

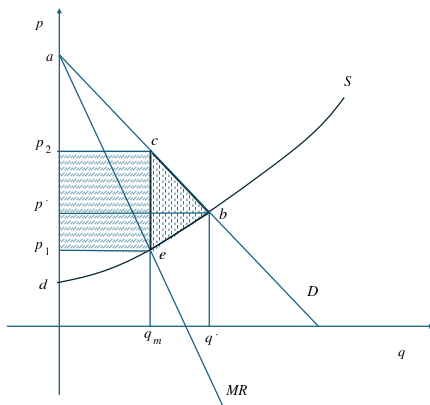
A Couple of Simple Examples of Policy Analysis: Lecture X

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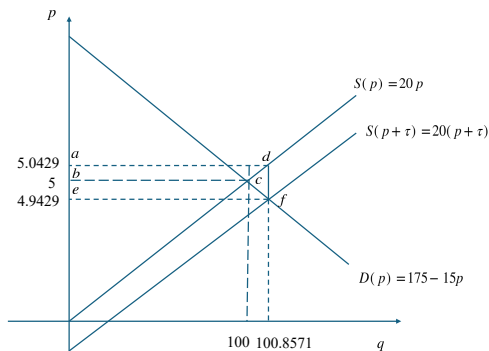
The Economic Cost of Monopolies



- Following what we know from undergraduate economics, the optimal point for the monopolist is where $MR = MC$ at q_m in Figure 3.
- Going through the welfare measures - consumer surplus in a competitive market is apb where the competitive market price is p .
- At the monopolistic solution, the consumer surplus becomes ap_2c . So the loss of consumer surplus is p_2pbc .
- The original producers surplus is peb . Under the monopoly the producers earn a standard producer surplus of p_1ef and what are typically referred to as monopolistic rents of p_2p_1fc . The gains to producers are $p_2pdc - dfb$.
- The economic loss referred to as the Deadweight Loss (DWL) (or the Harberger Triangle) is cfb . We typically define this as the true economic cost - why?
 - What is the potential compensation?



A Simple Numeric Example



- We begin by assuming that at an initial equilibrium $q = 100$ and $p = 5$. Further I am going to assume that the elasticity of supply (η_S) is 1.0 and the elasticity of demand is -0.75 ($\eta_D = -0.75$).

$$\begin{aligned}q_S &= \alpha_S + \beta_S p \Rightarrow \beta_S = 1.0 \frac{100}{5} = 20 \\ \alpha_S &= 100 - 20 \times 5 = 0 \\ q_D &= \alpha_D + \beta_D p \Rightarrow \beta_D = -0.75 \frac{100}{5} = -15 \\ \alpha_D &= 100 + 15 \times 5 = 175\end{aligned}\tag{1}$$

- Check

$$\begin{aligned}20p &= 175 - 15p \\ 35p &= 175 \Rightarrow p = 5\end{aligned}\tag{2}$$

- Next, consider $\tau = 0.10$, the equilibrium price is the determined

$$\begin{aligned} 20(p + 0.10) &= 175 - 15p \\ 35p &= 173 \Rightarrow p = 4.9429 \end{aligned} \tag{3}$$

- Based on this solution, we can determine the quantity supplied as

$$q_S = 20 \times (4.9429 + 0.10) = 20 \times 5.0429 = 100.8571. \tag{4}$$

- And the quantity demanded can be computed as

$$q_D = 175 - 15 \times 4.9429 = 100.8571 \tag{5}$$

- First question - what is the gain in producer surplus? Area $abcd$

$$\Delta S_P = (5.0429 - 5.0000) \times 100 + (5.0571 - 5.0000) \times (100.8571 - 100) / 2 = 4.3041 \quad (6)$$

- Second Question - what is the gain in consumer surplus? Area $befc$

$$\Delta S_C = (5.0000 - 4.9429) \times 100 + (5.0000 - 4.9429) \times (100.8571 - 100.000) = 5.7388 \quad (7)$$

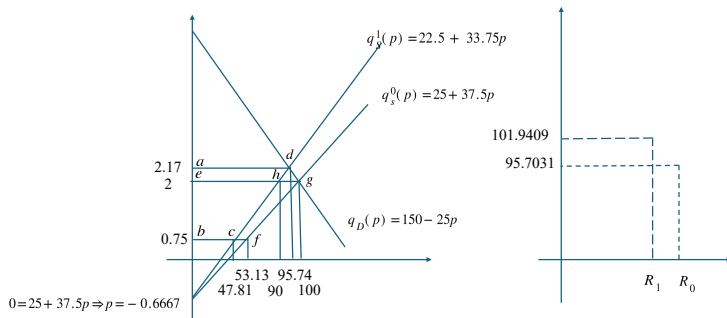
- What is the cost to the Treasury? Area $aefd$

$$TC = 100.8571 \times 0.10 = 10.0857 \quad (8)$$

- What is the deadweight loss? efd

$$DWL = 10.0857 - 10.0429 = 0.0429 \quad (9)$$

Allotment Model



- Original supply function - $q_S = 100$, $p = 2$, and $\eta_S = 0.75$

$$q_S^0(p) = 25 + 37.5p \quad (10)$$

- Demand function - $\eta_D = -0.50$

$$q_D(p) = 150 - 25p \quad (11)$$

- New supply function (assume a 10% reduction in quantity supplied) $q_S = 90$

$$q_S^1(p) = 22.5 + 33.75p \quad (12)$$

- New equilibrium

$$\begin{aligned} 22.5 + 33.75p &= 150 - 25p \\ 127.5 &= 58.75p \Rightarrow p = 2.17 \end{aligned} \quad (13)$$

- Notice in this case the price at $q = 0$ is less than zero

$$0 = 25 + 37.5p \Rightarrow p = -0.06667 \quad (14)$$

One alternative is to put a “choke price” into the model - basically, an assumed value where the marginal cost curve cross the average variable cost curve.

- Here, we will assume a choke price of 0.75.
- To compute the gain in producer surplus, we need to compute the original producer surplus S_P^1 and the surplus after allotments S_P^2 .
- The surplus after allotments is $abcd$ - note that c is determined by $q_S^1(0.75) = 47.81$

$$S_P^2 = (47.81 - 0) \times (2.17 - 0.75) + (95.74 - 47.81) \times (2.17 - 0.75) / 2 = 101.94 \quad (15)$$

- The surplus before allotments is $ebfg$ – where
 $f = q_S^0(0.75) = 53.13$

$$S_P^1 = (53.13 - 0) \times (2.0 - 0.75) + (100 - 53.13) \times (2.0 - 0.75) / 2 = 95.7031 \quad (16)$$

- The gain in producer surplus is then 6.2377.
- The loss in consumer surplus is

$$\Delta S_C = (95.74 - 0) \times (2.17 - 2.0) + (100.0 - 95.74) \times (2.17 - 2.0) = 16.6591 \quad (17)$$

- What is the DWL ?