

PART I. QUESTIONS FROM THE LAST SECTION OF THE COURSE

(71 points total; about 1 hr total)

Question 1 (20 points; 18 minutes)

Suppose the following equations describe the short-run economy.

$$C = 500 + 0.8Y^D$$

$$G = 600$$

$$T = 500 + 0.10Y$$

$$GX = 500 - 100r$$

$$I = 400 - 300r$$

$$IM = 0.12Y$$

- A) (7 points) Solve for the IS equation, which expresses Y as a function of the real interest rate, r . Show your work or no points.
- B) (7 points) Suppose the Fed follows a Taylor rule. Describe the economic logic that makes the Fed believe that increasing the real interest rate is an effective way to fight inflation.

Suppose the Fed follows a simple Taylor rule, $r = r^* + \phi''(\pi - \pi')$, where $r^* = 2$ percent (use 0.02), $\phi'' = 3$ (use 3), and the target inflation rate is 2 percent (use 0.02).

- C) (3 points) If the actual inflation rate is 2 percent (use 0.02), what is the equilibrium value of income? Show your work or no points.
- D) (3 points) Suppose instead that the actual inflation rate is 5 percent. In this case, what will income be? Show your work or no points.

Question 2 (10 points; 8 minutes)

The Phillips Curve captures the supply-side relationship between inflation and unemployment in the short run. Suppose that initially the expected rate of inflation is 2 percent and the natural rate of unemployment is 6 percent.

- A) (2 points) Using the axes at right, draw the Phillips Curve. Label the curve PC_A . Label your axes, and label one point on the Phillips Curve.
- B) (4 points) Suppose the expected inflation rate rises from 2 percent to 6 percent. Draw the new Phillips Curve and label it PC_B . What effect does this rise have on the Phillips Curve? Why?
- C) (4 points) Suppose the natural rate of unemployment falls from 6 percent to 4 percent. Draw the new Phillips Curve

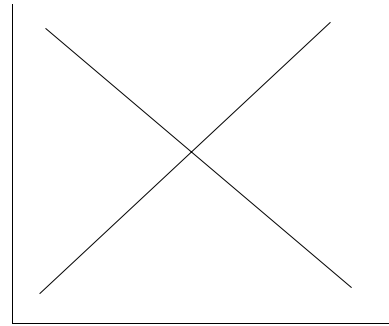


and label it PC_C . What effect does this fall have on the Phillips Curve? Why?

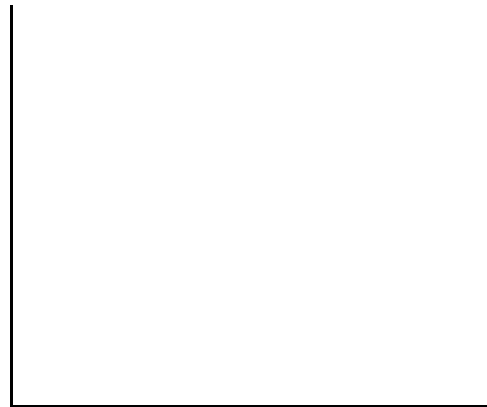
Question 3 (25 points; 23 minutes)

Suppose that the economy is initially in equilibrium in the short run with the actual unemployment rate, u_1 , equal to the natural rate of unemployment (u^*) and also equal to the unemployment rate (u_0) that is generated when the Fed sets the real interest rate, r , equal to the Fed's notion of its long-run normal rate, r^* . In addition, the actual inflation rate π_1 is equal to the Fed's target inflation rate (π') which also equals the expected inflation rate (π^e). Suppose the Fed follows a simple Taylor rule when setting its interest rate target. Suppose expectations are static.

- A) (3 points) Using the graph at the right, label the axes, curves, and point depicting this initial equilibrium.



- B) (4 points) Suppose the federal government implements a lump-sum tax cut by reducing every family's income tax bill by \$400 per child in the family. What is the effect on the inflation and unemployment rates? Draw a new graph at right to supplement your answer.
- C) (6 points) Explain the process by which the economy adjusts from the initial equilibrium (part A) to the new equilibrium (part B).



Suppose – as a surprise to policy makers – most but not all families take this tax reduction and use it to pay off their credit card bills.

- D) (4 points) What effect does the families' behavior have on the curves in part (A)? Why?
- E) (8 points) Will the change in the inflation rate and the change in the unemployment rate be the same as you had predicted in part (B)? Explain. Supplement your answer with a graph.

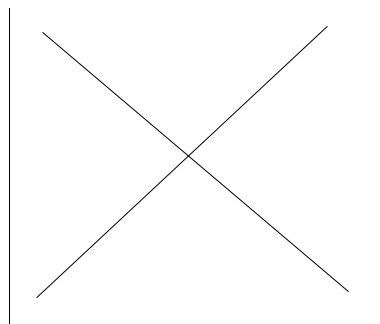


Question 4 (16 points; 14 minutes)

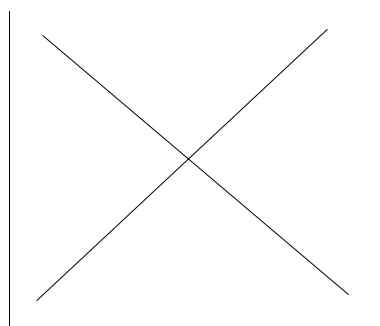
Consider again the lump-sum tax cut discussed in

Question 3. Suppose that families spend the tax reduction as expected – using most but not all of it to purchase consumer goods and services.

- A) (8 points) Suppose that inflationary expectations are adaptive. In this case, what effect would the tax cut have on unemployment and inflation over time? Explain your answer. Supplement your answer with a graph.



- B) (8 points) Suppose instead that inflationary expectations are rational. (Suppose that expectations are what Prof. Olney called “crystal ball” expectations, where everyone accurately predicts the future.) In this case, what effect would the tax cut have on unemployment and inflation over time? Explain your answer. Supplement your answer with a graph.

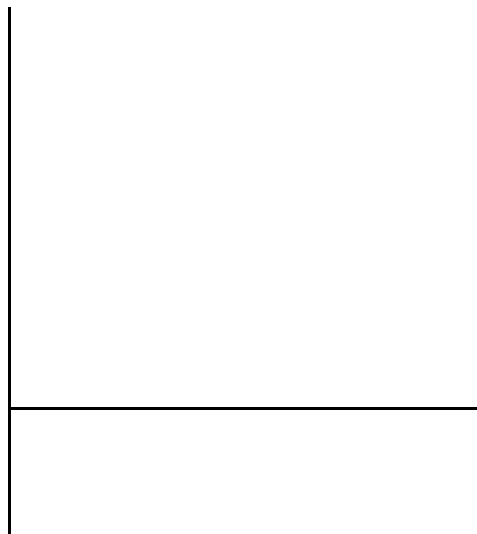


**PART II. QUESTIONS FROM ANY PART OF THE COURSE
(69 points total; about 1 hour total)**

Question 5 (18 points; 15 minutes)

Consider again the tax cut discussed in Questions 3 and 4. Now suppose the tax cut is made permanent. Consider in parts (A) and (B) the long-run effects of the tax cut.

- A) (6 points) If consumers use all of the tax cut to buy goods and services, what effect will the tax cut have on real interest rates and investment in the long run? Explain your answer. Supplement it with a graph.



- B) (6 points) If consumers use most of the tax cut to pay down debt, what effect will the tax cut have on real interest rates and

investment in the long run? Explain your answer. Supplement it with a graph.

- C) (6 points) Drawing on your answers to questions 3, 4, and 5, what is an *economic* justification in favor of a tax cut? What is an *economic* justification opposing a tax cut? State any assumptions explicitly.

Question 6 (10 points; 9 minutes)

Suppose the total saving rate is 24 percent, the labor force is growing by 2 percent per year, capital depreciates by 7 percent per year, and efficiency is growing by 3 percent per year. Suppose the Cobb-Douglas production function parameter, α , equals $\frac{1}{2}$. Suppose efficiency initially equals 10,000.

- A) (5 points) What is the value of the capital-output ratio when the economy is in its long-run balanced-growth steady-state equilibrium? Show your work or no points.
- B) (5 points) Here's a formula you didn't have to memorize: In balanced-growth steady-state equilibrium, the level of output per worker, Y/L , will be described by

$$\left(\frac{Y}{L}\right) = \left(\frac{K}{Y}\right)^{\frac{\alpha}{1-\alpha}} \cdot E$$

What is the initial equilibrium value of output per worker in this economy? Next year, what will output per worker be? Show your work or no points.

Question 7 (16 points; 14 minutes)

In Japan, the nominal interest rate is 0.002% (0.00002). That's about as close to zero as it can get. Nominal interest rates can not go below zero.

- A) (4 points) If the central bank of Japan wants to lower the real interest rate, what, if anything can they do? Explain.
- B) (4 points) In Japan, prices have been falling; the inflation rate has been less than zero. Inflationary expectations are also therefore negative. Using the axes at the right, draw an IS/LM graph that illustrates a short-run equilibrium for Japan.



- C) (8 points) Suppose something happens to increase the expected inflation rate. Show this change in the IS/LM graph. Describe the process by which the economy moves to a new equilibrium.

Question 8 (8 points; 6 minutes)

Suppose the economy is initially in long-run balanced-growth equilibrium with efficiency growing by 3 percent per year. Now suppose that immigration restrictions lead to a decrease in the labor force growth rate. What will happen to the growth rate of output per worker, $g(Y/L)$, while the economy is adjusting to the decrease in the labor force growth rate? Once the economy has fully adjusted to the new lower labor force growth rate, what will the growth rate of output per worker be? Explain your answers.

Question 9 (5 points; 4 minutes)

In the statement issued by the Fed after the December 9 FOMC meeting, they wrote: “. . . The committee perceives that the upside and downside risks to the attainment of sustainable growth for the next few quarters are roughly equal. The probability of an unwelcome fall in inflation has diminished in recent months and now appears almost equal to that of a rise in inflation.” What does that quote seem to imply with regard to the rule the Fed is using to set the real interest rate? Explain.

Question 10 (12 points; 10 minutes)

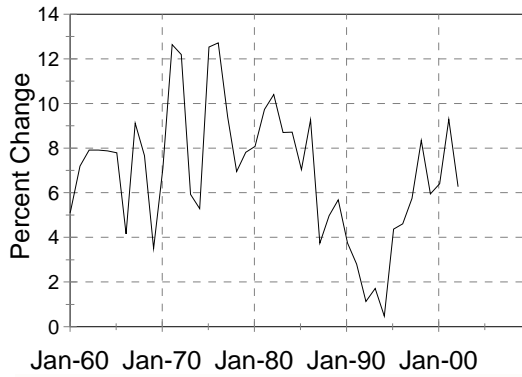
using.

Here are some graphs: Figure 1 is the rate of growth of the money supply (M2) in the U.S. since 1960. Figure 2 is the inflation rate (GDP deflator) in the U.S. since 1960. Figure 3 is the labor productivity growth rate (smoothed by taking a three-year moving average of the annual data) since 1960.

- A) (6 points) Looking at the figures, explain why some economists are concerned that the inflation rate might soon begin to rise in the U.S. Be sure to state what economic model you are using.
- B) (6 points) Looking at the figures, explain why other economists are not concerned that the inflation rate might soon begin to rise in the U.S. Be sure to state what economic model you are

M2 rate of growth

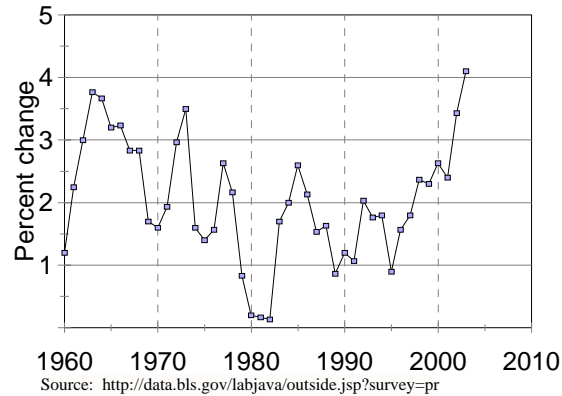
1960-2003



Source: <http://www.federalreserve.gov/releases/h6/hist/h6hist1.txt>

Output per worker-hour

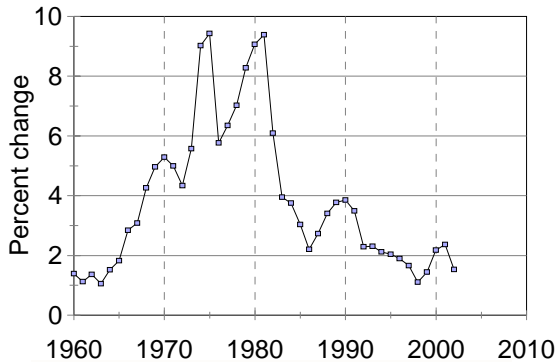
nonfarm sector, 1960-2003



Source: <http://data.bls.gov/labjava/outside.jsp?survey=pr>

Inflation Rate (GDP Deflator)

1960-2002



Source: National Income and Product Accounts Table 1.1.9. Implicit Price Deflators for Gross Domestic Product [Index numbers, 2000=100]

PART III. COMPREHENSIVE ESSAY QUESTION (60 points; about 1 hour)

Congratulations! You're headed off to DC for an internship at the Federal Reserve Board. What a great opportunity!!! Your immediate boss is one of the Board's Governors. She will be attending the next FOMC meeting, where the interest rate target will be set, and needs you to do some analysis for her. She wants you to prepare a clear, thorough briefing paper on the possibility of an interest rate increase.

Your boss will want to be able to share your paper with others, including some folks who have little detailed knowledge of economic theory. Don't use lingo (MPRF is lingo; "Federal Reserve monetary policy" is not). Graphs may not help; non-economists might not understand them. But do explain things clearly and highlight relevant assumptions.

Here is the memo to you from the Governor.

Welcome to Washington. Please prepare a briefing paper in which you address my questions below. I've

given you some background information below that you might want to supplement with more information about current economic conditions. I ask that you address these issues in the order I have listed them.

- ▶ Recent reports on the U.S. economy have been quite rosy. A recent Associated Press report reads, “Retail sales are up, housing is booming and even the nation’s beleaguered factories are coming back to life, the Federal Reserve said on November 26 in its most optimistic assessment of the economy in more than three years. The Fed said its latest nationwide survey of business conditions . . . found some hopeful signs on the jobless front, noting that ‘labor market conditions generally stabilized after an extended period of weakness,’ with layoffs slowing and demand rising for temporary workers.” Please begin your report by supplementing this AP report to describe current economic conditions.
- ▶ We are considering raising interest rates at our next FOMC meeting. What reasons can we offer to justify raising the interest rate? What reasons can we offer to oppose raising the interest rate?
- ▶ Please clearly explain the likely short-run effects on inflation and unemployment of an increase in interest rates.
- ▶ In March 2002, the Bush Administration raised tariffs on steel in an effort to protect jobs in the U.S. steel industry. The tariffs were ruled a violation of WTO agreements in November 2003, paving the way for other countries to raise their tariffs in retaliation. The Bush Administration responded to the likelihood of a trade war on December 4, 2003 by rescinding the steel tariffs. If the trade war had not been averted, would we have needed to take trade matters into consideration in deciding whether to raise interest rates? Why?
- ▶ The Bush Administration and Congress have implemented several tax cuts in the last two years, which have contributed to rising federal budget deficits. Spending increases have further increased the deficit. Last week, Congress passed a Medicare drug policy that, when it is implemented in 2006, will further increase the budget deficit. Should we take these factors into account in setting our interest rate policy? Why?
- ▶ Productivity has surged recently. The Labor Department’s revised report for the third quarter of 2003 indicated that labor productivity rose at an annual rate of 9.4 percent. The economy obviously can’t keep up *that* pace but we do seem to have entered a new era in which productivity will be growing more rapidly than it did between 1973 and 1995. What effect does the surge in productivity growth have on the economy? Should our decision about whether to raise interest rates hinge on what happens with productivity growth? Why?
- ▶ Finally, give me your honest opinion. Do you think we should raise interest rates at this time? Why?

Real-world note: The FOMC met on Tuesday December 9. The best essays written during the final will incorporate some information from news reports of the actual decisions made at the December 9 FOMC meeting.