Chapter #3: Welfare Economics

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**General Analysis Overview**

*Welfare analysis* is a systematic method of evaluating the economic implications of alternative allocations. Welfare analysis answers the following questions:

1. Is a given resource allocation efficient?
2. Who gains and who loses under various resource allocations? By how much?

*Welfare economics:* A methodological approach to assess resource allocations and establish criteria for government intervention.

*Partial analysis:* Evaluates outcomes in a subset of markets assuming efficiency in others.

\[ D = \text{demand curve} \]
\[ S = \text{supply curve} \]
\[ A = \text{area under demand curve } ABC0 = \text{gross benefits from consumption.} \]
\[ ABP = \text{consumer surplus area between demand and price.} \]
\[ PLM = \text{area between price and supply } = \text{producer surplus.} \]
When there are no externalities, an efficient outcome occurs where the sum of consumers’ and producers’ surplus is maximized.

- Area under demand = gross benefits
- Area under supply = gross cost
- Social surplus = gross benefit – cost.
- A competitive equilibrium is efficient. It maximizes sum of consumer and producers surplus.
**Welfare under Monopoly**

A monopoly is the only seller in a market. The basic condition for a monopoly is below:

Maximizes \( P(Q)Q - C(Q) \)

\( P(Q) = \) Inverse demand: price as a function of quantity

\( C(Q) = \) quantity.

Optimality occurs where:

\[
P + Q \frac{\partial P}{\partial Q} - \frac{\partial C}{\partial Q} = 0
\]

\( MR(Q) - ML(Q) = 0 \)

\( MR = \) marginal revenue

\( MC = \) marginal cost.

\( Q_c = \) quantity under competition \( P_c = \) price under competition

\( P_m = \) price under monopoly

\( Q_m = \) quantity under monopoly.

A monopoly produces too little and charges too much. Welfare loss under monopoly is \( \Delta ABC \).
Linear Example of Monopoly

inverse demand = \( P(Q) = a - bQ \)

revenue = \( (a - bQ)Q = aQ - bQ^2 \)

supply = \( c + dQ \)

competitive outcome = \( a - bQ = c + dQ \)

\[
Q_c = \frac{a-c}{b+d}
\]

\[
P_c = a - \frac{ba - bc}{b + d}
\]

\[
P_c = \frac{ad + bc}{b + d}.
\]

Under monopoly,

\[ a - 2bQ = c + dQ \]

\[
Q_M = \frac{a-c}{2b+d}
\]
\[ P_M = a - \frac{b(a - c)}{2b + d} = \frac{a(b + d) + bc}{2b + d} \]

demand = 10 − Q
supply = 1 + Q

\[ Q_c = \frac{10 - 1}{2} = 4.5 \quad P_c = \frac{10 + 1}{2} = 5.5 \]

\[ Q_{mm} = \frac{9}{3} = 3 \quad P_m = 7 \]

**Welfare under Monopsony**
A monopsony is the only buyer in a market.
Maximize \[ B(Q) - QMC(Q) \]

\[ B(Q) = \int_{0}^{Q} P(z)dz = \text{area under demand.} \] The optimality condition is:

\[ \frac{\partial B}{\partial Q} = Q \frac{\partial MC}{\partial Q} + MC(Q) \]

\( P_{mn} = \text{price paid by monopsonist} \)

\( Q_{mn} = \text{quantity produced by monopsonist} \)

\( MC(Q) = \text{marginal cost of producers.} \)

Price paid by monopsony

\( MO = \text{marginal outlay} = MC(Q) + \frac{\partial MC}{\partial Q}. \)

\( \Rightarrow \text{Monopsonist: Underbuys and underpays.} \)

\( \text{Monopolist: Underbuys and oversells.} \)
Welfare under Middlemen
A middleman is the only buyer and seller of product.

\[ Q_{MM} = \text{middlemen output} \]

\[ P_{MM}^S = \text{price paid by middlemen to suppliers} \]

\[ P_{MM}^B = \text{price paid to middlemen by buyers} \]

\[ P_{MM}^B CE P_{MM}^S = \text{middlemen profit} \]