

CHAPTER 8

The Neo-Classical Theories of Labor Market & Loanable Funds Market

Summary:

In this chapter we look at the neoclassical (laissez faire) theories of the labor market and loanable funds market.

The object of the chapter is to argue that, according to these neoclassical theories, **neither monetary policy nor fiscal policy can change the output or employment in the economy.**

Note:

As mentioned earlier, the neoclassical theories of labor market and loanable funds market advocated laissez faire.

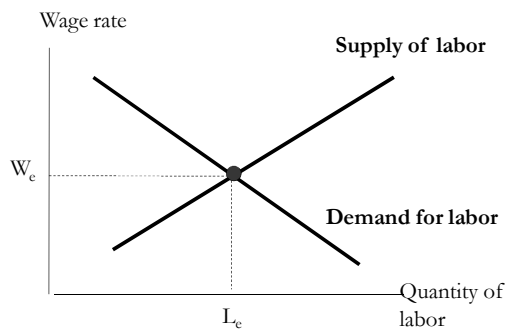
But during the Great Depression John M. Keynes became disillusioned with these theories and challenged them.

We will see the Keynesian challenge in Chapters 11 and 13.

Neoclassical Theory of Labor Market

The labor market in the neoclassical theory looks like any other market.

Labor Market



But what lies behind the demand and supply curves, why do they look the way they do?

In other words, why is the demand for labor downward sloping and the supply of labor upward sloping?

Given the time constraint, I will only explain the demand curve.

Derivation of Demand for Labor

We start with the concept of “aggregate production function.”

Def. **Aggregate production function** shows the total output (GDP or y) the economy can produce with different quantities of labor, for a given amount of land and capital, and a given state of technology.

Notationally:

$$y = f(\text{Units of Labor, Units of Land, Units of Capital})$$

If units of land and capital are given (fixed), then

$$y = f(\text{Units of Labor})$$

$$y = f(L)$$

Where y is real GDP or “total product,” and L stands for units of labor.

Simplifying assumption:

Suppose we live in a moneyless country and the country produces only one good, Corn.

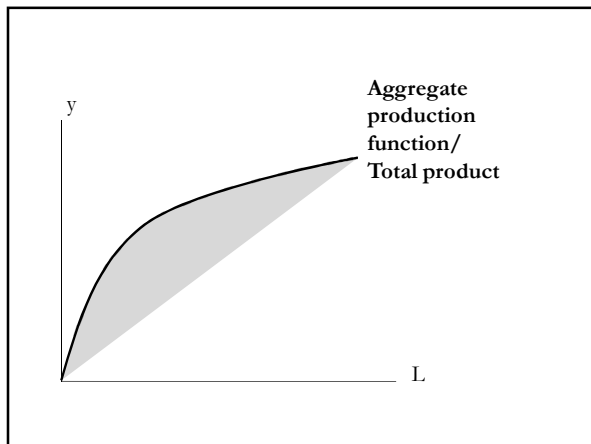
Then real GDP or y is measured in corn units.

Also, workers will receive **real wages** in corn.

Example:

L (units of labor)	y (units of corn)
1	9
2	17
3	24
4	30
5	35

Input / Output Table



This production function exhibits “the law of diminishing returns”:

As you increase an input, while holding all other inputs fixed, the **increase** in output would diminish beyond certain point.

Def. Marginal product of labor is additional product per unit of additional labor

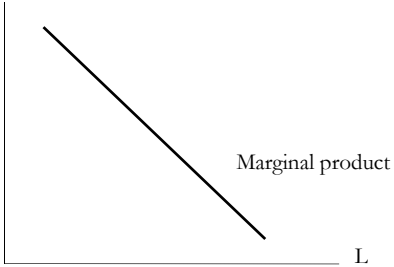
$$MP_L = \Delta y / \Delta L$$

Note

MP_L is the slope of the total product function or y .

L	y (corn)	$\Delta y / \Delta L$ (corn/ labor)
1	9	9/1
2	17	8/1
3	24	7/1
4	30	6/1
5	35	5/1

$\Delta y / \Delta L$ or MP



Suppose the real wage (w_0), paid in corn, is 6 units of corn per labor.

L	y (corn)	$\Delta y / \Delta L$ (corn/ labor)	w_0 (corn/ labor)
1	9	9/1	6/1
2	17	8/1	6/1
3	24	7/1	6/1
4	30	6/1	6/1
5	35	5/1	6/1

How many units of labor would maximizing firms of this country demand and why?

L	y (corn)	$\Delta y / \Delta L$ (corn/ labor)	w_0 (corn/ labor)
1	9	9/1	6/1
2	17	8/1	6/1
3	24	7/1	6/1
4	30	6/1	6/1
5	35	5/1	6/1

As long as $MP > w$, the firms will hire.
When $w > MP$, they won't hire.

L	y	$\Delta y / \Delta L$	w_0
1	9	9/1	> 6/1
2	17	8/1	> 6/1
3	24	7/1	> 6/1
4	30	6/1	= 6/1
5	35	5/1	< 6/1

Firms maximize profit when:

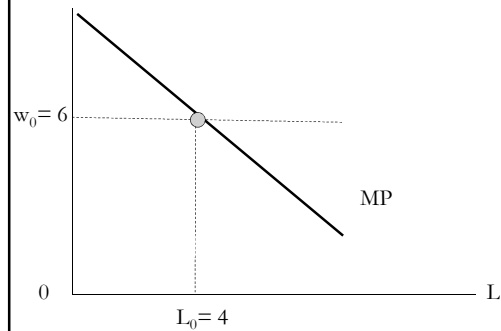
$$MP = w$$

They hire $L_0 = 4$ at $w_0 = 6$ corn units/labor.

$$\begin{aligned} \text{Total profit (TP)} &= \text{Total Revenue (TR)} - \text{Total Cost (TC)} \\ &= y - (L_0 \times w_0) \\ &= 30 \text{ units of corn} - 4 \times 6 \text{ units of corn} \\ &= 6 \text{ units of corn} \end{aligned}$$

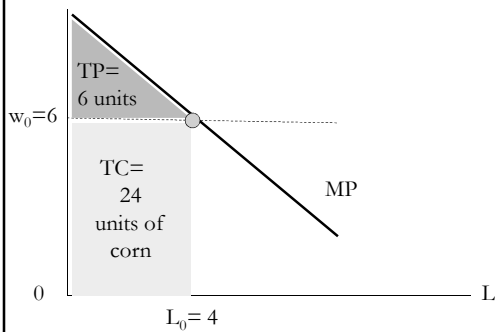
Graphically

w (corn/labor) also MP (corn/labor)



Graphically

w (corn/labor)

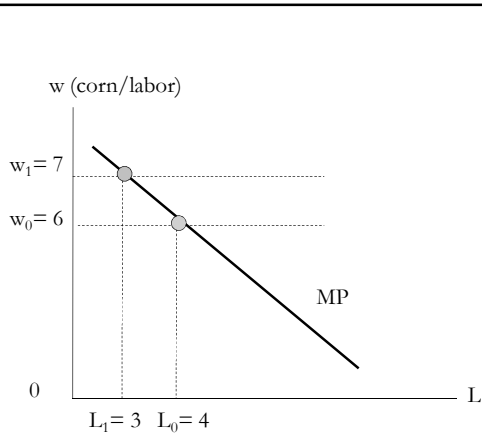


Suppose the real wage (w_1) rises to 7 units of corn per labor. How many labor will be demanded?

L	y (corn)	$\Delta y / \Delta L$ (corn/labor)	w_1 (corn/labor)
1	9	9/1	7/1
2	17	8/1	7/1
3	24	7/1	7/1
4	30	6/1	7/1
5	35	5/1	7/1

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L	y (corn)	$\Delta y / \Delta L$ (corn/labor)	w_1 (corn/labor)
1	9	9/1	7/1
2	17	8/1	7/1
3	24	7/1	7/1
4	30	6/1	7/1
5	35	5/1	7/1

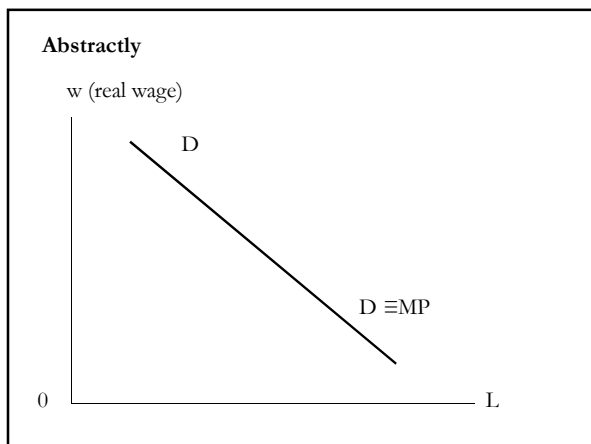
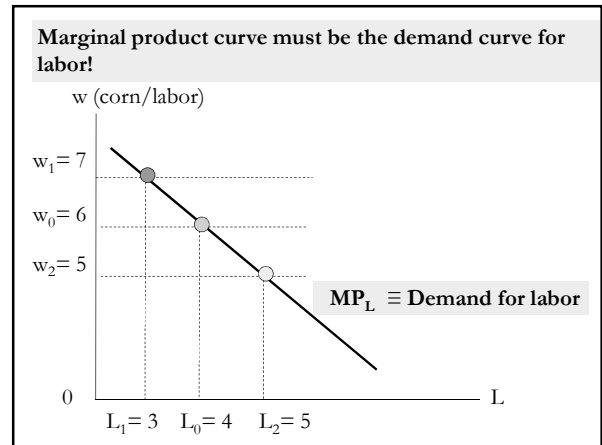
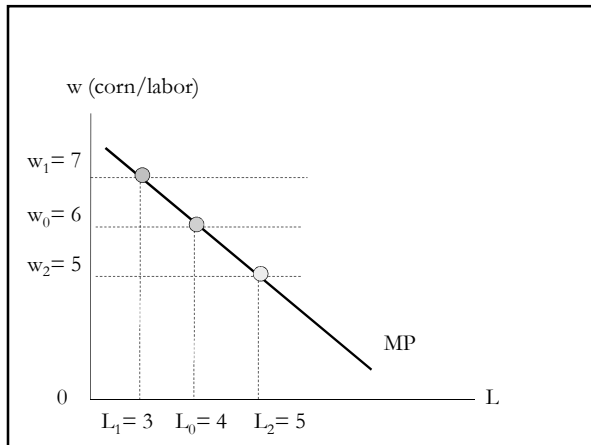


Suppose the real wage (w_2) falls to 5 units of corn per labor. How many labor will be hired?

L	y (corn)	$\Delta y/\Delta L$ (corn/ labor)	w_2 (corn/ labor)
1	9	9/1	5/1
2	17	8/1	5/1
3	24	7/1	5/1
4	30	6/1	5/1
5	35	5/1	5/1

Suppose the real wage (w_2) falls to 5 units of corn per labor. How many labor will be demanded?

L	y (corn)	$\Delta y/\Delta L$ (corn/ labor)	w_2 (corn/ labor)
1	9	9/1	5/1
2	17	8/1	5/1
3	24	7/1	5/1
4	30	6/1	5/1
5	35	5/1	5/1



Note: So far we have assumed a moneyless country.

Does it make any difference if we have money, a unit of account other than corn?

The answer, as we will see, is no!

Let us say we use dollar as a unit of account.

Now corn acquires a price (p_c) and wages are nominally given (W).

Let us say price of corn is given to be \$10/ corn unit: $p_c = \$10/\text{corn unit}$. (We have a “perfectly competitive market.”)

L	y	$\Delta y/\Delta L$	w_0	p_c (\$)
(corn)	(corn/ labor)	(corn/ labor)	(corn/ labor)	
1	9	9/1	6/1	10
2	17	8/1	6/1	10
3	24	7/1	6/1	10
4	30	6/1	6/1	10
5	35	5/1	6/1	10

We need two new concepts:

Def. **Total revenue (TR)** = $y \times p_c$

Def. **Marginal revenue product of labor (MRP)** is additional revenue per unit of additional labor:

$$\text{MRP} = \Delta \text{TR} / \Delta L$$

L	y	$\Delta y/\Delta L$	w_0	p_c	TR	$\Delta \text{TR} / \Delta L$
(corn)	(corn/ labor)	(corn/ labor)	(corn/ labor)	(\$)	(\$)	\$/ labor
1	9	9/1	6/1	10	90	90/1
2	17	8/1	6/1	10	170	80/1
3	24	7/1	6/1	10	240	70/1
4	30	6/1	6/1	10	300	60/1
5	35	5/1	6/1	10	350	50/1

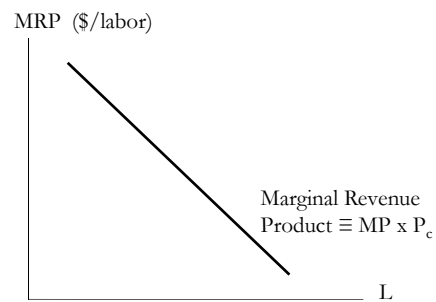
Note:

Under “perfect competition”:

$$\text{MRP} = \text{MP} \times P_c$$

L	y	$\Delta y/\Delta L$	p_c	$\Delta \text{TR} / \Delta L$
(corn)	(corn/ labor)	(corn/ labor)	(\$)	\$/ labor
1	9	9/1	10	90
2	17	8/1	10	80
3	24	7/1	10	70
4	30	6/1	10	60
5	35	5/1	10	50

Graphically



Suppose the nominal wage rate (W_0) is given to be \$60 /labor.

L	y (corn)	$\Delta y/\Delta L$ (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	$\Delta TR/\Delta L$ \$/ labor	W_0 \$/ labor
1	9	9/1	6/1	10	90	90/1	60/1
2	17	8/1	6/1	10	170	80/1	60/1
3	24	7/1	6/1	10	240	70/1	60/1
4	30	6/1	6/1	10	300	60/1	60/1
5	35	5/1	6/1	10	350	50/1	60/1

How many units of labor would maximizing firms of this country demand and why?

L	y (corn)	$\Delta y/\Delta L$ (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	$\Delta TR/\Delta L$ \$/ labor	W_0 \$/ labor
1	9	9/1	6/1	10	90	90/1	60/1
2	17	8/1	6/1	10	170	80/1	60/1
3	24	7/1	6/1	10	240	70/1	60/1
4	30	6/1	6/1	10	300	60/1	60/1
5	35	5/1	6/1	10	350	50/1	60/1

Same as before! $L_0 = 4$.

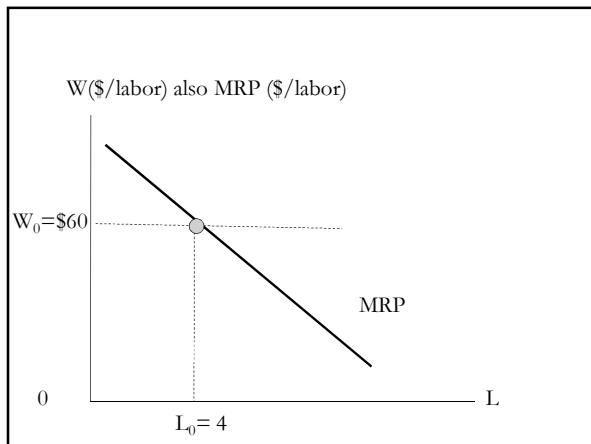
L	y (corn)	$\Delta y/\Delta L$ (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	$\Delta TR/\Delta L$ \$/ labor	W_0 \$/ labor
1	9	9/1	6/1	10	90	90/1	> 60/1
2	17	8/1	6/1	10	170	80/1	> 60/1
3	24	7/1	6/1	10	240	70/1	> 60/1
4	30	6/1	6/1	10	300	60/1	= 60/1
5	35	5/1	6/1	10	350	50/1	< 60/1

Firms maximize profit when:

$$MRP = W$$

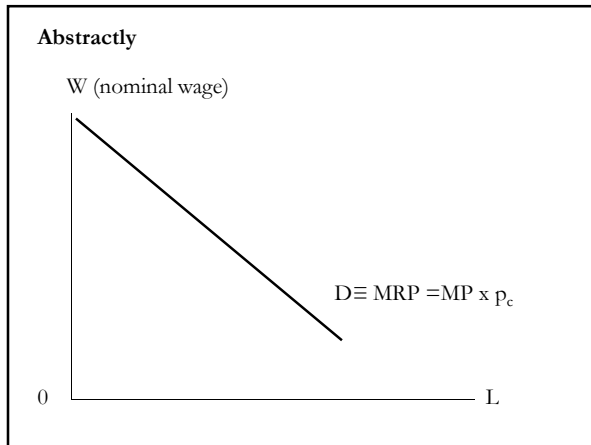
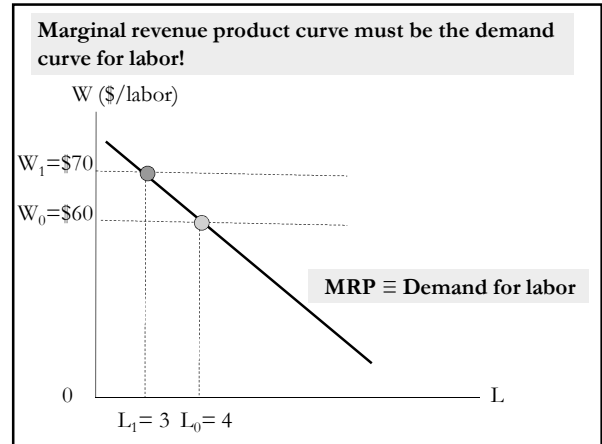
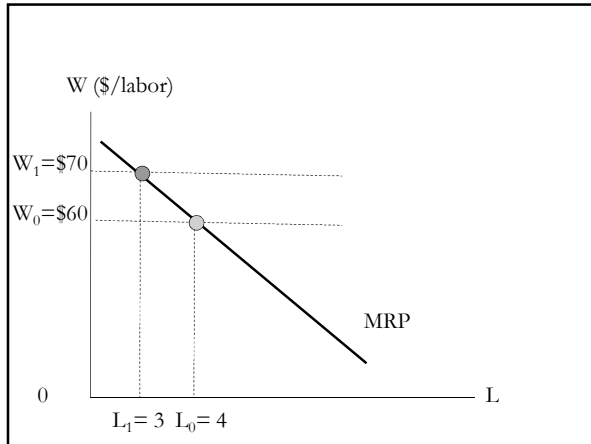
They hire $L_0 = 4$ at $W_0 = \$60$ /labor.

$$\begin{aligned} \text{Total profit (TP)} &= \text{Total Revenue (TR)} - \text{Total Cost (TC)} \\ &= y \times p_c - L_0 \times W_0 \\ &= 30 \times \$10 - 4 \times \$60 \\ &= \$60 \end{aligned}$$



Similarly, if nominal wage rate (W_1) changes \$70 /labor, then $L_1 = 3$

L	y (corn)	$\Delta y/\Delta L$ (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	$\Delta TR/\Delta L$ \$/ labor	W_1 \$/ labor
1	9	9/1	7/1	10	90	90/1	70/1
2	17	8/1	7/1	10	170	80/1	70/1
3	24	7/1	7/1	10	240	70/1	70/1
4	30	6/1	7/1	10	300	60/1	70/1
5	35	5/1	7/1	10	350	50/1	70/1



The effect of price changes on demand for labor

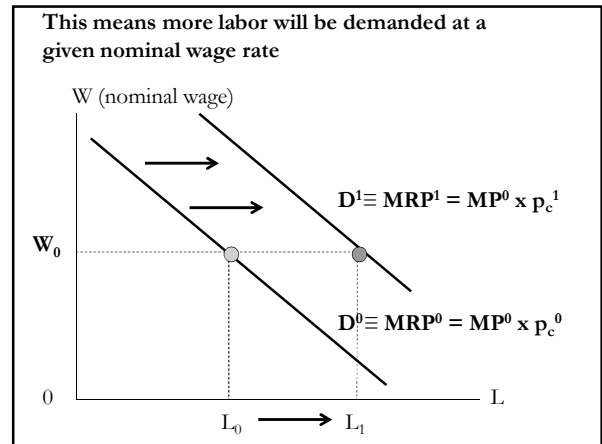
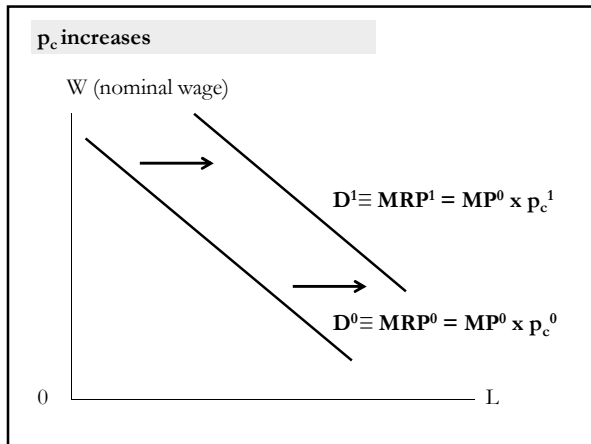
Suppose, ceteris paribus, the price of corn increases from p_c^1 to p_c^2 . What happens to the demand for labor, if

- 1) wage is nominal (W)?
Demand shifts to the right.
- 2) wage is real (w)?
We move down the demand curve.

L	y (corn)	$\Delta y / \Delta L$ (corn/labor)	p_c (\$)	$\Delta TR / \Delta L$ \$/labor
1	9	9/1	10	90
2	17	8/1	10	80
3	24	7/1	10	70
4	30	6/1	10	60
5	35	5/1	10	50

Price of corn doubles:

L	y (corn)	$\Delta y / \Delta L$ (corn/labor)	p_c (\$)	$\Delta TR / \Delta L$ \$/labor
1	9	9/1	20	180
2	17	8/1	20	160
3	24	7/1	20	140
4	30	6/1	20	120
5	35	5/1	20	100

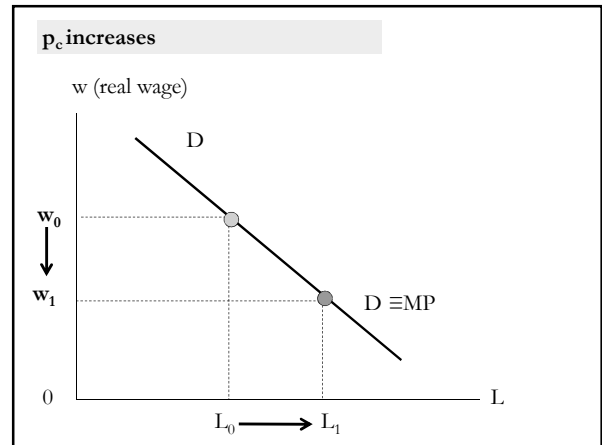


Real wage expressed in corn = $\frac{\text{Nominal wage}}{\text{Price of corn}}$

If the price of corn rises and nominal wages stays the same, real wage falls.

Example:

$$w_0 = \frac{W_0}{p_0} = \frac{\$60/\text{labor}}{\$10/\text{corn unit}} = \underline{6 \text{ corn units labor}}$$

$$w_1 = \frac{W_0}{p_1} = \frac{\$60/\text{labor}}{\$20/\text{corn unit}} = \underline{3 \text{ corn units labor}}$$


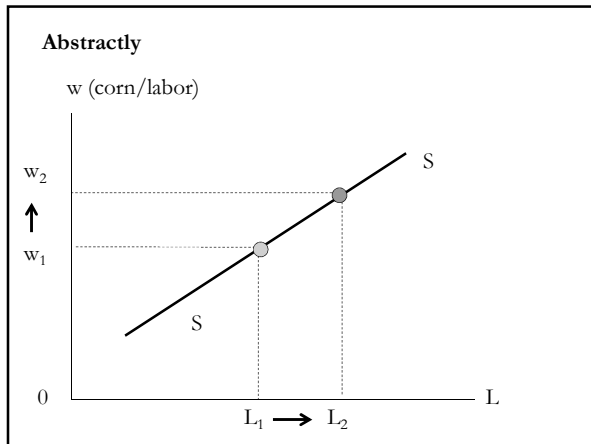
Supply of Labor

What about supply of labor, why is it upward sloping?

The explanation is more difficult, it is based on “utility maximization” by workers between “labor” and “leisure.”

We will skip the explanation.

We simply assume that as real wage rises, more labor is forthcoming.



The effect of price changes on supply of labor

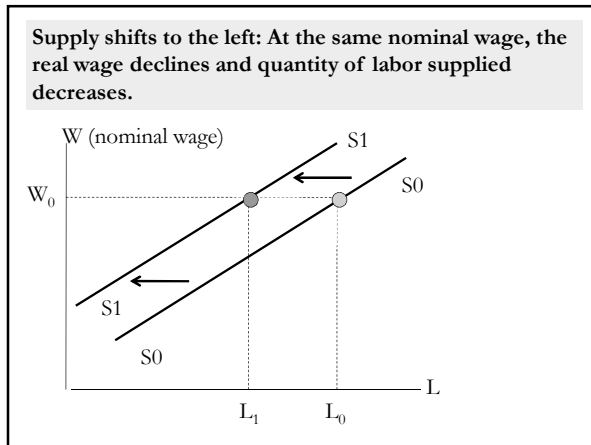
Suppose, ceteris paribus, the price of corn increases from p_c^1 to p_c^2 . What happens to supply of labor, if

- 1) wage is nominal (W)?

Supply shifts to the left.

- 2) wage is real (w)?

We move down the supply curve.



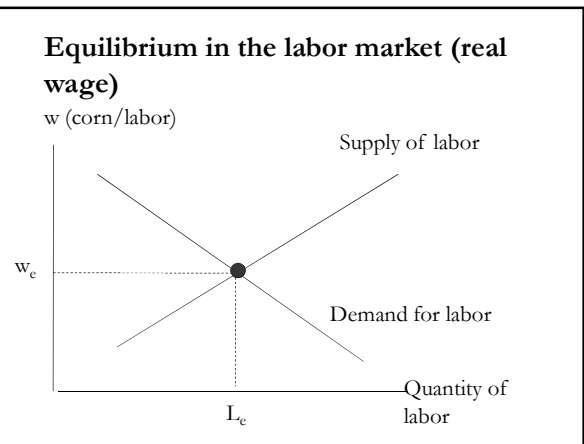
Note:

As we will see in another chapter, following Keynes, Keynesians disagree that a rise in prices or a decline in the real wage will result in a decrease in the supply of labor.

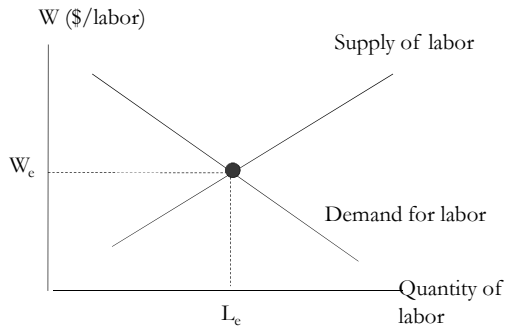
Workers, they argue, are **not concerned with real wage**.

Labor Market

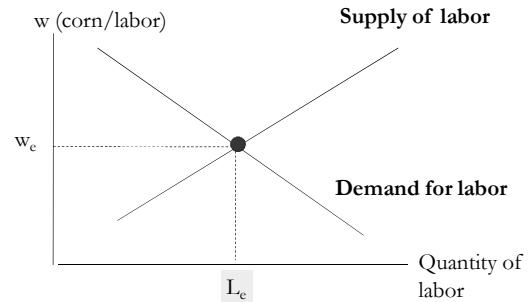
Demand for and supply of labor combined



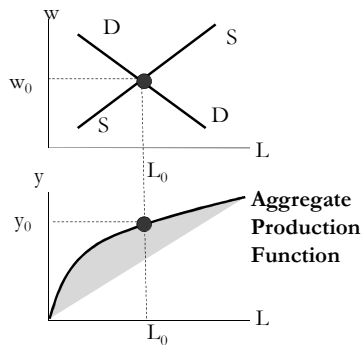
Equilibrium in the labor market (nominal wage)



L_e is called the "Natural Rate of Unemployment"



The level of employment in the labor market determines the level of output (GDP) in the economy



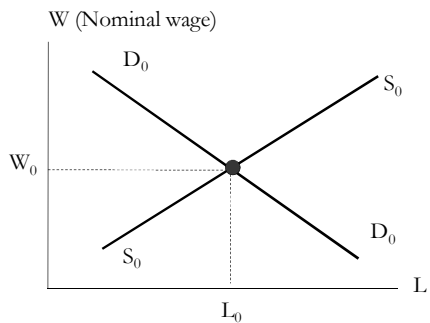
Since the level of employment and output is determined by "real variables," such as marginal product, **neither monetary policy nor fiscal policy can influence output and employment.**

Fiscal policy: taxing and spending by the government.

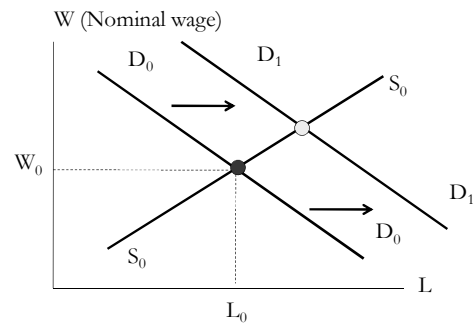
Monetary policy: changing the supply of money by the Federal Reserve System.

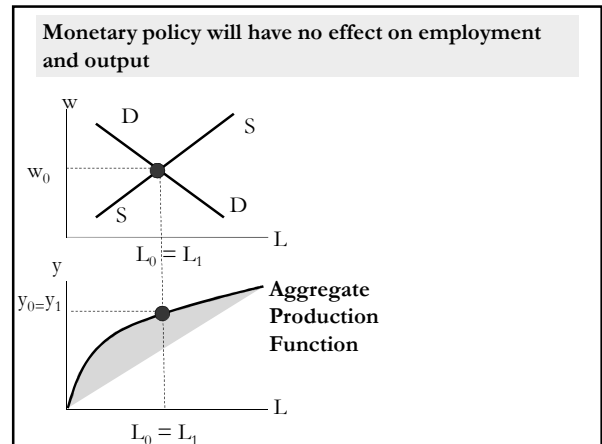
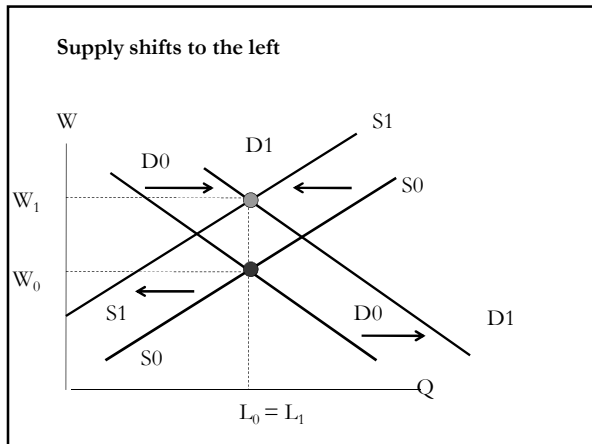
As we will see, increasing money supply will increase prices.

What happens to employment and output when prices increase?



Demand shifts to the right





Fiscal policy has also no effect on output and employment.

To show this, neoclassicals use “loanable funds market” or “capital market.”

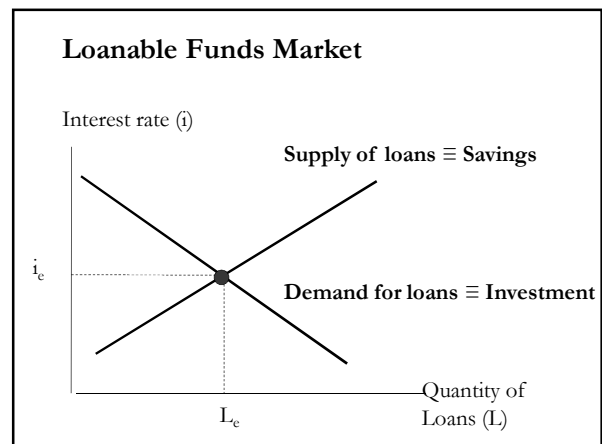
Note :

The meaning of “capital” and how to measure it became controversial in the neoclassical economics in the 1960s-70s and led to the “**Cambridge capital controversy.**”

After the controversy some books avoid using “capital market” theory that, naturally following the “labor market” theory, tries to explain the interest rate.

Neoclassical Theory of Loanable Funds Market

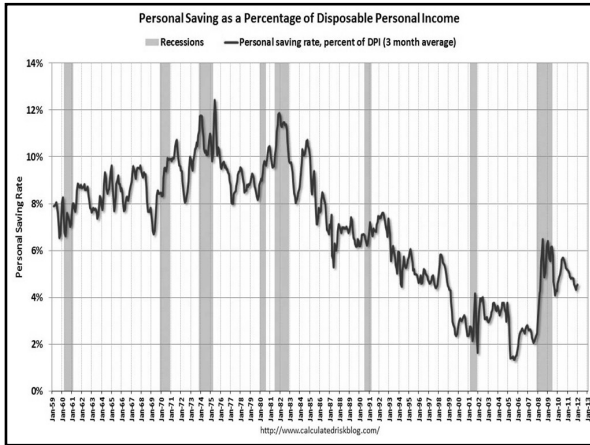
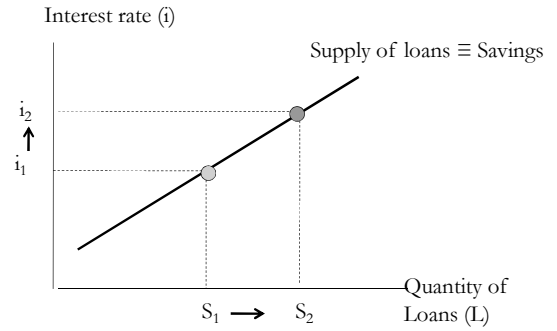
The loanable funds market in the neoclassical theory looks like any other neoclassical market.



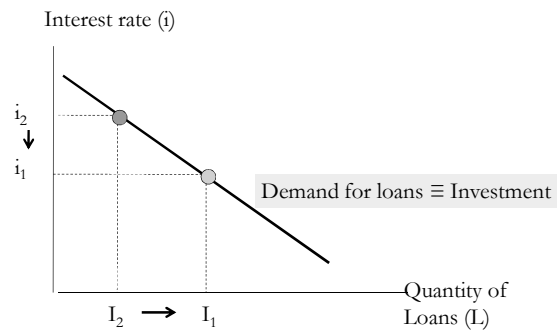
There is usually no explanation for savings and investment functions in the loanable funds market theory, as opposed to the old “capital market theory.”

It is simply assumed that as interest rates rise, people save (lend) more and firms invest (borrow) less.

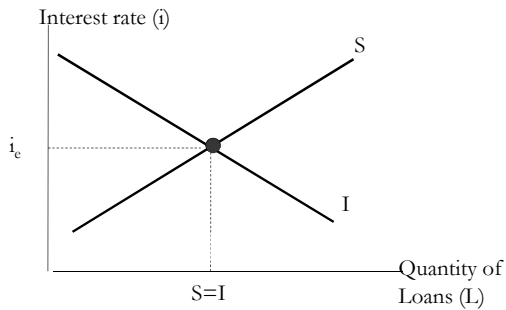
Savings



Investment



Equilibrium in the loanable funds market:
At i_e (natural rate of interest), savings = investment.



The effect of fiscal policy on the loanable funds market

Fiscal policy involves government spending (G) and taxing (T).

Def Surplus spending: $T > G$.

$$\text{Surplus} = T - G$$

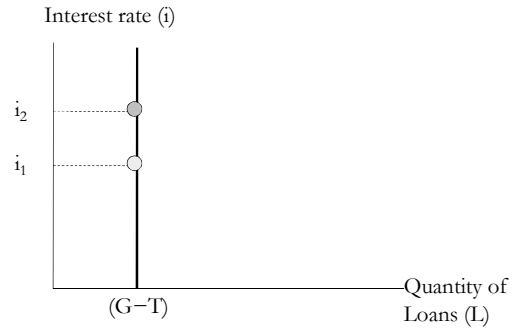
Def Deficit Spending: $G > T$.

$$\text{Deficit} = G - T$$

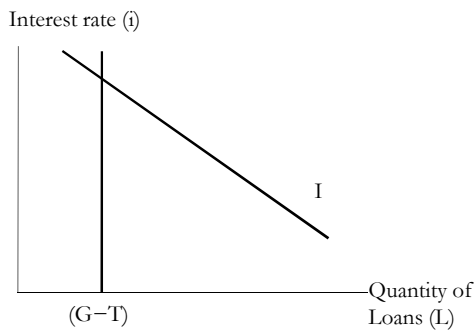
How could government spend more than it collects in taxes?

Issue bonds: borrow in the same loanable funds market.

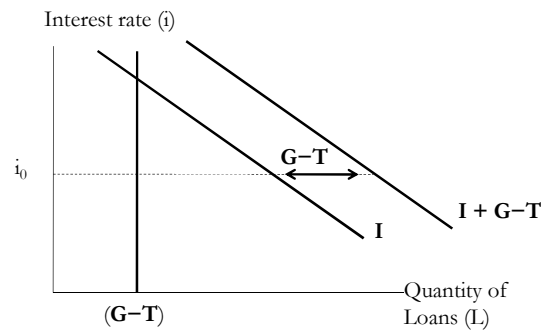
Government borrowing: Deficit spending



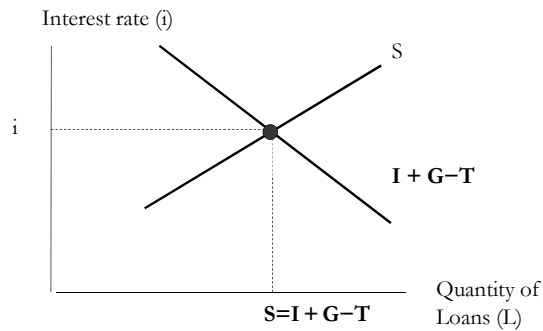
Total demand for loans: $I + G - T$



Total demand for loans: $I + G - T$



Equilibrium in the loanable funds market with government borrowing



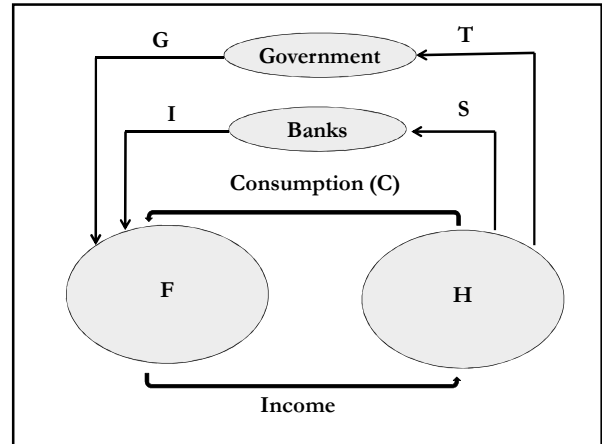
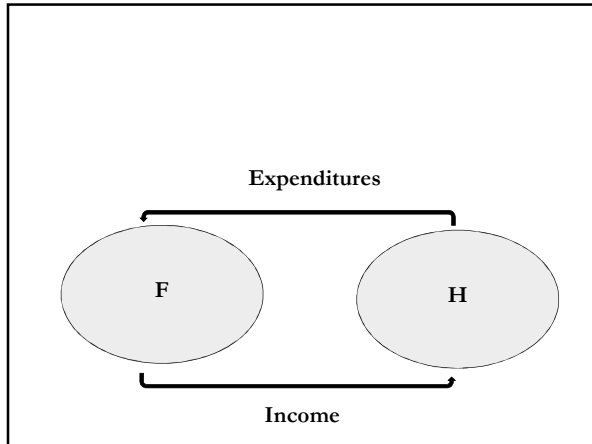
Note:

$S = I + G - T$ implies:

$$S + T = I + G$$

Def. Leakages: $S + T$

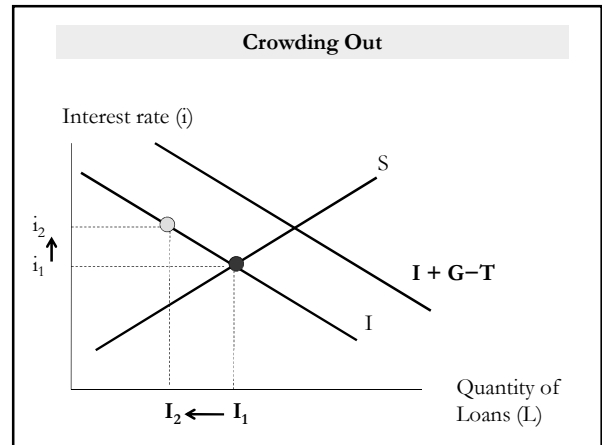
Def. Injections: $I + G$



Crowding Out

When government borrows money in the loanable funds market it pushes the interest rate higher, crowding out the private sector's (firm's) borrowing.

Def. **Crowding out**: increasing the interest rate and reducing private investment, which results from government borrowing.

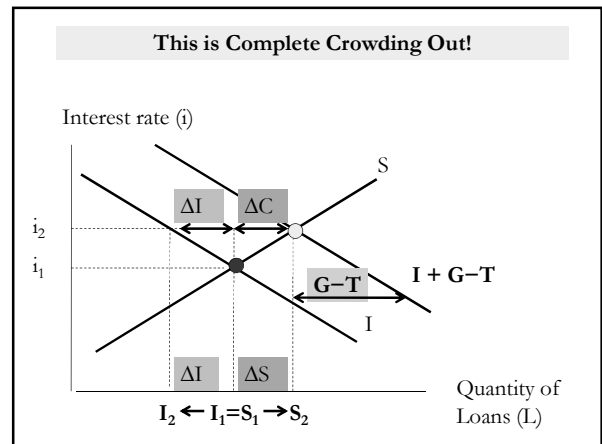


Complete Crowding Out

Def. **Complete crowding out** is when government deficit spending will only cause interest rates to go up with no increase in output or employment.

Government deficit, $G - T$, is intended to increase output by the same amount, $G - T$.

But a neoclassical would argue that the government increase in expenditure is matched by a decrease in investment and consumption expenditures.



In the end, government increase in expenditures is matched by a decrease in consumption and investment:

$$G-T = \Delta C + \Delta I$$

There is no gain in output.

Thus fiscal policy, such as deficit spending, does not increase output and employment.

Conclusion:

In the neoclassical world, output and employment are determined by “real forces,” such as the aggregate production function and marginal productivity.

Neither monetary policy nor fiscal policy can change output and employment.

So we don't need the government or the central bank to interfere in the economy: laissez faire!

Next stop: Chapter 11! (but first a few words about other chapters in between)