Chapter #3: Welfare Economics

Contents: General Analysis Overview Welfare under Monopsony
Welfare under Monopoly Welfare under Middlemen

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?


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

\[ D = \text{demand curve} \]
Area under demand curve \( ABC0 \) = gross benefits from consumption.
\( ABP \) = consumer surplus area between demand and price.

\[ S = \text{supply curve} \]
Area under supply curve \( 0ELM \) = cost of production.
\( PLM \) – area between price and supply = 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.

A monopoly produces too little and charges too much. Welfare loss under monopoly is $\Delta ABC$. 

$Q_c$ = quantity under competition

$P_c$ = price under competition

$P_M$ = price under monopoly

$Q_M$ = quantity under monopoly.
**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

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

\[ Q_M = \frac{9}{3} = 3 \quad P_M = 7 \]

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

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

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

$P_{mn} = \text{price paid by monopsonist}$

$Q_{mn} = \text{quantity produced by monopsonist}$

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

Price paid by monopsony

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

=> **Monopsonist:** Underbuys and underpays.

**Monopolist:** Underbuys and oversells.
Welfare under Middlemen

A middleman is the only buyer and seller of product.

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

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

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

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