

Microeconomics

Problem Set 3

Bocconi University Group number _____

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Problem 5

1. Bella Italia's inverse demand function is:

$$P = 132 - Q$$

2. Bella Italia's marginal revenue is:

$$MR(Q) = \frac{dR(Q)}{dQ} = 132 - 2Q$$

3. Bella Italia's marginal cost is:

$$MC(Q) = \frac{dTC(Q)}{dQ} = 2Q$$

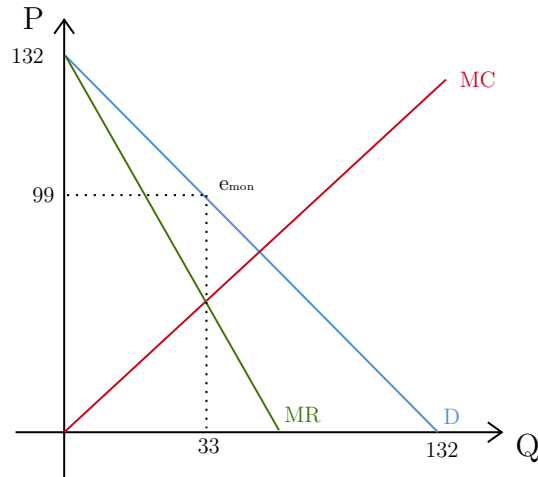
4. Bella Italia's optimal quantity and the corresponding price that maximize profits is:

$$\begin{aligned}MR &= MC \\132 - 2Q &= 2Q \\P^* &= 99 \\Q^* &= 33\end{aligned}$$

5. Bella Italia's maximum profits are:

$$\pi(Q) = P^* \times Q^* - TC(Q^*) = 33 \times 99 - (33)^2 = 2178$$

6.



7. Consumer surplus in this market is:

$$CS = \frac{33 \times (132 - 99)}{2} = 544.5$$

8. Bella Italia's surplus in this market is:

$$PS = \frac{33 \times (99 + 33)}{2} = 2178$$

9. Total surplus in this market is:

$$TS = PS + CS = 2722.5$$

10. The equilibrium quantity and price under perfect competition are:

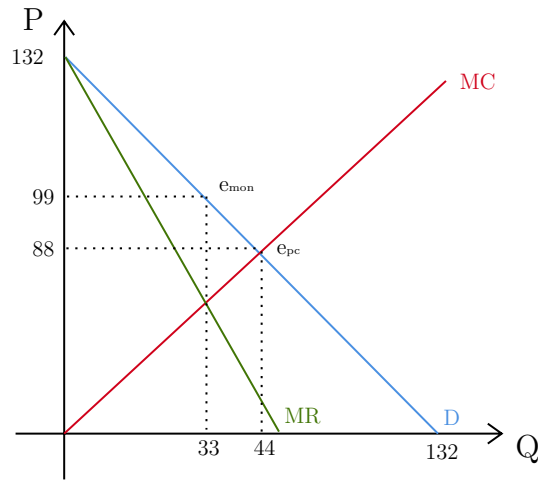
$$\begin{aligned} MC(Q) &= P \\ 2Q &= 132 - Q \\ Q^* &= 44 \\ P^* &= 88 \end{aligned}$$

11. Under perfect competition the quantity is increased while the price is decreased compared to the monopoly scenario.

12. The profits under perfect competition are:

$$\pi(Q) = P^* \times Q^* - TC(Q^*) = 44 \times 88 - (44)^2 = 1936$$

13.



14. Consumer surplus under perfect competition is:

$$CS = \frac{44 \times (132 - 88)}{2} = 968$$

15. Bella Italia's surplus under perfect competition is:

$$PS = \frac{88 \times 44}{2} = 1936$$

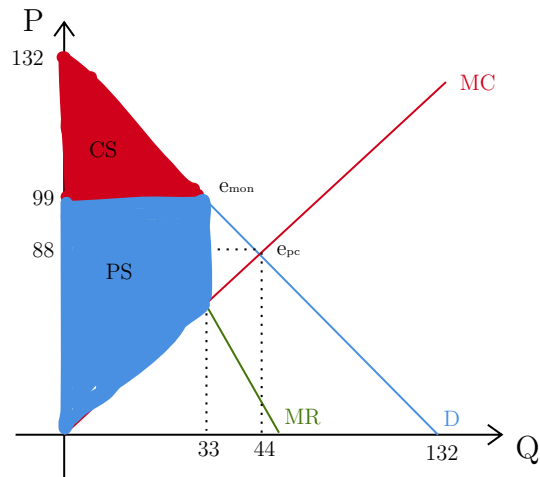
16. Total surplus under perfect competition is:

$$TS = PS + CS = 2904$$

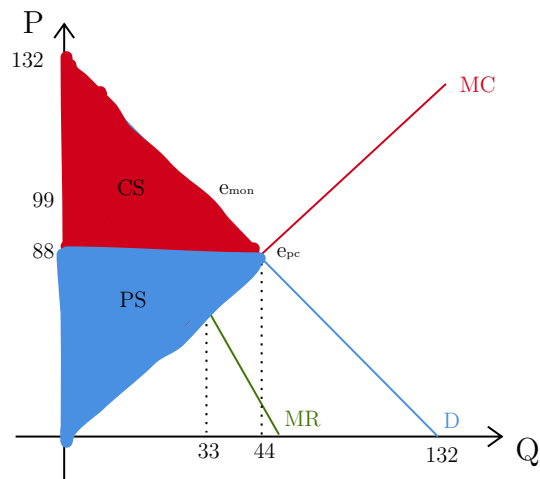
17. The deadweight loss when Bella Italia operates like a monopolist with respect to perfect competition is:

$$TS_{pc} - TS_{monopoly} = 2904 - 2722.5 = 181.5$$

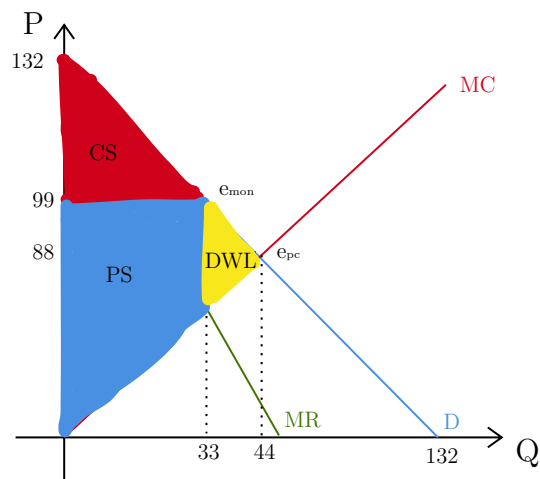
18. Consumer Surplus and Producer Surplus in a monopoly scenario:



Consumer Surplus and Producer Surplus under perfect competition:



19. The deadweight loss is:



20. The new equilibrium quantity and price is:

$$PriceCeiling = P^* = 64$$

$$64 = 2Q$$

$$Q^* = 32$$

21.

22. The profits when the city council imposes the price ceiling are:

$$\pi(Q) = P^* \times Q^* - TC(Q^*) = 64 \times 32 - (32)^2 = 1024$$

23. The price ceiling creates an excess of demand because:

$$Q_{demand} = 132 - 64 = 68$$

$$Q^* - Q_{demand} = 32 - 68 = -36$$

24. New Consumer surplus is:

$$CS = \frac{32 \times (132 - 100)}{2} + (100 - 64) \times 32 = 1644$$

25. New Bella Italia's surplus is:

$$PS = \frac{32 \times 64}{2} = 1024$$

26. New Total surplus is:

$$TS = PS + CS = 2688$$

27. Consumers can only buy 32 instead of 44 units. This cause a reduction in consumer surplus (C). The consumers can, anyway, buy 32 units at a lower price, gaining an additional surplus (B).

The producers now sell fewer units at a lower price, loosing producer surplus equal to $B + D = 912$.

Anyway, part of this loss, B, is appropriated by consumers, while D is a loss for the society. Therefore:

$$DWL = C + D = 2904 - 2688 = 216$$

or in another way

$$DWL = \frac{(100 - 64) \times 12}{2} = 216$$

28. Compare total surplus and the deadweight loss under monopoly and under perfect competition with the price ceiling. Therefore, comparing the 2 scenarios:

$$TS_{monopoly} = 2722.5 \text{ and } TS_{ceiling} = 2688$$

$$DWL_{monopoly} = 181.5 \text{ and } DWL_{ceiling} = 216$$

Under perfect competition with the price ceiling, the DWL is higher, which means that more surplus is wasted. In addition the total surplus under monopoly is higher, making the monopoly a more desirable situation for the society.

29. Compare monopoly, perfect competition without the price ceiling, and perfect competition with the price ceiling. Therefore, the consumer surplus in the 3 scenarios are:

$$CS_{monopoly} = 544.5 \quad CS_{ceiling} = 1664 \quad CS_{pc} = 968$$

Since the consumer surplus is the highest in the scenario with the price ceiling, that's the most desirable situation for consumers.

30. Compare monopoly, perfect competition without the price ceiling, and perfect competition with the price ceiling. Therefore, the producer surplus and profits in the 3 scenarios are:

$$PS_{monopoly} = 2178 \quad PS_{ceiling} = 1024 \quad PS_{pc} = 1936$$

$$Profits_{monopoly} = 2108 \quad Profits_{ceiling} = 1024 \quad Profits_{pc} = 1936$$

Since the producer surplus is the highest in the monopoly scenario, that's the most desirable situation for producers.

31. What is the most efficient scenario, that is, the scenario that maximizes total surplus in Granville Island? We compared the total surplus in the 3 scenarios:

$$TS_{monopoly} = 2722.5 \quad TS_{ceiling} = 2688 \quad TS_{pc} = 2904$$

Since the total surplus is the highest in the scenario under perfect competition, that's the most desirable situation. Also because in perfect competition there is no DWL.