

0513403

Quiz 2

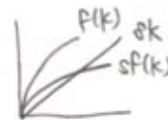
Macroeconomics, 1062 Semester (Spring 2018)
 College of Management, National Chiao Tung University
 Instructor: Professor Alex YiHou Huang
 May 15, 2018

Instructions

- Please read the questions carefully and make sure you provide answers to all parts of questions.
- Raise your hand if you have any problem. Please do not talk to or exchange notes with other students.
- No bathroom breaks are allowed.
- Turn off your cell phone(s) and any other electronic device.

Part I. Multiple Choice (60%, 4 points each, choose one correct answer):

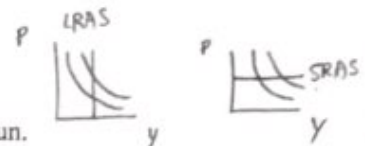
- B 1. In the Solow growth model of Chapter 7, for any given capital stock, the _____ determines how much output the economy produces and the _____ determines the allocation of output between consumption and investment.
- (A) saving rate; production function
 (B) production function; saving rate
 (C) technology growth; consumption function
 (D) depreciation rate; population growth rate
 (E) population growth rate; saving rate
- C 2. The version of Okun's law studied in Chapter 9 assumes that with no change in unemployment, real GDP normally grows by 3.5 percent over a year. If the unemployment rate rose by 3 percentage points over a year, Okun's law predicts that real GDP would:
- (A) decrease by 0.5 percent.
 (B) decrease by 2 percent.
 (C) decrease by 2.5 percent.
 (D) decrease by 4 percent.
 (E) increase by 1.5 percent.
- B 3. In the Solow growth model, the steady-state growth rate of output per effective worker is _____, and the steady-state growth rate of output per worker is _____.
 (A) the sum of the rate of technological progress plus the population growth rate; zero
 (B) zero; the rate of technological progress
 (C) zero; zero
 (D) the sum of depreciation rate plus population growth rate; zero
 (E) the rate of technological progress; the rate of population growth



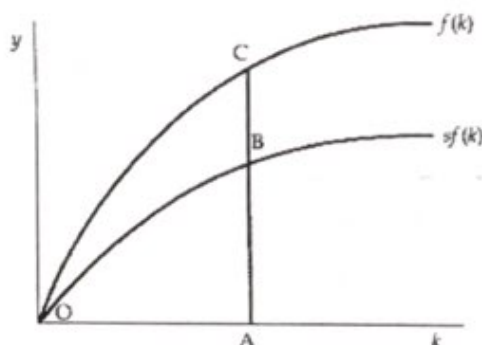
- LEI
- B 4. Leading economic indicators are:
- (A) the most popular economic statistics.
 - (B) variables that tend to fluctuate in advance of the overall economy.
 - (C) perfect indicators to predict future business cycle.
 - (D) data that are used to construct the consumer price index and the unemployment rate.
 - (E) standardized statistics compiled by the National Bureau of Economic Research.

- D 5. In a Solow model with technological change, if population grows at a 2 percent rate and the efficiency of labor grows at a 3 percent rate, then in the steady state output per worker grows at a _____ percent rate.
- $n = 0.02$
 $g = 0.03$
 $y = \frac{Y}{L \times E}$
 $\frac{y}{L} = y \times E$
 $\frac{y}{L} = g$
- (A) 0
 - (B) 1
 - (C) 2
 - (D) 3
 - (E) 5

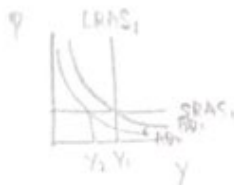
- E 6. A difference between the economic long run and the short run is that:
- (A) the classical dichotomy holds in the short run but not in the long run.
- (B) monetary and fiscal policy affect output only in the long run.
- (C) prices and wages are sticky in the long run only.
- (D) their supply curves in the AD-AS models are separate and parallel to each other.
- (E) demand can affect output and employment in the short run, whereas supply is the ruling force in the long run.



- D 7. In below graph, when the capital-labor ratio is OA, AB represents:



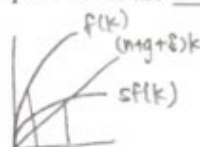
- (A) investment per worker, and AC represents consumption per worker.
- (B) consumption per worker, and AC represents investment per worker.
- (C) consumption per worker, and AC represents saving per worker.
- (D) investment per worker, and BC represents consumption per worker.
- (E) consumption per worker, and BC represents investment per worker.



8. When the Central Bank reduces the money supply, at a given price level, the amount of output demanded is low and the aggregate demand curve shifts inward.
- (A) greater; inward
(B) greater; outward
(C) the same as previous level; outward
(D) lower; inward
(E) lower; outward

9. If the marginal product of capital net depreciation equals 8 percent, the rate of growth of population equals 2 percent, and the rate of labor-augmenting technical progress equals 2 percent, to reach the Golden Rule level of the capital stock the rate in this economy must be increased.

- (A) saving; increased.
(B) population growth; decreased
(C) velocity; increased.
(D) depreciation; decreased
(E) total output growth; decreased



$$n+g=0.04$$

10. A higher saving rate leads to a:
- (A) higher rate of economic growth in both the short run and the long run.
(B) higher rate of economic growth only in the long run.
(C) higher rate of economic growth in the short run but a decline in the long run.
(D) large capital stock and a low level of output in the long run.
(E) large capital stock and a high level of output in the long run.

11. If the per-worker production function (Chapter 7) is given by $y = k^{1/2}$, the saving rate (s) is 0.2, and the depreciation rate is 0.1, assume no population growth rate, then the steady-state ratio of capital to labor is:

- (A) 1.
(B) 2.
(C) 4.
(D) 9.
(E) 25.

$$s=0.2 \quad \delta=0.1$$

$$sf(k) = \delta k$$

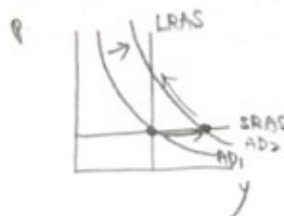
$$0.2 \sqrt{k} = 0.1 k$$

$$2 = \sqrt{k}$$

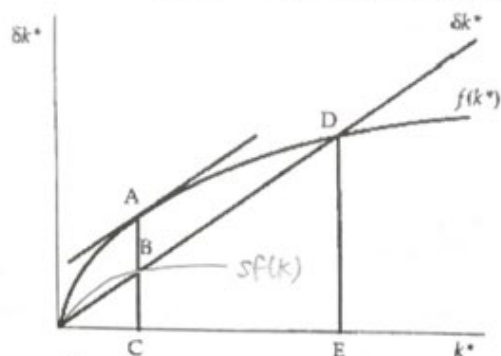
$$4 = k$$

12. Assume that the economy starts from long-run equilibrium. If the Central Bank increases the money supply, then output increase(s) in the short run and output increase(s) in the long run.

- (A) output; prices
(B) output; output
(C) prices; output
(D) velocity; nothing
(E) prices; prices



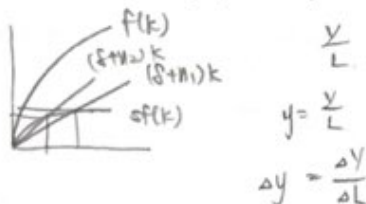
13. In below graph, the Golden Rule level of steady-state consumption per worker is:



- (A) AC.
(B) AD.
(C) AB.
(D) BC.
(E) DE.

- E 14. Assume two economies are identical in every way except that one has a higher population growth rate. According to the Solow growth model, in the steady state the country with the higher population growth rate will have a lower level of total output and the same rate of growth of output per worker as than the country with the lower population growth rate.

- (A) higher; the same
(B) higher; a higher
(C) higher; a lower
(D) lower; a lower
(E) lower; the same



15. In Solow model with technology growth,

- (A) output per worker grows at the same rate as real wage. g g
(B) output per worker grows at the same rate as total output. g $n+g$
(C) output per worker grows at the same rate as real rental price. g n
(D) total output grows at the same rate as population. $n+g$ n
(E) total output grows at the sum of population rate plus depreciation rate. $n+g$ $n+\delta$

Part II. Problems (40%, detail procedures must be provided):

1. (12 points) Suppose Congress passes significant tax cuts on household income but does not reduce spending, so that the government budget deficit is larger. Use the Solow growth model of Chapter 8 to graphically illustrate the impact of the tax cut on the steady-state capital-labor ratio and the steady-state level of output per worker. Be sure to label the: (i) axes; (ii) curves; (iii) initial steady-state levels; (iv) terminal steady-state levels; and (v) the direction curves shift. Please describe the impact and explain what would happen to the investment, capital, and output (per effective worker).
2. (4 points) If the U.S. production function is Cobb-Douglas with capital share as 0.3, total output growth is 3 percent per year, depreciation is 4 percent per year, and the Golden Rule steady-state capital-output (K/Y) ratio is 4.29, to reach the Golden Rule steady state, the saving rate must be (based on Solow model at Chapter 8):
3. (8 points) An economy's capital per worker grows at 2%. Its population growth rate and depreciation rate are 3% and 4%, respectively. Based on Solow model with technology progress, at the steady state, what are the growth rates of (a) real wage, (b) output per effective worker, (c) real rental price, and (d) total level of capital?
4. (16 points) Suppose you are an economist working for the Central Bank when droughts in the South and floods in the North of Taiwan substantially reduce food production. Use the aggregate demand / aggregate supply (AD/AS) model to illustrate graphically your policy recommendation to accommodate this adverse supply shock, assuming that your top priority is maintaining full employment in the economy. Be sure to label: (i) the axes; (ii) the curves; (iii) the initial equilibrium values; (iv) the direction the curves shift; and (v) the terminal equilibrium values.

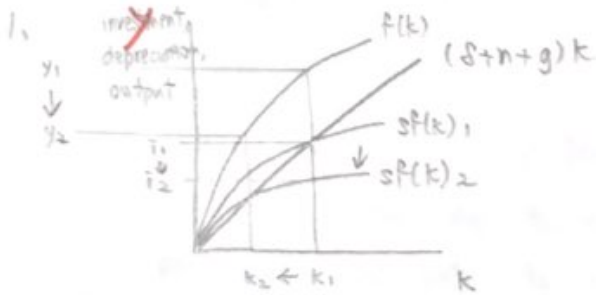
Please state in words: (a) what would happen before any policy action is taken, (b) what action you would recommend, and (c) what happens to prices and output as a combined result of the supply shock and the recommended policy action?

Part I.]

1. B 2. C 3. B 4. B 5. D 6. E 7. D 8. D 9. A 10. ~~C~~
 11. C 12. A 13. C 14. E 15. A

-4

Part II.]



A significant tax cut would lower the saving rate, causing $sf(k)_1$ change to $sf(k)_2$. The investment, capital, and output (per worker) would all fall due to this policy.



2. $ntg = 0.03$

$s = 0.04$

$k/y = 4.29$

$sy = (n+g+s)k$

$s = (n+g+s) \left(\frac{k}{y} \right)$

$= (0.03 + 0.04) \times 4.29$

$= 0.3003$

$$\begin{array}{r} 0.07 \\ 4.29 \\ \hline 63 \\ 14 \\ \hline 28 \\ \hline 0.2003 \end{array}$$

3. $\frac{k}{L} = 0.02 = g$

$k = \frac{K}{L \times E} \quad \frac{K}{L} = k \times E$

$n = 0.03, s = 0.04$

(a) Real wage = $\frac{\text{income share per output}}{L} \Rightarrow$ growth rate is $(n+g) - n = g = 0.02$

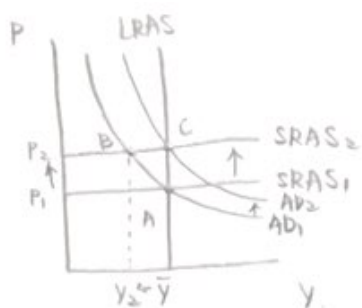
(b) 0

(c) Real rental price = $\frac{\text{capital share per output}}{K} \Rightarrow$ growth rate is $(n+g) - (n+g) = 0$

$k = \frac{K}{L \times E} \Rightarrow K = k \times L \times E$

(d) $k = \frac{K}{L \times E} \Rightarrow K = k \times L \times E \Rightarrow$ growth rate is $ntg = 0.03 + 0.02 = 0.05$

4.



- (a) Before any policy taken, the Short Run Aggregate supply would jump from $SRAS_1$ to $SRAS_2$, because at the same level of output, food's price level will rise due to the natural disasters. This causes the total output and employment rate to drop and a rise in the price level (for a short time, and still slowly recover back to P_1 in the future.)
- (b) If the top priority is maintaining full employment, I would suggest to increase the money supply. (Shifting the aggregate demand outward to AD_2)
- (c) After the policy action, the total output won't change, as well as the full employment in the economy. But, the result is a permanently higher price level.