Title slide

I would like to begin this lecture by clearly stating three key takeaways from this week's content.

1. Power dynamics enable firms to set prices and choose quantities in pursuit of profit

2. The modern structure of production utilizes long-lived and expensive capital.

    a. The structure of production creates an advantageous position for large firms who can benefit from technological and cost advantages of large-scale production.

3. The firm's price and profit margin are affected by the responsiveness of consumers to price changes.

In unit 2, which seems like it was only yesterday, we looked at how firms choose a technology. TO model this decision-making process, we used the concept of isocost lines to compare costs. Recall that the isocost lines from unit 2 represented different combinations of inputs that yielded a constant cost.

In unit 6 we looked at how firms set the wage. If we assume that labor is the only input for production, then the wage constitutes the cost of production. We will be making the unrealistic assumption that labor is the only input. This assumption will be relaxed a bit later in the semester. By assuming labor is the only input, our model becomes much simpler without impacting the key results.

With the cost structure determined in the wage setting process, we will now look at how firms set the price. We will be using indifference curves and the feasible set…and the optimal position will occur at the tangency. Isoprofit curves give the different combinations of price and quantity that yield a constant profit and the demand curve will act as our constraint to price quantity combinations.

Price is set as a markup over cost. The firm starts with its cost structure then determines how much more than the cost it can charge given the power it has.

One more time: price is set as a markup over cost.

Now say it with me: price is set as a markup over cost.

The context for this unit

The concepts in this unit will become the foundation for work in subsequent chapters. Perhaps the most important is the relationship between firms profit maximization and power. As a proxy for this power, we use the elasticity of demand. The power of the firm emerges through its ability to set a price above the cost of production, the more powerful the firm, the lager the markup over cost.

This unit

Assuming labor is the only input, then wages alone determine the cost. Recall from last week that the wage is set in the interaction between firm and worker or equivalently, capital and labor. Asymmetric information and incomplete contracts were key components for how we modeled that interaction.

Once the firm knows the cost, then the market power that the firm has determines how much higher the price is above the cost.

Price is set as a markup over cost. The size of the markup depends on the power of the firm. The more power the firm has, the greater the markup.

Cost functions

This is your first introduction to the cost function. However, it is like other functions you have seen this semester. Specifically, it is a mathematical relationship between two quantities. In this example if Q number of cars are produced, then c, measured in the unit of account (i.e. dollars), is the cost.

Total costs equal the unit costs multiplied by the quantity. The unit cost includes all the fixed and variable costs. If zero units are produced, then the only costs incurred are the fixed costs which includes primarily capital- like machines and buildings. The fixed costs is where the cost function intersects the vertical axis.

Average cost

The average cost, AC, is determined by taking the total cost, given to us by the cost function $C(Q)$ and dividing it by the quantity produced, Q.

Here we have a u-shaped cost function where average cost decreases at first and then increases with higher levels of production.

Before moving on, come up with an explanation for the u-shaped average cost function.

Marginal cost

The marginal cost represents the change to total cost from producing one additional unit of output. Mathematical, you can derive the marginal cost by finding the slope of the cost function; either approximate it using rise over run or if you have made it through calc 1, take the derivative of the cost function.

Why is the MC an upward sloping line?

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To answer this question, recall that the MC represents the slope of the cost function which gets steeper as Q increases.

Relationship between MC and AC

There is a relationship between MC and AC. In fact, the two statements made on the bottom of the slide are always true. Why?

I am not giving you the answer, but I will remind you that the marginal cost is the effect on total costs from producing an additional unit and average cost is the total cost divided by the total quantity.

Hint button on slide for relationship between AC and MC

Ok here is a hint. Imagine you have 3 pencils that are all 6 inches long. If you add a fourth pencil which is only 3 inches long, what happens to the average length of the pencils.

What if the fourth pencil was 9 inches long, what happens to the average length of the pencils?

What if the fourth pencil was 6 inches long, what happens to the average length of the pencils?

Demand curve

The demand curve is going to act as our constraint in the model for price setting. It represents the quantity the firm can expect to sell at a given price.

The demand curve is downward sloping. In fact, the law of demand states that as prices rise, the quantity consumers demand falls. There are two reasons for this observed behavior.

(1) At the higher price some who had been buying before may become unable or unwilling to buy any of the good at all and may therefore drop out of the market. So, at higher prices we may have a smaller number of individual demanders.

(2) Individual demanders who continue to buy may wish to buy fewer units at the higher price than they did at the lower price. If the usefulness of the good to a buyer decreases the more units they already have, the number of units whose usefulness outweighs the price the buyer must pay will decrease the higher the price.

So, the law of demand tells us to expect the quantity of a good potential buyers will be willing to buy to be a negative function of price.

It is important to understand that this so-called law should not be interpreted like the laws of physics. No economist believes that the demand of every individual demander in every market decreases as market price rises.

A quick counter example to the law of demand: consider the demand for Amazon stock, as the price rises some people increase their demand because they are interpreting the rising price as signal for future price changes. This type of behavior leads to bubbles and market failures.

Isoprofit curve

The firm is propelled to action by its singular pursuit of maximizing profit.

The Isoprofit curves represent the different price-quantity combinations that yield a constant level of profit. Further from the origin represents higher profit.

You will notice that like on the previous slide with the relationship between AC and MC, the Isoprofit slopes down when price is greater than marginal cost and slopes up when price is less than marginal cost.

Consider point G, Q=23 and price > MC. As you move to the right on the Isoprofit curve and you increase Q by 1, the profit stays the same and the price is lower. The extra profit received from selling the 24th car must be offset by a decline in revenue on the other 23 cars.

Profit maximization

Like previous units, we are still relying on constrained optimization to model the decision made by firms on how to set the price. Constrained optimization in general terms can be conceptualized as a decision maker choosing a value of a variable in pursuit of achieving a goal, the objective of which is to optimize

something, but the decision must take into account the constraint they face. The solution to the problem is at the tangency where MRS = MRT; the tradeoff the decision maker is willing to make equals the trade-off they are constrained to make.

Profit is what firms are trying to maximize, but it is subject to the constraint of the demand curve. The equilibrium price will occur at the point of tangency between the Isoprofit and demand curve. At the equilibrium, the firm is balancing the tradeoff they are willing to make between price and quantity with the trade-off they are constrained to make by given to us by the demand curve.

The MRT is how lower prices are transformed into greater quantities. And the MRS represents the rate between selling more and charging more that leaves firm indifferent.

Price elasticity of demand

Price elasticity is a measure of proportional change. It is measuring change in percentages not absolutes.

A lower value of this measure represents less elastic demand. Translate this into non-econ speak: inelastic demand, when the measure takes a value less than 1, represents a situation in which the percentage change demand is less than the percentage change in price — the more inelastic is demand the less responsive it is to changes in prices. Elastic demand, when the value is greater than 1, represents a situation in which the percentage change in demand is greater than the percentage change in price.

Here you have a straight line with a slope of -80. For every $80 that the price falls, quantity demanded increases by one. Calculate the elasticity at points A, B, C, and D.

Hint: even though it is a straight line since elasticity measures proportional changes it will not be constant.

Price elasticity and profits

Elasticity of demand is closely related to the degree to which the firm can capture profit- the share of the surplus obtained by the firm

In fact, elasticity is going to serve as a proxy for firm's market power. A more powerful firm faces a more inelastic demand curve. And as you can see here in the image on the right, the more inelastic demand curve is associated with a greater profit margin. While in the image on the left, the more elastic demand is associated with a smaller profit margin.

Lower elasticity can be conceived of as the power of the firm to raise prices without losing many customers.

The profit margin as a share of the price gives us the markup. The profit margin is price minus marginal cost which is then converted to the markup by dividing it by the price. The markup is $\frac{p-MC}{p}$

Price elasticity and market power

This slide is rather self-explanatory and there is nothing else that I have to say, so peace out.

Summary

In the next unit