Final Exam : 14.02

Fall 1999

Full Name:
TA Name:
Section Time:

STOP! Failure to follow these instructions could be detrimental to your grade.

The exam consists of 4 parts on 3 pages. Please answer all of the questions completely. The total score is 100. You have 3 hours to complete the exam, which should be enough time. **Please use three blue books for the exam, one for each part.** Be sure to LEGIBLY write your *full name, section* (which should consist of your TA's name and section time), and *question number* on the front of each blue book. When finished with the exam, you must return all three blue books and this signed exam sheet to a proctor.

Show your calculations and explain all answers in your bluebooks. If you think that any question is ambiguous, then say so in your answer and explain what assumptions you made to resolve the ambiguity.

You can use a calculator, but no notes or other assistance are allowed.

GOOD LUCK!

Part 1. This part consists of one question: question 1.

Question 1. (35 points)

Consider a country characterized by the following relations:

$$
\begin{aligned}
C &= 4 + 0.6(Y - T) && (1)\\
I &= 5 - 0.4i && (2)\\
G &= 5 && (3)\\
T &= 5 && (4)\\
M^d &= P\left(Y - \frac{1}{3}i\right) && (5)\\
M^s &= 1 && (6)\\
W &= P^e\left(2 - \frac{32}{3}u\right) && (7)\\
P &= (1 + 0.5)W && (8)\\
L &= 16 && (9)\\
P_0^e &= P_0,\ P_t^e = P_{t-1} && (10)
\end{aligned}
$$

a) (3 points) Derive and graph the equilibrium condition for the goods market. Describe the equilibrium in words. What is the most important feedback effect?

b)(2 points) Derive and graph the equilibrium condition for financial markets. Describe the equilibrium in words.

c) (3 points) Derive and graph the IS and LM curves. What is responsible for the relationship between output and the interest rate in those curves? Can you think of any further connections between output and the interest rate?

d) (4 points) Describe equilibrium in the labor market. Solve for the natural rate of unemployment.

e) (6 points) Derive, graph and interpret in words the aggregate supply and the aggregate demand curves.

f) (10 points) Assume that investor confidence suddenly shoots up, so the investment equation becomes

$$I = 6 - 0.4i.$$

Analyze the immediate and dynamic changes, both graphically and in words. Show the changes in all the underlying curves.

g) (7 points) Answer part f under the assumption that people have very good price information (hence $P_t^e = P_t$). Explain the differences between the two cases.

Part 2. This part consist of one question: question 2.

Question 2. (20 points) Suppose that government expenditure on domestic goods in an open economy is given by

$$G = G\left(i^* ED\right),$$

where i^* is the world interest rate, E is the nominal exchange rate, and D is some parameter. Assume that G is decreasing with respect to its argument. (You can think of D as foreign debt, so $i^* ED$ is the annual debt service obligation of the government.) Work with

$$G = \bar{G} - i^* ED$$

as a particular choice of this function. The rest of our standard assumptions remains the same, so

$$\begin{aligned} Y &= C(Y-T) + I(Y,i) + G(i^* ED) + NX(Y, Y^*, E) \\ M/P &= YL(i) \\ i &= i^* + \frac{E^e - E}{E} \end{aligned}$$

The exchange rate is flexible.

a) (4 points) Suppose first that $D = 0$ (the government has no foreign obligations). Graph and describe the effects of a monetary expansion on the interest rate, the exchange rate and output. What happens to the components of aggregate demand?

b) (10 points) An earthquake hits the country and causes a significant damage. Everything is immediately reconstructed, with the help of foreign loans. Thus D becomes positive (but $\bar{G}$ stays unchanged). What happens to the IS curve? What happens to the interest rate, the exchange rate, output and its components? Can you think of a policy intervention that would have had similar effects (meaning that the signs of changes are the same, but not necessarily the sizes)? Interpret.

c) (6 points) Does the presence of a positive debt D make monetary policy more or less effective? (In the following sense: in order to implement the same output change, does the central bank have to shift the LM curve more or less?) Explain.

Part 3. This part consists of two questions: question 3 and question 4.

Question 3. (ESSAY QUESTION – 15 points)

In response to a proposal in Congress to use the current budget surplus as an opportunity to cut taxes, some economists have argued that now is poor timing for a tax cut. Assume the tax cut is lump-sum, and use the tools developed in class to discuss why or why not this argument is correct. Limit yourself to two pages in your blue book.

Question 4. (10 points)

This question draws from the attached short article that was recently published in the Financial Times. It talks about policy measures in Australia.

a) (3 points) Based on the information given in the article, can you say which exchange rate regime Australia has (fixed, flexible; or insufficient information to tell)?

b) (4 points) What would the Central Bank do if the economy starts growing at 6% per year? What would happen to the interest rate and the exchange rate as a consequence of this policy action?

c) (3 points) During the 1997 East Asian crisis, although Australia did much better than its neighbors (Australia is very close geographically to the crisis countries), but it clearly suffered. What do you think the channel was through which the crisis affected Australia?

Part 4. This part consists of one question: question 5.

Question 5. (20 points)

(This question follows current debate in economics about increasing wage inequality in the US over the last 3 decades)

Consider an economy with heterogeneous population. Suppose there are workers with just high school education and with college education. Productivity of high school graduates is 1, that of college graduates is $A > 1$. In the rest of the question, superscript H (mnemonic from *high*) refers to college graduates with high productivity, L (for *low*) to high school graduates. Thus, if the employment of the former is N_H, and of the latter is N_L, the production functions are

$$\begin{aligned} Y_H &= AN_H \\ Y_L &= N_L \end{aligned}$$

These two distinct subpopulations of workers are called types in what follows.

We assume that college graduates and high school graduates are not substitutable in production. Consequently, they are employed by two different types of firms. So, the wage setting equations for each type depend only on their respective unemployment rate:

$$\begin{aligned} w_H &= p^e F(z, u_H) = \frac{p^e z}{u_H} \\ w_L &= p^e F(z, u_L) = \frac{p^e z}{u_L} \end{aligned}$$

a) (3 points) Write down *two* price setting equations for firms employing either H or L workers, assuming a constant markup μ.

b) (3 points) (Combine the wage-setting and price-setting relations to get 2 aggregate supply equations.

c) (6 points) Compute the natural rates of unemployment *for each type*. Which type will suffer relatively higher unemployment in the long run equilibrium? Compute the ratio of real wages w_H/p and w_L/p which will prevail in the long run. Can this ratio serve as an inequality indicator?

d) (4 points) Now suppose that the proportions of type H and L workers are half and half. Find the aggregate natural rate of unemployment in the economy (Optional hint: compute the total number of the unemployed of both types and divide by the total number of workers in the economy. You may take this total number to be 1000). Find the long run average real wage

$$\bar{w}/p = \frac{1}{2}\frac{w_H}{p} + \frac{1}{2}\frac{w_L}{p}$$

in the economy.

e) (4 points) What happens if productivity of college graduates (A) goes up? Specifically, discuss the effect on the natural rate of unemployment, the average wage, and the inequality indicator (ratio of real wages of the two types).