CHAPTER 8

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

Neoclassical Theory of Labor Market

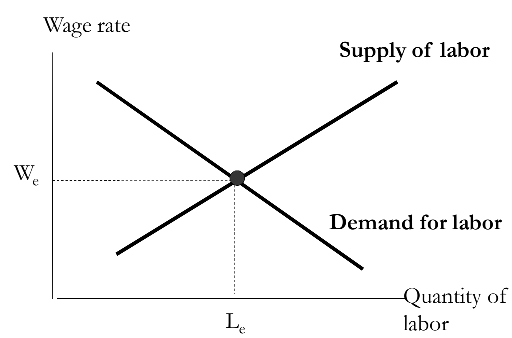
The labor market in the neoclassical theory looks like any other market.

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.**

Labor Market



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.

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.

Example:

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

Input / Output Table

Notationally:

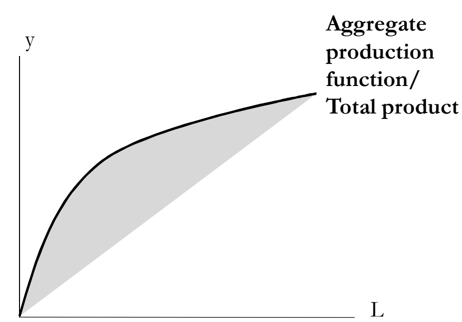
y = f (Units of Labor, Units of Land, Units of Capital)

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

y = f (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.

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.

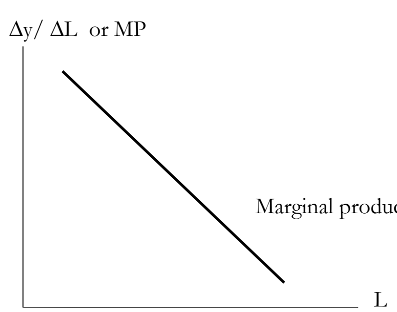
Suppose the real wage (w_0), paid in corn, is 6 units of corn per labor.

L	y (corn)	Δy/ΔL (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

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

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

L	y (corn)	Δy/ΔL (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	Δy/ΔL		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

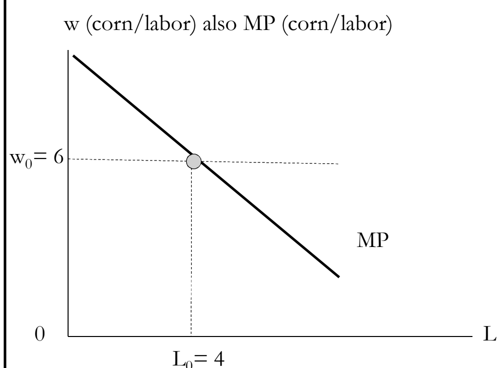
They hire L_0 =4 at w_0 = 6 corn units/labor.

Total profit (TP)= Total Revenue (TR) – Total Cost (TC)
= y – (L_0 x w_0)

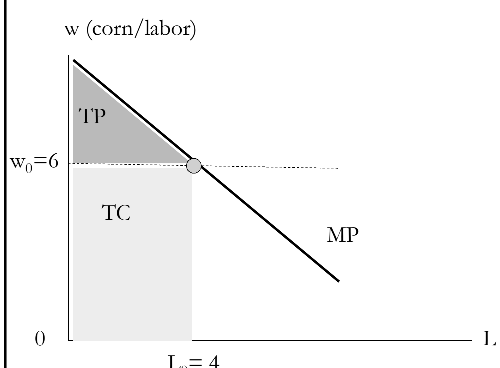
= 30 units of corn – 4 x 6 units of corn

= 6 units of corn

Graphically



Graphically



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

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
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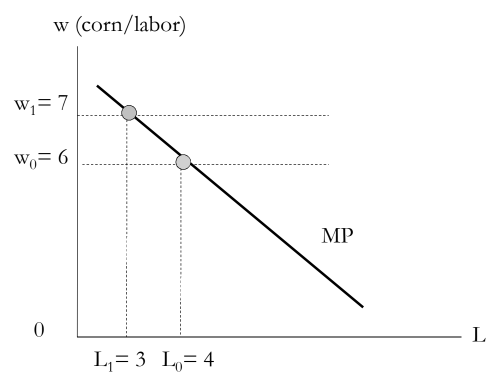
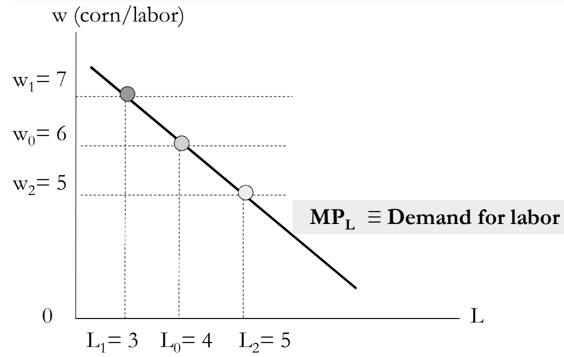
4	30	6/1	7/1
5	35	5/1	7/1



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

L	y (corn)	Δy/ΔL (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

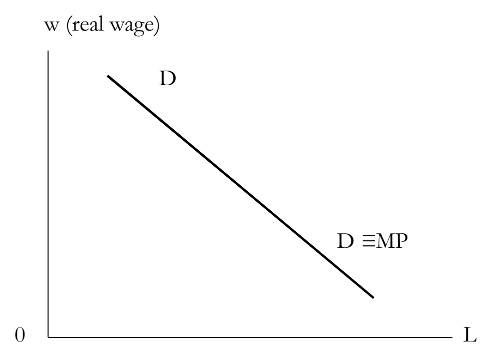
Marginal product curve must be the demand curve for labor!

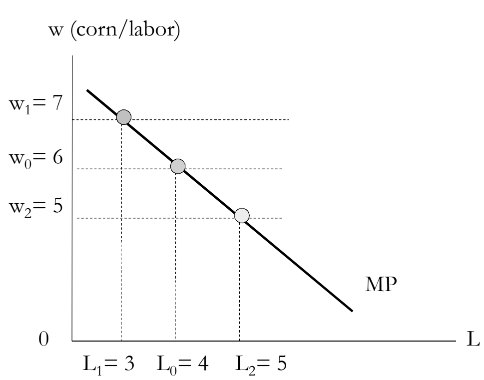


Suppose the real wage (w_2) falls to 5 units of corn per labor. How many labor will be demanded?

L	y (corn)	Δy/ΔL (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

Abstractly





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/corn unit. (We have a "perfectly competitive market.")

L	y (corn)	$\Delta y/\Delta L$ (corn/ labor)	w_0 (corn/ labor)	p_c (\$)
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

Note:

Under "perfect competition":

MRP = MP x P_c

We need two new concepts:

Def. **Total revenue (TR) = y x p_c**

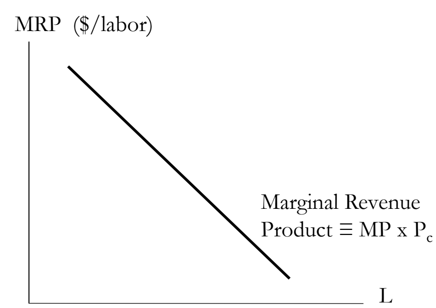
Def: **Marginal revenue product of labor** (MRP) is additional revenue per unit of additional labor:

MRP = ΔTR/ΔL

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

L	y (corn)	$\Delta y/\Delta L$ (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	$\Delta TR/\Delta L$ \$/ 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

Graphically



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

L	y (corn)	Δy/ΔL (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	ΔTR/ΔL \$/ 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.

Total profit (TP)= Total Revenue (TR) – Total Cost (TC)

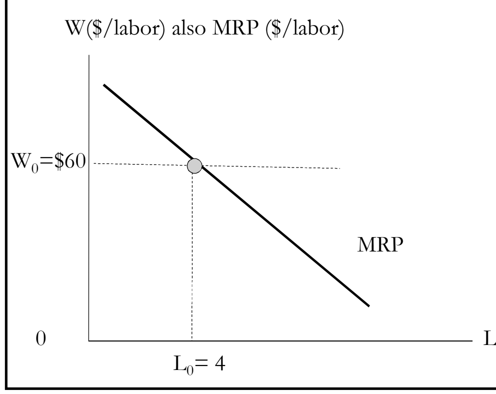
$= y \times p_c - L_0 \times W_0$

= 30 x \$10 – 4 x \$60

= \$60

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

L	y (corn)	Δy/ΔL (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	ΔTR/ΔL \$/ 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

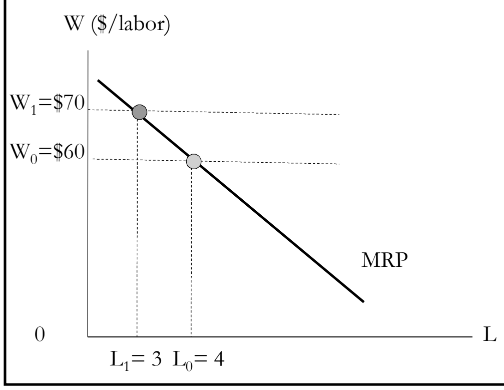


Same as before! L_0 = 4.

L	y (corn)	Δy/ΔL (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	ΔTR/ΔL \$/ 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

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

L	y (corn)	Δy/ΔL (corn/ labor)	w_0 (corn/ labor)	p_c (\$)	TR (\$)	ΔTR/ΔL \$/ 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

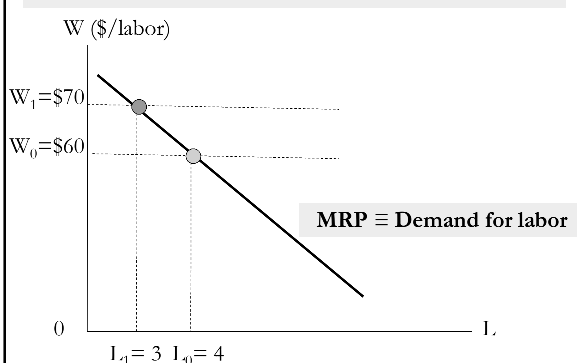
1) wage is nominal (W)?

   Demand shifts to the right.

2) wage is real (w)?

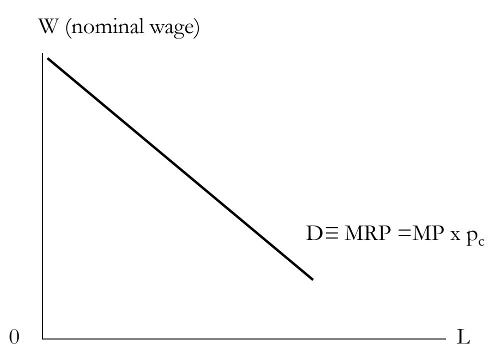
   We move down the demand curve.

Marginal revenue product curve must be the demand curve for labor!



L	y (corn)	Δy/ΔL (corn/ labor)	p_c ($)	ΔTR/ΔL $/ 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

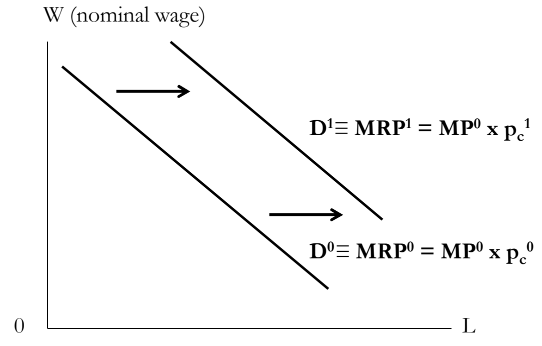
Abstractly



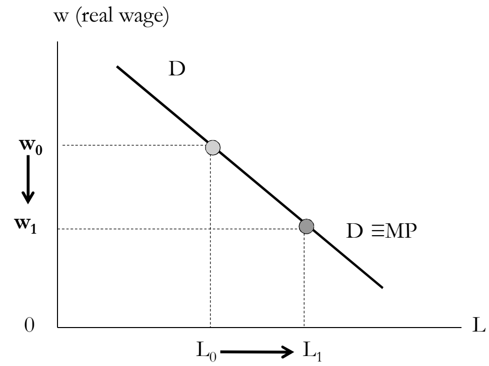
Price of corn doubles:

L	y (corn)	Δy/ΔL (corn/ labor)	p_c ($)	ΔTR/ΔL $/ 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

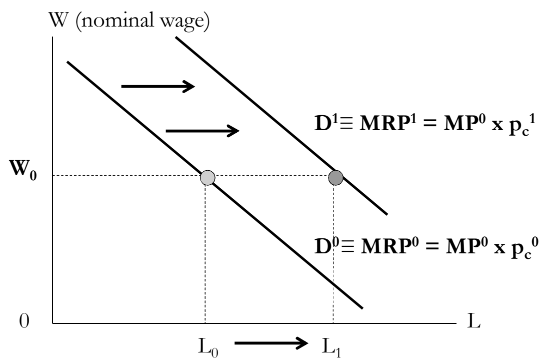
p_c increases



p_c increases



This means more labor will be demanded at a given nominal wage rate



Supply of Labor

Real wage expressed in corn = $\dfrac{\textbf{Nominal wage}}{\textbf{Price of corn}}$

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

Example:

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

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

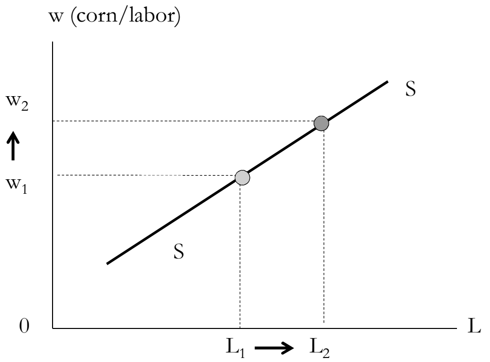
What about supply of labor, why is it upward sloping?

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.

Abstractly



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**.

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.

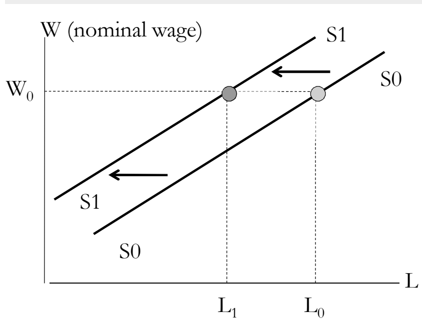
2) wage is real (w)?

We move down the supply curve.

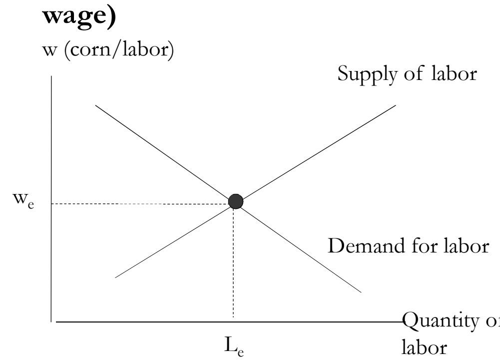
Labor Market

Demand for and supply of labor combined

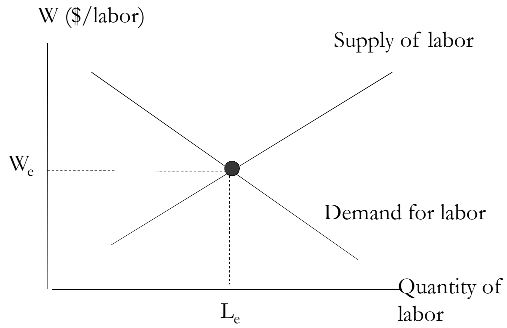
Supply shifts to the left: At the same nominal wage, the real wage declines and quantity of labor supplied decreases.



Equilibrium in the labor market (real wage)



Equilibrium in the labor market (nominal wage)



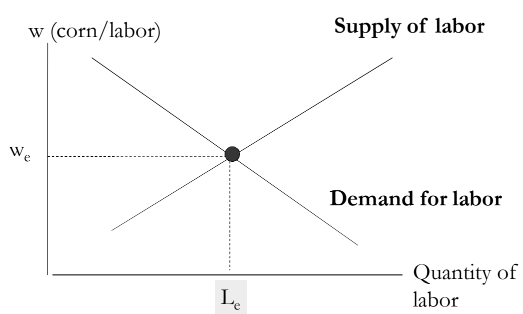
Since the level of employment and output is determined by "real variables," such as marginal product, **neither monetary policy nor fiscal policy can influence output and employment.**

Fiscal policy: taxing and spending by the government.

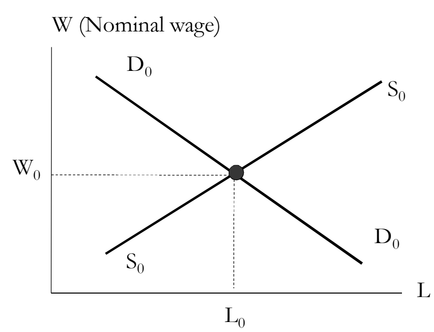
Monetary policy: changing the supply of money by the Federal Reserve System.

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

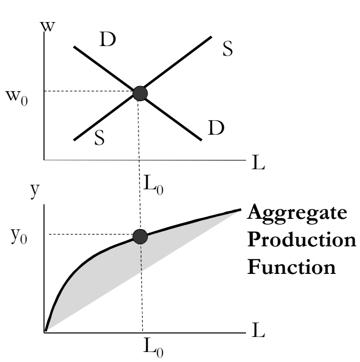
L_e is called the "Natural Rate of Unemployment"



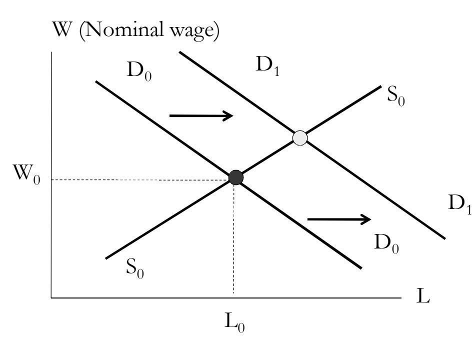
What happens to employment and output when prices increase?



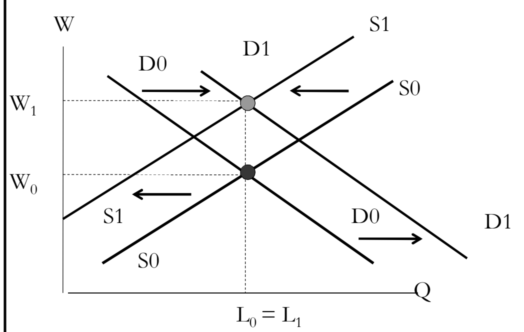
The level of employment in the labor market determines the level of output (GDP) in the economy



Demand shifts to the right



Supply shifts to the left

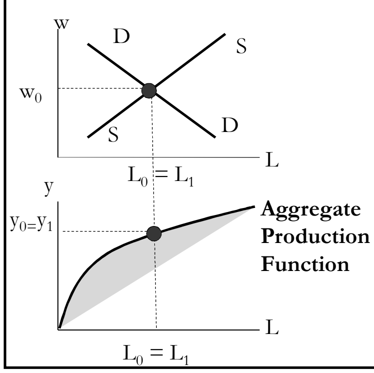


Note :

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.

Monetary policy will have no effect on employment and output



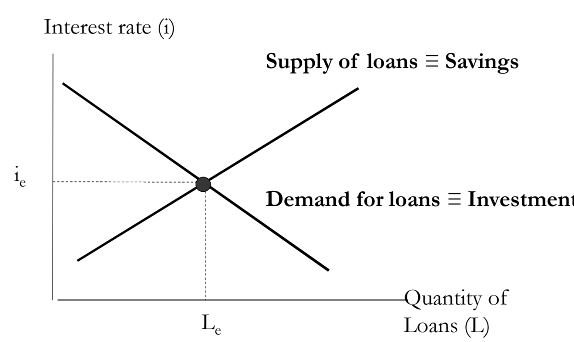
Neoclassical Theory of Loanable Funds Market

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

Fiscal policy has also no effect on output and employment.

To show this, neoclassicals use "**loanable funds market**" or "**capital market**."

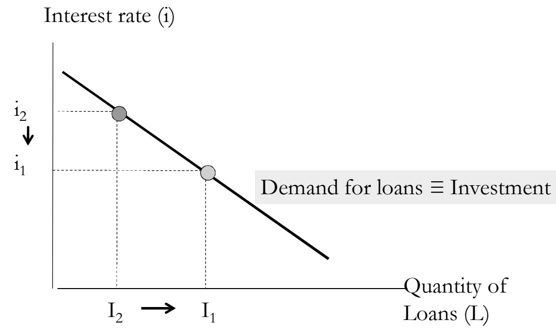
Loanable Funds Market



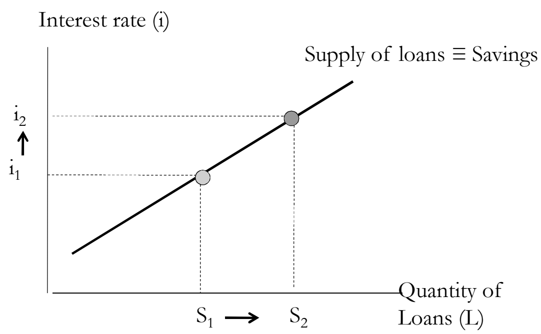
There is usually no explanation for savings and investment functions in the loanable funds market theory, as opposed to the old “capital market theory.”

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

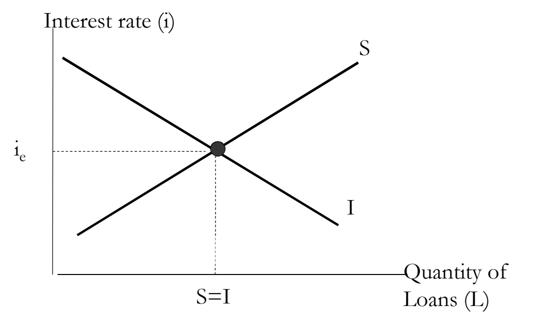
Investment

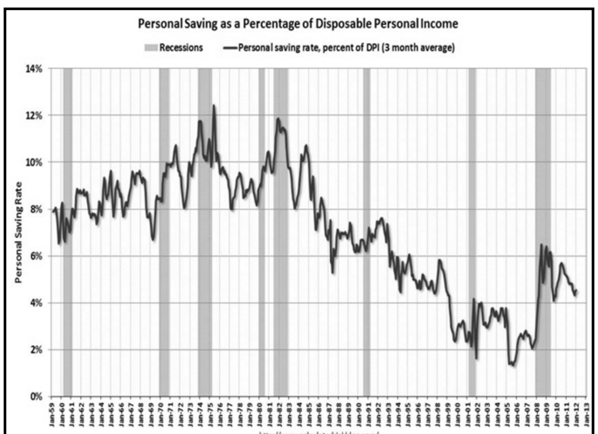


Savings



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.

Surplus = T−G

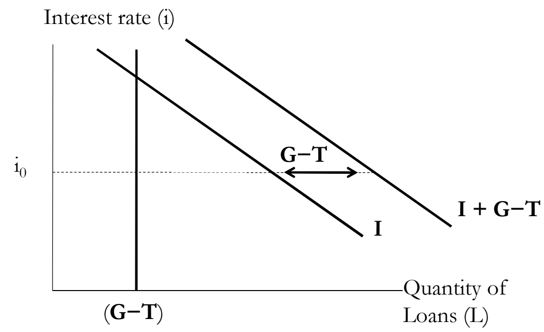
Def Deficit Spending: G>T.

Deficit = G−T

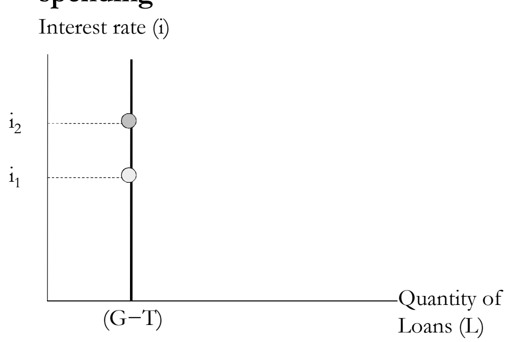
How could government spend more than it collects in taxes?

Issue bonds: borrow in the same loanable funds market.

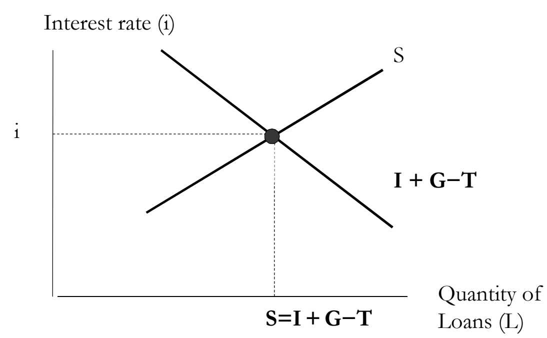
Total demand for loans: I + G−T



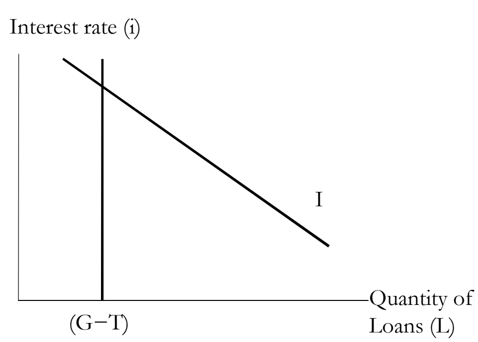
Government borrowing: Deficit spending



Equilibrium in the loanable funds market with government borrowing



Total demand for loans: I + G−T

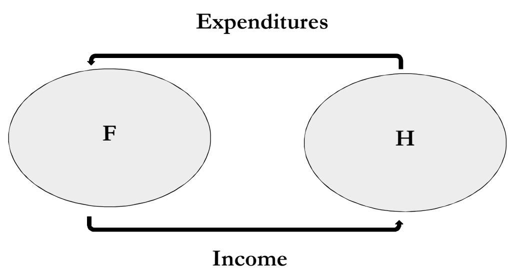


Note:

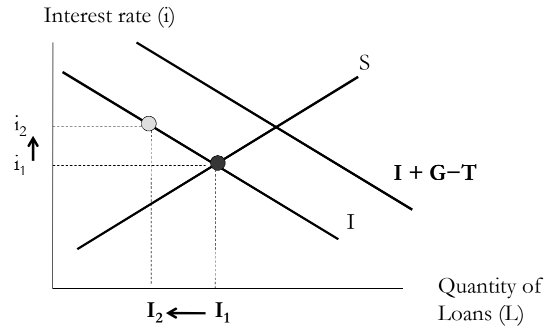
S = I + G−T implies:

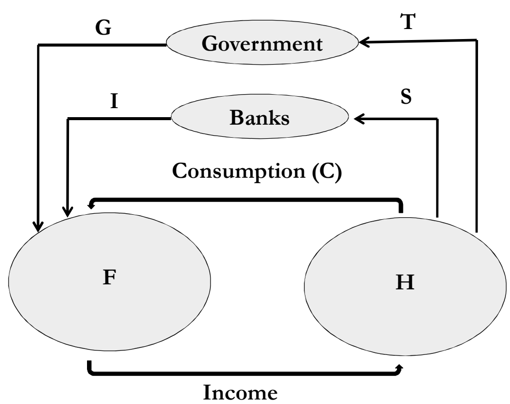
S + T = I + G

Def. Leakages: S + T
Def. Injections: I + G



Crowding Out





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.

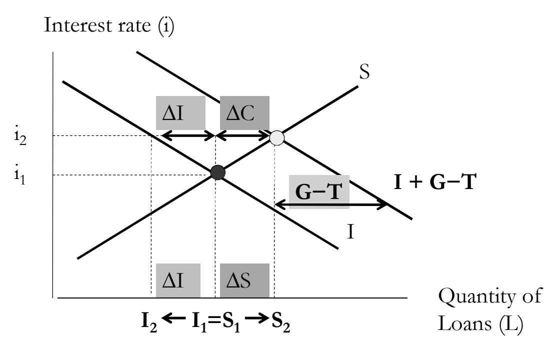
But a neoclassical would argue that the government increase in expenditure is matched by a decrease in investment and consumption expenditures.

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.

This is Complete Crowding Out!



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)