LECTURE 5.0

PRODUCT DIFFERENTIATION

OUTLINE

5.0 Product differentiation

5.1 Horizontal product differentiation

5.2 Preemption

5.3 Pricing complementary products

READING

Chapter 4, ”Differentiation” in McAfee (2002) *Competitive Solutions*

A link to this chapter is in the Week 5 reading page on Canvas.

VALUE CREATION

Think of value as the sum of producer and consumer surplus.

- Net value to consumer is (Willingness to Pay minus Price), i.e. consumer surplus.
- Net value to seller is (Price minus marginal cost), i.e. Producer surplus
- Hence total value equals (Willingness to Pay minus marginal cost), i.e. Total Surplus.

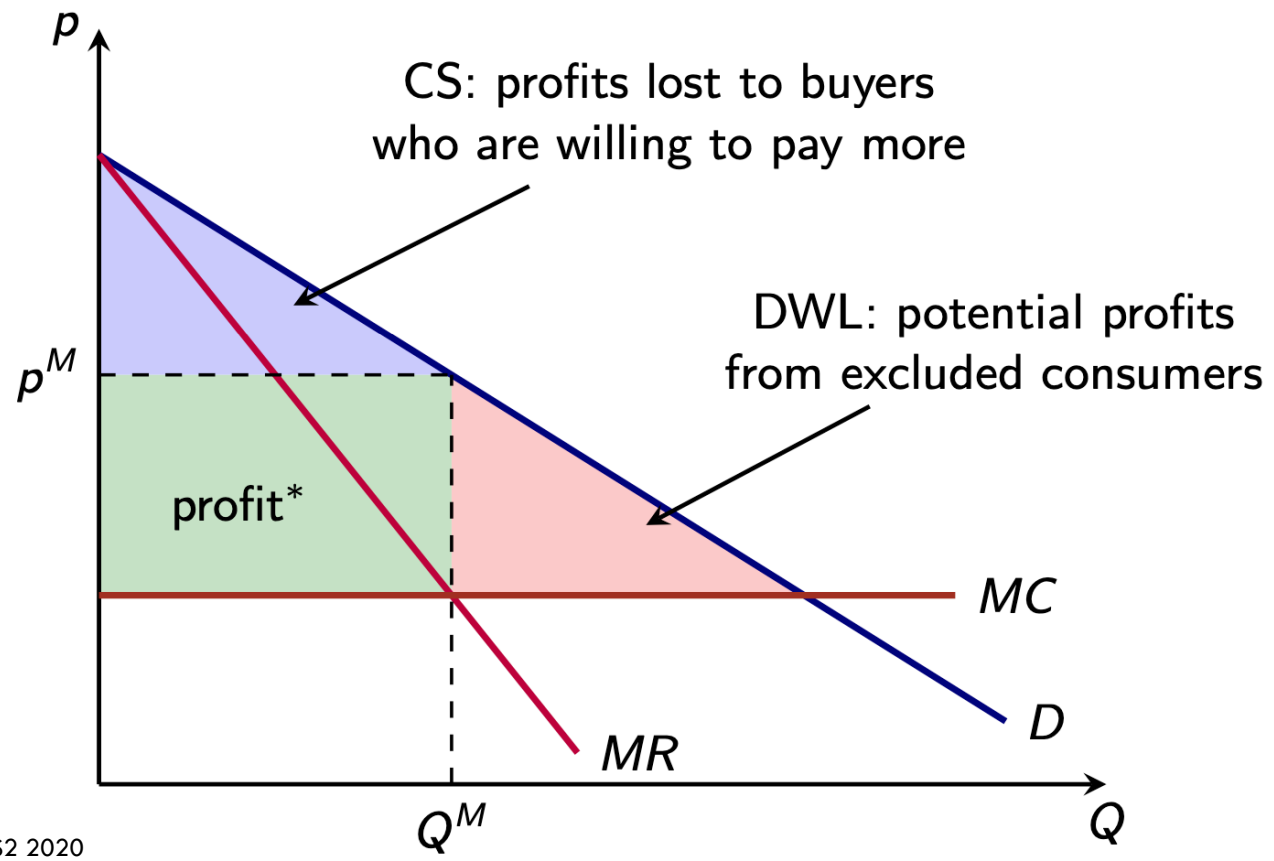
It is important to note how to think about willingness to pay.

- For consumers it reflects the utility derived from consumption of good or service.
- For business buyers it reflects the next best alternative: e.g. sugar versus corn syrup in soft drink production

As we have already considered in the context of pricing, it is important to note that Willingness to Pay will vary over buyers

VALUE CREATION

Recall this diagram from last week.



PRODUCT DIFFERENTIATION

The question for a firm is how can they capture more of the value.

One strategy to capture value is product differentiation

- By making your self different or creating some uniqueness, i.e. offering a product no one else sells.
- By doing so you create some market power.
- This could come through market entry or it could come from creating a new product in an existing market

PRODUCT DIFFERENTIATION

Competing products often have distinguishing characteristics

- physical differences
- perceived differences (e.g. pharmaceuticals, home brands)
- service quality
- location

Product differentiation alters the strategic interaction between firms

- product differentiation provides firms with market power
- firms have downward sloping demand curves
- one explanation for pricing above marginal cost

PRICE COMPETITION WITH DIFFERENTIATED PRODUCTS

With differentiated products, demand depends on the prices of all related products:

$$q_i = q_i(p_1, p_2, \dots, p_n)$$

e.g. suppose firms 1 and 2 produce imperfectly substitutable products

$$q_1 = 100 - 2p_1 + p_2$$

How does this demand curve compare with the Bertrand model?

PRICE COMPETITION WITH DIFFERENTIATED PRODUCTS

Suppose there are two firms who compete by simultaneously setting prices. They face the market conditions below. Find equilibrium prices.

Demand:

$$q_1 = 100 - 2p_1 + p_2 \qquad i, j = 1,2$$

Costs:

$$C_i(q_i) = 10q_i \qquad i = 1,2$$

PRICE COMPETITION WITH DIFFERENTIATED PRODUCTS

Firm 1 has profits:

$$\pi_1 = (100 - 2p_1 + p_2)(p_1 - 10)$$

To maximise profits, solve FOCs (set the slope of profits to zero):

$$\frac{d\pi_1}{dp_1} = 100 - 2p_1 + p_2 - 2(p_1 - 10) = 0$$

$$4p_1 = 120 + p_2$$

$$p_1 = 30 + \frac{p_2}{4} \equiv R_1(p_2)$$

Similarly, for Firm 2:

$$p_2 = 30 + \frac{p_1}{4} \equiv R_2(p_1)$$

PRICE COMPETITION WITH DIFFERENTIATED PRODUCTS

In equilibrium, both firms operate on their reaction function:

$$p_1 = 30 + \frac{30 + \frac{p_1}{4}}{4}$$

$$p_1 = 40 = p_2$$

TYPES OF DIFFERENTIATION

Horizontal differentiation

- Consumers have different product rankings
- e.g. red BMWs and blue BMWs
- Could think about horizontal differentiation as a choice over location

Vertical differentiation

- Consumers agree on the ranking of products
- Consumers have different preferences for quality
- e.g. new BMWs and used Toyota Corollas