
14.02 Principles of Macroeconomics

Spring 06

Quiz 2

Thursday April 20, 2006

7:30 pm - 9:00 pm

Please answer the following questions. Write your answers directly on the quiz. There are 5 True/False questions, followed by 3 short questions. The quiz is for a total of 90 points. Keep the point distribution in mind as you allocate your time across the questions. There is a blank page at the end of the quiz to be used for scratch paper. Good luck!

NAME: _____

MIT ID NUMBER: _____

TA: _____

CLASS TIME: _____

EMAIL: _____

(Table is for corrector use only.)

	1	2	3	4	Total
I. T/F					
II. SQ 1					
II. SQ 2					
III. SQ 3					
Total					

I. Answer each as True or False, and explain your choice. (25 points. Each question counts for 5 points.)

1. The equilibrium real wage in the labor market is independent of the bargaining power of workers.

2. The credibility of the Central Bank determines whether money is neutral in the medium run.

3. In the medium run, positive nominal money growth always leads to inflation.

Read Table I carefully, and answer questions 4 and 5 based on the evidence provided by the table.

Table I. Average Annual Rates of Growth of Output per Worker and Technological Progress in Four Rich Countries, 1950-2000

	<u>Rate of Growth of Output per Worker (%)</u>			<u>Rate of Technological Progress (%)</u>		
	1950-1973	1973-2000	Change	1950-1973	1973-2000	Change
	<1>	<2>	<3>	<4>	<5>	<6>
France	4.8	2.1	-2.7	5.3	1.6	-3.7
Japan	7.1	2.1	-5.0	7.0	1.4	-5.6
United Kingdom	3.4	1.7	-1.7	3.7	1.9	-1.8
United States	2.7	1.2	-1.5	2.9	1.4	-1.5

4. The slowdown in growth of output per worker starting in the mid-1970s is due to a sharp drop in the saving rate.

5. Convergence of the growth rate of output per worker across countries during 1973-2000 has come from higher technological progress, rather than from faster capital accumulation, in the countries that started behind.

II. Short Questions: (65 points)

1. The Labor Market (30 points)

Assume wage setting is given by

$$\frac{W}{P^e} = B + f(u); f(0) = \infty, f(1) > 0 \text{ and } f'(u) < 0.$$

And price setting is given by

$$P = W(1 + \tau),$$

where W is the nominal wage, P the price level, P^e the expected price level, and u the unemployment rate. The new parameters are: B represents unemployment benefits, τ the payroll tax rate (for example, if $\tau = 0.2$, firms pay payroll taxes equal to 20% of the wage).

- a. Explain in words why unemployment benefits lead to an increase in the real wage in the wage setting equation. (5 points)

- b. Characterize the medium-run equilibrium unemployment (the natural rate of unemployment, u_n) graphically. (5 points)

c. Show graphically the effects of higher unemployment benefits on $\frac{W}{P}$ and u_n . (5 points)

d. Show graphically the effects of higher payroll taxes on $\frac{W}{P}$ and u_n . (5 points)

e. “Since higher unemployment benefits lead to higher unemployment, they should be eliminated.” Discuss. (5 points)

f. “Since payroll taxes lead to higher unemployment, they should be eliminated.” Discuss. (5 points)

2. Beyond the Short Run (15 points)

Consider the IS-LM equations as follows:

$$Y = C(Y - T) + I(i, Y) + G$$
$$\frac{M}{P} = YL(i).$$

And assume that, in the medium run, Y returns to \bar{Y} .

- a. Consider an increase in G , financed by an equal increase in T . Show that, in the medium run, this fiscal expansion leads to a higher interest rate, and lower investment. (5 points)

- b. Using what you learned from the Solow model, explain what lower investment implies for output in the long run. (5 points)

- c. “A fiscal expansion may increase output in the short run, but may decrease in the medium and the long run” Discuss. (5 points)

3. Technological Progress and Growth (20 points)

Suppose that the economy's production function is

$$Y = K^{\frac{1}{2}} (AN)^{\frac{1}{2}},$$

and that the saving rate is s and that the rate of depreciation is δ . Suppose further that the number of workers grows at g_N per year and that the rate of technological progress is g_A per year. s, δ, g_N and g_A are all positive constants.

- a. Find the steady-state values of:
 - i. The capital stock per effective worker.
 - ii. Output per effective worker.
 - iii. Consumption per effective worker.
 - iv. The growth rate of output per effective worker.
 - v. The growth rate of output per worker.
 - vi. The growth rate of output.

Hint: Express the values in terms of the given parameters s, δ, g_N and g_A . (10 points)

b. Now suppose that the number of workers grows at $g'_N > g_N$. Based on your answers to part (a), explain whether people are better off in (a) or (b). (5 points)

c. Now suppose that the number of workers grows at the same rate as in question (a), but now the saving rate s' is higher than in question (a). Based on your answers to part (a), provide the condition(s) under which people are better off in the steady state in case (c) than in case (a). Hint: write down the condition(s) in terms of s and s' . (5 points)