

# 17 | MORE COMPETITIVE MARKETS IN THE SHORT-RUN

Purpose: To provide more practice working with price and output determination in competitive markets in the short-run.

Computer file: **srmkt2.xls**

Instructions and background information:

You are still operating in the role of a government economist studying the wine industry. Emphasis here is mostly on the effects of subsidies to the wine industry. The exercises here will help generate data that you can use to prepare your report on the consequences of government intervention in the industry.

The wine industry is assumed to be perfectly competitive. The price of wine is determined in the market by supply and demand. In equilibrium excess demand for wine must be zero. Firms in the industry take the market price as a constant, and try to maximize profits by choosing an output level. In equilibrium for the firm, marginal revenue must equal marginal cost. Firms in the industry must adjust their outputs in response to changes in the market equilibrium price.

The graphical setup for this problem is the same as for the previous one. The variables you can choose here are market price, the firm's output, income, a tax rate, and the number of firms. Excel automatically computes all the other values in the tables.

Here are some things to watch for and learn as you do the problems:

- 1) As in the previous problem set, competitive markets adjust to equilibrium through changes in price. If a good is produced in perfect competition, it is supply and demand in the market that determine the price.
- 2) A competitive firm takes market price as given, and tries to maximize profit by choosing output so that marginal cost equals marginal revenue. Because price is constant for the typical competitive firm, marginal revenue and price (average revenue) are equal.
- 3) A subsidy is just a negative tax. A per unit subsidy lowers the market supply curve and firms' marginal and average cost curves by the amount of the subsidy per unit. The increase in market supply lowers price, but by less than the subsidy, and increases quantity. Firms increase output because marginal cost falls by less than price falls. Profits rise.

Here are some hints to help you get the answers more quickly:

- 1) Use Goal Seek to find the market equilibrium price. After you find the price, use Goal Seek again to find the firm's output that will make MR-MC equal to zero.
- 2) You'll need a calculator to figure out total profits. The quickest way to do that is to find the profit per unit (P-AC) and multiply by output.
- 3) You're asked at one point to compute the elasticity of demand for wine. Use the midpoint formula to determine whether demand is elastic or inelastic.

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**MATH MAVEN'S CORNER:** For this problem the market demand curve is given by  $Q(D) = aI - b(P)$ , where  $I$  is income,  $P$  is price, and  $a$  and  $b$  are randomly picked constants. The market supply curve is given by  $Q(S) = N(P - t - d)/c$ , where  $N$  is the number of firms in the industry,  $t$  is the tax per unit of output placed on all firms, and  $d$  and  $c$  are constants. The cost curves of the typical firm are  $AC = d + (c/2)(q) + (FC/q) + t$ , and  $MC = d + c(q) + t$ .  $FC$  is fixed cost.

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### Questions

Set income, the tax, and the number of firms to their baseline values.

- 1) What's the market equilibrium price of wine?
- 2) What's the market equilibrium quantity of wine?

Start from the equilibrium you found in questions 1) and 2).

- 3) What output should the firm produce in order to maximize profit?
- 4) How much is maximum total profit?

The government decides to help the wine industry by paying a subsidy of \$10 per case.

- 5) What's the new short-run equilibrium price of wine?

Continuing on from question 5,

- 6) What's the new market equilibrium quantity?
- 7) What's the total cost of the subsidy to the government?

With the subsidy still at \$10 per case, and the market in equilibrium,

- 8) What output should the typical firm produce?
- 9) What are the maximum profits of the typical firm?
- 10) When the typical firm maximizes profits after receiving the subsidy, what are the total subsidy payments to the firm per time period?
- 11) How much did market price of wine change in response to the \$10 per case subsidy?  
[Hint: Decreases must carry a minus sign.]
- 12) Before the subsidy, how much do consumers spend on wine?
- 13) After the subsidy, how much do consumers spend on wine?
- 14) Between the before-subsidy and after-subsidy prices of wine, is demand elastic or inelastic?

Set all variables to their baseline values, and make sure the market is in equilibrium. Increase income to \$60,000.

- 15) What's the new market equilibrium price?
- 16) Continuing on from the last question, what's the new market equilibrium quantity?
- 17) Continuing on from the last question, what's the new profit maximizing quantity for the typical firm?

- 18) Continuing on from the last question, what are the profits of the typical firm?
- 19) What are the total profits of the industry?