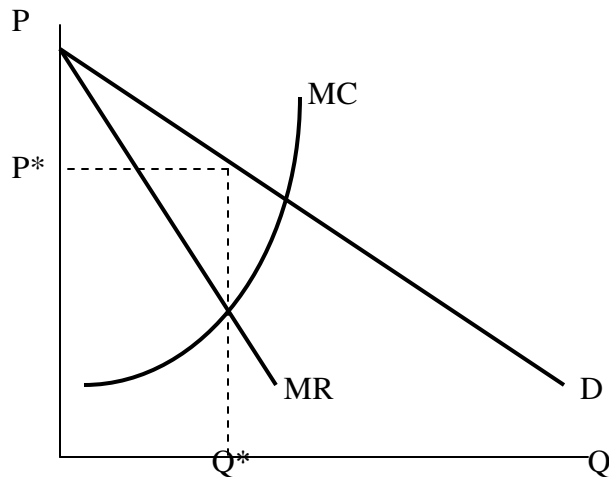


Chapter 11: Pricing with Market Power

In the previous chapter, we assumed that a monopolist (or any firm with market power) simply set one price that it charged to all its customers. In practice, that need not be the case. In this chapter, we will investigate ways that a firm with market power can further increase its profits by setting its prices in a more “clever” manner than merely equating marginal revenue and marginal cost.

The Goal of Price Discrimination

This chapter studies the issue of price discrimination, in which a firm charges different prices to different consumers for the same good. The basic issue behind price discrimination is that it allows firms to capture consumer surplus. Consider the following monopolist:



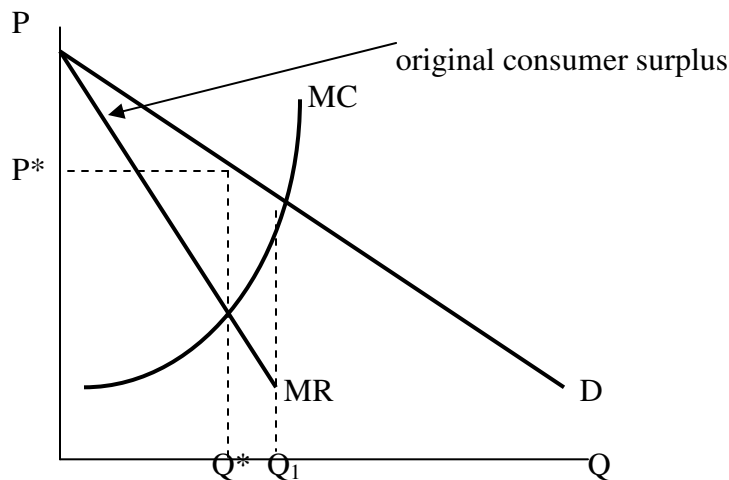
In this diagram, the monopolist is producing Q^* and charging price P^* as it normally would. However, notice that there are some consumers who would like to buy additional units of output, and would be willing to pay $P > MC$ (thus increasing the firm’s profits). The only reason the firm won’t make these sales is that if it lowers the price for the *next* consumer, it must lower its price for *all* consumers. This would reduce the firm’s profits, and so these potential consumers are not served by the firm.

If we relax the assumption that the monopolist must charge one price and one price only, then the monopolist can increase its profits beyond even its “normal” monopoly profits. For example, the monopolist could continue to charge P^* for most of its consumers, but charge the last, marginal consumer, a price above MC , yet below P^* . Then this consumer will buy the product, and the firm will add to its profits.

In this case, the firm would be capturing part of the monopoly deadweight loss as producer surplus. While this is a common result of many price discrimination schemes, most types of price discrimination also allow the firm to capture consumer surplus as well. Note that if the firm charges $P = P^*$, consumers who buy the good reap some consumer surplus. But if the firm can charge different prices to different consumers, it need not allow customers to receive this surplus. Instead, the firm can try to set its prices to shift this surplus from consumers to the firm, further adding to its profit. As we will see, there are many varieties of price discrimination available to firms with market power.

First-Degree Price Discrimination

In this simplest and most direct form of price discrimination, the firm simply charges each consumer his reservation price (the maximum price the consumer is willing and able to pay for a good). If we think of points on the demand curve as representing one consumer's willingness to pay for one unit of a good, the monopolist simply charges the price dictated by the demand curve for each and every unit of output. In this arrangement, consumers get no consumer surplus at all; all surplus goes to the producer.



In this diagram, consumers initially received the triangle formed by P^* , Q^* and the choke price as CS. When the firm charges each consumer his reservation price, CS drops to zero. However, the firm receives the entire distance from MC to D as its PS for each unit of output. Furthermore, since the firm's marginal revenue is now the same as demand (since it need not lower its price on all output to sell more), the firm will choose to produce Q_1 , the competitive output level.

In this setup, the firm captures all of CS as producer surplus, and it also captures the entire monopoly deadweight loss as producer surplus. Also notice that first degree price discrimination is efficient in the sense that the competitive level of output gets produced and total surplus is maximized (even though it is entirely made up of PS!). Of course, if we place any special weight on surplus earned by consumers, then first-degree price discrimination appears undesirable even compared to “regular” monopoly.

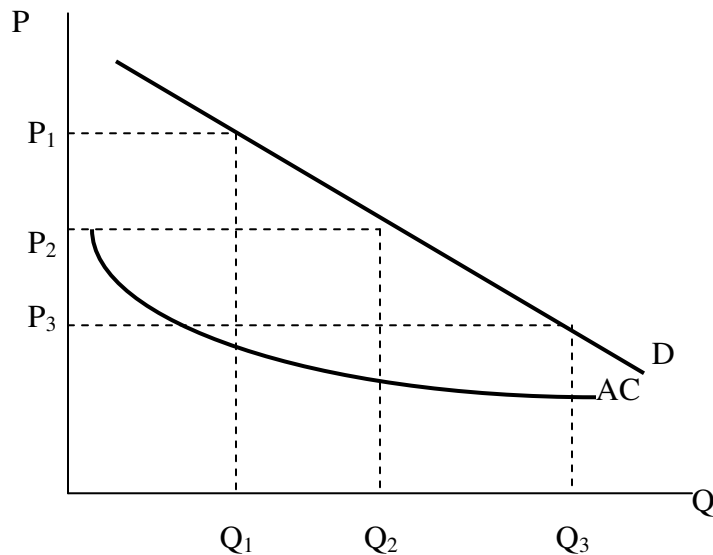
Second-Degree Price Discrimination

The idea behind second-degree price discrimination is to sell different quantities at different prices. Usually this practice is used in industries where there are economies of scale (so that AC and MC fall as the firm produces more) and where consumers place a high value on the first few units of output but little value on additional output.

e.g. Electric company. Consumers place a very high value on the first few kilowatt-hours they buy (refrigerator, lights, AC, etc.) but are unwilling to pay much for additional kWhs.

e.g. Water company. Consumers can easily conserve water, but place a very high value on the first couple of thousand gallons they buy.

To take advantage of these patterns in demand, the firm charges a different per-unit price depending on how much the consumer buys.



Here the firm charges price P_1 per unit if the consumer buys Q_1 or fewer units, P_2 per-unit if the firm buys Q_2 units, and price P_3 per unit if the consumer buys Q_3 units.

Third-Degree Price Discrimination

The firm has another option at its disposal if it is able to separate consumers into two or more “types.” If the firm can do this, and charge different “types” of consumers different prices, it can engage in third-degree price discrimination. A moment’s reflection should reveal that this is very often possible.

e.g. Airlines are able to charge different prices to people traveling on business (short notice, no Saturday-night stay \Rightarrow high fares) and vacation travelers (who make plans well in advance and stay over on Saturday night \Rightarrow low fares).

In these cases, the firm can divide consumers into two groups, each group having a different demand curve. The firm can then charge each group of consumers a different price. If the firm is able to successfully divide and identify different groups of consumers, how should it set prices in both of these groups? There are two conditions that must hold for the firm to be maximizing profits in both “markets.”

1) $MR_1 = MR_2$. The firm must choose output levels such that marginal revenue is the same for both groups. Otherwise, the firm could shift one unit of output from the low-MR market to the high-MR market and increase TR (and profit).

2) $MC = MR$. For each group of consumers, marginal revenue must equal the total marginal cost of production. If $MR > MC$ for any consumer group, for instance, the firm would do better to produce one more unit and sell it to that group.

Thus, our firm sets $MC = MR_1 = MR_2$ (for two groups of consumers).

Remember in the previous chapter that we found $MR = P + P/E_p$, or $MR = P(1 + 1/E_p)$. For two groups of consumers, this means that

$$\begin{aligned} MR_1 &= P_1(1 + 1/E_1) \\ MR_2 &= P_2(1 + 1/E_2) \end{aligned}$$

$$\begin{aligned} \text{but } MR_1 = MR_2 &\quad \Rightarrow \quad P_1(1 + 1/E_1) = P_2(1 + 1/E_2) \\ &\quad \Rightarrow \quad P_1/P_2 = (1 + 1/E_2)/(1 + 1/E_1) \end{aligned}$$

This means that the price ratio (relative prices charged to the two groups) depends on the demand elasticities of the two groups. Specifically, if $|E_2| > |E_1|$ (so that the first group’s demand is less elastic), then $P_1 > P_2$. In other words, if the firm engages in third-degree price discrimination, it will charge a higher price to the group with inelastic demand, and a lower price to the group with elastic demand.

e.g. Suppose that airlines can divide customers into two groups: business travelers and vacation travelers. The demand for business travelers has elasticity $E_B = -3$ and the demand for vacationers has elasticity $E_V = -6$. Then relative prices will be

$$P_B/P_V = (1 - 1/6)/(1 - 1/3) = (5/6)/(2/3) = 5/4$$

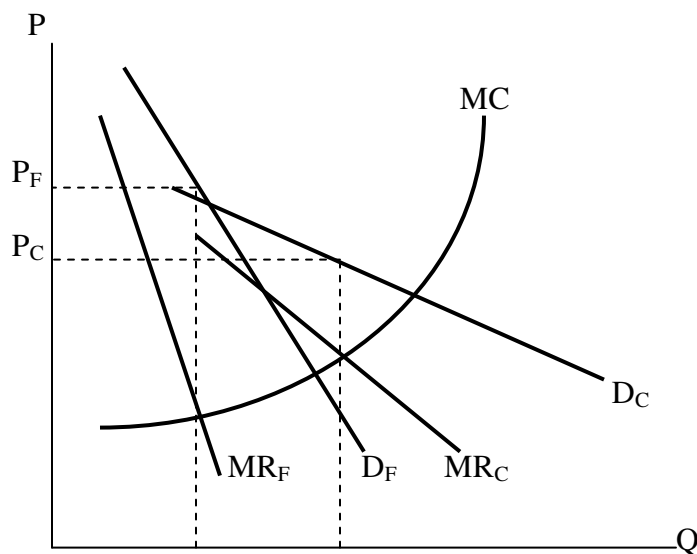
So business travelers will be charged 5/4 the fare charged to vacationers (20% more).

Intertemporal Price Discrimination

Often, a firm can discriminate between groups of consumers by charging different prices at different times, a practice known as intertemporal price discrimination. At each moment, the firm acts as a normal monopolist, charging all consumers the same price, but because this price changes over time, the monopolist is price discriminating.

Example – A new Stephen King novel is released. Fans of this author will want to buy the book immediately (inelastic demand) and would be willing to pay a fairly high price. This high price will deter many casual readers from buying the book, though. The publisher can charge fans and casual readers different prices by selling the book for different prices at different times. The way that publishers actually do this is by releasing the King novel in hardcover first (high price, purchased by fans right now) and then following up with a paperback edition a year or so later (low price, purchased by casual readers later). Thus, the publisher sells to both “markets” at the normal monopoly profit-maximizing price for each market.

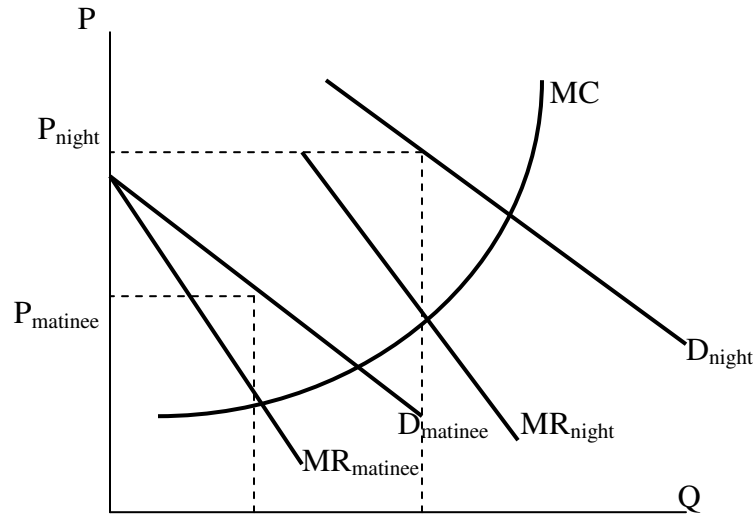
This practice can be illustrated below:



Notice that MR need not be equal for each group in this case. That is because the MCs of selling another unit today and another unit in the future are independent of one another. Unlike third-degree price discrimination, where the firm produces a unit of output and can sell it to either group A or group B (thus implying equal MRs), this firm can only sell to the group that is buying currently, so MR need not be equal.

Sometimes, a firm knows that it will face higher demand at particular times, and it can set prices accordingly. This practice is known as peak-load pricing.

Example – A movie theater knows that demand for its product is high in the evening but relatively low during the day. Thus, it charges more for movies shown at night and less for daytime matinees. We can see this type of situation graphically:



As expected, the movie theater charges higher prices at night due to higher demand.

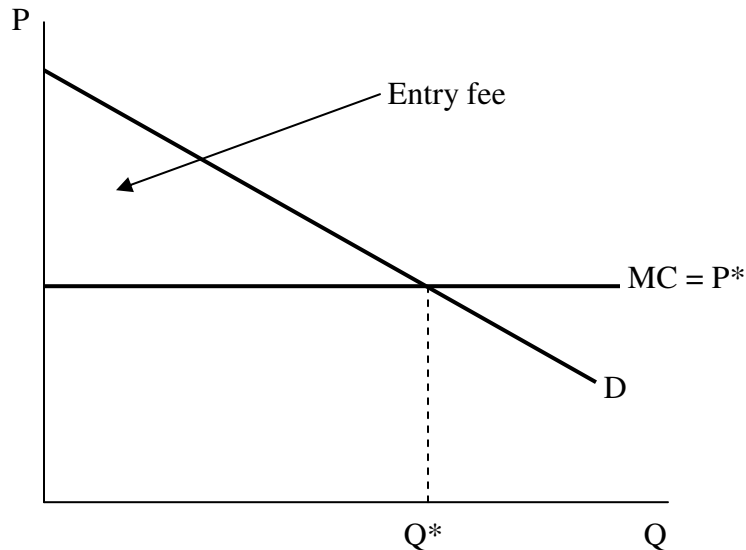
Two-Part Tariffs

A two-part tariff is another way for firms to expropriate consumer surplus. Whether it technically qualifies as price discrimination is questionable, since all consumers are offered the exact same “deal,” but it is worth noting that it will often result in consumers being charged different average (per-unit) prices. Still, it naturally belongs in this chapter since it is a clever and widely-used surplus-stealing mechanism.

In a two-part tariff, the firm charges consumers an “up-front” fee for the right to buy the product, and then an additional per-unit fee. Common examples include:

- Amusement parks charging a \$10 entry fee and \$1 per ride
- Cell phone services charging \$10 per month and \$0.10/minute

The interesting thing is that if everyone has the same demand, the outcome of a two-part tariff is exactly the same as first-degree price discrimination.



The firm can set $P = MC$ (here assumed to be constant for simplicity), and consumers will buy Q^* units of the good. This output level would normally allow consumers to earn some CS, but the firm imposes an entry fee equal to this CS. Thus, consumers are left just indifferent to paying the entry fee and buying Q^* units of the good or not buying at all. The firm captures all of CS, just as in the case of first-degree price discrimination. This outcome is also efficient, in the sense that total surplus is maximized.

It should be noted, though, that things get more difficult if consumers have different demand curves. Then the firm must be careful not to charge such a high entrance fee that it drives otherwise-profitable consumers away. Because of this consideration, firms would prefer to engage in first-degree price discrimination if they can. Only when first-degree price discrimination is impossible would they resort to a two-part tariff.

Conditions for Price Discrimination to be Possible

Based on the above discussion, all firms would like to price discriminate. However, not all firms actually do so. To see why, we need to consider a few conditions that need to be satisfied in order for price discrimination to be viable.

- 1) The firm must have some market power.
- 2) “Willingness to pay” must vary across consumers.
- 3) The firm must be able to observe this “willingness to pay.”
- 4) The firm must be able to limit resale of the good.

