Chapter 3
Welfare Economics

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

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.

Figure 3.1

\[ D = \text{demand curve} \]
Area under demand curve \( ABCO \) = gross benefits from consumption.
\[ ABP = \text{consumer surplus} \] 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.

Figure 3.2

- 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 $P(Q) \cdot Q - C(Q)$

$P(Q) = \text{Inverse demand: price as a function of quantity}$

$C(Q) = \text{quantity}$.

Optimality occurs where:

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

$$MR(Q) - MQ(Q) = 0$$

$MR = \text{marginal revenue}$

$MC = \text{marginal cost}$. 
A monopoly produces too little and charges too much. Welfare loss under monopoly is $\Delta ABC$.

**Figure 3.4**

*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 \[ Q \] \[ B(Q) - QMC(Q) \]

\[ B(Q) = \int_0^Q P(z)dz \] \[ = \text{area under demand.} \]

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

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

\[ => \textbf{Monopsonist:} \text{ Under buys and underpays.} \]

\[ \textbf{Monopolist:} \text{ Under sells and overprices.} \]
Welfare under Middlemen

A middleman is the only buyer and seller of product.

Figure 3.6

\[ Q_{\text{MM}} \]

\[ P_{\text{MM}}^B \]

\[ P_{\text{MM}}^S \]

\[ P_{\text{MM}}^B \]

\[ P_{\text{MM}}^S \]

\[ P_{\text{MM}}^B \]

\[ P_{\text{MM}}^S \]

\[ Q_{\text{MM}} \]

\[ MO \]

\[ MC \]

\[ MR \]

\[ D \]

\[ C \]

\[ E \]

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

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

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

\[ P_{\text{MM}}^B \]

\[ CE \]

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

The middleman produces where \( MO=MR \).