

# Competition and Welfare

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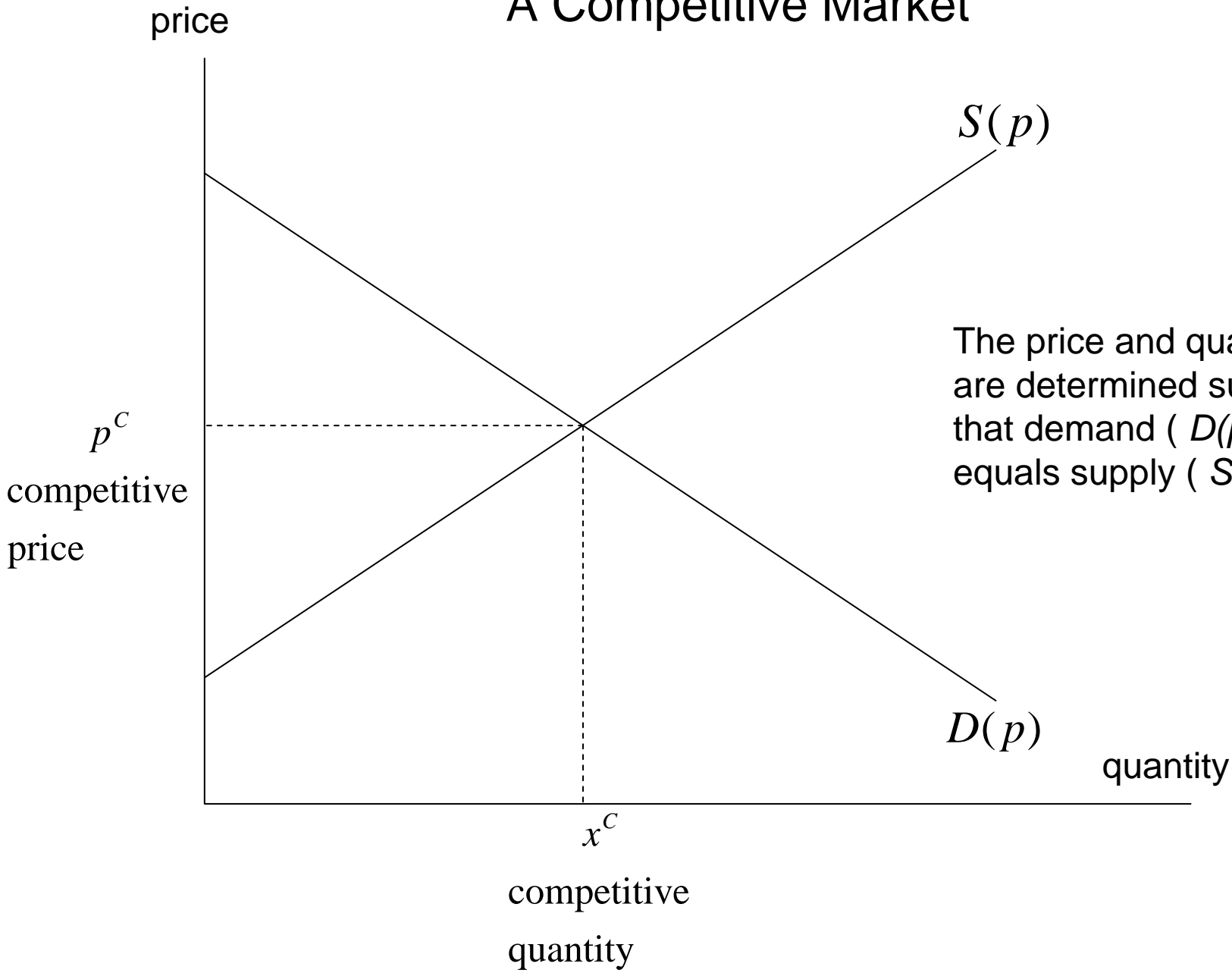
# Competitive Markets

- In a competitive market, agents act as *price-takers*.
- A consumer decides how many units of the good she buys, taking the price of the good as given.
- A firm decides how many units of the good he sells, taking the price of the good as given.

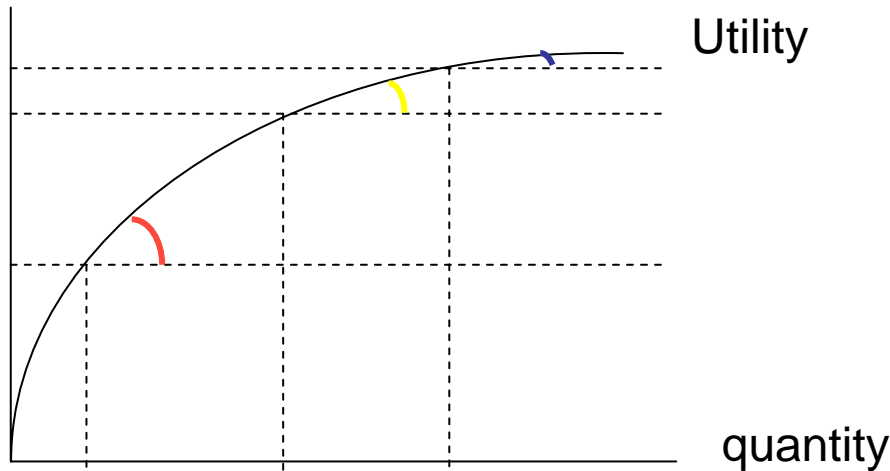
# Less Competitive Markets

- In less competitive markets, producers have some monopoly power to *control prices*.
- *Monopoly*: There is only one producer.
- *Duopoly*: There are two producers.
- *Oligopoly*: There are several producers.
- *Monopolistic Competition*: There are many producers, each of which has some monopoly power. A typical example is a market of convenience stores.

# A Competitive Market



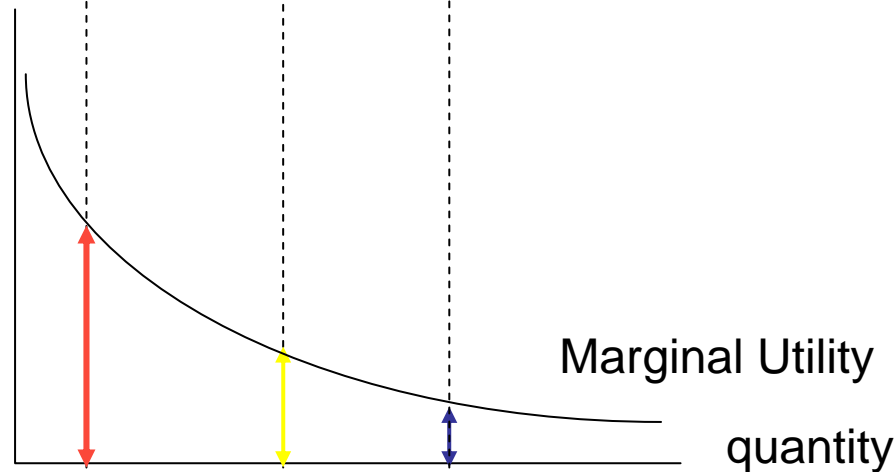
The price and quantity are determined such that demand ( $D(p)$ ) equals supply ( $S(p)$ ).



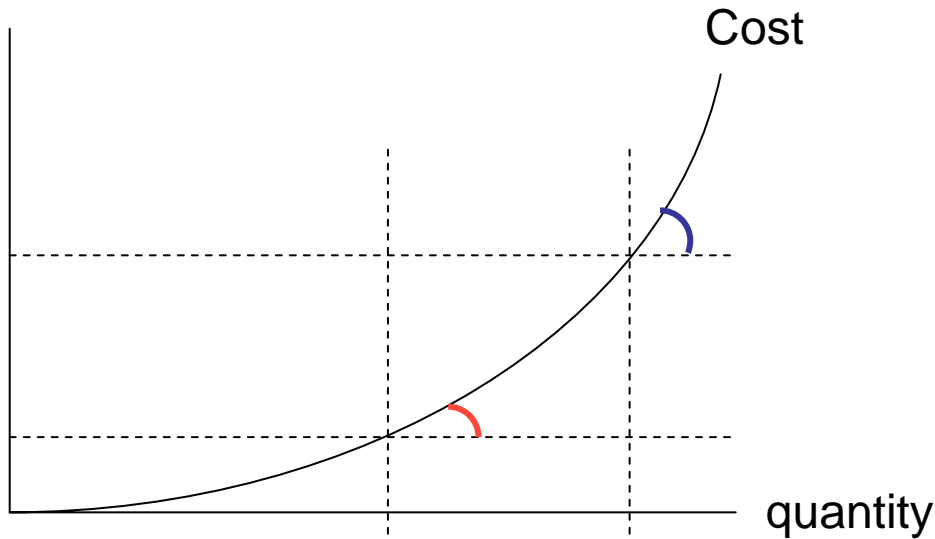
The *marginal utility* is the slope of the utility function, which represents the level of satisfaction.

In the regular case, the marginal utility is decreasing in the quantity.

In economics, the *decreasing marginal utility* is a standard assumption.



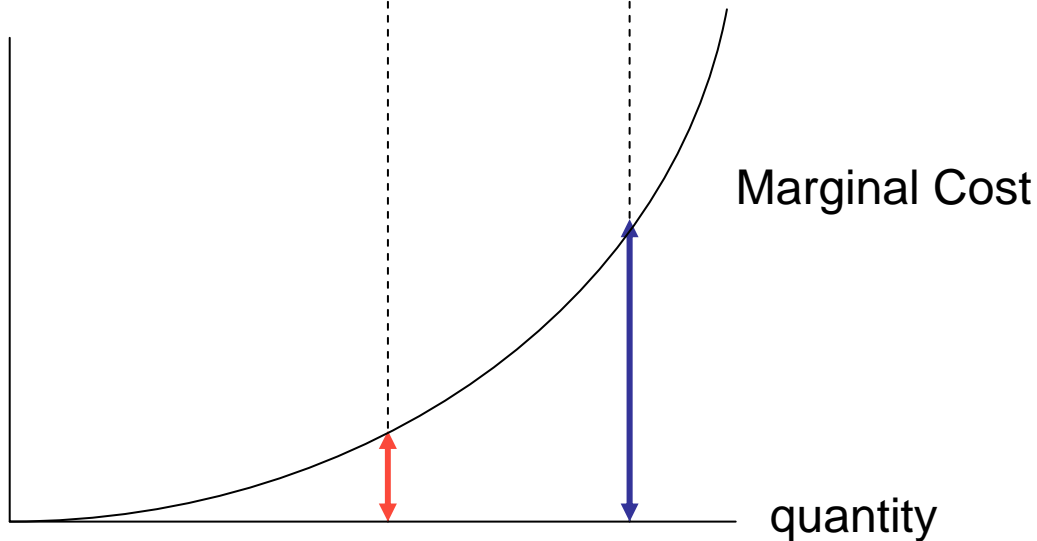
*The demand curve represents the marginal utility.* Therefore the area below it represents the consumer's utility, which is the *integral* of marginal utility.



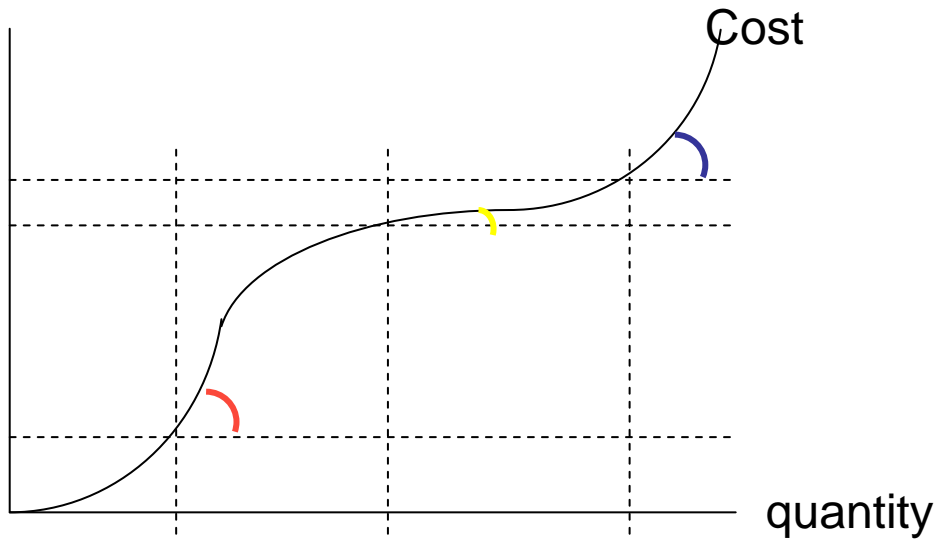
The *marginal cost* is the slope of the cost function.

In the regular case, the marginal cost is increasing in the quantity.

In economics, the *increasing marginal cost* is a standard assumption.

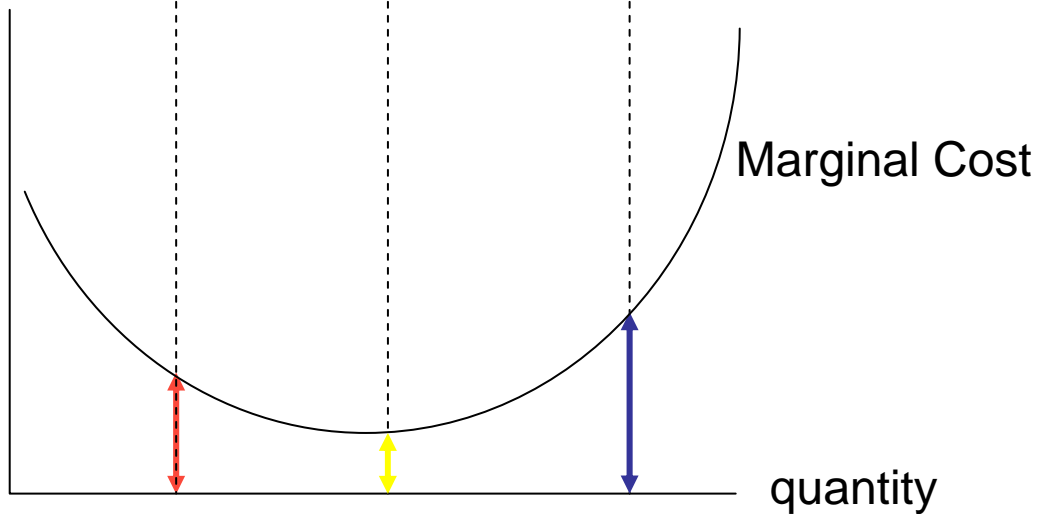


*The supply curve represents the marginal cost.* Therefore the area below it represents the producer's cost, which is the *integral* of the marginal cost.

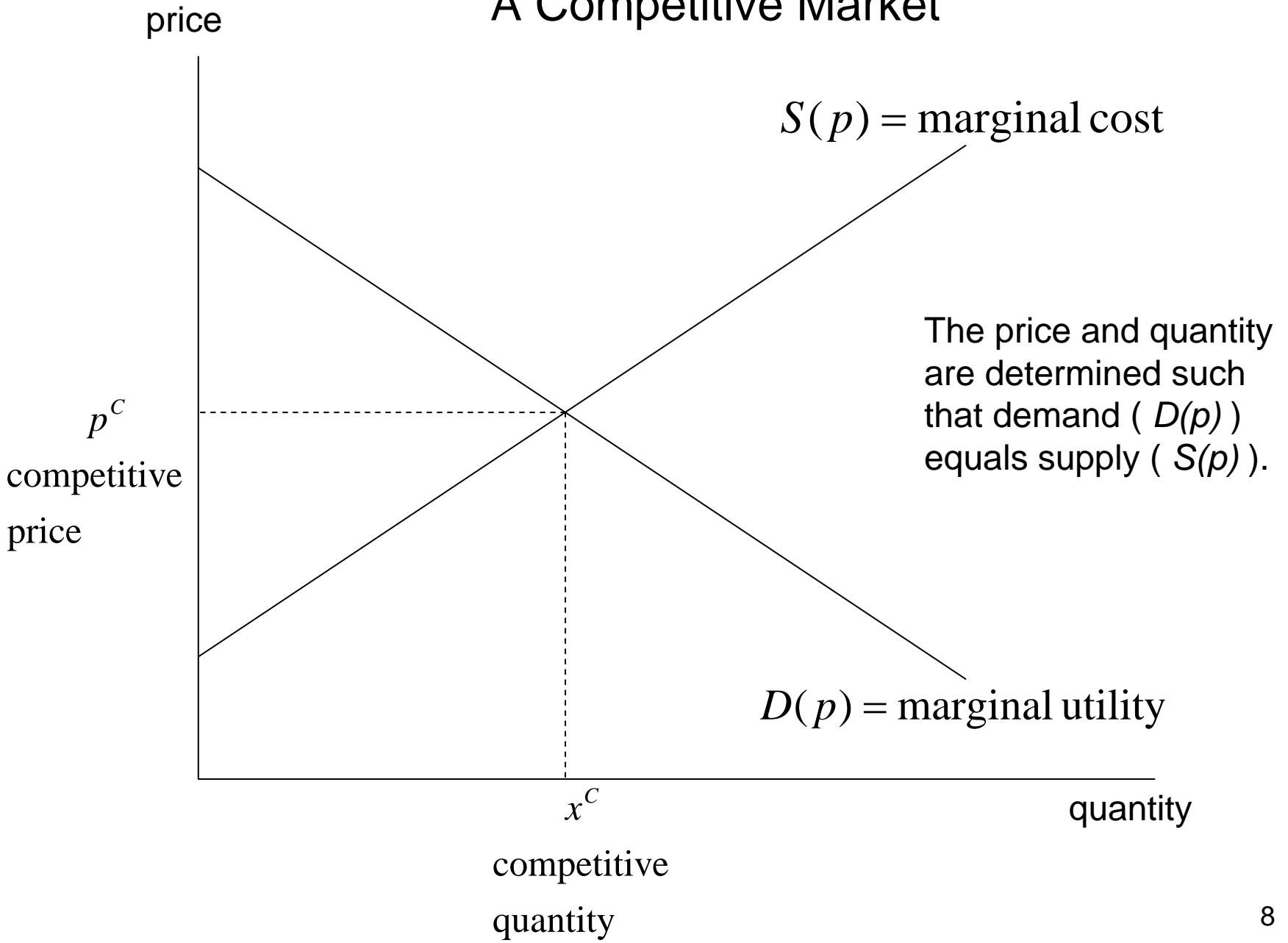


In many cases, the marginal cost is increasing as the quantity is low, while it is increasing as the quantity is high.

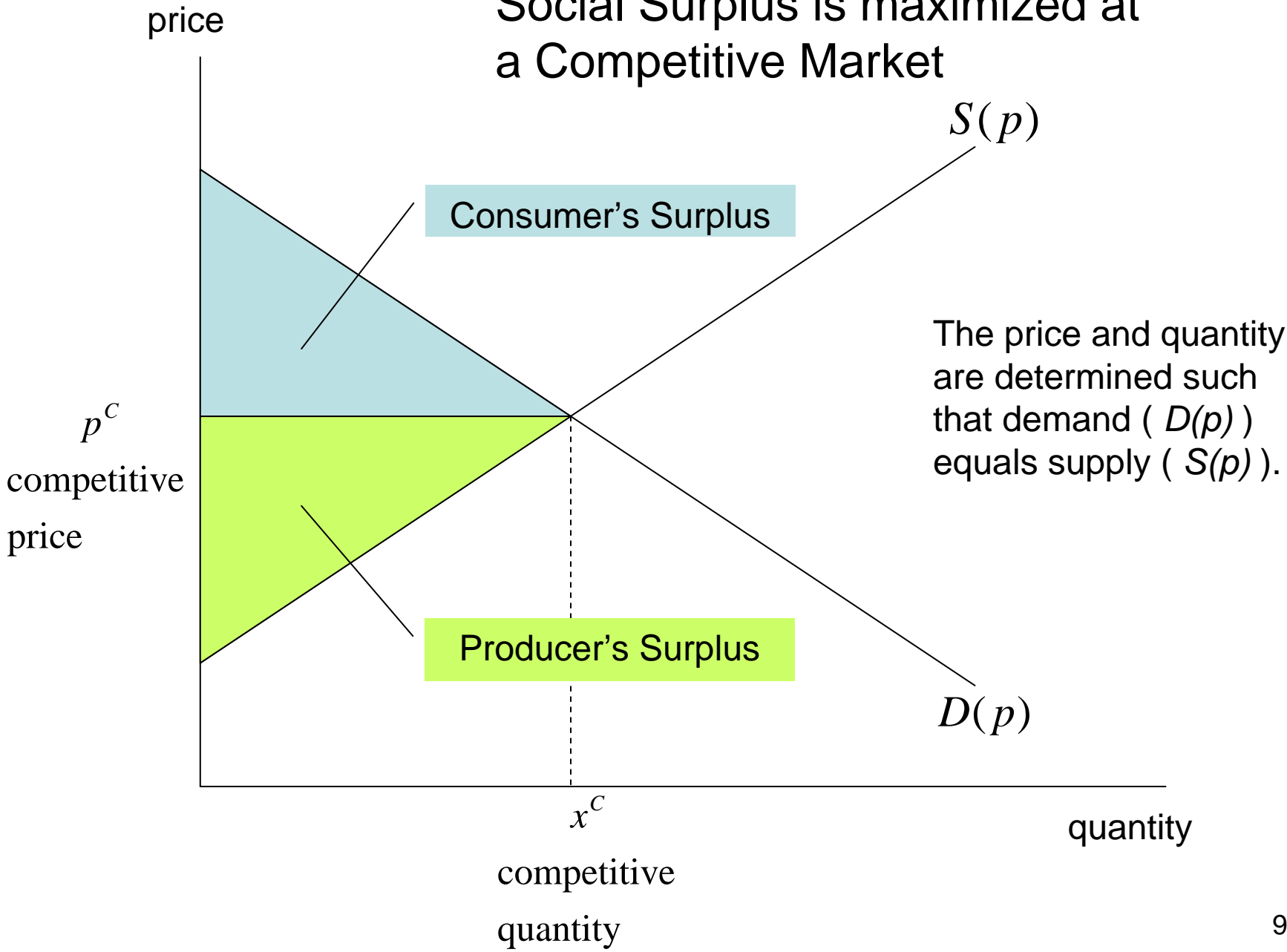
In microeconomics, we regularly consider the cases that the quantity is so high as the marginal cost is increasing and the supply curve has a positive slope.



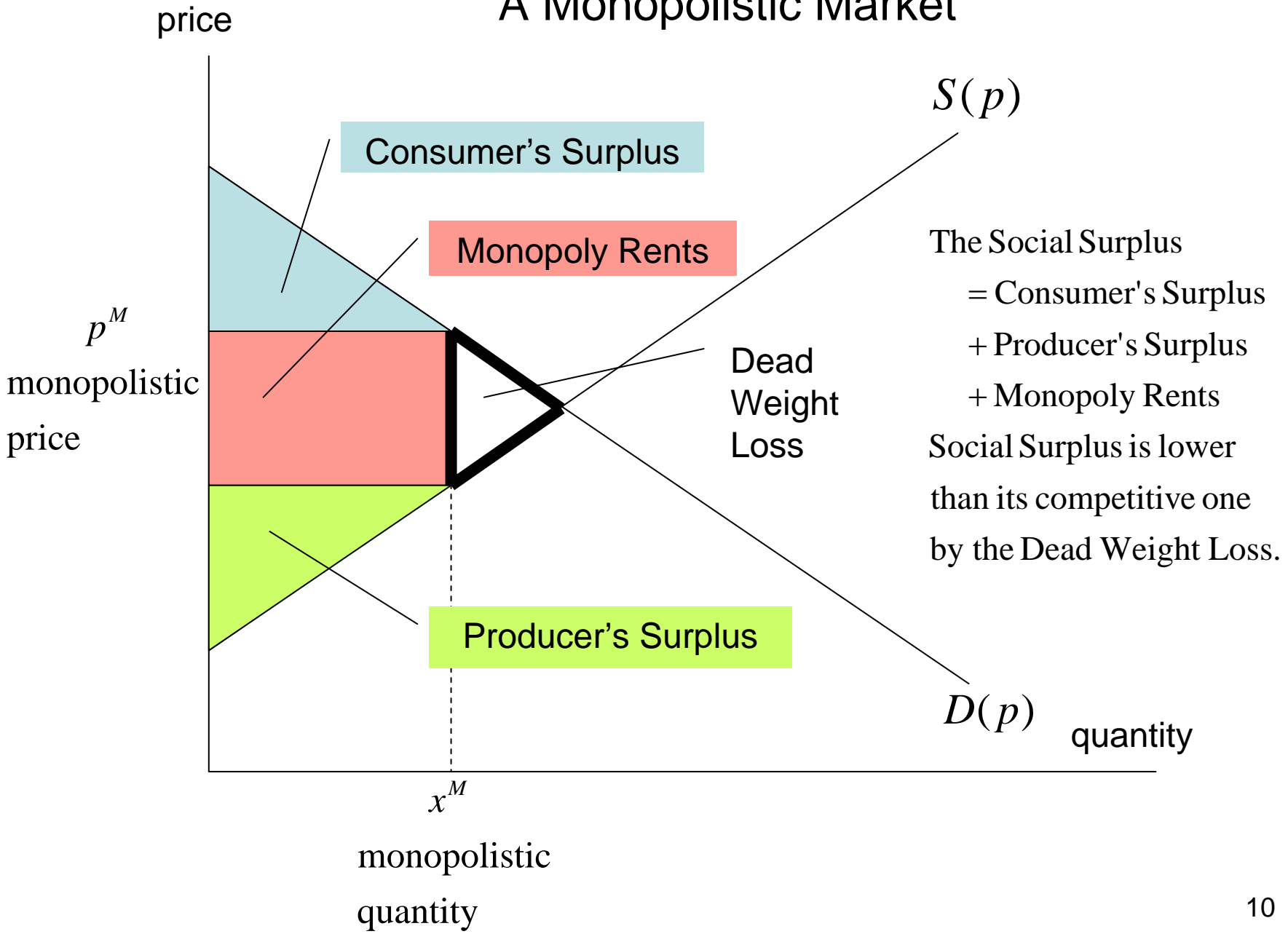
# A Competitive Market



# Social Surplus is maximized at a Competitive Market



# A Monopolistic Market



# Some Analytics of Social Surplus

The consumer's surplus is

$$u(x) - px,$$

where  $u(x)$  is the utility function. The producer's surplus is

$$px - c(x),$$

where  $c(x)$  is the production cost. The social surplus is the sum of the consumer's surplus and the producer's surplus.

$$\text{Social Surplus} = u(x) - c(x) = \int_0^x [u'(y) - c'(y)] dy = [u(y) - c(y)]_0^x$$

(Note that a more subtle discussion is necessary for more rigorous treatment of the social surplus.)

In a competitive market, the consumer maximizes its utility, taking the price  $p$  as given .

The first - order condition of maximization is

$$u'(x) = p.$$

where  $u'(x)$  is called the marginal utility of consuming  $x$ . Therefore the demand curve represents the marginal utility of consuming  $x$ .

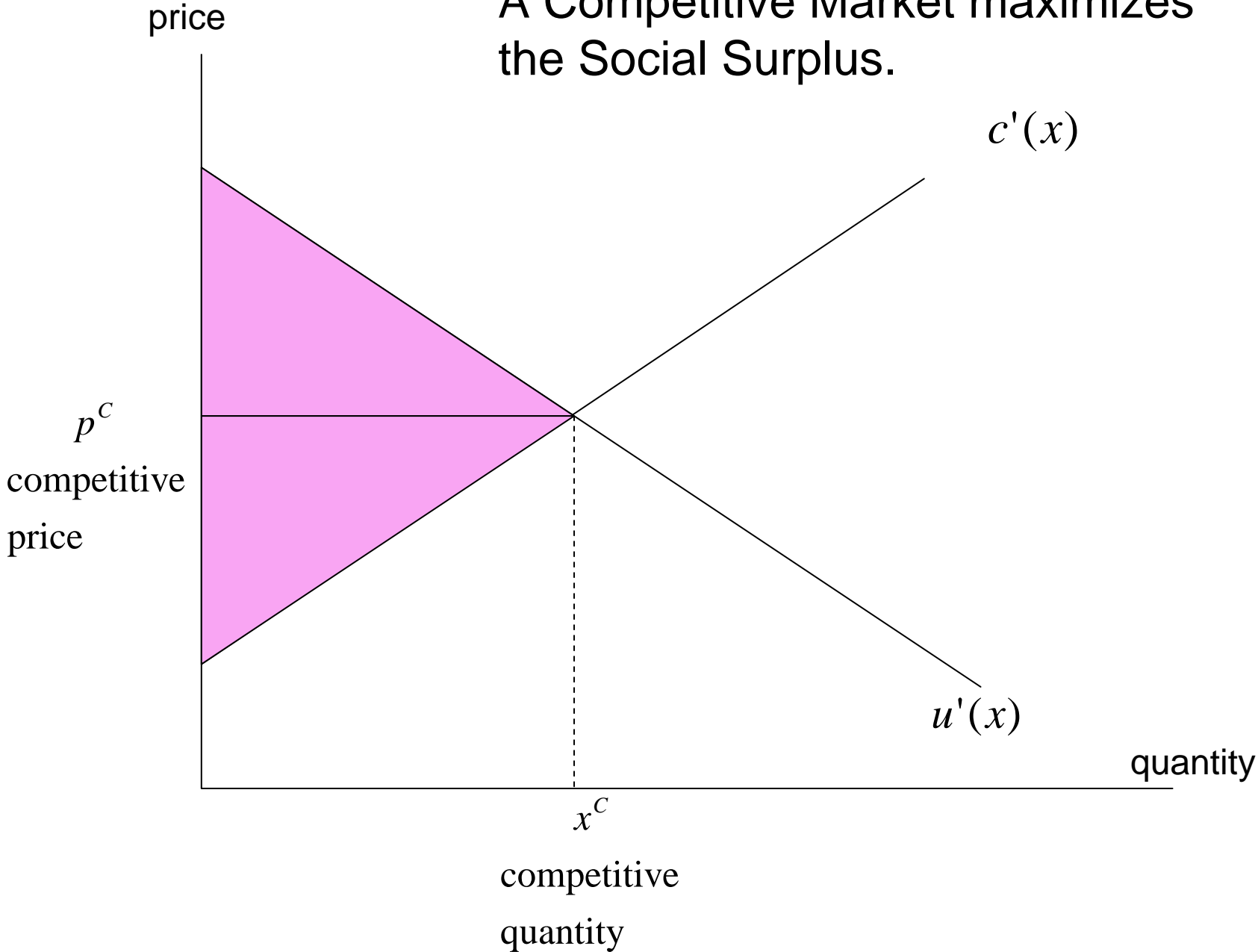
Similarly, in a competitive market, the producer maximizes its profit, taking the price  $p$  as given .

The first - order condition of maximization is

$$p = c'(x)$$

where  $c'(x)$  is called the marginal cost of producing  $x$ . Therefore the supply curve represents the marginal cost of producing  $x$ .

# A Competitive Market maximizes the Social Surplus.



# Fixed Costs - Increasing Returns

1. The production consists of the *fixed* cost and the *variable* cost.
2. The variable costs are considered to be constant or increasing in quantity.
3. However, the existence of the fixed cost requires the minimal size of operation at which the revenue just covers the total cost.

The total costs is

$$c(x) = F + cx$$

where  $F$  denotes the fixed cost and  $c$  is the marginal cost.

The firm's profit is written as

$$\pi = px - c(x) = px - F - cx$$

In a competitive market, new firms enter the market until the profit equals zero.

Then the minimal operation quantity is determined such that

$$\pi = px - F - cx = 0 \Rightarrow x = \frac{F}{p - c}$$

If this minimal operation quantity is large enough to create monopoly power, the quantity is a function of  $p$ . We can write

$$\pi = (p - c)x(p) - F$$

Then the (partially) monopolistic firm chooses  $p$  to maximize  $\pi$ .

# Price Elasticity of Demand

- The slope of the demand curve represents the price *elasticity* of demand.
- The higher the slope is, the *less elastic* the demand is. Goods of this type are called *essential* goods, in the sense that we buy them even if the price is high.
- The lower the slope is, the more elastic the demand is. Goods of this type are called *luxury* goods, in the sense that we buy them only if the price is low.

# Consumption Tax and Price Elasticities

Assume that the government takes  $t$  as tax from one unit consumption of the good.

Then the producer's profit becomes

$$(p - t)x - c(x)$$

because the sales of one unit product drop by  $t$ .

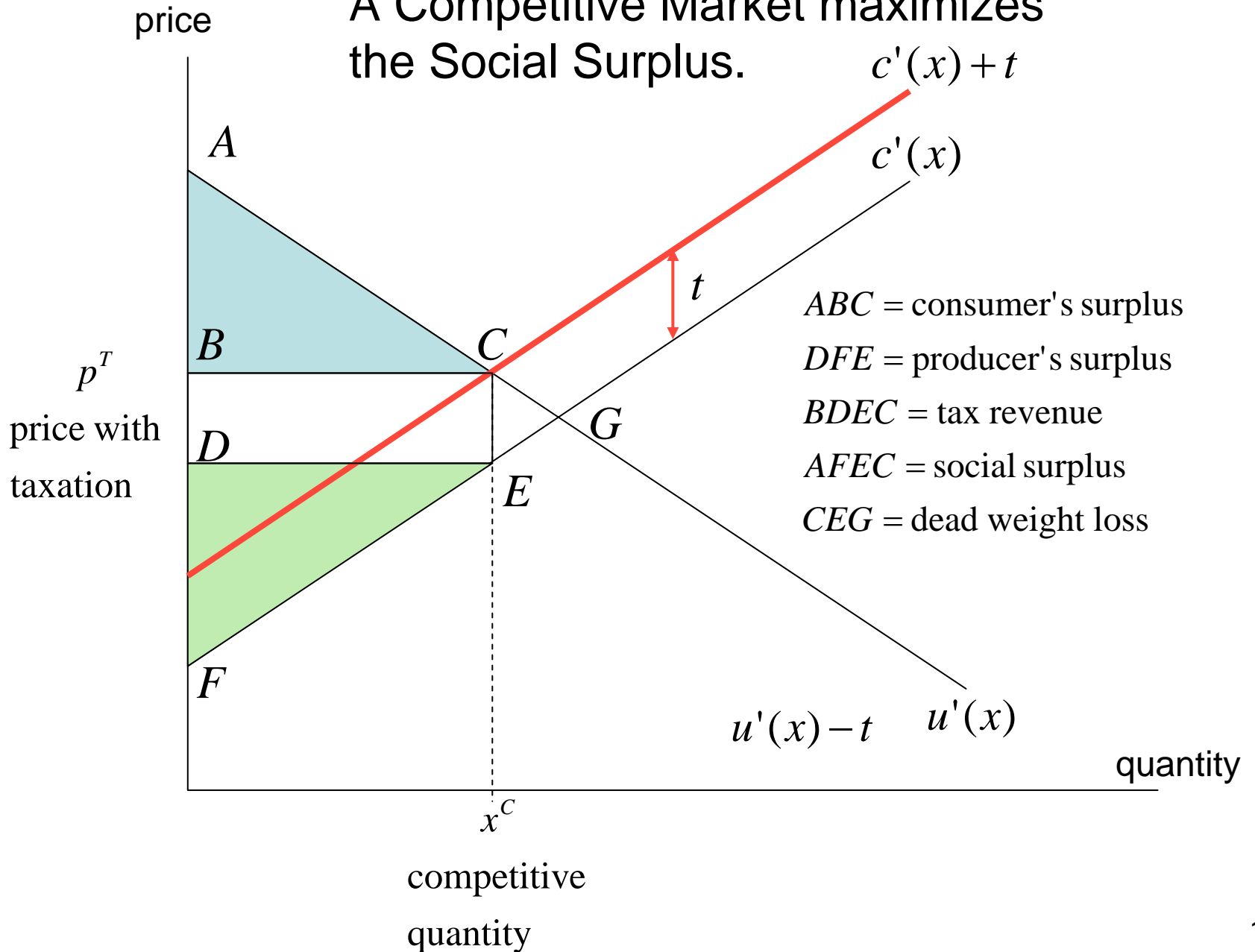
Then the first - order condition becomes

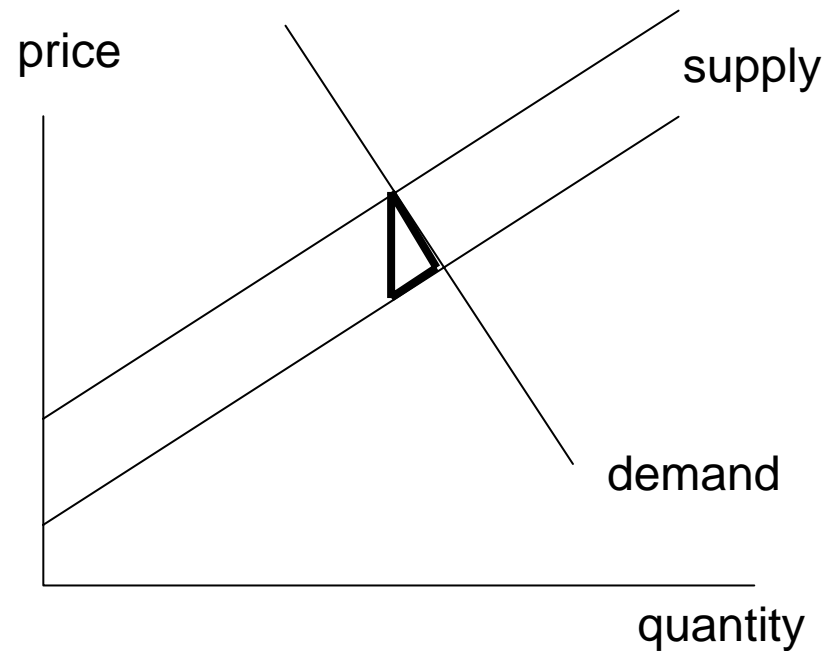
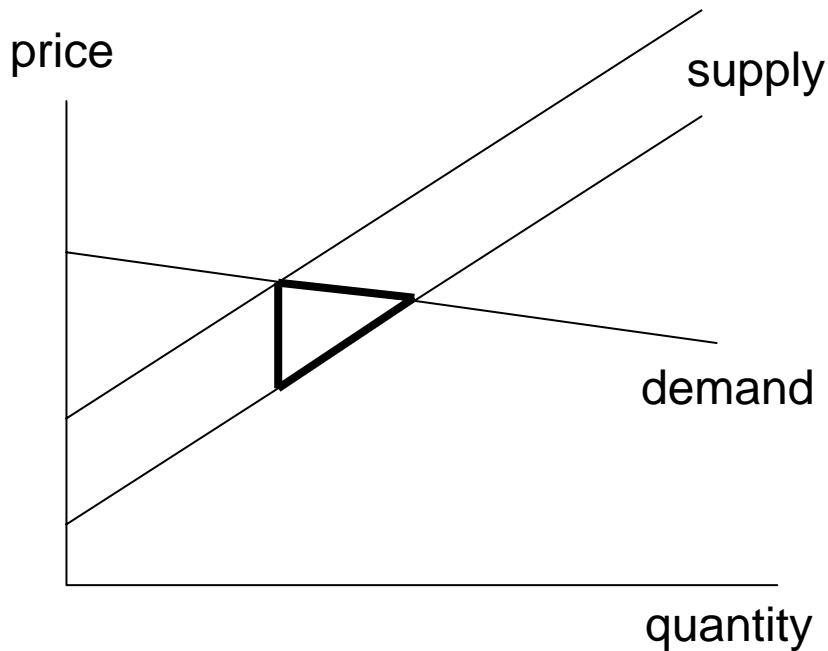
$$p = c'(x) + t$$

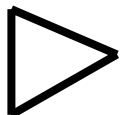
Therefore the supply curve shifts up by  $t$ .

There is no change in the demand curve.

# A Competitive Market maximizes the Social Surplus.





 = dead weight loss

1. The more elastic (less steep) the demand curve is, the larger the dead weight loss is. In other words, quantity (= consumption) is more distorted for luxury goods than for essential goods by the consumption tax.
2. It is desirable for the government to tax on consumption, not of luxury goods but of essential goods, in the view point of *efficiency*.

# Efficiency versus Equality

- Taxation on essential goods is desirable because it is associated with less dead weight loss.
- Consider a more plausible model with rich and poor people.
- Taxation on essential goods hurts the welfare of the poor by more and the rich by less, because the poor consume less luxury goods than the rich.