

MULTIPLE CHOICE QUESTIONS

Choose the one alternative that best answers the question.

1. When the central bank reduces the supply of central bank money, which of the following will happen?

b

- a. The federal funds rate will increase, and the inflation rate relative to the expected inflation rate will increase.
- b. The federal funds rate will increase, and the inflation rate relative to the expected inflation rate will decrease.
- c. The federal funds rate will decrease, and the inflation rate relative to the expected inflation rate will increase.
- d. The federal funds rate will decrease, and the inflation rate relative to the expected inflation rate will decrease.

2. An increase in the minimum wage will tend to cause which of the following?

a

- a. an upward shift in the WS curve
- b. a downward shift in the WS curve
- c. an upward shift in the PS curve
- d. a downward shift in the PS curve
- e. none of the above

3. Blanchard (2016) argues that the current Phillips curve is flatter than that in the 1980s.

Complete the following sentences accordingly. If this is true, the IS curve has (1).

Furthermore, the same monetary policy will have (2) effects on changes in inflation now than in the 1980s.

c

- a. (1) shifted to the right, (2) smaller
- b. (1) became flatter, (2) larger
- c. (1) not changed, (2) smaller
- d. (1) became steeper, (2) larger
- e. None of the above.

4. Several economists have recently argued that the markup of the price over the cost in the US economy has been increasing since the 1980s. Given the information, fill up the following sentence accordingly. This may have shifted the (1) (2), which implies a (3) in the natural rate of unemployment if the other curve has not moved.

d

- a. (1) price setting curve, (2) upward, (3) decline
- b. (1) wage setting curve, (2) downward, (3) rise
- c. (1) wage setting curve, (2) upward, (3) rise
- d. (1) price setting curve, (2) downward, (3) rise
- e. None of the above.

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5. (This question is not explicitly covered in lectures. Students can ignore this question. Interested students may refer to pp.188-190 in the textbook.) Which of the following will tend to occur as a result of a reduction in the proportion of a country's workers who have indexed wages?

d

- a. the unemployment rate will be relatively low.
- b. the unemployment rate will be relatively high.
- c. the inflation rate will be relatively low.
- d. a given change in the unemployment rate will cause a relatively smaller change in the inflation rate.
- e. none of the above

6. When a government reduces its deficits by increasing taxes, in the medium run,

a

- a. output returns to potential.
- b. output increases.
- c. interest rate is higher.
- d. IS curve does not change.

7. For this question, assume that the Phillips curve equation is represented by the following: $\pi_t - \pi_{t-1} = (m + z) - \alpha u_t$. Which of the following will cause a reduction in the natural rate of unemployment?

c

- a. an increase in m
- b. an increase in z
- c. an increase in α
- d. an increase in actual inflation
- e. an increase in expected inflation

8. Select all of the production functions having constant returns to scale.

c

- (1) $Y = K + N$
- (2) $Y = K^{0.4}N^{0.7}$
- (3) $Y = \min\{K, 10N\}$

- a. (1)
- b. (2)
- c. (1), (3)
- d. (2), (3)
- e. (1), (2), (3)

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9. Select all of the correct statements about the Solow model where $g_N \neq 0$ and $g_A = 0$.

b

- (1) In the steady state, output does not change.
- (2) In the steady state, capital per worker does not change.
- (3) Consider an economy at the steady state. If the saving rate increases permanently, consumption per worker decreases temporarily but increases as the economy approaches the new steady state.

- a. (1)
- b. (2)
- c. (1), (3)
- d. (2), (3)
- e. (1), (2), (3)

10. Which of the following is always true after an economy reaches a balanced growth equilibrium?

c

- a. the growth rate of output equals the rate of depreciation.
- b. population growth is zero.
- c. the growth rate of capital is equal to the growth rate of the effective work force.
- d. the growth rate of capital is equal to the savings rate.
- e. none of the above.

Q11 Technology and the labor market

Consider the wage-setting equation in the medium run:

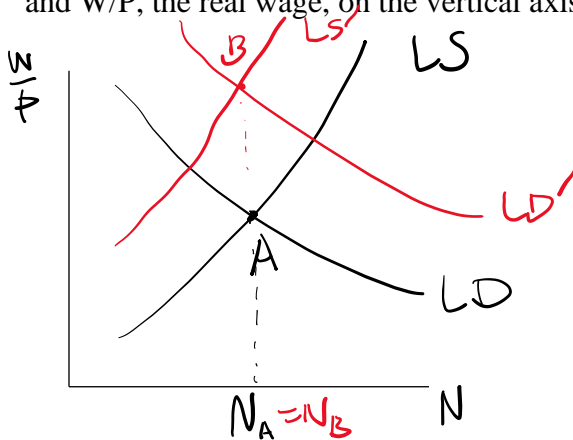
$$\frac{W}{P} = \mathcal{A}F(u, z).$$

The function F is decreasing in the unemployment rate u and increasing in z . For a given labor force L , the unemployment rate u , can be written as

$$u = 1 - \frac{N}{L}$$

where N is the employment. Here, we assume that $\mathcal{A} = 1$.

1) Substitute the expression for u into the wage-setting equation. Using this relation you just derived, draw a graph of the labor supply curve in a diagram with N on the horizontal axis and W/P , the real wage, on the vertical axis. Mark the curve as LS .



$\frac{W}{P} = \mathcal{A}F\left(1 - \frac{N}{L}, z\right)$. When N increases, $1 - \frac{N}{L}$ decreases, and then $\frac{W}{P}$ increases. So, the LS curve should be upward sloping.

You may consider this curve as representing the labor supply. That is, when real wage increases, workers tend to supply more labor, i.e., want to work more.

Consider the price-setting equation

$$P = (1 + m)MC,$$

where MC is the marginal cost of production. Let's assume that

$$MC = W/MPL,$$

where W is the nominal wage and MPL is the marginal product of labor. Further assume that the production function is given by $Y = \mathcal{A}N^\beta$, where $0 < \beta < 1$. That is, $MPL = \mathcal{A}\beta N^{\beta-1}$ falls with the employment for a given level of technology.

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2) Derive the labor demand relation, with W/P as a function of the MPL and the markup m . In the same diagram you drew for part (1), graph the labor demand relation. Mark the curve as LD.

$$P = (1 + m)MC = (1 + m) \frac{W}{MPL}$$

$$\Rightarrow \frac{W}{P} = \frac{MPL}{1 + m} = \frac{\mathcal{A}\beta}{1 + m} N^{\beta-1}.$$

By the assumption, MPL decreases in N . As a result, the LD curve should be downward sloping in the $(N, \frac{W}{P})$ -plane.

You may consider this curve as representing the labor demand. That is, when real wage increases, firms tend to hire less workers.

3) What happens to the labor demand and supply curves if the level of technology improves? Explain and illustrate it in the diagram you drew above. Does the improvement in technology affect the equilibrium real wage and the equilibrium employment?

Note that the two curves are given as follows:

$$\text{LS: } \frac{W}{P} = \mathcal{A}F\left(1 - \frac{N}{L}, z\right),$$

$$\text{LD: } \frac{W}{P} = \frac{MPL}{1+m} = \frac{\mathcal{A}\beta}{1+m} N^{\beta-1}.$$

As \mathcal{A} increases, the LS and LD curves shift upward in proportion to the increase in \mathcal{A} . Therefore, the equilibrium real wage, $\frac{W}{P}$, increases in proportion to \mathcal{A} , where the equilibrium employment, N , does not change.

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Q12. Credibility and disinflation

Suppose that the Phillips curve is given by:

$$\pi_t - \pi_t^e = 2.5\% - 0.5u_t.$$

The expected inflation is given by $\pi_t^e = \pi_{t-1}$.

Suppose in period t , the economy is in its medium run equilibrium with an inflation rate of 10%. The central bank would like to reduce the inflation rate by 9 percentage points.

1) If the disinflation is to be achieved in one year, i.e., $\pi_{t+1} = \pi_t - 9\%$, what is the unemployment rate in period $t+1$?

Note that $\pi_t = 10\%$ and $\pi_{t+1} = 1\%$. From the Phillips curve, we have the following results:

$$\begin{aligned}\pi_{t+1} - \pi_t &= 2.5\% - 0.5u_{t+1} \\ \Rightarrow -9\% &= 2.5\% - 0.5u_{t+1} \\ \Rightarrow u_{t+1} &= 23\%.\end{aligned}$$

2) If the disinflation is to be achieved in two years, i.e. $\pi_{t+2} = \pi_t - 9\%$, and the cost in terms of *excess unemployment rate* (actual unemployment rate minus the natural rate of unemployment) is equally spread over the two years, what should the inflation rate be in period $t+1$? What is the unemployment rate in period $t+1$ and period $t+2$?

It is clear that $\pi_t - \pi_t^e = -0.5(u_t - u_n)$, where $u_n = 5\%$. Given that $\pi_t^e = \pi_{t-1}$, we have

$$\begin{aligned}\pi_{t+2} - \pi_{t+1} &= -0.5(u_{t+2} - u_n), \\ \pi_{t+1} - \pi_t &= -0.5(u_{t+1} - u_n).\end{aligned}$$

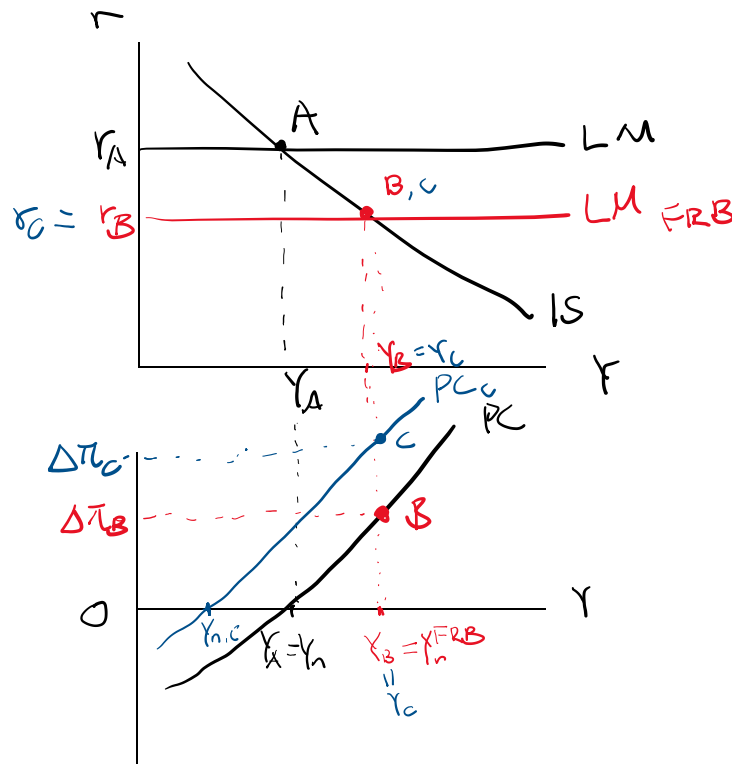
Therefore, $-9\% = \pi_{t+2} - \pi_t = -0.5[(u_{t+2} - u_n) + (u_{t+1} - u_n)]$. Also, $(u_{t+2} - u_n) + (u_{t+1} - u_n) = 18\%$. Because the unemployment gaps in years $t+1$ and $t+2$ are the same by assumption, $u_{t+2} - u_n = u_{t+1} - u_n = 9\%$. That is,

$$u_{t+1} = u_{t+2} = 9\% + u_n = 14\%.$$

Finally, $\pi_{t+1} = \pi_t - 0.5 \times 9\% = 5.5\%$, and $\pi_{t+2} = \pi_{t+1} - 0.5 \times 9\% = 1\%$.

Q13. IS-LM-PC

Consider the IS-LM-PC model. Suppose that output in year t equals the potential output.



1) Draw the IS-LM-PC diagram. Label the equilibrium in year t as point A.

Some macroeconomists (e.g., Orphanides, 2004) argue that the federal reserve board overestimated the potential output in the 1970s than what it actually was. That is, they thought that Y_n was higher than the true value. Furthermore, the federal reserve actively tried to close the output gap, i.e., achieve the perceived natural level of output.

2) Denote the potential output that the federal reserve believed by Y_n^{FRB} . Draw a new LM curve in a reflection of the federal reserve's policy to return to the potential output it believed. Label this new LM curve as LM^{FRB} and the new equilibrium as point B. Explain briefly what would happen to the inflation rate.

Because $Y_B = Y_n^{FRB} > Y_n$, $\pi_B - \pi_B^e > 0$. If we consider the accelerationist Phillips curve, this implies that the inflation rate increases.

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3) In the 1970s, there were other shocks that raised oil prices. Shift the relevant curve(s) in the figure and denote the new equilibrium by point C. Suppose that the perceived natural level of output, Y_n^{FRB} , did not change and the FRB maintained the policy in part 2). Explain the effects of the oil price shock on the inflation rate in three sentences.

As Y_n decreases, the true PC curve shifts to the left. Because $Y_C = Y_B = Y_n^{FRB} > Y_{n,C}$, π increases more the economy moves from point B to point C.

Q14. Solow growth model

Here we adopt the same notation used in lectures and the textbook. Suppose that

$$Y_t = \sqrt{K_t} \sqrt{N}.$$

We assume that the employment, N , is constant. Let k_t be the amount of capital per worker in year t , $\frac{K_t}{N}$. Similarly, $k^* = \frac{K^*}{N}$ denotes the steady-state capital per worker.

1) Show that $k^* = \left(\frac{s}{\delta}\right)^2$. (HINT: You may want to begin with showing that $\frac{Y_t}{N} = \sqrt{k_t}$.)

$$Y_t = \sqrt{K_t} \sqrt{N} \Rightarrow y_t = \frac{Y_t}{N} = \frac{\sqrt{K_t} \sqrt{N}}{N} = \sqrt{\frac{K_t}{N}} = \sqrt{k_t}.$$

At the steady state, saving per worker, sy^* , equals depreciation of capital per worker, δk^* . Thus,

$$s\sqrt{k^*} = sy^* = \delta k^* \Rightarrow \sqrt{k^*} = \frac{s}{\delta} \Rightarrow k^* = \left(\frac{s}{\delta}\right)^2.$$

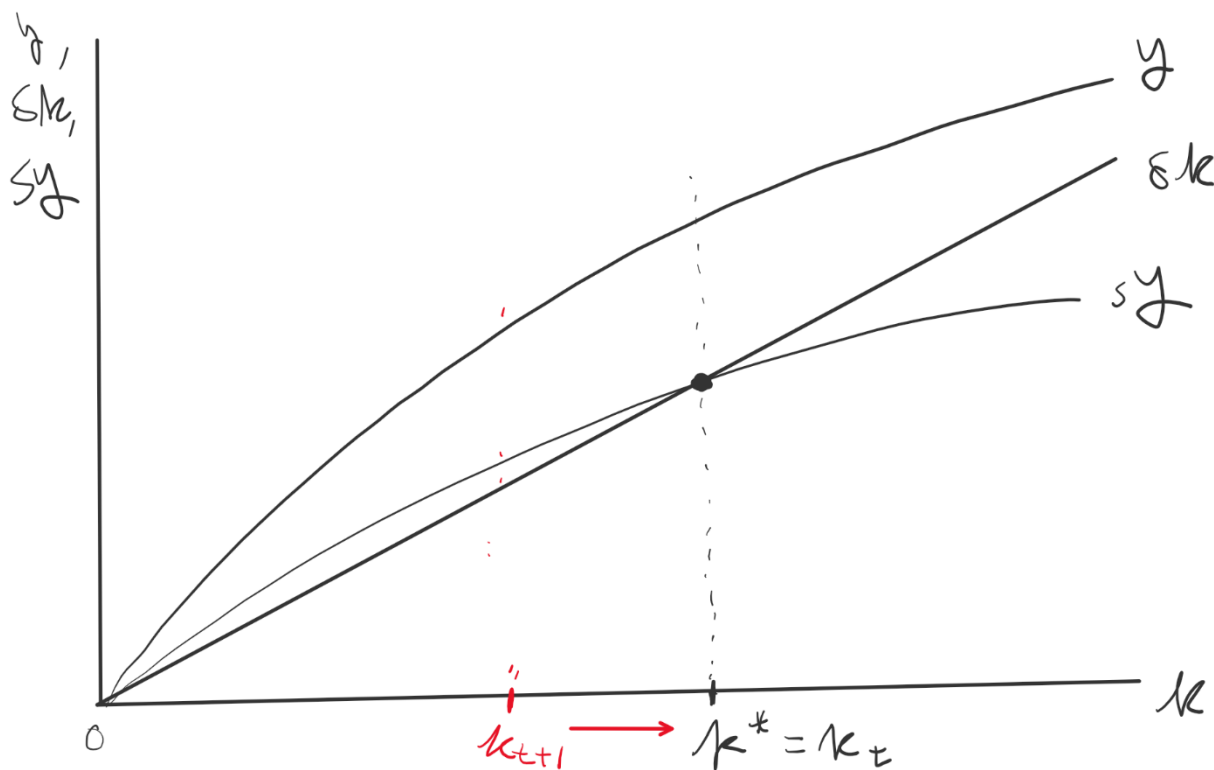
2) Suppose that the savings rate, s , is 0.2, and the rate of capital depreciation, δ , is 0.1 per year. We further assume that N is 4 million, which is similar to the number of employed persons in Hong Kong. Calculate the consumption per worker and the aggregate output in this economy in the steady state.

From the result in 1), $k^* = \left(\frac{0.2}{0.1}\right)^2 = 4$. Also, $y^* = \sqrt{k^*} = 2$. Therefore, consumption per worker is given by $c^* = (1 - s)y^* = 0.8 \times 2 = 1.6$. Because $Y^* = y^* \times N$, the aggregate output in the steady state equals 8 million.

3) An earthquake hits the economy in year $t + 1$, which was in the steady state in year t . While some factories are destroyed, no casualties are reported (i.e., no one died). Explain what will happen to output and capital in the future graphically.

$k_t = \frac{K_t}{N} = k^*$. Because $K_{t+1} < K_t$ and N does not change, $k_{t+1} < k_t = k^*$. From year $t + 1$, capital accumulates and the economy converges to the steady state.

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4) Under the scenario assumed in 3), compare the capital to output ratio, $\frac{K}{Y}$, in year $t + 1$ to that in year t . (HINT: $\frac{K}{Y} = \frac{K/N}{Y/N}$.)

$$\frac{K}{Y} = \frac{K/N}{Y/N} = \frac{k}{y} = \frac{k}{\sqrt{k}} = \sqrt{k}.$$

Because $k_{t+1} < k_t$, it follows that $\frac{K_{t+1}}{Y_{t+1}} < \frac{K_t}{Y_t}$.