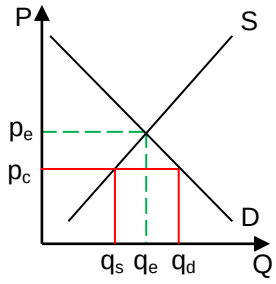
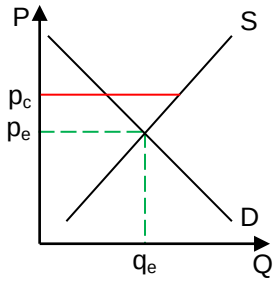
Microeconomics: Price Controls & Taxes

A state of disequilibrium exists in the market whenever it is operating at a non-equilibrium price and quantity. The government can force a market to operate at disequilibrium through the use of **price controls.** Price controls restrict the price at which a good or service can be sold.

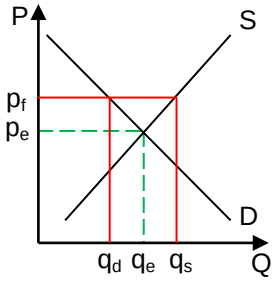
The two types of price controls are price ceilings and price floors. The name is a clue to what each term means. A **price ceiling** sets the maximum price (or ceiling), p_c, at which a good/service can be sold. A **price floor** sets the minimum price (or floor), p_f, at which a good/service can be sold.

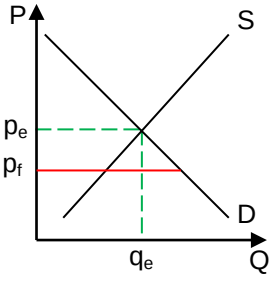
A price ceiling is only effective when set BELOW the equilibrium price (below, left). At the price ceiling, the quantity demanded (q_d) is greater than quantity supplied (q_s), which indicates a shortage situation. The amount exchanged in the market will be limited by the smaller of the two quantities (q_s in this case). If a price ceiling is set above the equilibrium price, the market will continue to operate at equilibrium (below, right).





A price floor is only effective when set ABOVE the equilibrium price (below, left). At the price floor, the quantity demanded is less than quantity supplied, which is a surplus situation. The amount exchanged in the market will be limited by the smaller of the two quantities (q_d in this case). When the price floor is set below the equilibrium price, the market will continue to operate at its equilibrium price (below, right).





For any market exchange, there are additional indirect costs known as **search costs** or **transaction costs.** Search costs reflect the time and money needed to find an opportunity to trade.

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Whenever an effective price ceiling or price floor is in place, these search costs are higher. As a result, black markets develop. In **black markets**, goods are bought or sold in violation of restrictions like price controls or rationing.

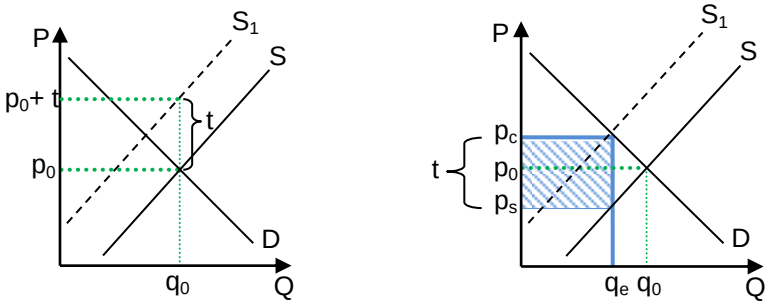
In the case of a price ceiling, black market goods will be illegally sold at prices higher than the maximum legal price. The difference between the set price (ceiling) and the black market price is the search cost. Conversely in the case of a price floor, black market goods will be illegally sold at prices lower than the minimum legal price. The difference between the two prices reflects the search cost.

Taxes

Taxes exist for a variety of reasons. An **excise tax** is imposed by the government and is used to generate revenue and/or to curb the use of a particular good (compensate for externalities).

To depict a tax graphically using the supply and demand curve graphs, the tax results in a decrease of supply. The curve is shifted upwards by the tax amount ($p_0 + p_t$) and results in an excess supply of goods/service (in regular situations). See left graph below.

We then determine what portion (the incidence) of tax each party pays by looking at the new equilibrium point, p_c (where S_1 curve intersects D curve, below right graph). From this point, draw the new equilibrium quantity line downwards. The new equilibrium price, p_c, is the price consumers pay. (Although this is the same symbol as used for the price ceiling, the two situations are different). The price on the original supply curve at the new equilibrium quantity is p_s, the price producers receive. p_0 still represents the original equilibrium price. The shaded area shows the government's tax revenue $(p_c - p_s) * q_e$. The amount of tax the consumer pays per unit is $p_c - p_0$ and the amount of tax the supplier pays per unit is $p_0 - p_s$.



The portions of tax that consumers and producers share is called **tax incidence.** Determining the sizes of tax that the supplier or consumer will pay depends on the elasticity of the supply and demand curves. Whichever curve is more INELASTIC will end up paying more, if not all, of the tax.

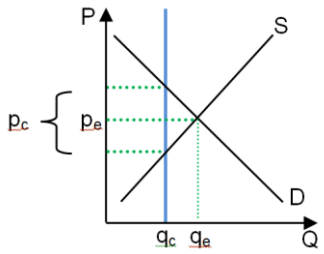
There are four **special cases** of tax incidence **where one side of the market pays the whole tax**: perfectly elastic supply curve, perfectly elastic demand curve, perfectly inelastic supply curve and perfectly inelastic demand curve.

When a supply (or demand) curve is perfectly inelastic (vertical), a change in price will have no effect on the quantity supplied (or demanded). The perfectly inelastic side of the market will pay all the tax.

When a supply (or demand) curve is perfectly elastic (horizontal), a change in price will result in the quantity supplied (or demanded) becoming zero. The side of the market that DOES NOT have a perfectly elastic curve will pay all the tax.

Quantity Control

Governments can also control the quantity that a firm/market is allowed to produce. When government imposes a quantity control at q_c, the good will be traded within the price range of p_c. q_e - q_c units of the good will not be traded by the market.



Marketable Permits

Governments can issue tradable permits to firms in a market. The tradable permits allow firms that are more efficient (has a lower cost) to pay more for the permits to produce while letting the less efficient firms to sell their permits to the more efficient firms, which allows the economy as a whole utilize resources and produce the good more efficiently.

Subsidies & Tax cuts

For positive externalities, governments can offer incentives such as subsidies and/or provide tax cuts to firms or consumers.

Practice Problems

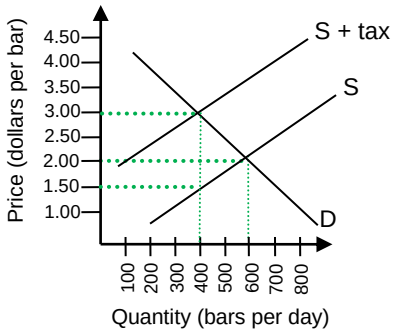
1. A price ceiling set below the equilibrium price results in:
   (a) Excess quantity demanded
   (b) A decrease in supply
   (c) The equilibrium price
   (d) An increase in supply
   (e) Excess quantity supplied

2. True or false: When a price floor is operating effectively, the quantity exchanged will be less than the equilibrium quantity. Explain with a graph.

3. What is the impact of the government setting a price floor below the equilibrium price for cheese? Above the equilibrium price for cheese?

4. A current shortage exists due to a price ceiling. If the price ceiling is removed, what will happen?
   a. Price would rise, quantity demanded would decrease, and quantity supplied would increase
   b. Price would rise, quantity demanded would increase, and quantity supplied would decrease
   c. Price would fall, quantity demanded would increase, and quantity (Smith, 1981) supplied would decrease
   d. Price would rise, quantity demanded would decrease, and quantity supplied would increase

5. The graph below shows the chocolate market. When the government imposes a tax of $1.50 per chocolate bar (a) What is the price per chocolate bar received by sellers? (b) Explain the tax incidence for consumers and suppliers. (c) Determine the tax revenue collected by the government each day.



6. If the demand for oatmeal is perfectly inelastic and the supply curve of oatmeal is upward sloping, then a tax imposed on oatmeal:
   a. is paid entirely by the supplier
   b. is paid by both the consumer and the seller but the consumer pays more
   c. does not earn any revenue for the government
   d. is paid entirely by the consumer
   e. is split evenly between the consumer and the seller.

7. A tax is imposed on liquor. Suppliers will not pay any of the tax burden if:
    a. supply for liquor is perfectly elastic
    b. supply for liquor is unit elastic
    c. demand for liquor is perfectly inelastic
    d. demand for liquor is perfectly elastic

Solutions

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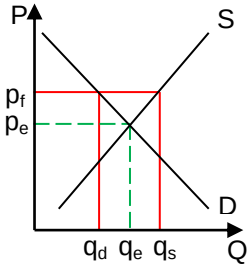
1. A
2. T. For an effective price floor, $q_s > q_d$. The amount exchanged in the market will be q_d which is less than the equilibrium quantity.



3. Setting a price floor below the equilibrium price will have no effect. The market will continue to operate at equilibrium price. Setting a price floor above the equilibrium price will result in a surplus of cheese on the market.
4. A
5. (a) $1.50 per bar is the price received by sellers (consumers pay $3) (b) The tax paid by consumers is $1 per bar. The tax paid by producers is $0.50 per bar. This tells us that the supply of chocolate bars is more elastic than the demand. (c) 400 bars/day × $1.50/bar = $600 per day in tax revenue
6. D
7. C