

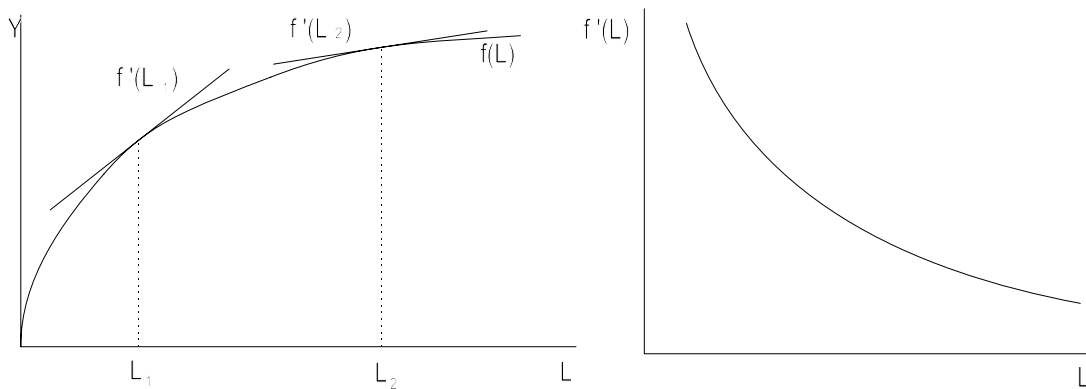
Perceptions, Expectations, and Output Effects of Money

I. Labor Market

A. Labor demand

1. Production function

$$Y_t = f(L_t, \dots) \quad f'(L_t) > 0, \quad f''(L_t) < 0$$



2. Profit maximization

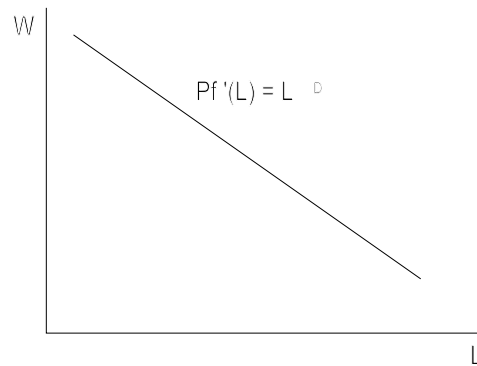
a. Profit = $P_t f(L_t) - W_t L_t$

b. First-order condition for maximization

$$\frac{\partial(\text{Profit})}{\partial L_t} = 0$$

$$= P_t f'(L_t) - W_t$$

$$\Rightarrow P_t f'(L_t) = W_t \quad (\text{marginal revenue} = \text{marginal cost})$$



(If we define $F(L) \equiv Pf(L)$ and then take the inverse, we get labor demand in the usual form:

$$L_t = F^{(-1)}(W_t) \quad \text{where } \partial L / \partial W < 0 \text{ because } f'' < 0 \Rightarrow F' < 0$$

but we don't need this form of labor demand and so won't bother with it.)

B. Labor supply

1. Price perceptions

Suppose workers' perception P_t^e of current price P_t changes more slowly than P_t does (because at any instant they have incomplete information on the the prices of all goods they want to buy).

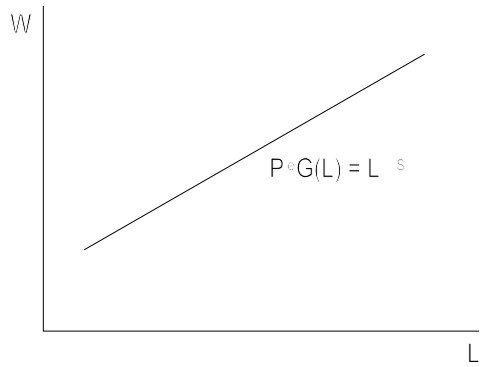
2. Labor supply then depends on the perceived real wage W/P^e

$$L_t^S = g\left(\frac{W_t}{P_t^e}\right) \quad \text{where } g' > 0$$

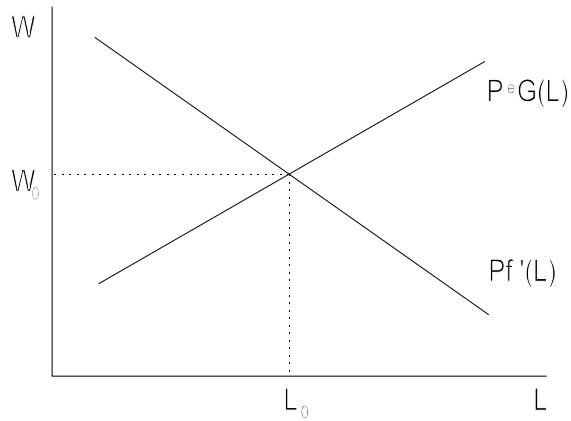
$$\Rightarrow \frac{W_t}{P_t^e} = g^{(-1)}(L_t)$$

$$\equiv G(L_t) \quad \text{where } G' > 0 \text{ because } g' > 0$$

$$\Leftrightarrow W_t = P_t^e G(L_t)$$

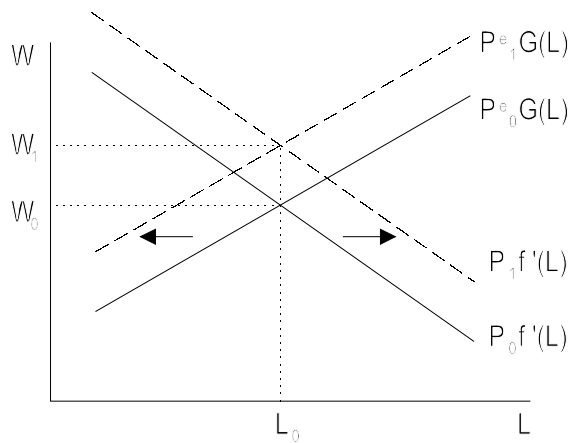


C. Market equilibrium



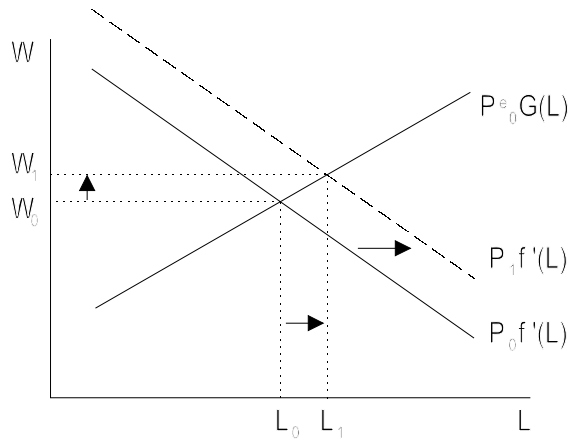
D. Response to an increase in P

1. $P^e = P$ always



No change in Y ; it remains at $Y_0 = f(L_0)$.

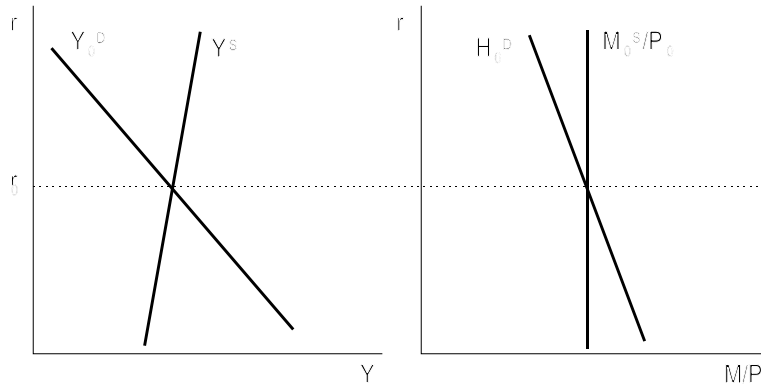
2. P^e does not change at all



Y increases from $Y_0 = f(L_0)$ to $Y_1 = f(L_1)$.

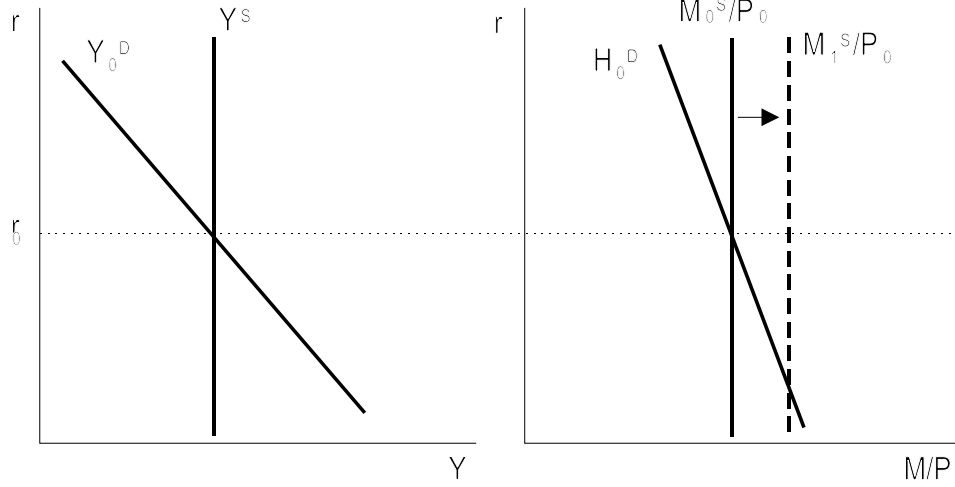
II. General Equilibrium

A. General picture

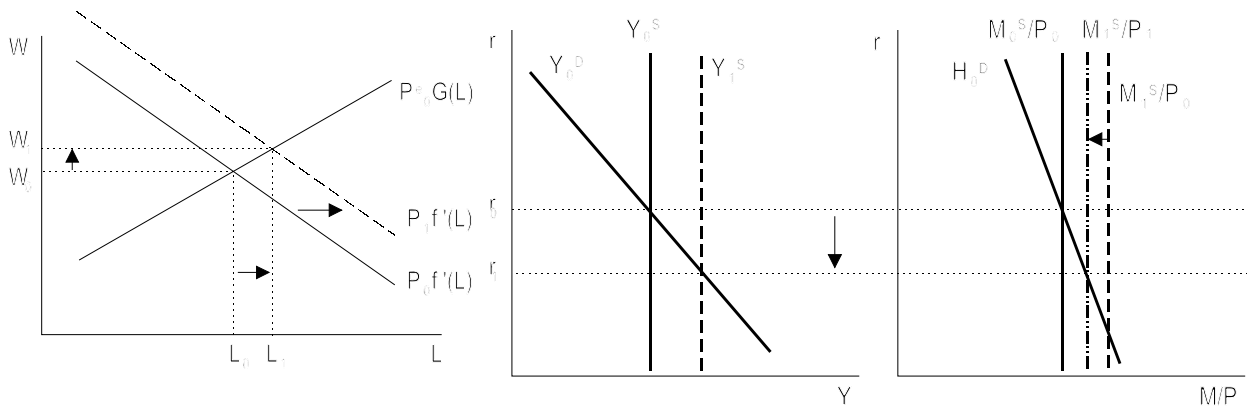


B. Increase in money supply M

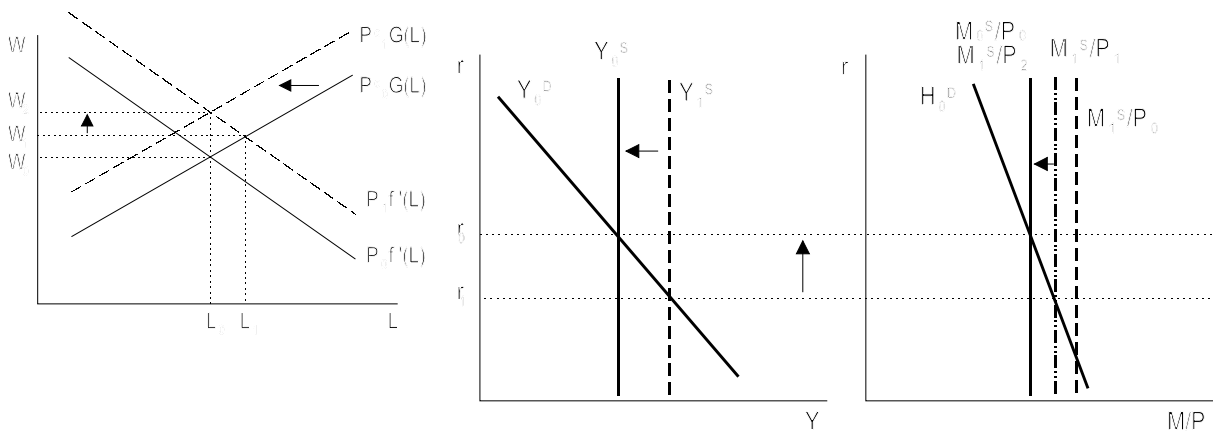
1. The shock



2. Short run



3. Long run



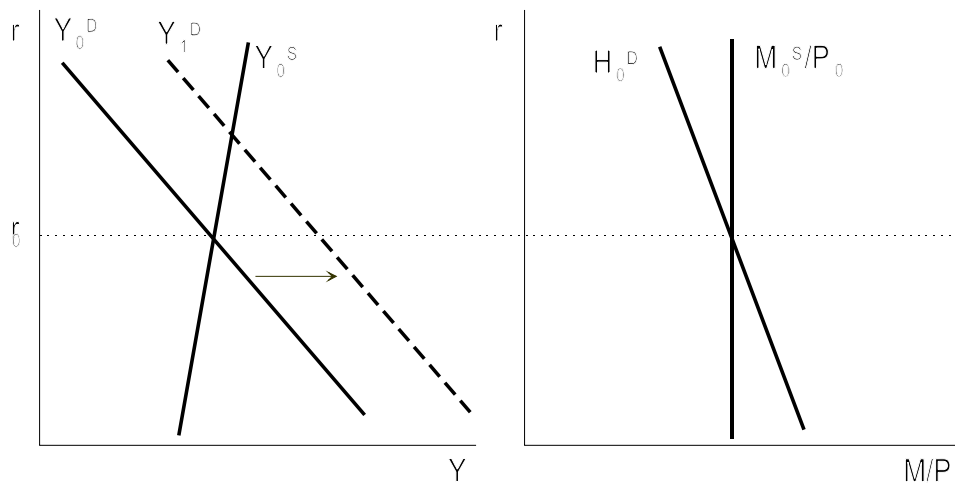
C. Increase in money growth rate μ

Similar to increase in M.

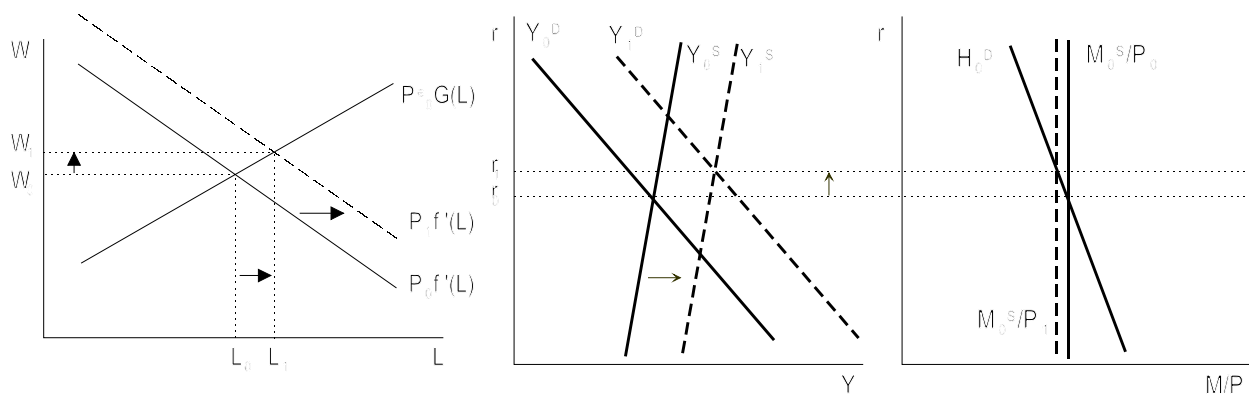
The major difference is that, in the long run equilibrium, inflation and nominal interest rates are higher than before the change.

D. Increase in government purchases

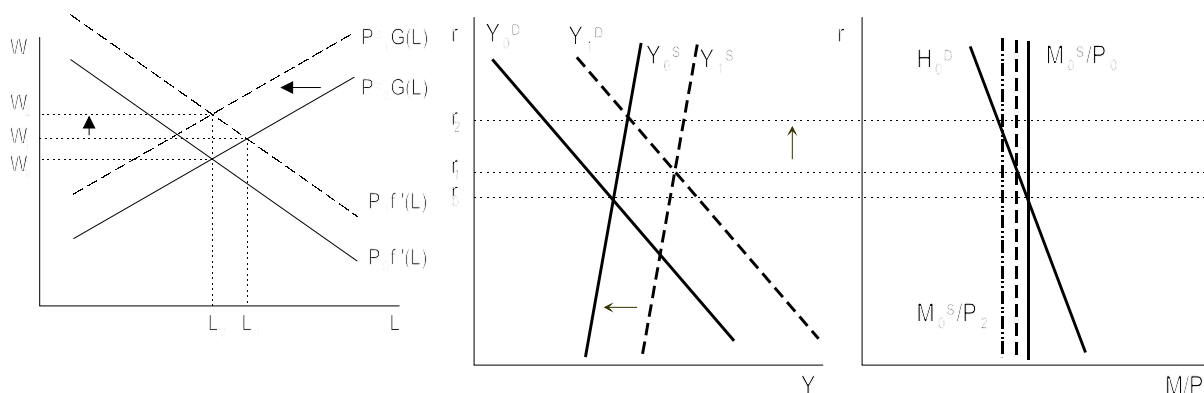
1. The shock



2. The economy's response: short run



3. The economy's response: long run



III. Unemployment

A. Definitions

1. Types of labor force participation

- a. Employment
- b. Unemployment
- c. Non-participation

2. Labor force = employment plus unemployment (= number of people who want to work at the current wage)

3. Types of unemployment

- a. Frictional unemployment
- b. Structural unemployment
- c. Cyclical unemployment

B. Labor demand and supply

1. Labor demand = employment plus vacancies

$$L^D = E + V$$

2. Labor supply = employment plus unemployment

$$L^S = E + U$$

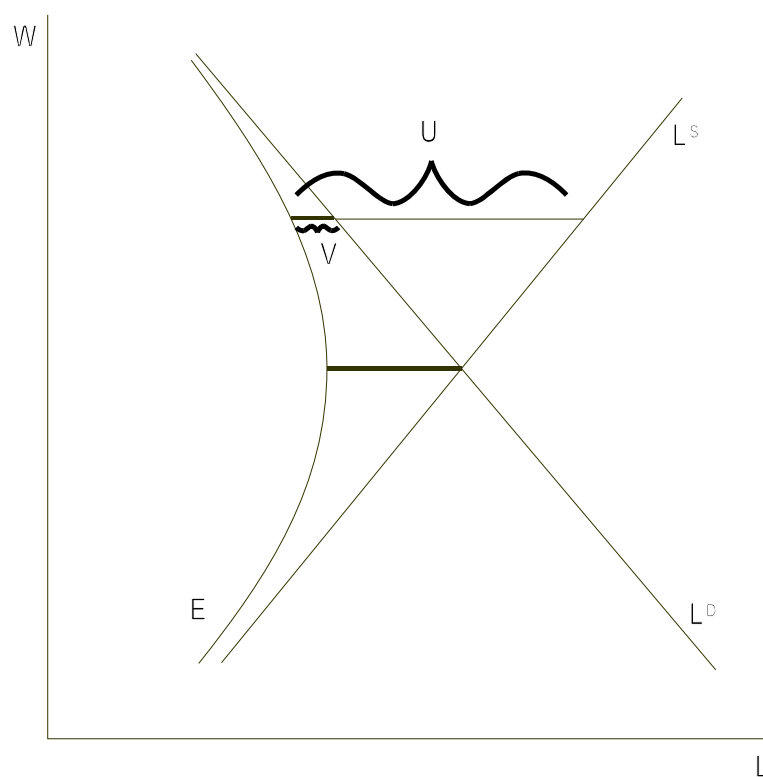
C. Labor market equilibrium

$$L^D = L^S$$

$$\Rightarrow E + V = E + U$$

$$\Rightarrow V = U$$

Note that labor market equilibrium does *not* require that $U = 0$, only that $U = V$.



D. Unemployment rate

$$u \equiv \frac{U}{L^S} = \frac{U}{U + E}$$

IV. Phillips Curve

A. Effect of an unexpected money shock

1. Prices rise
 2. Price rise is misperceived
 3. Employed workers supply more hours
 4. Unemployed workers perceive wage offers as more valuable than they really are and are induced to accept job offers they would reject if they had full information
- ⇒ unemployment falls
5. Over time, correctly perceive the price increase and return to their normal labor supply

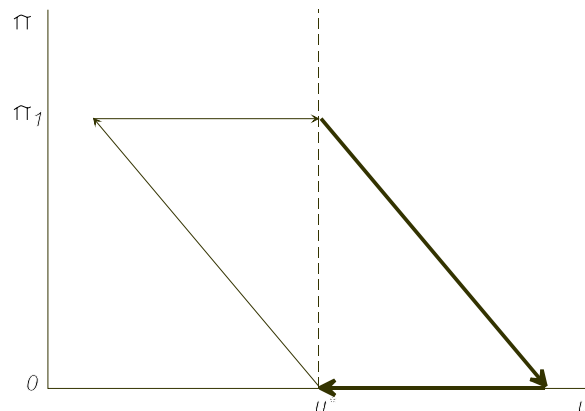
B. Effect of an unexpected increase in the money growth rate

1. Prices start rising
2. The increases in prices are misperceived at first, leading to a reduction in unemployment
3. Eventually, prices are correctly perceived and unemployment returns to normal

C. Reduction in the money growth rate

Same type of results but in the opposite direction

1. Unemployment initially rises
2. Unemployment eventually returns to normal



D. Phillips Curve

1. Equation for the foregoing relation between inflation and unemployment:

$$\pi = \pi^e + f(u) , \quad f' < 0$$

2. Linear approximation:

$$\pi = \pi^e + \phi(u^* - u), \quad \phi > 0$$

3. Implications

- a. If the actual inflation rate π rises above the expected inflation rate π^e , then the actual unemployment rate falls below its normal value of u^* .
- b. As the expected inflation rate adjusts and approaches the actual inflation rate, the unemployment rate returns to its normal value.
- c. Similarly for inflation below expected inflation.

4. Short-run Phillips curve

- a. The foregoing equation specifies the *short-run Phillips curve*.
- b. Can rewrite the equation as

$$\pi = (\pi^e + \phi u^*) - \phi u$$

and interpret the term in parentheses as the vertical intercept.

- c. This intercept term shifts as expected inflation shifts.
- d. When expectations are correct and $\pi^e = \pi$, the short-run Phillips curve intersects the vertical line $u = u^*$ at the actual inflation rate π .

