14.01 Principles of Microeconomics, Fall 2007
Chia-Hui Chen
November 30, 2007

Lecture 30

# Dominant Firm Model and Factor Market

## Outline

1. Chap 12, 13: *Dominant Firm Model*
2. Chap 14: *Factor Market*

## 1 Dominant Firm Model

The dominant firm model is the model that in some oligopolistic markets, one large firm has a major share of total sales, and a group of smaller firms supplies the remainder of the market. The large firm has power to set a price that maximizes its own profits. A dominant firm exists because it has lower marginal cost than the other fringe firms.

Assume the fringe firms' total supply is $S_F$, the market demand is $D_M$, then the dominant firm's demand is (see Figure 1)

$$D_D = D_M - S_F.$$

Knowing $D_D$, we can derive $MR_D$. The dominant firm produces at a quantity $Q_D$ that satisfies

$$MR_D = MC_D.$$

Correspondingly, the price is $P^*$. The fringe firm's supply curve thus shows $Q_F$. Furthermore, the total quantity is

$$Q_T = Q_F + Q_D.$$

*Example* (OPEC). OPEC is an example of a successful cartel, which can be regarded as a dominant firm.

Cartels are more likely to succeed if

- demand is inelastic, and
- supply of non-Cartel producers is inelastic.

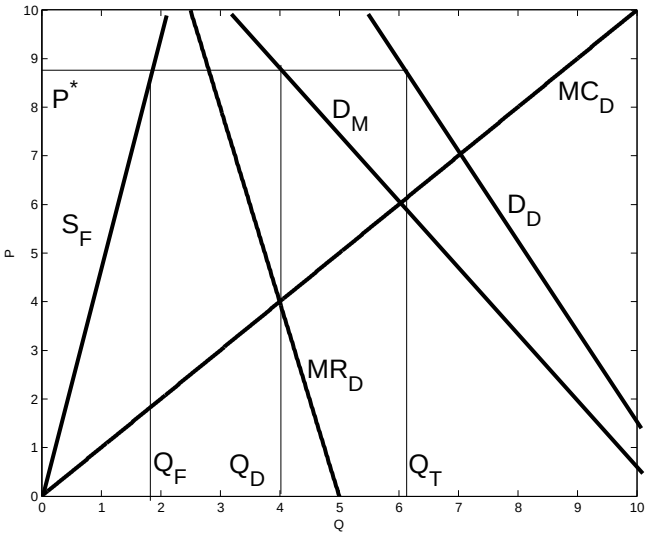


Figure 1: Dominant Firm Model.

# 2 Factor Market

The last chapters were about product market, or output market, in which

- individuals are buyers, and
- firms are producers;

we start to discuss factor markets, or input markets, in which

- individuals are producers, and
- firms are buyers.

Firms need labor and capital to produce.

## Outline

1. Demand of Labor
2. Supply of Labor

## 2.1 Demand of Labor

Demands of labor are different in short run and long run markets, and conditional and unconditional market (see Table 1). Firms use labor and capital as input.

| | Short Run | Long Run |
|---|---|---|
| Conditional | Output price fixed<br>Other factors fixed | Output price fixed<br>Other input factors vary |
| Unconditional | Output Price varies<br>Other input factors fixed | Output Price varies<br>Other Inputs vary |

Table 1: Demand of Labor.

**Short Run Demand of Labor.** Only labor is variable.

The prices for $L$ and $K$ are $w$ and $r$ respectively.

Define marginal revenue product of labor $MRP_L$ to be additional revenue from an additional unit of labor.

$MP_L$ is the additional output obtained from an additional unit of labor; $MR$ is the additional revenue from an additional unit of output. Therefore,

$$MRP_L = \frac{dR}{dL} = \frac{dR}{dQ}\frac{\partial Q}{\partial L} = MR \times MP_L.$$

Firm chooses $Q$ such that

$$w = MRP_L(L),$$

so the marginal revenue and marginal cost at hiring one more unit of labor are the same.

- If output market is competitive,

  $$MR = P;$$

  if it is not competitive,

  $$MR < P$$

  (see Figure 2 and 3).
- Given $w$, we derive the firm's demand for labor from

  $$w = MRP_L(L).$$

  $MRP_L$ decreases in $L$; therefore, $MRP_L$ is the firm's short run demand curve.

**Long Run Demand of Labor.** Both $K$ and $L$ are variable.

$w$ decreases then $MC$ decreases, $Q$ increases, and $L$ increases. With higher $L$, $MP_K$ increases, so the firm uses more $K$, and then $MP_L$ increases further, and the firm hires more labor. Thus, the demand of labor is more elastic than that in short run (see Figure 5).

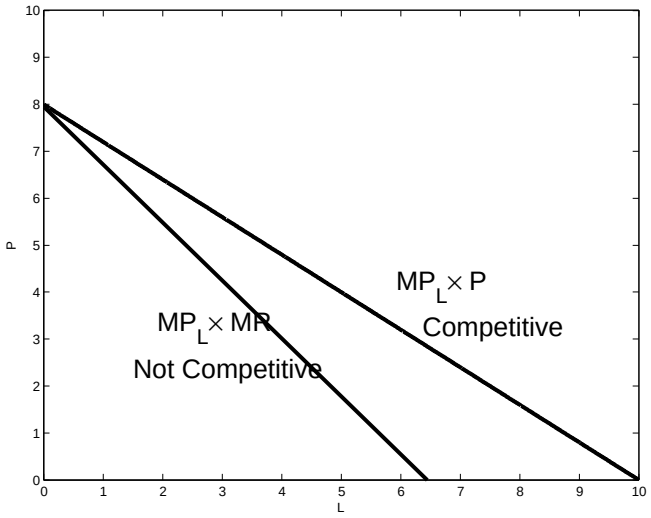


Figure 2: Marginal Revenue Product of Labor.

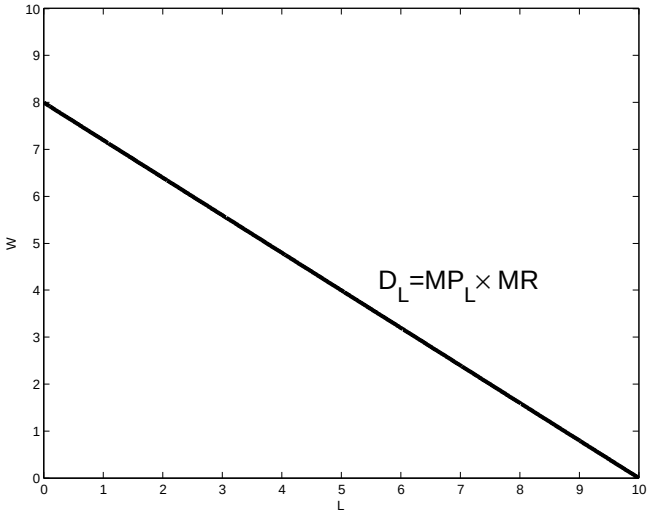


Figure 3: Marginal Revenue Product of Labor in Competitive Market.

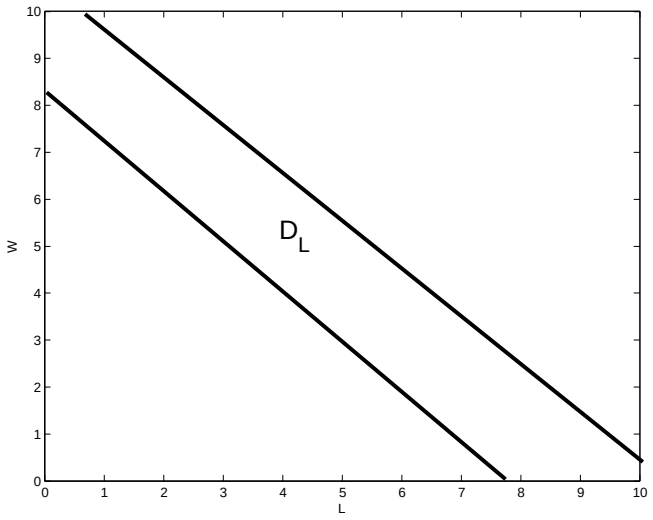


Figure 4: Marginal Revenue Product of Labor Increases in Price.

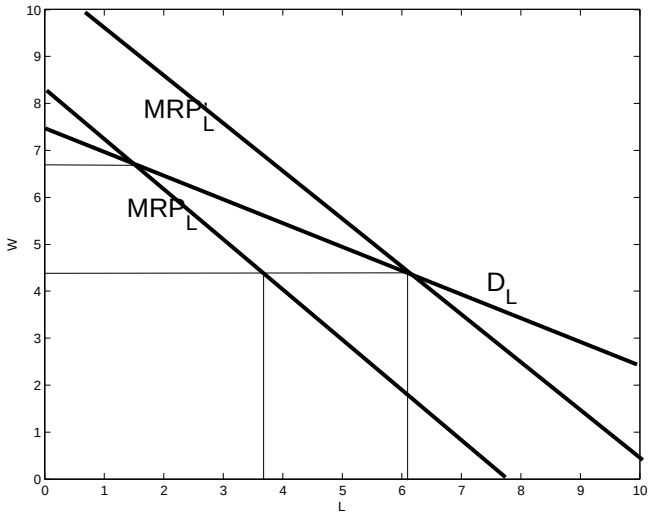


Figure 5: Marginal Revenue Product of Labor in Long Run.

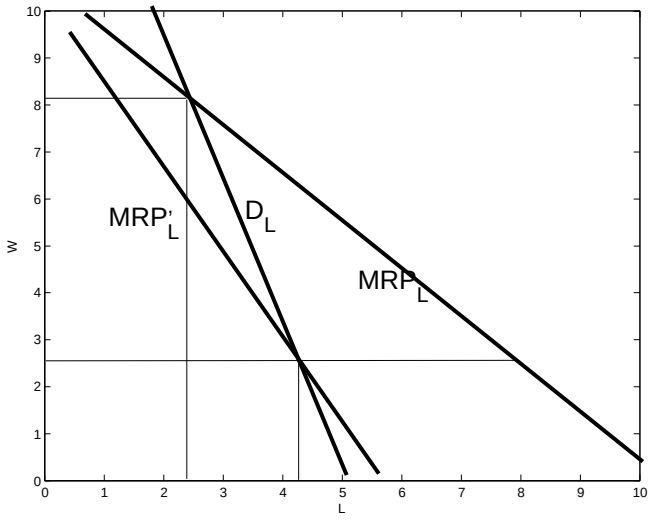


Figure 6: Unconditional on Output Market Price.

**Unconditional on Output Market Price.** The discussion before was based on the assumption that the output price is fixed. Now consider the case when the output price is unconditional so that it is not fixed.

If $w$ decreases, $L$ increases and $Q$ increases, and so $P$ decreases; with $MRP_L$ decreases, $Q$ and $L$ decrease.

The demand is less elastic than when output $P$ is fixed (see Figure 6).