumer would buy if they knew the true quality.
 - Without accurate information, quantity and price are too high
 - In this case, there is a deadweight loss because too much is produced. The value to consumers (if quality known) is less than the cost of production.

- Implication: markets for lemons
 - With information asymmetry, sellers know more than buyers.
 - Consider buying a used car.
 - The quality of the used car may be high or low.
 - Assume that there is 50% chance of each.
 - Your demand will be based on the average of your demand for low quality and high quality.
 - E.g.: Willing to pay \$1,000 for high quality, but just \$500 for low quality.
 - If cannot know quality with certainty, and have 50/50 chance of each, will pay \$750 for a used car.
 - Thus, you offer too low a price for a high quality car and too high a price for a low quality car.
 - But this drives high quality cars out of the market, as the seller cannot get enough for them.
 - Problem can cycle – if buyers know only poor cars in market, only offer \$500. Now the incentive to offer quality used cars for sale is even lower.

- Potential solutions
 - Warranties
 - Provide insurance against low quality
 - But lead to other issues, such as moral hazard
 - Will the buyer do required maintenance on the car?
 - Third party certification services
 - Regulation
 - “Lemon laws” require auto dealers to take back defective new cars, and prohibit re-selling them until they are repaired
 - Note doesn’t help private re-sellers
 - Labeling: e.g. how energy efficient is a home or car
 - Information provision
 - Insurers set premiums on the type of equipment used to reduce risks

- Implication: job markets
 - How do employers tell which job candidates are the best?
 - How do job candidates reveal their quality to employers?
 - Signaling is a solution
 - Earning a degree from a high-quality school is a signal of ability
 - Depends on the signal being credible
 - Question: Does this mean the value of education is mostly private (as a signal) rather than public (by making workers more productive)?
 - Credit score example from *Economist*
 - Several states banned employers from asking for the credit score of job applicants, as poor and minorities are likely to have lower scores
 - But credit history is a credible signal
 - After the ban, employers put more weight on other signals, such as education and experience, that are harder for disadvantaged groups to get.
 - Other examples of signals
 - Firms pay dividends, rather than reinvesting profits, to show they are a strong firm and don't need to hoard cash.
 - Restaurants locate in expensive areas to signal high quality food

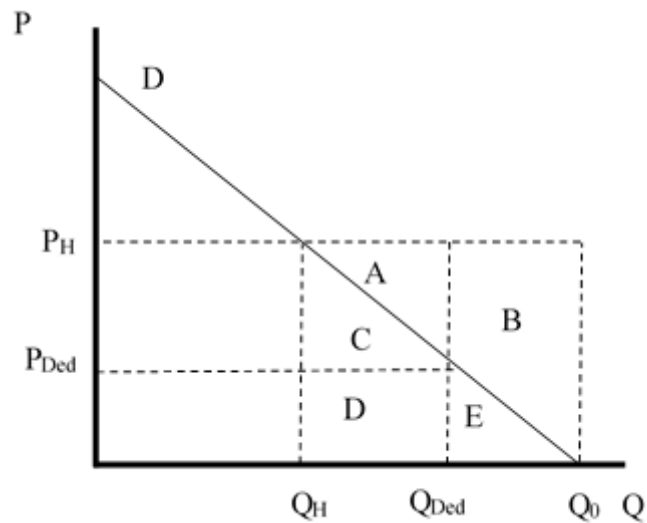
II. Uncertainty and Insurance

- We can extend our basic models to include uncertainty.
 - Here, people maximize expected utility (or expected profits)
- If insurance is available for all contingencies, people can insure so that their actual utility remains constant no matter which outcome occurs
 - Actuarially fair insurance is when the premium equals the expected payout
 - Requires knowing the probability of each outcome
- Expected utility model
 - Utility depends on a person's wealth: $U(w)$
 - There are two possible outcomes: high wealth, w_H , or low wealth, w_L
 - The probability of being in the high wealth state is p .
 - Expected utility is thus:
 - $pU(w_H) + (1-p)U(w_L)$
 - Because of diminishing marginal utility, the lost utility from losing a dollar will be greater than the increase from gaining a dollar.
 - Thus, insurance can make individuals better off by smoothing outcomes across the two states

- Example:
 - Suppose your car is worth \$10,000. There is a 1% probability it will be stolen.
 - Thus, the expected value of the loss from theft is \$100
(=\$10,000 X 0.01)
 - In this example, an insurance premium of \$100 would be “actuarially fair”:
 - $EV(\text{with insurance}) = 100\%(\$10,000 - \$100) = \$9,900$
 - $EV(\text{no insurance}) = 0.99(\$10,000 - \$0) + 0.01 (\$10,000 - \$10,000) = \$9,900$
 - As a result, if you were risk averse, you would prefer to pay \$100 for the insurance policy.
 - Utility theory suggests that people will be risk averse, because of diminishing returns to income.
 - Suppose $u = X^{0.5}$. Now compare the utility in each case.
 - $EV(\text{with insurance}) = 9,900^{0.5} = 99.5$
 - $EV(\text{no insurance}) = 0.99(\$10,000)^{0.5} + 0.01 (0) = 99$
 - Purchasing insurance makes you better off
- Behavioral economics extensions
 - People value gains and losses differently
 - As a result, people deviate from an expected utility framework
 - Instead, they base decisions from a reference point, usually considered the status quo.
 - Known formally as the endowment effect.
 - Place more weight on losses than on gains.
 - Also are risk averse – prefer a smaller certain gain to a larger probable gain when expected values are the same
 - But exhibit loss aversion when facing losses: prefer a larger probable loss to a smaller certain loss.
- However, perfect insurance markets do not exist.
 - Insurers need to earn a profit and need to cover transaction costs
 - Risk averse consumers do make this possible
 - Insurance reduces individual risk through pooling of independent risks borne by members of a group.
 - Can be purchased in private markets (e.g. auto insurance, home insurance), but market failures may make insurance markets incomplete
 - Knowing probabilities difficult for extreme events
 - Easier to observe the probability of an auto accident than the expected damage from an earthquake
 - Insurance rates include a risk premium to account for the lack of perfect information on probabilities

- Risks may not be independent
 - Insurance depends on risk pooling – those not filing a claim help pay for the claims of those that do file
 - If risks aren't independent, some social risk remains
 - Damage from flooding affects all those in path of a storm
 - Large insurers diversify portfolios to mitigate such risk.
- Multiple market failures make knowing the probabilities difficult
 - Adverse selection occurs because insurance is more attractive to people with a high probability of suffering a loss.
 - If the characteristics that affect risk are observable, insurance companies can charge different premiums based on risk.
 - But, what if risks are unobservable?
 - Consider a policy based on average risk.
 - For those with high risk, the price will be lower than needed to get them to buy
 - But, for low-risk people, the price will be too high. They will choose not to buy insurance.
 - If low-risk people don't buy insurance, the insurance company will lose money. They will raise thus raise premiums.
 - This continues until prices are high and only high risk people are willing to buy insurance.
 - Possible solutions
 - Provide policies to a group of people, such as company employees, for which people have other reasons to join the group
 - Mandatory insurance
 - Exclude coverage for pre-existing conditions
 - Note difference between mandate and excluding coverage. One tries to increase access to less healthy people, where the other increases access for healthy people.
 - Screening
 - Insurer can offer two different policies, each of which is attractive to a different group.
 - E.g. offer a low price option with a high deductible. Bad drivers will not want that. Safe drivers will.
 - But, not a perfect resolution, as good drivers are stuck with high deductibles.

- Moral hazard occurs when people take fewer precautions when they are insured.
 - Note that adverse selection is an issue before a transaction occurs. Moral hazard is the result of imperfect information after a transaction occurs.
 - Results in overuse of insurance
 - Three types of moral hazard in medical insurance:
 - Less use of preventive care/more risky behaviors
 - May not buy insurance because expect will get free treatment at ER if get sick.
 - Overconsumption



- On the graph above, D is the demand curve for healthcare
- The full cost of health services, P_H , is paid by the insurer
- If the patient pays no costs for health insurance, consume up to Q_0 .
 - Compared to Q_H , extra cost is ABCDE
 - Extra consumer surplus is CDE
 - AB is wasted money (e.g. DWL)
- If there is a deductible, P_{Ded} , the consumer only consumes Q_{Ded} of insurance
 - Cost savings are BE
 - Compared to before, consumers lose areas DE
 - D is a transfer from consumers to the insurance company, which paid D before
 - A is wasted money (e.g. DWL)

- So, a higher deductible reduces the inefficiency from moral hazard.
 - But, higher deductibles will also discourage the purchase of insurance.
 - Intuitively, if the deductible was 100% (e.g. consumer pays P_H), there would be no point to the insurance.
 - Moral hazard occurs in other settings
 - Banks giving risky mortgages because mortgages are insured
 - People living in flood prone areas
 - How to limit moral hazard?
 - Invest in monitoring systems
 - Use copayments to require beneficiaries to pay a fraction of claimed costs
 - Reduces incentives for unnecessary expenses
- Role of government in insurance markets
 - Because of these market failures, government often intervenes in insurance markets.
 - Examples of government intervention
 - Flood insurance
 - Health care
 - Social Security
 - Note: not pure insurance, but a transfer from one generation to another

- What roles can government play in insurance markets?
 - Mandatory insurance
 - Rationales for mandatory insurance
 - Adverse selection
 - If individuals have better risk about individual risk than insurers, adverse selection will limit the availability of insurance
 - Mandating that everyone buy insurance keeps low risk people in the insurance pool and helps keep premiums lower
 - Negative externalities
 - Uninsured drivers impose costs on others if they get in an accident
 - Paternalism
 - People may not save enough for retirement. Possible reasons include:
 - Myopia, bad luck, poor information, laziness
 - Social Security insures against the possibility that people outlive their savings
 - Note moral hazard at work here as well.
 - Such people would likely end up on government support
 - Regulatory
 - Even in cases where regulation prevents bad behavior (e.g. regulating against release of toxic chemicals), accidents happen.
 - Smaller firms may not have sufficient resources to pay damages for cleanup
 - Requiring firms to carry liability insurance provides a way to ensure compensation to victims is possible.
 - Subsidize insurance
 - Flood insurance is an example where coverage is subsidized by the government
 - Challenges to providing flood insurance in private markets:
 - Flood risk is difficult to monitor – thus information is poor
 - It is difficult to spread risks around
 - Britain does this by mandating that every policy cover floods
 - But government intervenes through reinsurance to keep costs affordable
 - If risks are pooled, there is moral hazard
 - Those in risk prone areas do not pay more
 - Rationale for subsidies:
 - Fairness – can low income families get insurance otherwise?

- Stockpiling
 - Stockpiling resources during normal times to have available during periods of disruption
 - US Strategic Petroleum Reserve is an example

III. Principal-Agent Problem

- Moral hazard relates to the principal-agent problem.
 - How does one actor (the principal) get another (the agent) to behave as he wants?
 - E.g. how do managers get workers to perform as they want, when constant monitoring is not possible?
 - The principal-agent problem also relates to information
 - The problem is that the principal has different information about the agent (e.g. how much effort does an employee give?)
 - Note that principals and agents have different goals
 - The employer wants workers to work hard. Employees have less incentive to work hard.
 - A principal-agent framework provides a way to think about crafting an effective agreement
 - The goal is for the principal to provide sufficient incentives to the agent so that the agent follows through on a commitment.
 - Principal designs an agreement to maximize expected utility subject to:
 - A participation constraint
 - Agent's expected utility higher if he participates than if not
 - Incentive compatibility constraint
 - Agent must choose to comply with the agreement ex post
 - The key is to provide incentives that are consistent with what the principal wants.
 - E.g. profit sharing
 - Reservation wages
 - Paying a worker a wage premium raises the costs of the worker shirking. They have more to lose if they get fired.
 - This suggests, however, that in markets with imperfect information, prices will not equal marginal cost.
- The *Economist* article provides an application related to education funding
 - Even if benefits are private (e.g. high private returns), markets might not work well.
 - We'll discuss possible solutions in class on Monday