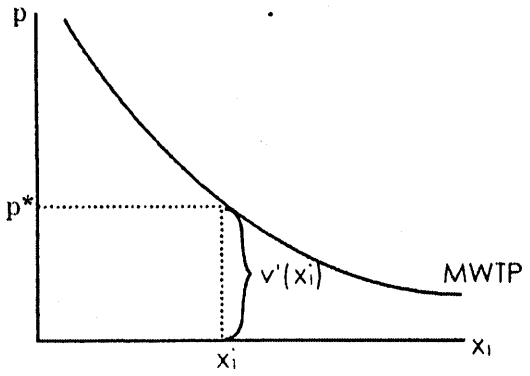
Consumer Behavior

1. $u(x_1, x_2) = v(x_1) + x_2$
   $v' \geq 0,\ v'' \leq 0$

   Budget constraint
   $px_1 + x_2 = m$

   Consumer Behavior:
   max $u(x_1, x_2)$
   subject to $px_1 + x_2 = m$

   Demand curve of the good x_1



We call $v'(x_1^*)$ the marginal willingness to pay (MWTP) at x_1^*. The area to the left of x_1^* and below the demand curve is the total utility, which we call the total willingness to pay (TWTP).

Let $v(x_1) = \log x_1$.
The demand curves of x_1 and x_2 are:

$$x_1 = \frac{1}{p}$$
$$x_2 = m - px_1 = m - 1$$

2. $u(x_1, x_2) = x_1 x_2$

   Budget constraint
   $p_1 x_1 + p_2 x_2 = m$

Demand curves of the goods x_1 and x_2.

3. Elasticities of demand with respect to prices and income

$$E_{11} = -\frac{\partial x_1}{\partial p_1}\frac{p_1}{x_1}$$
$$E_{12} = \frac{\partial x_1}{\partial p_2}\frac{p_2}{x_1}$$
$$E_{1m} = \frac{\partial x_1}{\partial m}\frac{m}{x_1}$$

An example

$$u(x_1, x_2) = \log x_1 + x_2$$
$$x_1 = \frac{1}{p}$$
$$\begin{cases} E_{11} = -\frac{\partial x_1}{\partial p_1}\frac{p_1}{x_1} = 1 \\ E_{12} = 0 \\ E_{1m} = 0 \end{cases}$$

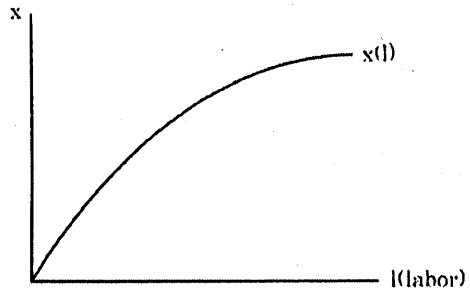
Do the case

$$u(x_1, x_2) = x_1 x_2$$

Producer Behavior

1. A firm uses the labor, l, to produce the good x. The production function of the good is given by $x(l)$ and looks like the following:

Figure 1

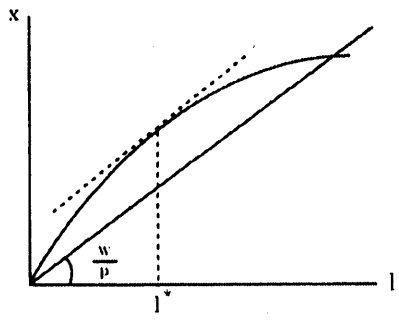


Note that

$x'(l)$ = marginal product of labor
$x''(l) \leq 0$; decreasing returns to scale

2 Profit maximization by the input
Maximize
$\pi = px(l) - wl$
p : the price of the good x
w : the wage rate

Figure 2

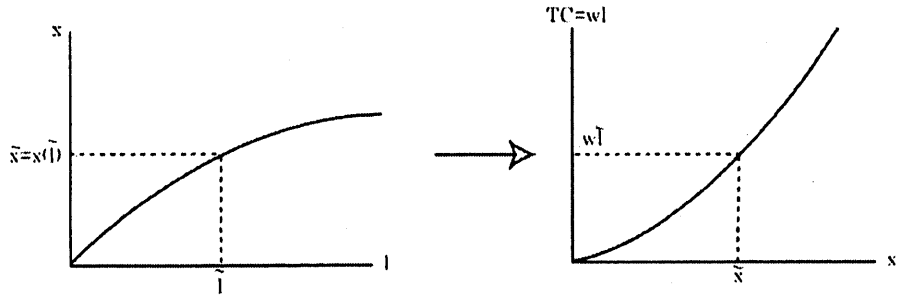


$px'(l*) = w$
The value marginal product of labor is equal to the wage rate.

3 Note that when the profit is maximized, the total cost for producing the good x, TC, is always minimized.

When the production function is the one like in the Figure 1, how does the total cost curve look like?

Figure 3



4 Profit maximization by the output

Maximize

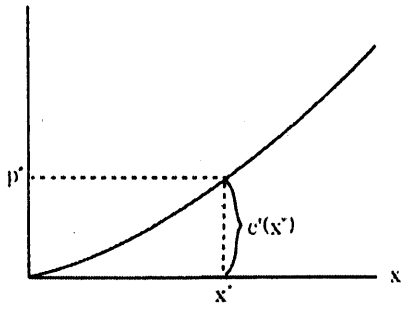
$\pi = px - c(x)$,

where $c(x)$ is the TC

$p = c'(x)$ = marginal cost of producing x, MC

Therefore, the supply curve is the marginal-cost curve.

Figure 4



We call $c'(x^*)$ the marginal cost of producing x^*. The area to the left of x^* and below the supply curve is the total cost, $TC(x)$.

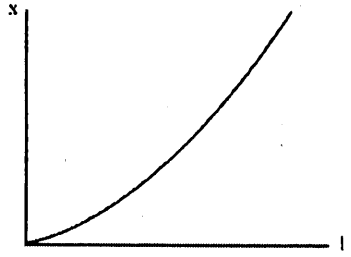
5 Examples

- $x = \sqrt{l}$

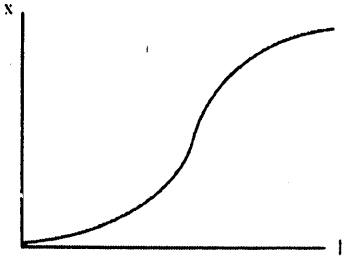
1. Draw the curve on the plane with l on the horizontal axis and x on the vertical axis.
2. Maximize the profit by the input.
3. What is the total cost for producing x?
4. Maximize the profit by the output.

- Draw the total and marginal cost curves corresponding to each of the following production curves.

(1)



(2)



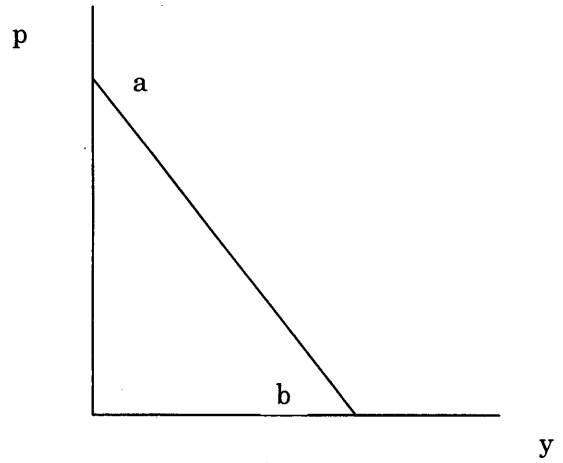
Monopoly

The monopolist knows the demand curve; he knows how consumers behave. Therefore, he has a chance to get more profit than at a competitive market.

An example;

$P(y)=a+by$, $a>0$, $b<0$.

$MC=c$, fixed



Homework: $MC=d+cy$, $d>0$, $c>0$.

Price discriminating monopolist (1)

The monopolist can sell the goods at different price according to the amount he sells.

There is still more chance that he can increase his profits.

Price discriminating monopolist (2)

Take-it-or-leave-it monopolist

The monopolist assigns a combination of the amount of goods to sell and the (limp-sum) price for it.

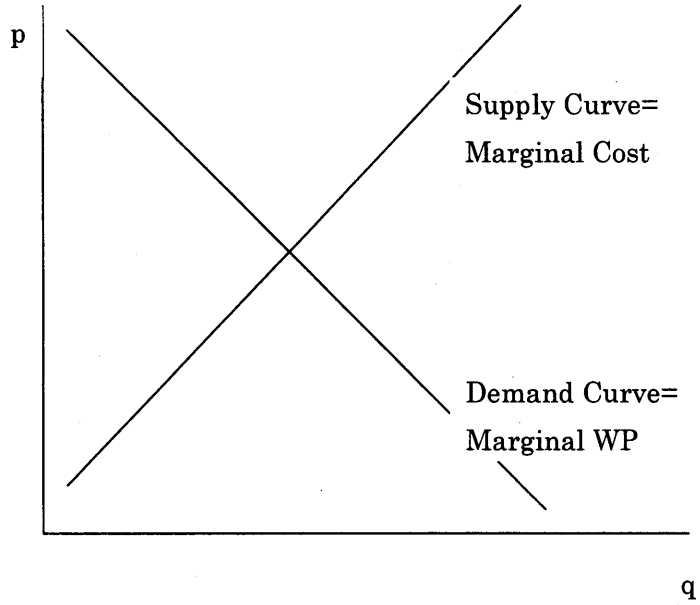
What about the case where the monopolist is faced with consumers with such different consumers that one type has stronger demand than the other.

Social optimum

Social welfare=TWP(Total willingness to pay) – TC(Total cost)

What is the TWP in a diagram with q on the horizontal and P on the vertical axes?

What is the TC in the same diagram above?



Market Equilibrium

1) Prices are taken for granted for consumers and producers.
2) Consumers and producers behave rationally.
3) The market clears.