Chapter 6

Factor markets

Flow of study in this chapter

› Understanding factor markets

First, we lay fundamental concept and comparison between product and factor market to further deepen the marginal concept.

› Demand for factors of production

Now we turn to firms side, who demand for factors of production and study how firms decide to choose each factor.

› Supply for factors of production

On the other hand, households are the agents supplying factors of production. Here we only cover basic understanding of each factor.

› Interaction between product and factor markets

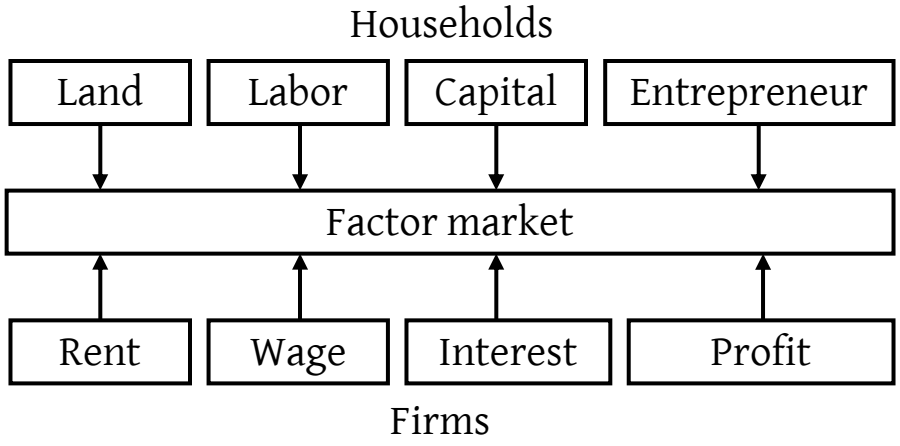
We attempt to understand how demand and supply for factors of production interact with product markets.

Further reading can be found in Pindyck and Rubinfeld (2018) Part 3, Chapter 14.

Introduction

Similar to the product markets, factor market is a context where factors of production are ‘traded’. The opposing aspect of these markets is the position of buyers and sellers

Firms now demand factors of production for their production process while households are willing to supply their factors of production. In return, households get compensation back as the opportunity cost. In other words, price is still a mechanism to settle down the agreement for those who demand and supply the factors.



Introduction

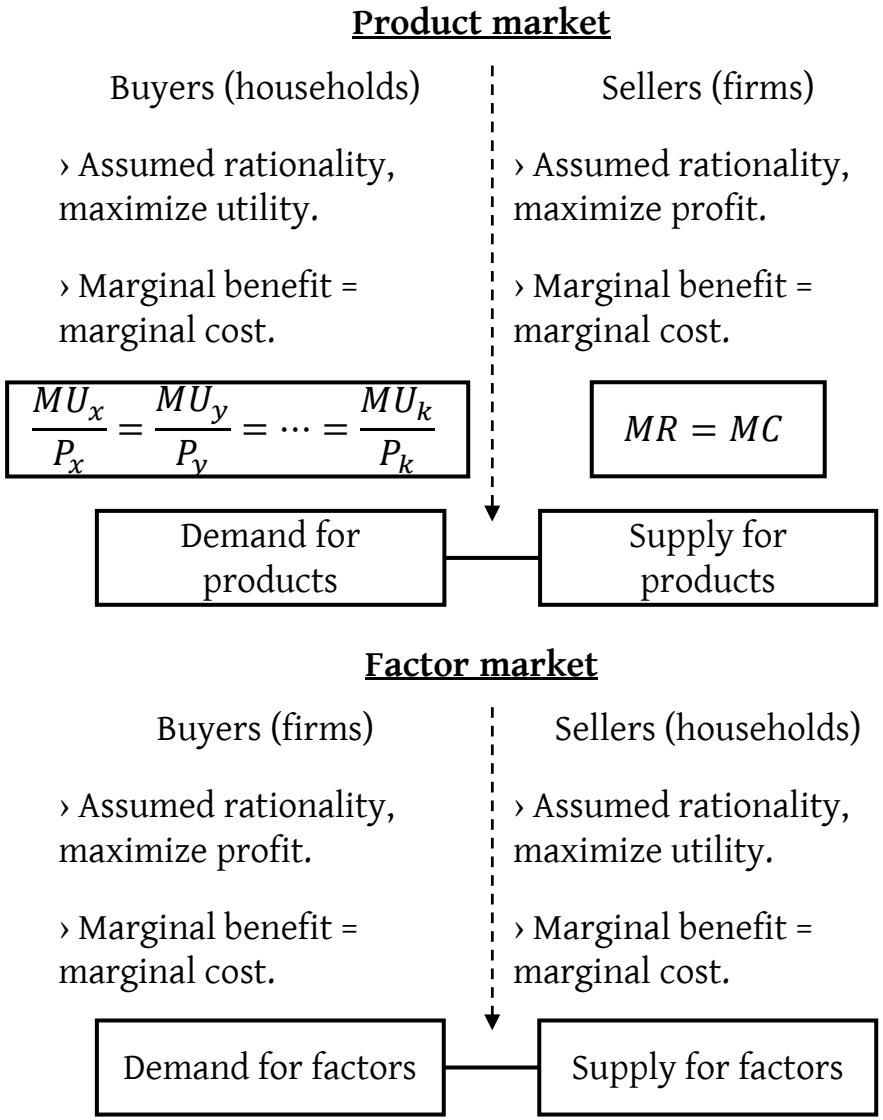
Factor market and product market are connected in almost every possible ways. Let's consider these examples.

› If middle classes in urban area grow in size, meaning that their purchasing power increases. There can be more demand for accommodations, leading to a higher demand for construction service, and lastly, more demand for labors which results in increasing wage.

› Assumed that the Bank of Thailand increases policy rate, both saving and lending rate also increase. The opportunity cost for capital becomes higher resulting in higher products and services price.

Methods used to study factor market are very similar to product market. Following Neoclassical school of economics, we rely on marginal analysis to study demand and supply side as we did in the previous chapters. Comparing with product market would portray how we are going to deal with this market, illustrated below.

Introduction



(1) Definition

Therefore, the study will follow as usual, by considering demand for factors of production at first.

Definition 6.1

Demand for factors of production *is quantity of factors of production demanded by firms, at different level of price in a period of time.*

The interesting aspect of this demand for factors is that it is called '**derived demand**', meaning that this demand is derived from product demand, instead of genuinely demanded by firms. Logic of studying demand is as follows.

(1) Definition

› Firms demand factors of production for their production process, while seeking to maximize profit in product market.

› Having more quantity of factors leads to more output, while also increases the cost of production.

› A criterion to decide how many number of factors of production should be utilize depending on

Marginal benefit: how much revenue gain from having an increment unit of factor = **Marginal cost**: how much does it cost to have an incremental unit of factor.

(2) Marginal Revenue

For simplicity, firms only utilize capital and labor for their production. Hence, mainly we will focus on labor as in the short-run, labor is more flexible and most of the time we take labor as a variable factor.

Definition 6.2

Marginal revenue product *is additional revenue that a firm receive, from selling marginal product, when an incremental unit of factor is added into production process, defined as*

› $MRP = MP \; x \; MR$

where

MP *is marginal product from an incremental factor*

MR *is marginal revenue from selling a product.*

(2) Marginal Revenue

Example : In a perfect competition, $MR = 10$. Hiring 1 more unit of labor yields 2 units of marginal product. Find the MRP

What if a firm hires 2 more units of labor resulted in 3 united of marginal product, find the MRP.

(2) Marginal Revenue

Product market plays a very important role here. A firm in a perfectly competitive market and a monopoly has different level of market power. Hence, we define another variable to measure '**value**' of product below.

Definition 6.3

Value of marginal product *is the value of the marginal product in a market when an incremental unit of factor is added into production process, defined as*

› $VMP = MP \ x \ P$

where

MP *is marginal product from an incremental factor*

P *is price of product in a market.*

(2) Marginal Revenue

Example : In a perfect competition, $P = 10$. Hiring 1 more unit of labor yields 0.5 units of marginal product. Find the VMP

(2) Marginal Revenue

We firstly need to imposed an assumption that

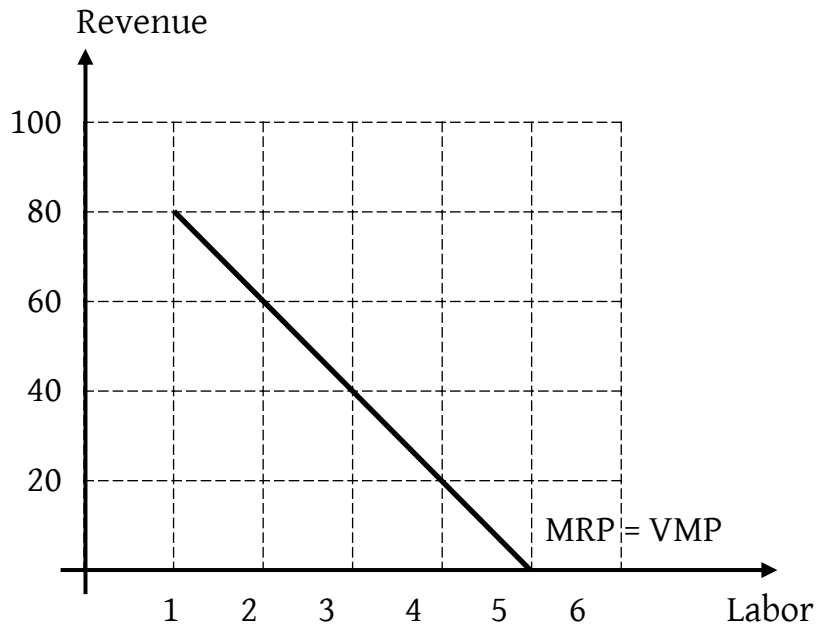
› Factor market is perfectly competitive.

› Product market can be both perfect competition or monopoly.

For perfect competition, we can be sure that $MRP = VMP$ since $MR = P$. However, for a monopoly case, $MR < P$, and therefore, $MRP \neq VMP$. See the example of tables and plots below.

(1) L	(2) q	(3) MP	(4) MR	(5) MRP	(6) VMP
1	8				
2	14				
3	18		10		
4	20				
5	20				
6	18				

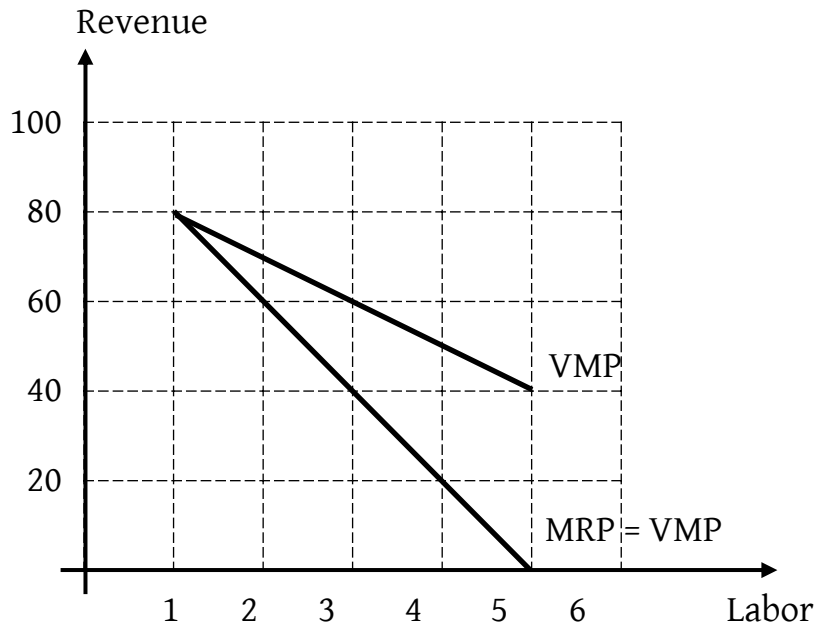
(2) Marginal Revenue



Since we are considering only labor, we are going to plot a relationship between MRP and L as follows.

What would happen to MRP when price increases while marginal product remains constant?

(2) Marginal Revenue



Recall that in a monopoly market, price and marginal revenue are two separate lines, resulting in $MR < P$ and $MRP < VMP$ as portrayed in the follow figure.

(3) Marginal Cost

Let's go back to analyze perfect competitive market, we have the marginal benefit part already. So, another part is the marginal cost, defined as

Definition 6.4

Marginal factor cost *is marginal cost for adding an incremental unit of factor into the production.*

› $MFC = \frac{\Delta TFC}{\Delta L}$

where

TFC *is total factor cost*

L *is number of factor (in this case, labor)*

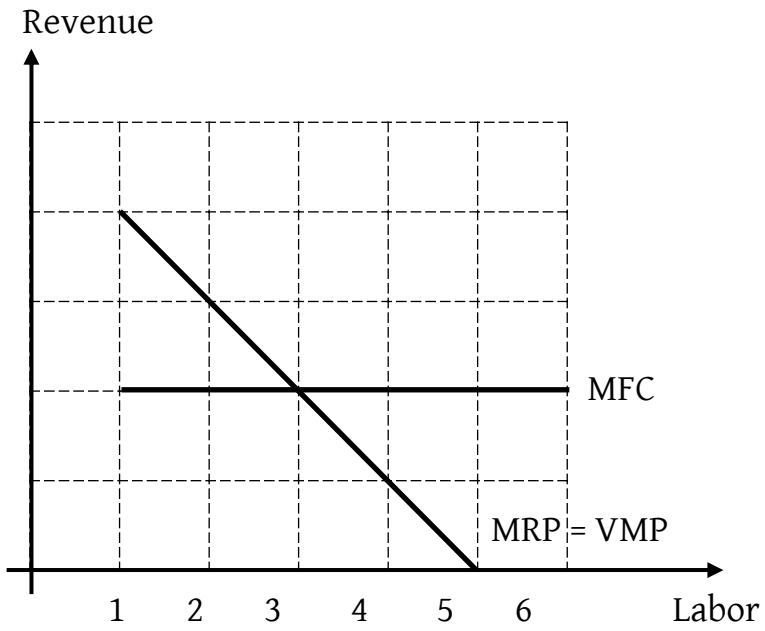
(3) Marginal Cost

Example : In a perfect competition, given that wage is 350 baht a day, find the MFC when a firm hires 2 more units of labor.

We can also, for the case of labor, define that

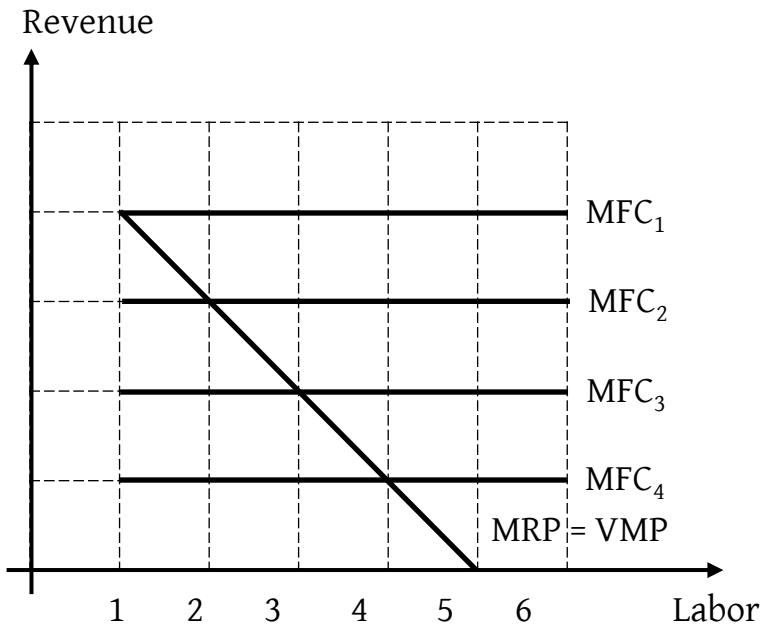
› $MFC =$

(3) Marginal Cost



Since we assumed that factor market is perfectly competitive, both firms (demand) and households (supply) are price taker. Therefore, wage is consistent no matter how many units of labor a firm hires. We can then plot MFC as in the figure here.

(4) Equilibrium



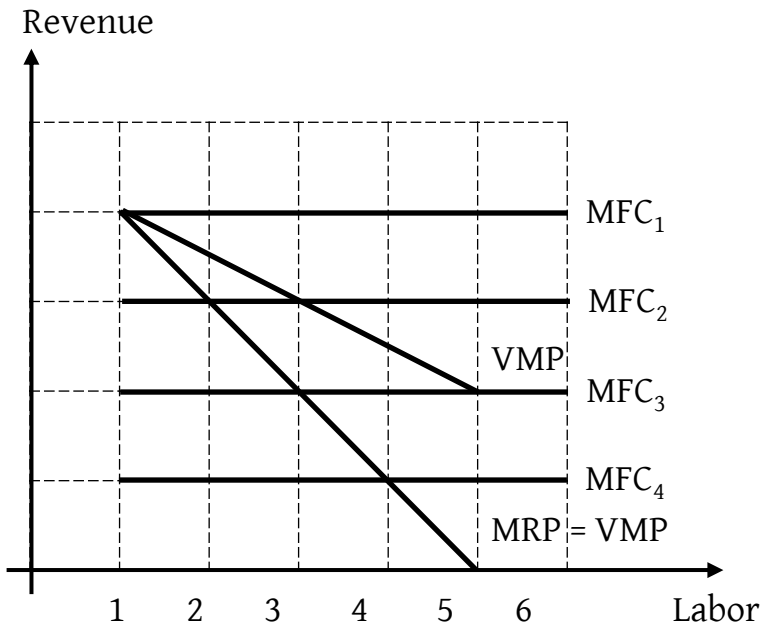
Firms will maximize their profit when the marginal benefit and marginal cost are equal. For this case,

› $MRP = MFC$

Assumed that product price remains constant, if we alternate wage, resulting in different level of MFC, each of the intersection represent firm's equilibrium.

Therefore, MRP is firm's demand for factor of production (or labor in this case).

(4) Equilibrium



Value of the product exceeds marginal revenue for a monopoly, implying that if a monopoly set the optimal quantity when $MR = MC$, the marginal cost compensated for factors of production is less that the market value of the product. This can be considered as an '**exploitation**'. We can see this concept clearer when we explore firm's equilibrium.

We can see clearly from this graph that when a product market is monopoly, there is a difference between value and cost of factor. It means that the further distance creates more exploitation. This seems fit with real-world scenarios.

Introduction

Supply for factors of production can be separately, roughly, analyzed by each factor. First of all, we define the supply as follows.

Definition 6.5

Demand for factors of production *is quantity of factors of production supplied by households, at different level of price in a period of time.*

Introduction

Each factor has a different specification. We should discuss each of them briefly here. For non-human factors, they are land and capital.

› **Land**, as a factor of production, is a space occupied for a production. Land may not be very elastic in the short-run but can be more elastic in the long-run. When land becomes more and more occupied, the elasticity becomes closer to zero. Price for land is rent, therefore, supply and rent are easily understandable that they directly vary.

› **Capital** price is interest rate. Therefore, this is quite easy because in economics, the higher the interest rate, the higher the saving and also supply for capital.

Introduction

Now for human factors, they are labor and entrepreneur. Most of the basic analyses leave entrepreneur out of the equation. Here we also assume their supply works the same way as labor supply.

To understand labor supply, we consider labor economics 101 with the assumptions here.

› People are rational, seeking to maximize their utility in everyday life.

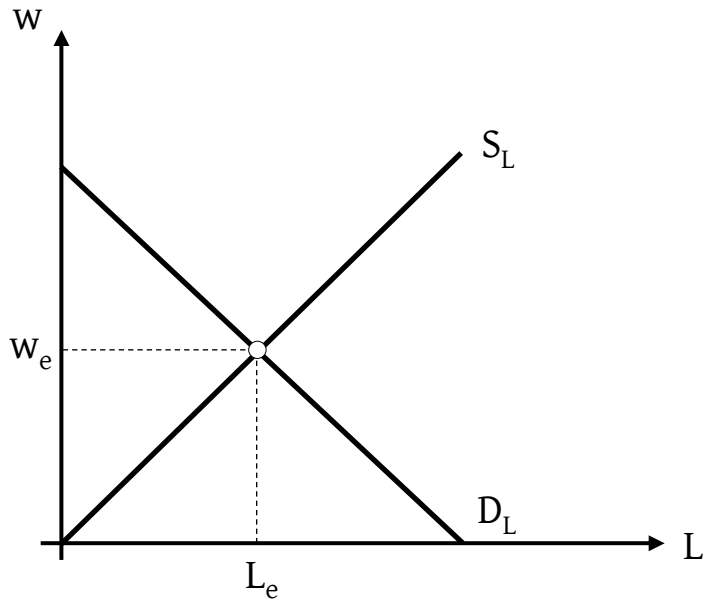
› Choices are between to supply labor or to have some leisure.

› To supply labor is not the goal of receiving utility, but to gain compensation to further consume. We can then turn working hours to level of consumption, assumed that we have more budget to spend in product market as we work more. So, the choices become between consumption and leisure.

› We are constrained by time.

We simplify these assumption and come up with a supply line that **labor supply corresponding to wage**.

(1) Introduction



Demand and supply for labor are covered. Now let's take them both into the same graph, with an exception that we only consider before the supply curve bends.

The equilibrium in labor market is determined by demand and supply for labor. However, since the demand is derived from product market, when product price goes up or down, price change also affects equilibrium in labor market. On the other hand, if there is any external factor affecting labor supply, it also affects price in product market. So, we are studying two cases which are

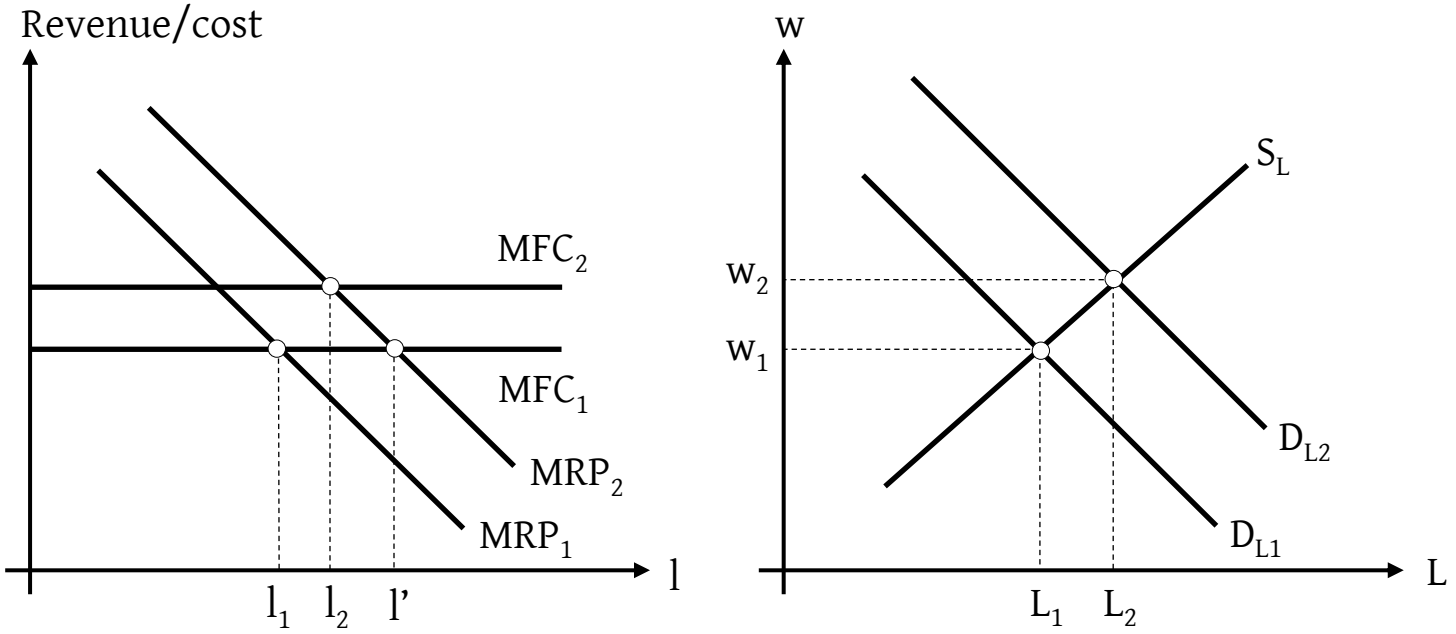
(2) Higher demand in product market

Let l be number of labor that a firm hires while L be total labor in an industry.

› Assumed price is driven upward by an external factor in product market, MRP shifts from MRP_1 to MRP_2.

› Every firm demands more labor from l_1 to l', driving total labor demand in this industry from D_{L1} to D_{L2}.

› Rising demand for labor causes wage increase from w_1 to w_2, leading to an increase in MFC (from MFC_1 to MFC_2)



(3) Rising labor supply

› Assumed labor supply increases, i.e., more people join labor force, labor supply shifts from SL_1 to SL_2.

› Wage drops from w_1 to w_2.

› MFC drops from MFC_1 to MFC_2, labors are absorbed into an industry.