

## Homework Problem #26

### Comparison of a Competitive and a Monopolized Industry

#### Introductory Discussion

In introductory economics courses instructors usually contrast the efficiency of the **competitive firm** against the inefficiency of a **monopoly firm** if both industries have the same cost structure. Even though the entrepreneurs in each case are pursuing the same objective, profit, the market conditions affecting profit are such that the entrepreneur operating in a competitive market is guided toward **social efficiency**, while the monopolist is guided away from social efficiency. The main difference between the two cases is in the marginal revenue faced by the firm if all buyers must be charged the same price. If a monopolist increases output, this pushes down price and the firm must consider this effect on the quantity sold in the entire market. For the competitive firm, on the other hand, any increase in output will have virtually no effect on the market price because the quantity it supplies to the market is but a small fraction of the total amount sold in the market. This consideration leads to the standard rule that a monopolist produces where **marginal cost (MC) equals marginal revenue (MR)** whereas a competitive firm produces where **marginal cost equals price (P)**. These actually reduce to the same rule, because, for **the competitive firm, price and marginal revenue are the same thing**.

In making comparisons between a competitive firm and a monopoly firm, however, we must be careful. If a competitive firm is placed into the same market circumstance as a monopolist, it will no longer act like a competitive firm, but like a monopolist. The correct comparison is thus not the competitive firm vs. the monopoly, but the **competitive industry vs. a monopolized industry**. It is also important to understand that **market structures** don't evolve accidentally, but rather in response to the technical and economic environment in which production and exchange takes place. For example, if increasing returns to scale apply throughout the entire range of market demand, the market structure will evolve naturally toward monopoly. On the other hand, if average cost reaches a minimum at a level of output (the **minimum efficient scale - MES**) that is a small part of the total market demand, the industry would evolve naturally toward a competitive industry.

It is not common to find an industry that is equally likely to evolve into a monopoly or a competitive industry. In this homework exercise we construct an imaginary circumstance to illustrate the main lessons. The problem uses a simplified representation of the truck transport industry to contrast the behavior and performance of the industry under the two polar market structures of perfect competition and monopoly.

#### Application

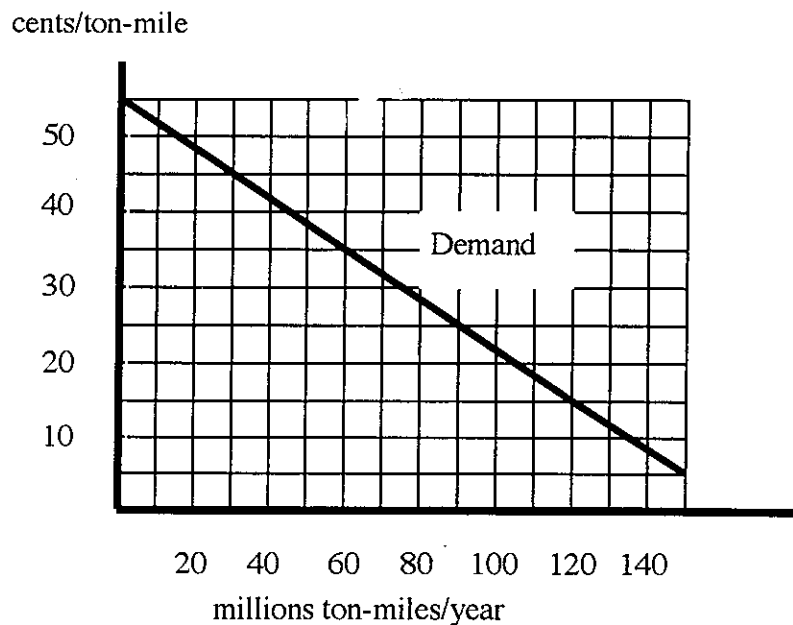
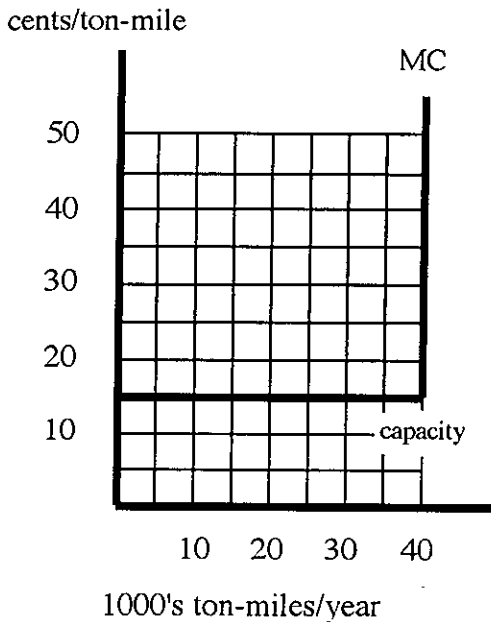
The diagram on the right of page 159 shows an assumed annual market demand for truck freight hauling services (measured in ton-miles per year). We can think of each truck as a production facility, and if we look at the long run, the initial cost of the truck can be allocated to all of the ton-miles of freight haulage produced with the truck. The point here is that the truck cost becomes a part of variable cost, just like gasoline, maintenance, and driver time would be in the short run, so we have no concern here with any fixed cost. Now suppose when we do this accounting we find that the average cost of a ton-mile of freight haulage is constant and equal to \$0.15. (Note that this also means the MC is \$0.15.) Suppose further that all trucks are identical and have a capacity of

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40,000 ton-miles annually. The diagram on the left below shows the MC curve for one truck, horizontal up to the capacity limit, at 40,000 ton-miles annually. The diagram which point it becomes vertical. Use this information to answer the following questions. Be careful to note the prices are in cents/ton-mile and quantities are measured in both thousands and millions of ton-miles per year.

**Marginal Cost for One Truck**

**Market Demand for Truck Transport Services**



1. Suppose the trucking industry is organized as a competitive industry.  
 How much freight will be hauled? \_\_\_\_\_ ton-miles  
 At what price? \_\_\_\_\_ cents/ton-mile  
 How many trucks will be used? \_\_\_\_\_ trucks
  
2. Now suppose a single company buys up all the trucks and runs the industry like a monopoly.  
 How much freight will be hauled? \_\_\_\_\_ ton-miles  
 At what price? \_\_\_\_\_ cents/ton-mile  
 How many trucks will the monopoly firm keep? \_\_\_\_\_ trucks

Questions continued on page 160

3. How much economic profit is earned by the competitive industry?  
Profit = \$\_\_\_\_\_ / year
4. How much economic profit is earned by the monopolized industry?  
Profit = \$\_\_\_\_\_ / year
5. Consumer surplus is smaller under the monopolized industry. By how much? (in comparison to the competitive case)  
\$\_\_\_\_\_ / year
6. Use the graph to show the inefficiency or "deadweight" loss that society would incur by allowing such a monopoly to operate without restraint by shading in the area that represents this inefficiency or loss.