

IAS 107: Spring 2011: Problem Set 9

Due at the start of lecture on Th Apr 28

1. What are the four parts of macroeconomics?

2. Why are real GDP per capita and the unemployment variables important quantities to look at?

3. Roughly, what was the highest that the inflation rate reached in the twentieth century?

4. Jean Baptiste Say in 1803 claimed that because nobody makes anything without intending to use it or sell it, and nobody sells anything without intending to buy something else, that there could be no general shortage of demand in an economy--that there could be a planned excess of supply of some commodities, but it would be balanced by a planned excess of demand of some other commodities. Was he wrong? Why was he wrong?

5. About how many people are unemployed now?

6. If a quantity shrinks at about 4% per year, how long will it take it to halve itself?

7. Roughly, how large is global real GDP today?

8. Roughly, what is the gap between real per capita GDP in the U.S. today and real per capita GDP in China?

9. Suppose that an economy's production function is $Y=K^{\alpha}(EL)^{(1-\alpha)}$ with $\alpha=0.5$; suppose further that the savings rate s is 30% of GDP, that the depreciation rate δ is 4% per year, the population growth rate n is 0% per year, and the rate of growth g of the efficiency of the labor force is 3% per year.
 - a. What is the steady-state balanced-growth capital-output ratio?
 - b. How fast does output per worker grow along the steady-state balanced-growth path?

- c. How fast does total output grow along the steady-state balanced-growth path?
10. Italy: Since 1946 Italian population growth (including illegal immigration) has been constant at about 1% per year and Italy has had a savings share of 25% of GDP. Today Italy has a GDP per capita level of about \$25,000 per year. The rate of growth of the efficiency of labor in Italy since the end of World War II has been constant at about 2% per year. Assume that Italy is today on its steady-state balanced-growth path.
- If Italy remains on its current steady-state balanced-growth path, what will GDP per capita be in Italy in 2050?
 - If Italy remains on its current steady-state balanced-growth path, what will GDP per capita be in France in 2100?
 - What would Italy's level of GDP per capita have been back in 1946 if it had then been on today's steady-state balanced-growth path?
 - In fact, Italy level of GDP per capita back in 1946 was about \$2,500 per year even though its efficiency of labor has grown at 2% per year since the end of World War II. Why do you think its level back then was so low?
11. Consider $\Delta Y = [\Delta A_0 + \Delta G - (I_r + X_\epsilon \epsilon_r) \Delta r] / (1 - (1-t)c_y + im_y)$, the investment savings framework (with $\Delta A_0 = \Delta c_0 + \Delta I_0 - X_\epsilon \Delta \epsilon_0 + X_y \Delta Y^* + X_\epsilon \epsilon_r \Delta r^*$). Suppose the responsiveness of exports to the exchange rate $X_\epsilon = 500$, the responsiveness of the exchange rate to interest rates $\epsilon_r = 10$, and the responsiveness of investment to the interest rate $I_r = 1000$. And suppose $t=0.2$, $c_y = 0.8$ $im_y = 0.14$:
- What happens to Y if the real interest rate r goes up by 2%—by 0.02—and if speculator confidence in the currency goes down by 30%?
 - What happens to Y if the real interest rate r goes up by 1%—by 0.01—and if baseline investment spending goes down by 300?
 - What happens to Y if the real interest rate r goes down by 1%—by 0.01—and if speculator confidence in the currency goes up by 5
12. In the simple income-expenditure model with real GDP Y equal to the sum of consumption spending by households C , investment spending by businesses I , government purchases G , and with net exports NX ; with consumption spending C given by the equation: $C = c_0 + c_y Y(1-t)$; and with imports IM given by the equation: $IM = im_y Y$...

a. Suppose $I = \$1.8$ trillion, $G = \$3$ trillion, $GX = \$1.7$ trillion, $c_o = \$3$ trillion, $c_y = 0.5$, the tax rate $t=0$, and $im_y = .15$. What is GDP Y ?

b. Suppose $I = \$1.8$ trillion, $G = \$3.5$ trillion, $GX = \$1.7$ trillion, $c_o = \$2$ trillion, $c_y = 1.0$, the tax rate $t=0.85$, and $im_y = .15$. What is GDP Y ?

c. Suppose $I = \$1.7$ trillion, $G = \$2$ trillion, $GX = \$1.8$ trillion, $c_o = \$3$ trillion, $c_y = 0.65$, the tax rate $t=0$, and $im_y = .15$. What is GDP Y ?

13. NIPA: Explain whether or not, why, and how the following items are included in the calculation of GDP:

- The purchase for \$500 of a dishwasher produced here at home this year.
- The purchase for \$500 of a dishwasher made abroad this year.
- The purchase for \$500 of a used dishwasher.
- The manufacture of a new dishwasher here at home for \$500 of a dishwasher that then nobody wants to buy.

14. **Quantity Theory of Money:** Suppose that the rate of labor force growth is 3% per year, the efficiency of labor is constant, and the economy is on its steady state growth path. Suppose also that the rate of growth of the nominal money stock is 10% per year. Do you think that it is likely that the inflation rate is less than 5% per year? Why or why not?

15. **Phillips Curve:** In the Phillips Curve framework in which $\pi = E(\pi) + \beta(u^* - u)$ —the inflation rate π equals the previously-expected inflation rate $E(\pi)$ plus the Phillips Curve slope parameter β times the difference between the economy's natural rate of unemployment u^* and the current rate of unemployment u ...

- If $E(\pi) = 9\%$ per year, $u^* = 6\%$, and $u = 8\%$, what is the inflation rate π going to be if the Phillips Curve slope parameter $\beta = 1/2$?
- If $E(\pi) = 3\%$ per year, $u^* = 4\%$, and $u = 4\%$, what is the inflation rate π going to be if the Phillips Curve slope parameter $\beta = 1/2$?
- If $E(\pi) = 1\%$ per year, $u^* = 7\%$, and $u = 3\%$, what is the inflation rate π going to be if the Phillips Curve slope parameter $\beta = 1/3$?
- If $E(\pi) = 1\%$ per year, $u^* = 7\%$, and $u = 3\%$, what is the inflation rate π going to be if the Phillips Curve slope parameter $\beta = 2/3$?
- If $E(\pi) = 1\%$ per year, $u^* = 7\%$, and $u = 3\%$, what is the inflation rate π going to be if the Phillips Curve slope parameter $\beta = 1$?

16. **Monetary Policy:** Suppose we have an economy with a natural rate of unemployment of 6%, current expected inflation of 2%, and a Phillips Curve slope parameter of 1/2. Suppose that the Federal Reserve has a target u^t for the unemployment rate and a target π^t for the inflation rate,

and suppose that for each percentage point inflation is above its target level the Federal Reserve raises unemployment by an extra percentage point above its target level.

- a. If the target for the inflation rate is 2% and the target for the unemployment rate is 6%, what will inflation and unemployment be?
- b. If the target for the inflation rate is 3% and the target for the unemployment rate is 4%, what will inflation and unemployment be?
- c. If the target for the inflation rate is 6% and the target for the unemployment rate is 8%, what will inflation and unemployment be?
- d. If the target for the inflation rate is 4% and the target for the unemployment rate is 4%, what will inflation and unemployment be?

17. Monetary Policy: Suppose we have an economy with a natural rate of unemployment of 4%, current expected inflation of 15%, and a Phillips Curve slope parameter of $1/2$. Suppose that the Federal Reserve has a target u_0 for the unemployment rate and a target π_t for the inflation rate, and suppose that for each percentage point inflation is above its target level the Federal Reserve raises unemployment by an extra two percentage points above its target level.

- a. Suppose that from this year forward the Federal Reserve sets its target for the inflation rate at 3% and its target for the unemployment rate at 5%, what will inflation and unemployment be this year?
- b. Suppose expected inflation is adaptive in that each year's expected inflation is the previous year's actual inflation. What will inflation and unemployment be next year?
- c. Suppose expected inflation is adaptive in that each year's expected inflation is the previous year's actual inflation. What will inflation and unemployment be two years from now?
- d. Suppose expected inflation is adaptive in that each year's expected inflation is the previous year's actual inflation. What will inflation and unemployment be five years from now?
- e. Suppose expected inflation is adaptive in that each year's expected inflation is the previous year's actual inflation. What will inflation and unemployment be ten years from now?

18. Monetary Policy: Suppose we have an economy with a natural rate of unemployment of 4%, and a Phillips Curve slope parameter of 1. Suppose that the Federal Reserve has a target u_0 for the unemployment rate and a target π_t for the inflation rate, and suppose that for each percentage point inflation is above its target level the Federal Reserve raises unemployment by an extra two percentage points above its target level.

- a. If the Federal Reserve's target for the inflation rate is 2% and its target for the unemployment rate is 4%, what will the long run rate of inflation be?
- b. If the Federal Reserve's target for the inflation rate is 2% and its target for the unemployment rate is 6%, what will the long run rate of inflation be?

- c. If the Federal Reserve's target for the inflation rate is 4% and its target for the unemployment rate is 4%, what will the long run rate of inflation be?
- d. If the Federal Reserve's target for the inflation rate is 4% and its target for the unemployment rate is 8%, what will the long run rate of inflation be?

ESSAYS

- 19. Why did America have a housing boom in the mid-2000s?
- 20. Why did the conditions that had been required for mortgage borrowers before 2000--20% down payment, evidence of a stable job, no more than a 33% ratio of housing expenses (including utilities and taxes) to income--disappear in the 2000s?
- 21. Why did the world economy fall into a very deep economic recession at the end of 2008?
- 22. Why is recovery from the current downturn in the United States likely to be partial and delayed?
- 23. Why are the economies of East and South Asia likely to grow much faster than the United States over the next half-decade or so?
- 24. Why is America's health care spending per capita so much higher than health care spending in other industrialized countries?
- 25. What will happen if America never brings its government revenues up to balance with spending, but keeps running federal budget deficits into the future?