McPeak
Lecture 11
PAI 723

Monopsony.

There is only a single buyer in a market, and this single buyer chooses the price quantity pair from the supply curve.

It buys at a price below what the price would be in a competitive market.

Supply curve is of the input, the demand curve is the demand of the monopsonist.

Without getting into the details, it is conceptually similar to the monopoly case, though the focus is on the supply curve / marginal expenditure curve rather than the demand curve / marginal revenue curve.

Know there is a conceptual distinction.

Strategic interactions and Game theory.

Game theory is a tool to understand why outcomes with higher payoffs may not be possible to obtain if each individual acts in his or her own best interest.

The reward associated with an action is not just a function of an individual's decision but also a function of decisions made and actions taken by others.

It is used to understand why a failure to coordinate actions leads us to an outcome that does not maximize welfare of the decision makers, and possibly well-being in our society.

Players in a game formulate best response strategies to actions that are possible by other players.

Where players are playing best response to each other, we call it a Nash equilibrium.

We can describe a Nash equilibrium by the actions taken by players and the resulting payoffs to players.

Chicken game, Footloose style.
Kevin Bacon (KB) is driving the tractor down the road toward Lunkhead Farm Guy (LFG). Both KB and LFG have to make a decision; go straight or swerve. The cell in the table reflects the outcome with the payoff to KB on the right side of the cell and the payoff to LFG on the left side of the cell.

Chicken Game, Footloose Style		KB	
		Straight	Swerve
LFG	Straight	Dead Dead	Cool Chicken
	Swerve	Chicken Cool	Alive Alive

Best response strategies lists out the options.
If LFG swerve, KB straight.
If LFG straight, KB swerve.
If KB swerve, LFG straight.
If KB straight, LFG swerve.

Neither option is dominant as a pure strategy.
If LFG swerve, KB straight is BR to If KB straight, LFG swerve, payoff is [Chicken, Cool]
If LFG straight, KB swerve is BR to If KB swerve, LFG straight, payoff if [Cool, Chicken]

Mixed strategy in such as case, play swerve half the time and straight half the time and hope for the best!

Prisoner's dilemma.
Butch Cassidy and the Sundance Kid have committed some terrible crime. The police know some but not all of their wrongdoing. They have brought them in for questioning. Butch and Sundance know what they did. Butch and Sundance are in separate rooms, facing the choice of whether to confess to all of what they did, plea bargain, and put the blame on the crime on the person in the other room.

Both quiet, lesser charge, they each go to jail for 1 year [-1, -1]
One squeals, gets let off, gives evidence on other so that they face a higher charge. [0, -4] or [-4, 0].
Both squeal, medium charge. [-2, -2]

Prisoner's Dilemma		Butch Cassidy	
		Quiet	Squeal
Sundance Kid	Quiet	-1 -1	-4 0
	Squeal	0 -4	-2 -2

Best response Strategies:
If SK squeals, BC squealing is BR.
If SK is quiet, BC squealing is BR.
If BC squeals, SK squealing is BR.
If BC is quiet, SK squealing is BR.

Nash Equilibrium outcome is that they both squeal and they end up each serving 2 years in jail.

Say it is a question of entering a market with asymmetric payoffs. Ford / GM example.

Market Entry		GM	
		Enter	Don't
Ford	Enter	10, -40	250, 0
	Don't	0, 200	0, 0

Best Response Strategies:
If GM enter, F enter.
If GM plays not enter, F enter.
If F enter, GM don't enter.
If F plays not enter, GM enter.

Nash Equilibrium:
Ford enters, GM does not, Ford gets 250, GM gets nothing.

Say it is the choice of a level of quantity to provide.

UA AA example.

Quantity of Flights		American			
		$Q_{AA}=64$		$Q_{AA}=48$	
United	$Q_{UA}=64$	4.1	4.1	5.1	3.8
	$Q_{UA}=48$	3.8	5.1	4.6	4.6

Best Response Strategies:
If UA chooses 64, AA chooses 64.
If UA chooses 48, AA chooses 64.
If AA chooses 64, UA chooses 64.
If AA chooses 48, UA chooses 64.

Nash Equilibrium Outcome:
$Q_{UA}=64$, $Q_{AA}=64$, each gets 4.1 as a payoff.

If they could coordinate, then they could offer a lower quantity and earn higher profits.

Note collusion on supply and demand graph.

Detection as a preventative means.

- Inspection of each other's books.
- Price matching ex post.
- Tracers in products.

Types of oligopoly solutions:

1) Cournot quantity setting oligopoly. Each firm chooses output level as a best response to the other firms' strategies.
2) Stackelberg quantity setting oligopoly. One firm has first mover status in a quantity setting game.
3) Bertrand price setting oligopoly. Each firm selects price as a best response to the other firms' strategy.

Math appendix to contrast market structure:

$p = 339 - q$
$c = 147 \cdot q, \Rightarrow MC = 147$

If the market is **perfectly competitive**:

Supply equals demand. $q = \sum q_i$, where i is each individual firm.

$339 - q = 147 \Rightarrow q = 192, p = 147.$
$\Pi = 192 \cdot 147 - 192 \cdot 147 = 0$
$CS = 18{,}432 : PS = 0 : TW = 18{,}432$

If we have Cournot oligopoly competition (say 2 firms)

$p = 339 - q_1 - q_2$
$\Pi_1 = (339 - q_1 - q_2) \cdot q_1 - 147 \cdot q_1$
$R=339q_1-q_1^2-q_1q_2$
$MR=339-2q_1-q_2$
$MC=147$
MR=MC implies $339-2q_1-q_2=147$, or $q_1=96-.5*q_2$

If firms are symmetric, $q_1=96-.5*(96-.5* q_1)$, or $q_1=96-.5*(96-.5* q_1)$,
or $q_1=96-48+.25* q_1$, or $.75* q_1=48$, or $q_1=64$.

Both produce this level, so total quantity is 64+64, or 128. This implies price is 211.

Profit for each firm is thus 211*64-147*64, or 13504-9408, or 4,096.

CS can be calculated as 8192, PS is 8192, total welfare is 16,384.

If Stackelberg (give firm 1 first mover status).
$p = 339 - q_1 - q_2$
$\Pi_1 = (339 - q_1 - q_2) \cdot q_1 - 147 \cdot q_1$

Firm one knows firm two is reacting to one's decisions by $q_2=96-.5*q_1$
So plug this in:
$R=339q_1-q_1^2-q_1*(96-.5*q_1)$, $=243q_1-q_1^2-96*q_1+.5* q_1^2=243*q_1-.5* q_1^2$
$MR=243- q_1$
MC=147, so if MR=MC, $q_1=96$. This then implies that $q_2=96-.5*(96)$, or 48.

Profit for firm one is 4,608, profit for firm two is 2304, total of 6912. CS = 10,368.

Total welfare is 17,280.

If a monopoly,
Bisection rule gives us MR=339-2*q, and MC = 147.

Monopoly q = 96, Monopoly p = 243.

Profit is 9216,
CS=4464

Total welfare is 13,680
Note half of 96 is 48.

General rule:

Welfare and quantity are highest in perfectly competitive market, lowest in monopoly.

Oligopoly of different forms lies in between.

	Q	P
Monopoly	96	243
Cournot	128	211
Stackelberg	144	195
Perfect Competition	192	147

Information Asymmetries and coordination problems in markets

Recall that one condition for a perfectly competitive market is symmetric information.

What if this does not hold?

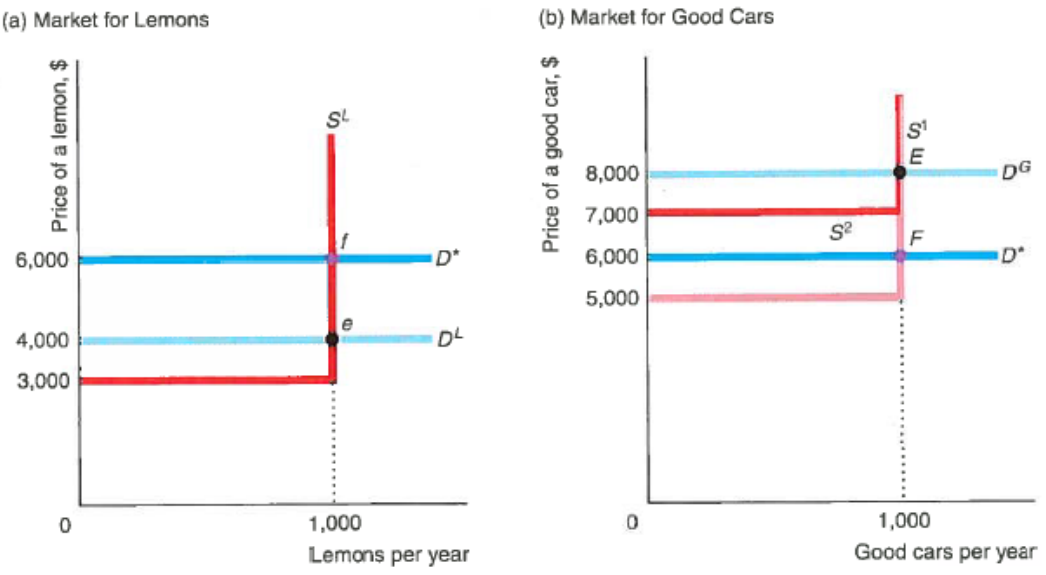
Quality uncertainty.

Informed demand versus uninformed demand. The case for a consumer protection agency:

The ‘lemons market’ problem. Chapter 19, figure 19.1.

Figure 19.1 Markets for Lemons and Good Cars MyEconLab Video

If everyone has full information, the equilibrium in the lemons market is e (1,000 cars sold for $4,000 each), and the equilibrium in the good-car market is E (1,000 cars sold for $8,000 each). If buyers can't tell quality before buying but assume that equal numbers of the two types of cars are for sale, their demand in both markets is D^*, which is horizontal at $6,000. If the good-car owners' reservation price is $5,000, the supply curve for good cars is S^1, and 1,000 good cars (point F) and 1,000 lemons (point f) sell for $6,000 each. If their reservation price is $7,000, the supply curve is S^2. No good cars sell; 1,000 lemons sell for $4,000 each (point e).



First, contrast full symmetric knowledge. If we have a demand curve for lemons (defective cars) and a demand curve for good cars, and we can use information to separate the two markets:

1,000 cars sold for $4,000 each for lemons,
1,000 cars sold for $8,000 each for good cars.

If we know that half are good and half are lemons, and we can’t tell the difference, the demand curve is D* at $6,000 per car.

If suppliers of good cars want at least $7,000 per good car, none will be offered for sale at $6,000

People figure this out, and the equilibrium is no good cars are sold, only lemons are sold, 1,000 lemons are sold at $4,000 each.

A related concept is that of an experience good. We only know the true value after we have paid the price, so our willingness to pay may be higher or lower when we have actually discovered what this thing is really like.

TV adds / online purchases – must act now. Snuggie on TV. Upside down tomato plants. Cat nail trimmer….

Variations on the theme of information asymmetries:

Adverse selection – hidden information by one side of the transaction influences their desire to enter into an economic agreement.

Insurance markets are one place to consider.

People most likely to benefit from insurance are more likely to purchase insurance, those less likely to buy are less likely to benefit.

Premiums will be incorrectly set if based on the likelihood in the overall population.

Pre-existing conditions.

Mandate all buy insurance.

Moral hazard – the provision of the product makes more likely the use of the product.

When one party is insured by another party, the presence of insurance and the difficulty of monitoring behavior may lead the insured party to undertake actions that increases the likelihood they will use insurance.

Moral hazard occurs when the party to be insured can affect the probability or magnitude of the event that triggers payment.

FDIC and the savings and loans crisis.

Bailout of banks. 'too big to fail'

Fried Green Tomatoes

[Evelyn is cut off in a parking lot]

Evelyn Couch: Hey! I was waiting for that spot!

Girl #1: Face it, lady, we're younger and faster!

[Evelyn rear-ends the other car six times]

Girl #1: What are you doing?

Girl #2: Are you crazy?

Evelyn Couch: Face it, girls, I'm older and I have more insurance.

Principal-agent problems. An agency relationship exists whenever there is an arrangement in which one party's welfare depends on what another person does.

The agent acts.

The principal is the party whom the action affects.

The problem is that the interests of the principal and those of the agent may not be the same.

The agent is the CEO, the principal is the stockholder.

The agent is the Senator, the principal is the citizen.

The agent is the person you paid to shovel, the principal is the homeowner.

The agent is the farmworker, the principal is the landowner.

The agent is the hired herder, the principal is the livestock owner.

Labor markets are another place we find information asymmetry to be an issue

Signaling on part of supplier of labor

Optimal contract design on part of demand for labor

Outcome is Score on a McPeak Exam in PAI 723:

	Bad Test Day	Good Test Day
Low Effort Study	10	15
High Effort Study	15	20

Can get into the details of how to solve this by contract design, but for the moment the nature of the problem is what we are after, and know that there are tools for designing contracts that deal with these problems.

A related issue is **the commitment problem**.

What is the commitment problem?

The firm promises to invest if people get education, they do, and the firm does not live up to its promise.

Why did Odysseus get tied to the mast and fill his sailors' ears with wax when he wanted to hear the song of the sirens?

What you commit to *ex ante* has to be credible *ex post*. Coordination problems when actions are based on an announced strategy that may not be the strategy implemented.

Temporal aspect makes coordination an issue.

Merchant guild case:

Greif et al contrasts a cartel explanation (the guild formed to create cartel returns for members) with a commitment explanation (the institution was needed to allow trade to happen at all).

The two players are:
Rulers (location specific and provide security to out of town traders).
Traders (come from out of town and allow trade which has benefits for both the traders and the rulers).

- A ruler of a city state can offer security to a visiting merchant. The ruler can protect the merchant from being robbed by the citizens of the city state at a cost of 1.
- The merchant has goods that cost him 1 to obtain elsewhere and transport to the city state if he decides to come. If they are sold in the city state, they earn revenue of 6, thus generating a profit of 5.
- The deal is that if the merchant comes with goods that generate a profit of 5 the ruler gets 2, the merchant keeps 3. The ruler thus nets 1 after paying the security cost [1 3 cell in the table]
- If the merchant does not come, no security costs are incurred; no goods are bought elsewhere to be sold in the city state, the ruler and the merchant get zero. [0 0 cell in the table]
- If the merchant comes and the ruler does not provide security, the ruler and his mob of citizens rob the stuff and sell it for profit of 6. The ruler keeps half (3), the mob keeps half (3). The merchant suffers a loss of -1. [3 -1 cell in the table]
- If the ruler pays for protection but the merchant does not come, the ruler pays the cost of protection, but gets no benefits, so suffers a loss of -1. [-1 0 cell in the table]

This can be summarized in the following table.

		Merchant			
		Come		Don't Come	
Ruler	Protect	1	3	-1	0
	Don't protect	3	-1	0	0

If the security of the trader is violated (the ruler allows all his stuff to be stolen and lets his people get away with it), what can the traders do?

Bilateral reputation – the trader who is attacked does not come back.

Multilateral reputation – the trader and his group does not come back.

Administrative bodies – no traders at all come back and any that do are detected and punished for doing so. An enforceable embargo.