

Solutions to Practice Problem on Demand and Supply

Consider the hypothetical market for cars. Assume that the demand for cars is given by $Q^d = 50 - 2p + 5I$ where p is price per car and I is the income of the buyers; the supply of cars is given by $Q^s = 20 + 5p - 3b$ where b is the price of all the materials needed to produce a car.

1. obvious; choose some values for the parameters, say $I = 1$ and $b = 0$. Then draw Q^d against p and Q^s against p . Keep p on the vertical axis.
2. It is the price at which the market for cars clears. At this price, buyers demand exactly as many cars as suppliers want to supply.
3. endogenous: p and Q ; rest are exogenous variables.
4. First set demand equal to supply, i.e., $Q^d = Q^s$, or

$$50 - 2p + 5I = 20 + 5p - 3b$$

bring all the p to one side

$$50 - 20 + 5I + 3b = 7p$$

solve for p^*

$$p^* = \frac{30 + 5I + 3b}{7}$$

this is the equilibrium price; eqbm quantity may be computed by putting this value of p into Q^d :

$$\begin{aligned} & 50 - 2p^* + 5I \\ = & 50 - 2\left(\frac{30 + 5I + 3b}{7}\right) + 5I \\ = & 50 - \left(\frac{60 + 10I + 6b}{7}\right) + 5I \\ = & \frac{350 - (60 + 10I + 6b) + 35I}{7} \\ = & \frac{1}{7}(25I - 6b + 290) \end{aligned}$$

5. Does the equilibrium price depend on
 - (a) Q : no
 - (b) p : no
 - (c) b : yes
 - (d) I : yes

- (a) Notice here that the demand function does not depend on price and so is a vertical line. This is somewhat peculiar but not totally unrealistic.
- (b) We adopt the same method as in 4 above. Set new demand equal to supply.

$$50 + 5I = 20 + 5p - 3b$$

$$p^* = \frac{30 + 5I + 3b}{5}$$

and use this in Q to compute eqm quantity.

- (c)

$$p^* = \frac{30 + 5I + 3b}{7} = 0$$

if

$$5I + 3b + 30 = 0$$

$$3b = -30 - 5I$$

$$b = -\left(\frac{30 + 5I}{3}\right)$$