Lecture 1
PAI 723
McPeak

Microeconomics:

The study of the allocation of scarce resources amongst competing alternatives.

The study of how best to use limited means in the pursuit of unlimited ends.

The ideas of **optimization** and **constraints** are critical here – the idea is constrained optimization.

Optimizing – we do the best we can.
Constraints - given the limits we face.

The study of trade-offs, and the factors that influence these trade - offs.

Perloff notes three categories of tradeoffs:

1) What goods and services are produced with the given resources that we have?
2) What particular mix of resources will be used to produce these different goods and services?
3) What will be the distribution of the goods and services we produce?

Decision makers are assumed to make rational decisions that are most effective in helping them meet their own objectives, whatever they may be.

Models and assumptions are critical to economic analysis.

Models are designed to illustrate and understand relationships between different economic variables.

They are based on simplifying assumptions.

The main goal of model building is to predict how changes in one variable will impact another variable of interest.

Key is to model relevant features, not every detail.

Although these models may simplify in ways that eliminate some realistic aspects, the goal is to focus on only the aspects of the problem that are relevant.

Do the predictions change significantly if specific underlying assumptions are relaxed?

Theories lead to predictions that can be tested.

We do this by looking at actual data

Our first model – the perfectly competitive market

So let us begin by considering the economic model of a perfectly competitive market. This is a model of how goods are exchanged between people that have them (suppliers / sellers) and people that want them (demanders / buyers).

What assumptions underlie a perfectly competitive market?

1) Both buyers and sellers are price takers. No individual buyer or seller has enough market power to determine the going market price. Large number of buyers and sellers.
2) The good in the market is perfectly homogeneous. Different suppliers are providing a good that is identical from the point of view of the consumers.
3) Both buyers and sellers have full and symmetric information about the quality and price of the good in the market.
4) There are no costs to completing an exchange that are relevant besides the market price. Such costs, if they exist, can be called transaction costs. These can be defined as costs of obtaining and processing information related to the exchange (see point three), costs of negotiation, monitoring agreed upon behavior, or enforcing contracts.

In addition, you might wonder:

Are there spatial aspects to markets?

We assume they are not relevant in our basic model, but there may be things to think about here in reality. Think real estate.

Are there temporal aspects to markets?

We assume they are not relevant to our basic model, but again, worth thinking about. Is the market appeal of a SUV at low gas prices the same as at higher gas prices?

Is the market a self-contained, universally defined entity or is it embedded in institutions (cultural practices, law, "ways of doing things"…)?

We assume the model can proceed without explicit reference to these. But, particularly with regard to point four in the definition, can markets exist without supporting institutions?

You can probably think of other aspects that have implicit assumptions.

Note: this is a set of assumptions, and these assumptions can be relaxed. But it is better to start simple (with lots of assumptions) and then see what happens when these assumptions are violated.

We can begin by considering half of the market we just described: the buyers. This we call the demand side.

The key element of a model of the demand side is a demand curve.

It helps if you think of it as a demand schedule that tells you what will happen under a variety of different circumstances.

It tells you the quantity that will be demanded for a given price level and traces out this information for a range of plausible price levels.

Example:

Say the price of NYS red wine is 9.00 per bottle.
How many bottles per day will be sold in Syracuse? Let's say 1000.

What about if it goes to 10.00 per bottle? Let's say it goes to 950 since a few people buy California red instead of NYS red – note CA red is a substitute for NY red.

Assume that over a period of time, we have observed the following relationship, and we are reasonably confident that all else has remained constant during this period of time (!!!?).

Consider the following table:

Price Per Bottle	Bottles per day demanded
$ 9.00	1000
$10.00	950
$11.00	900
$12.00	850
$13.00	800

What does the graph look like?

Draw graph.

What is on the x-axis?
What is on the y-axis?
What explains the slope?

[note, use this to review and explain what is meant by slope (rise over run), x-axis and y-axis, and also stress importance of labeling]

In the example above, it was noted that the analysis went forward "all else held constant", other than the relationship between price of the good and quantity demanded of the good.

What varied was the price and the corresponding level of demand as measured in quantity. If price changed, we moved **along** a demand curve.

A given demand curve is a relevant statement about the relationship between price of the good and the quantity demanded holding a variety of factors constant.

Changes in these other kinds of factors lead to a **shift** in the demand curve, so that the original curve is no longer applicable.

What are these "all else constant" factors?

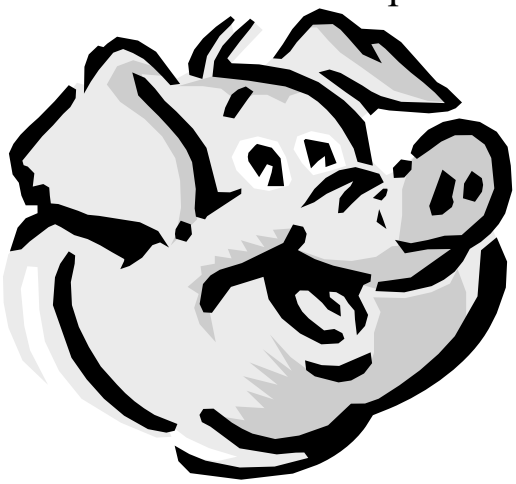
Some examples of things that lead to a shift in the demand curve:

Take the example of red wine produced in the Finger Lakes-
[Note: in this example, increase demand means at a given price, a greater quantity is demanded, decrease demand means at a given price a smaller quantity is demanded]

1) Change in consumers' tastes.
    a. Increase demand: Consumers demand more domestic red wine since we are mad at the French.
    b. Decrease demand: Consumers have decided drinking NYS red wine is "so last year" and moved on to the new trend of drinking NYS honey beer.
2) Change in information.
    a. Increase demand: A study was just released finding one glass of red wine per day is good for coronary health.
    b. Decrease demand: A study was just released finding NYS red wine makes your teeth turn green.
3) Change in the prices of other goods that are logically related to the demand for the good in question
    a. Substitutes. A good that can replace the good in question.
    Increase demand: A bad year for the Finger Lakes Chardonnay production increases the price of white wines from the area, thus leading those NYS wine diehards to switch to reds.
    Decrease demand: California red production is abnormally high given weather patterns, decreasing the price of California red.
    b. Complements. A good that enhances your enjoyment of the good in question.
    Increase demand: A bumper wheat harvest makes crackers less expensive.
    Decrease demand: Cheese price goes through the roof as cows go on strike.

4) Income.
    a. Increase demand: Rapid economic growth due to Destiny USA expansion leads to massive income increases and people buy more red wine.
    b. Decrease demand: The slowing down of the national economy leads consumers to move from NYS red wine to Milwaukee's Best beer.
5) Government rules and regulations.
    a. Increase demand: The state government reduces the drinking age to 18, so college students from around the Finger Lakes go on wine tasting tours and develop a taste for NY wines and buy them regularly.
    b. Decrease demand: The state government cracks down on underage drinking on Finger Lakes wine tours.

Take a numerical example: Perloff's Pigs from the book.[1] We are going to stick with this example for a while, so let us go into it in some depth.



Quantity demanded of processed pork.

Quantity demanded, Q, is a function, D(.), of the price of pork, p_p, the price of substitutes like the price of beef, p_b, and the price of chicken, p_c, and the income of consumers, Y.

$$Q_d = D(p_p, p_b, p_c, Y)$$

[Note: describe what is meant by a function, and how to interpret this equation]

Using statistical techniques, some economists came up with a linear approximation of this function.

Q =171-20*p_p + 20· p_b + 3* p_c + 2·Y

If we just want to focus attention on the relationship between the price of pork and the quantity demanded of pork, we hold other prices and income constant.

[1] In the 6th edition, he changed the example to avocados. In the 8th edition the example is coffee. A link on the course web page takes you to a file that illustrates the solutions for those examples.

P_b=4, P_c=3.333, Y=12.5 (again, all this is from the book)

$$Q = 171 - 20 * p_p + 20 * 4 + 3 * 3.333 + 2 * 12.5$$

$Q=171-20*p_p+80+10+25$

$Q = 286 – 20*p_p$.

Make a table of this:

Price in $ / kg	Quantity in millions of kg / year
5	286-20*5 = 186
4	286-20*4 = 206
3	286-20*3 = 226
2	286-20*2 = 246
1	286-20*1 = 266

This is the same kind of demand schedule as we were looking at in the previous discussion of red wine in NYS.

Draw this on a graph.

What is on the y-axis? The x-axis? What is the slope of this line?

What happens if the price of beef goes from 4 to 5?

Think about it first – if the price of beef goes up, should more or less pork be demanded at a given price?

More – a shift out in the demand curve. At a given price, more pork will be demanded. At a given quantity, the price per unit will be higher.

Check the intuitive answer by working through the math: From the book:

$Q = 171 - 20 * p_p + 20 \cdot p_b + 3 * p_c + 2 \cdot Y$

Let p be the price of pork after substituting other values and drop subscript p after substituting.

Original scenario:
Q=171-20*p+(20*4)+(3*3.33)+(2*12.5)
Q=286-20*p Compared to:
Q=171-20*p+(20*5)+(3*3.33)+(2*12.5)
Q=306-20*p

If the price of beef goes from 4 to five, and chicken price and income is constant,

Price	Quantity
5	306-20*5 = 206
4	306-20*4 = 226
3	306-20*3 = 246
2	306-20*2 = 266
1	306-20*1 = 286

Draw graph. Show shift.

Note the distinction between a **shift** in the demand curve and **movement along** a demand curve. This is critical for your understanding of supply and demand, so make sure you have it clear.

A movement along a demand curve means all else is being held constant and we are moving from one point to another on a given demand schedule like in the charts we used before. Another way to think about it is that there is a shift in the supply curve, leading to movement along the demand curve. Whatever changed shifted supply, not demand.

A shift in a demand curve means something in the all else held constant has changed, so the entire schedule has shifted and we now have a new schedule.

Note: some types of change can lead to a shift in both supply and demand (think about the price of gas for example). We will not worry about that in this course, and only focus on one shift at a time.
Supply.

Supply curve: traces out the amount of the good firms are willing to sell at a variety of different price levels. Geometric representation of an underlying supply schedule that describes the quantity supplied at a variety of given prices per unit all else held constant.

Again, the focus is on the relationship between the selling price of the commodity and the amount sold of the commodity all else held equal.

A supply curve tends to slope upward. Why?
[as we will go into detail later, as price goes up, more firms can enter the market or existing firms can produce more since they bid away resources from other alternative uses]. Corn fields turned into vineyards. Cattle farms turned into pig farms.

Draw a basic supply curve.

Again, we have an underlying relationship between price and quantity, all else held equal.

What else might matter that we are holding equal in that "all else equal"?

Let us continue to think of pork, since we are on a roll, and call decreased supply less quantity at a given price (supply shift up or in)

and increased supply more quantity at a given price (supply shift down or out).

1) Cost of inputs used in production.
    a. Decreased supply: pig disease wipes out hog supplies, raising the price of hogs used to make pork.
    b. Increased supply: gas prices go down, making it less costly to ship pigs to the pork factory.
2) Technology of production.
    a. Technology is usually an increased supply story: Cornell researchers develop a new pork processing machine that reduces processing waste by 4% for the same amount of input.

3) Government rules and regulations influencing production.
    a. Decreased supply: Government regulations on sanitary standards in processed pork plants become stricter and more costly to meet.
    b. Increased supply: Government regulations on overtime pay change, reducing total labor costs without reducing labor input.

Consider the example of the supply of processed pork presented in the book.

$$Q_s = S(p_p, p_h)$$

Where Q_s is the quantity supplied of processed pork, S (.) is the supply function, p_p is the price of processed pork, and p_h is the price of hogs.

[Note the example does not follow exactly the three influences described above – it is assumed there is no variation in technology or regulations and the only relevant cost of production is the cost of hogs]

Through the magic of empirical methods (which you are learning in other classes and is not what we are worried about here), the following approximation of the supply function was estimated.

$Q_s=178+40*p_p-60*p_h$

What does this tell you:

The price of processed pork goes up, the quantity supplied of processed pork goes up.

The price of the input used to make pork goes up, the quantity supplied processed pork goes down.

> *There is something to the idea that economics is formalizing the obvious. You are learning the language of economics, but this should be pretty intuitive.*
> Like we did before, we can simplify by using the sample average price of hogs of $1.50.

This gives us the simple relationship:

$Q^s=88+40*p$

Price	Quantity
5	88+40*5=288
4	88+40*4=248
3	88+40*3=208
2	88+40*2=168
1	88+40*1=128

We can draw this.

[graph]

Now, return to the idea that we had the all else held equal condition applied to the price of the input of hogs. What if it goes up?

Let us say it goes from $1.50 to $2.00.

$Q_s=178+40*p_p-60*p_h$

We go from $Q^s=88+40*p$ to $Q^s=58+40*p$

Price	Quantity
5	58+40*5=258
4	58+40*4=218
3	58+40*3=178
2	58+40*2=138
1	58+40*1= 98

Shift is up / left. Less is supplied at a given price.

[graph]
Note on supply and demand graphs:

The first people in economics to draw these drew it backwards from the way math works and from the way we have been talking about it.

Usually in math, the x axis is the variable, and the y axis describes a function of this variable, as in y=f(x). Here, we talk about quantity as a function of price (q = f(p)) , but price is on the y axis and quantity is on the x axis. Economists are a funny bunch.

However, recall that these curves describe the relationship between quantity and price.

We can think about a change in quantity leading to a change in price or a change in price leading to a change in quantity – either direction of causality could apply.

We could redefine $Q^s=88+40*p$ and $Q^s=58+40*p$ by rearranging terms:

$Q^s=88+40*p$, so divide through by 40,
$(1/40)Q^s=(88/40)+(40/40)p$,
so $(1/40)Q^s=2.2+p$,
so p(when price of hogs = 1.50)= $(1/40)Q^s-2.2$

$Q^s=58+40*p$
[repeat same steps if needed] Leads to:
p(when price of hogs = 2.00) = $(1/40)Q^s-1.45$

p=0 intercept for 1.50 graph is 88, p=0 intercept for the 2 graph is 58.

Of course, p is not ever zero, so we should think of this as the logical extension of the line, but not a prediction. Sometimes called the "tyranny of the straight line", or less dramatically, being off the support of the data.

Sometimes this helps make sense of the math relating to the graph.