Assignment 9

1. Assume that a firm faces a market price of $P^M$ per unit of output. The firm has a fixed cost of $F$ and a marginal cost of $MC(q)$ of producing $q$ units of output. Derive the firm's profit-maximizing output level $q^M$.

\[ q^M = \frac{P^M - MC(q^M)}{MC'(q^M)} \\ \]

2. Suppose the government levies an excise tax of $T$ per unit on the consumption of the good. Derive the new profit-maximizing output level $q_{new}^M$.

\[ q_{new}^M = \frac{P^M - (MC(q^M) + T)}{MC'(q^M)} \\ \]

3. Calculate the welfare loss from the tax using the expression for the deadweight loss:

\[ \text{DwL} = \frac{1}{2} (T^2) \frac{q_{M}^M}{MC'(q^M)} \\ \]

4. Suppose the government levies an excise tax of $T$ per unit on the consumption of the good. Derive the new profit-maximizing output level $q_{new}^M$.

\[ q_{new}^M = \frac{P^M - (MC(q^M) + T)}{MC'(q^M)} \\ \]

5. Calculate the welfare loss from the tax using the expression for the deadweight loss:

\[ \text{DwL} = \frac{1}{2} (T^2) \frac{q_{M}^M}{MC'(q^M)} \\ \]

6. Suppose the government levies an excise tax of $T$ per unit on the consumption of the good. Derive the new profit-maximizing output level $q_{new}^M$.

\[ q_{new}^M = \frac{P^M - (MC(q^M) + T)}{MC'(q^M)} \\ \]

7. Calculate the welfare loss from the tax using the expression for the deadweight loss:

\[ \text{DwL} = \frac{1}{2} (T^2) \frac{q_{M}^M}{MC'(q^M)} \\ \]

8. Suppose the government levies an excise tax of $T$ per unit on the consumption of the good. Derive the new profit-maximizing output level $q_{new}^M$.

\[ q_{new}^M = \frac{P^M - (MC(q^M) + T)}{MC'(q^M)} \\ \]

9. Calculate the welfare loss from the tax using the expression for the deadweight loss:

\[ \text{DwL} = \frac{1}{2} (T^2) \frac{q_{M}^M}{MC'(q^M)} \\ \]

10. Suppose the government levies an excise tax of $T$ per unit on the consumption of the good. Derive the new profit-maximizing output level $q_{new}^M$.

\[ q_{new}^M = \frac{P^M - (MC(q^M) + T)}{MC'(q^M)} \\ \]

11. Calculate the welfare loss from the tax using the expression for the deadweight loss:

\[ \text{DwL} = \frac{1}{2} (T^2) \frac{q_{M}^M}{MC'(q^M)} \\ \]