Econ 110: Introduction to Economic Theory

15th Class **2/23/11**

do practice problem answers
no new practice problems until after break when we start building a model of the whole economy

the monopoly model is just one case of what we would call models of imperfect competition

there are a number of other such models, which can be thought of in part by how many agents are on each side of the market

so perfect competition is generally the case of many buyers facing many sellers
monopoly is the case of one seller facing many buyers
we will see the other extreme case on Monday in the context of the labor market (though it can occur in goods markets as well): monopsony—the case of one buyer facing many sellers
the final extreme case is bilateral monopoly—one buyer facing one seller; we'll consider this in a couple of ways as well

but what about intermediate cases, where there are a few agents on one or the other side?
We could refer to two such cases as oligopoly—a few sellers (facing still many buyers) and oligopsony—a few buyers (facing still many sellers)
(the few sellers vs. few buyers case has not really been developed formally other than by extension on these other models)

we can find real-world examples of all of these cases

look at a few on the wikipedia websites:
http://en.wikipedia.org/wiki/Perfect_competition
http://en.wikipedia.org/wiki/Monopoly
http://en.wikipedia.org/wiki/Monopsony
http://en.wikipedia.org/wiki/Bilateral_monopoly
http://en.wikipedia.org/wiki/Oligopoly
http://en.wikipedia.org/wiki/Oligopsony

another way to model the intermediate case which still allows for a fairly large number of sellers (and many buyers) is monopolistic competition; its name implies that it has elements of both the competitive model and the monopoly model

http://en.wikipedia.org/wiki/Monopolistic_competition

Let's look at this model first and then we'll talk about oligopoly models and how those differ from the monopolistic competition case

in monopolistic competition models, assume:
-free entry and exit for firms (so like perfect competition)
-downward sloping demand curves (so like monopoly)
how can these two things happen? Firms are viewed by consumers as selling slightly different products even though they are in the same market. Easy to come up with examples of this; indeed it describes much of the forms of markets individuals see the most, i.e. retailing
they can also be selling a homogeneous product but at different locations, and thus total cost to the consumer of consuming the product, which includes transportation costs for the consumer of getting to the firm, varies. This model thus provides the basis for much of the subfield of urban economics

the model is solved just as in any other case, namely firms try to maximize profit, which involves setting MR = MC
just as in monopoly, MR < P because the demand curve is downward sloping , so P > MC

But note what happens if the firm is making positive profits due to the free entry and exit condition: other firms enter. Thus demand is chopped up more finely (even as it increases somewhat as the competition drives the price down somewhat)—each existing firm finds there is less demand for its product, and that the demand curve has gotten more elastic (as more close subsitutes exist). Thus its demand curve shifts down and gets flatter.

[draw the short-run and long-run equilibrium situations from the point of view of the individual firm][diagrams look like those on the related wikipedia page]

This process ends when all firms are making zero profits, which means that the AC curve must be touching the demand curve for the firm at the quantity where MR = MC. Thus the free entry competes away profits

Note this can be viewed as "inefficient" because all firms are operating below capacity, i.e., they are still on the downward sloping part of their AC curves. All firms would like to sell more output, but if they lower their price to try to do so they won't be able to cover their costs!

In the heterogeneous product version of this model, you can think of this as the surplus consumers give up because they want variety

In the location version of this model the inefficiency interpretation goes away completely; there is a tradeoff between minimizing total costs (including the transactions costs of going to the firm, i.e. the transportation costs) and minimizing production costs. It is more important to minimize total costs from a societal point of view. So we don't generally have only one store in the middle of the country from which to buy all of our groceries, even though that would be very cost effective from a production costs point of view.

Now let's consider the other approach to dealing with the intermediate case of a few sellers (and many buyers): oligopoly models

In these models, it is still assumed that the fundamental goal of the firm is to maximize profit, just as in all the other models of the firm that we have seen so far
The difference in the oligopoly models is that the firms act strategically with regards to their interactions with other firms.

This means that they may also consider specifically the alternatives of colluding with other firms (ie., becoming a cartel) as well as acting independently

Not surprisingly, once we go into a model where strategy becomes important, the tools of game theory (which is a branch of applied mathematics) become useful to the field of economics

Thus most economists are now quite able to utilize game theory concepts as part of their set of mathematical tools

The notions of optimization and equilbrium carry through right into game theory. Agents (whether consumers or firms) are still assumed to behave in ways that assist them in the goal of maximizing their target, whether it is utility or profits. And the interactions of agents lead, potentially to equilibria.

One simple notion of equilibrium is the idea of Nash equilibrium, named after its famous inventor. Nash equilibrium is the situation in which no one playing the game wants to change

their behavior (i.e., pick a new strategy) once they find out what everyone else is doing. Thus the outcome persists.

You can see this is analogous to equilibrium as we have defined it for markets. In a market, no one changes their behavior (i.e., exits or enters) once they see what the posted price is. But we can also have a Nash equilibrium even in a two-person game, so it doesn't require multiple players on each side of the market to reach equilibirum through price-taking the way our perfect competition market model did. It also allows us to define equilibria in terms of optimal strategies rather than optimal outcomes.

Think of games that do or do not have Nash equilibria. A given round of Rock-paper-scissors does not have an equilbrium. As soon as you see the outcome, one or the other of you wants to change your choice. But it can be shown that your best strategy in this game is to randomize your choices (playing each one-third of the time) and that is an equilibrium strategy for both players.

On the other hand, two firms can arrive at a Nash equilibrium (which will in general be at a higher price than in a perfectly competitive situation, but lower than in a monopoly situation) in terms of what amount of output each decides to make, and what that implies about the price in the market and the profit that each firm makes. And we can again compare this predicted outcome against the actual outcome in oligopolistic markets to see if firms behave in keeping with this model.

In oligopoly models one has to specify what one thinks each firm thinks the other will do if it lowers price (or alternatively increases output) as part of the model. This modeling of expectations is a key element of many economic models.

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Economics 110-01
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Answers to Practice Problems from 2/21/11

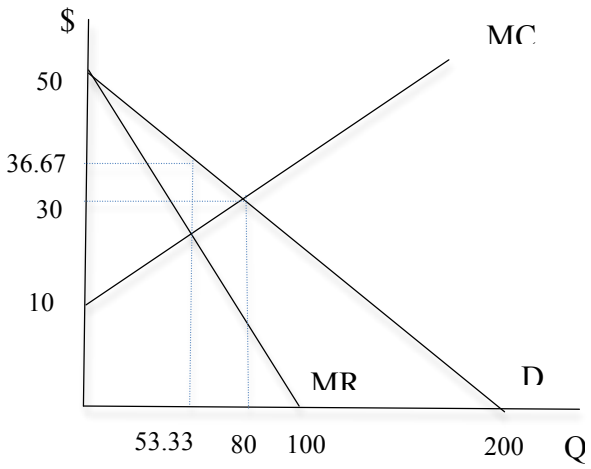
I. 1) $P = 50 - \frac{1}{4}Q$; $MR = 50 - \frac{1}{2}Q$

2) $MC = \frac{1}{4}Q + 10$

3) set MR = MC and solve for Q: $50 - \frac{1}{2}Q = \frac{1}{4}Q + 10$; $Q^M = 53.33$, $P^M = 36.67$

II. 1) P* = 30, Q* = 80

2)



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