

# Supply and Demand

October 14, 2013

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# Introduction

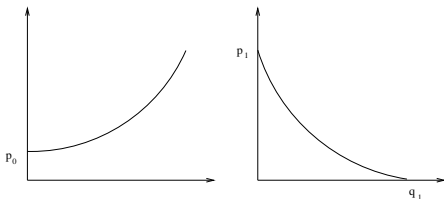
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- As the price increases, manufacturers are usually willing to supply more of the product,
- and the quantity demanded by consumers decreases.

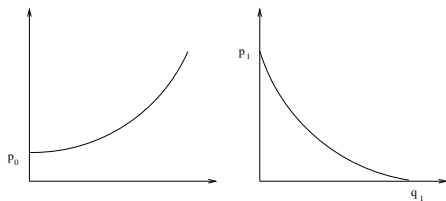
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- The **demand curve** relates the quantity,  $q$ , of an item demanded by consumers per unit time to the price,  $p$ , of the item.



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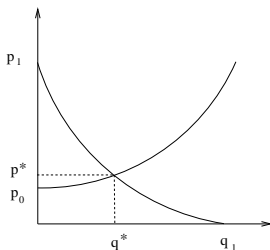
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- $q_1$  is the quantity demanded if the price were zero, i.e. *the quantity that could be given away free.*

# Equilibrium Price and Quantity

If we plot the supply and demand curves on the same axes, the graphs cross at the *equilibrium point*. The values  $p^*$  and  $q^*$  are called the *equilibrium price* and *equilibrium quantity*. It is assumed that the market naturally settles to this equilibrium point.



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Quantity supplies  $= 3p - 50$ , and Quantity  
demanded  $= 100 - 2p$ .
- $p^* = 30$ ,  $q^* = 40$ .

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Find the equilibrium price and quantity if  
Quantity supplies  $= 3e^{0.03p} + 50$ , and Quantity  
demanded  $= 100 - 2e^{0.03p}$ .

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- What effect do taxes have on the equilibrium price and quantity for a product?
- We distinguish between two types of taxes
  - *Specific tax* is a fixed amount per unit of a product sold regardless of the selling price.
  - *Sales tax* is a fixed percentage of the selling price.



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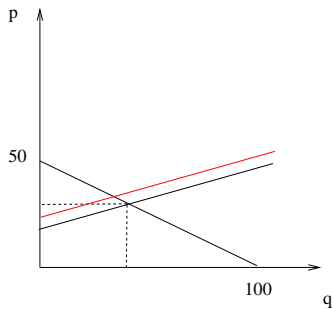
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- $p^* = 33, q^* = 34$ .



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- The consumer ends up paying \$3 more, and the government received \$5 per item.
- The producer pays the other \$2 of the tax, retaining \$28 of the price paid per item.
- Although the tax was imposed on the producer, some of the tax is passed to the consumer in terms of higher price.

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- The producer pays the other \$2 of the tax.
- Although the tax was imposed on the customer, some of the tax is passed to the supplier in terms of lower price.

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- Consumer pays tax \$0.93 per item. Total:  $30.93 \cdot 5\% \approx \$1.55$ , so producer pays \$0.62.
- Total tax collect:  $\$1.55 \cdot 38.14 \approx \$59.12$ .

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- Consumer pays  $\$29.41 \cdot 105\% - \$30 = \$0.89$ , so producer pays  $\$0.59$ .

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- Consumer pays  $\$29.41 \cdot 105\% - \$30 = \$0.89$ , so producer pays  $\$0.59$ .
- Total tax collect:  $\$1.48 \cdot 38.23 = \$56.58$ .

# A budget constraint

Suppose you have a budget of 400 dollars for one month. You would like to buy some textbooks and CDs. The average cost of a book is 50 dollars each and that of a CD is 10 dollars each. Let  $x$  denote the number of books you buy and  $y$  denote the number of CDs that you buy. Assume that all the money is spent,



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$$y = 40 - 5x$$