Notes on: Monopolies and Welfare, Natural Monopolies and Regulation, and Price Discrimination

Below are notes concerning monopoly markets. Section I deals with welfare (CS, PS, TS) in a monopoly market. Section II deals with regulating monopolies – specifically shows diagrams dealing with regulating natural monopolies. Section III deals with price discrimination.

I. Monopolies and Welfare

In general it seems that a firm with monopoly power is not good. One reason I think many people believe this is because the government works to prevent monopolies (the Microsoft case about 10 years ago).

For an economist to address the question of whether or not a monopoly is “good” or “bad” he or she needs a specific notion of what “good” or “bad” is. Specifically for this course we will use the idea of total surplus and the efficient outcome.

In Chapter 7 we discussed the ideas of consumer surplus, producer surplus and total surplus. We also discussed the idea of an “efficient outcome” (a price and quantity that maximized total surplus). If an outcome was not efficient then there was a “deadweight loss,” which was the amount of surplus lost as a result of this inefficient outcome. We made the claim (and then justified it) that the equilibrium outcome is the efficient outcome.

We now want to apply these ideas of efficiency and deadweight loss to a monopolistic market.

It seems we would be interested in the demand and supply curve of a monopolistic firm. However, a monopolist does NOT have a supply curve. This is a very important point:

NOTE: A monopolist does not have a supply curve. A monopolist sets price they do not take a price. See page 321 in the text book for more detail.

Again, the reasoning is that a monopolist is a price-setter (since it is the only producer in the market) and thus does not take a price as given and then produce a certain quantity. It makes these two decisions (quantity produced and price to charge) simultaneously.

For welfare analysis treat the monopolist’s Marginal Cost (MC) curve as its supply curve. So for welfare analysis of a monopolist we will be looking at the demand curve and the marginal cost curve.
Let’s look at the market diagram for a monopoly. The efficient outcome would be a quantity and price such that Demand meets Marginal Cost (since the equilibrium outcome is the efficient outcome).

Given the efficient outcome the Consumer’s Surplus is the area below the D curve and above \( P_{\text{eff}} \) (blue area). The Producer’s Surplus is the area above the MC curve and below \( P_{\text{eff}} \) (red area). Again, since this is the efficient outcome, this is the maximized total surplus.

We know that the monopolist would not choose to produce this quantity or set this price. The monopolist would choose the profit-maximizing quantity. In order to determine \( Q_{\pi_{\text{max}}} \) we need MC and Marginal Revenue (MR) curves. We know that for a monopolist with a linear Demand curve its MR curve has the same y-intercept and is twice as steep. Given this quantity, the firm takes the price on the Demand curve at this quantity and charges this price for the good.

The area below the demand curve and above the monopoly price, \( P_{\text{monop}} \), and up to \( Q_{\pi_{\text{max}}} \) is the Consumer’s Surplus (blue area). The area below the monopoly price and above the MC curve up to \( Q_{\pi_{\text{max}}} \) is the Producer’s Surplus (red area). If we compare the total surplus generated by the monopolist to the total surplus generated by the efficient outcome, we can see the monopolist generates a smaller surplus. Specifically, the triangular area between \( Q_{\pi_{\text{max}}} \) and \( Q_{\text{eff}} \) and below Demand and above MC is the deadweight loss (green area) (the surplus that is lost due to the monopoly).
II. Natural Monopolies and Regulation

We have seen that a monopolist will not choose to produce the efficient quantity. Thus, the government may choose to intervene and regulate the industry. There are two specific types of regulation I will discuss.

First I will consider **Marginal Cost Pricing** regulation.

- For Marginal Cost pricing, the government sets a price for the good such that Demand crosses the Marginal Cost Curve.

Consider a natural monopolist. Remember, a natural monopoly is a firm that has economies of scale in the long-run. This means that the long-run ATC curve is always decreasing (by definition of economies of scale). Remember, that MC crosses ATC at the minimum of ATC. Since ATC is always decreasing (it does not have a minimum) it must be that MC is always below ATC.
With a price set such that \( MC = D \), the firm would automatically be earning a loss (since \( MC \) is always below \( ATC \), the price earned per unit sold would be less than the cost per unit). However, quantity is set such that \( MC = D \), so the outcome is efficient (see page 328 for more details).

Second, consider **ATC Pricing** regulation.

- For Average Total Cost pricing, the government sets a price for the good such that Demand crosses the Average Total Cost Curve.

With price set equal to \( ATC \), the total revenue for the firm will be equal to total cost. Now quantity and price are set such that \( MC \) does NOT equal Demand. What does this imply about efficiency?

Usually this type of regulation is done with natural monopoly, but think about what it would be like if a monopolist had a U-shaped \( ATC \).

### III. Price Discrimination

So far (above) we have been dealing with a “single-price” monopolist – when a firm must charge the same price to all consumers.

However, in real life we can think of certain goods/markets in which different consumers are charged different prices. For example, at a movie theater older people, students, young children get special prices compared to the average movie-goer. Similarly, different groups of people pay different prices for a bus ride. At a car dealership, different people pay different prices (depending on their bargaining ability).

We have a term for this in economics:

**Def:** Price discrimination is when a firm charges different prices to different people.
**Def:** *Perfect price discrimination* is when a firm charges every consumer the exact price that the consumer is willing and able to pay. (This price comes from the demand curve).

*Example: Car sales*

There are different degrees of price discrimination, between single-price monopolist and perfect price discrimination. There are price discriminators that separate people into groups (movies, bus rides).

Not any firm can price discriminate. There are three necessary conditions that a firm must satisfy in order to be a price discriminator.

1. Firm must be price setter (not-price taker).  
   (Does not necessarily need to be a monopolist)

2. Firm must be able to separate customers based on willingness and ability to pay. Different groups have different price elasticity of demand.  
   Ex: business travelers (inelastic)  
   Families (elastic)

3. Firm must be able to prevent resale.  
   (Otherwise someone from special group could purchase at lower price and sell to others at discounted price.)  
   Ex: plane tickets, bus passes . . .

We want to consider the quantity and price decision of a monopolist that price discriminates. Specifically, we will consider a *perfect* price discriminator. First we want to determine what quantity a perfect price discriminator would produce. We need a marginal revenue curve for a perfect price discriminator. What will it be?

For a perfect price discriminator, marginal revenue curve is equal to the demand curve (MR = D). Since the perfect price discriminator can charge each consumer a different price, the marginal revenue will be the price of the additional unit sold

To calculate profits (specifically to calculate total revenue), remember everyone is paying a different price.
Profits will be the area to the left of the maximizing quantity and above the Average Total Cost at the profit-maximizing quantity and below the demand curve.

What about deadweight loss? Note that the quantity produced is the quantity such that Demand is equal to Marginal Cost. Total surplus is maximized, but producers get the entire surplus (they extract the entire Consumer’s surplus by charging all consumers exactly what they are willing and able to pay). (NOTE: diagram on page 334 in the text assumes that ATC=MC, do NOT make this assumption, draw a U-shaped ATC curve and an upward sloping MC curve).