Econ 1: Spring 2012: Problem Set 9

Due at the April 30, 2012 Lecture

1. 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 "slope" β times the difference between the natural rate of unemployment u^* and the actual rate of unemployment u—calculate the rate of inflation π:

a. If $E(\pi)=3\%$ per year, $\beta=1/2$, $u^*=5\%$, and $u=5\%$

b. If $E(\pi)=9\%$ per year, $\beta=1/2$, $u^*=5\%$, and $u=5\%$

c. If $E(\pi)=6\%$ per year, $\beta=1/2$, $u^*=5\%$, and $u=7\%$

d. If $E(\pi)=10\%$ per year, $\beta=1/2$, $u^*=7\%$, and $u=3\%$

2. 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 "slope" β times the difference between the natural rate of unemployment u^* and the actual rate of unemployment u—and in which this year's expected inflation $E(\pi)$ is last year's actual inflation, calculate the rate of inflation π:

a. In the first year, if the starting $E(\pi)$=10% per year, β=1⁄2,u^*=5%, and u=5%

b. In the second year, if $E(\pi)$ is what inflation was the previous year—that is, if $E(\pi)$ is your answer to part a—β = 1⁄2, u^* = 5%, and u = 9%

c. In the third year, if $E(\pi)$ is what inflation was the previous year—that is, if $E(\pi)$ is your answer to part b—β = 1⁄2, u^* = 5%, and u = 9%

d. In the fourth year, if $E(\pi)$ is what inflation was the previous year—that is, if $E(\pi)$ is your answer to part c—β = 1⁄2, u^* = 5%, and u = 9%

e. In the fifth year, if $E(\pi)$ is what inflation was the previous year—that is, if $E(\pi)$ is your answer to part a—β = 1⁄2, u^* = 5%, and u = 9%

3. 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 "slope" β times the difference between the natural rate of unemployment u^* and the actual rate of unemployment u—and in which this year's expected inflation $E(\pi)$ is last year's actual inflation, calculate the rate of inflation π:

a. In the first year, if the starting $E(\pi)$=2% per year, $\beta = 1/2$,u^*=5%, and u=5%

b. In the second year, if $E(\pi)$ is what inflation was the previous year—that is, if $E(\pi)$ is your answer to part a—$\beta = 1/2$, u = 5%, but structural changes in the economy raise u^* to 7%

c. In the third year, if $E(\pi)$ is what inflation was the previous year—that is, if $E(\pi)$ is your answer to part b—$\beta = 1/2$, u = 5%, but structural changes in the economy keep u^* at 7%

d. In the fourth year, if $E(\pi)$ is what inflation was the previous year—that is, if $E(\pi)$ is your answer to part c—$\beta = 1/2$, u = 5%, but structural changes in the economy keep u^* at 7%

e. What should the government and central bank do if they want to keep inflation from rising?

4. Websurf your way over to the Congressional Budget Office's most recent Long-Term Budget Outlook at <http://www.cbo.gov/ftpdocs/115xx/doc11579/06-30-LTBO.pdf>. Read it.

a. What is federal health care spending currently as a percentage of GDP?

b. What does the CBO think that federal health care spending—Medicare, Medicaid, CHIP, and Exchange Subsidies—is likely to be as a percentage of GDP in 2035?

c. What does the CBO say that Social Security spending currently is as a percentage of GDP?

d. What does the CBO think that Social Security spending is likely to be as a percentage of GDP by 2035?

e. Why, in your own words, does the CBO believe that the share of GDP the federal government spends on its major "mandatory" programs is going to rise between now and 2035?

5. What does the Congressional Budget Office project that the federal debt held by the public will be, as a share of GDP, in 2035, if congress and the president either adhere to the "baseline" of current federal programs or if they hold to PAYGO—that is, cut one program or raise taxes by the amount by which they raise another program? What, in your own words, is the logic behind this projection?

6. What does the Congressional Budget Office project that the federal debt held by the public will be, as a share of GDP, in 2035, if congress and the president continue to do business more-or-less as they have done business since 1980? What, in your own words, is the logic behind this projection?

7. Let us think about very long-run economic growth in the longest possible perspective. In 8000 BC there were roughly 5 million people in the world; in 1800 there were roughly 750 million; today there are 7.5 billion. In 8000 BC GDP per capita worldwide was roughly $500 per year in today's dollars; in 1800 GDP per capita worldwide was roughly $600 per year; today GDP per capita is roughly $7,500 per year. Total worldwide GDP at any moment equals GDP per capita times the population. Ignore the fact that the Gregorian calendar does not include a year zero.

a. What was the average annual growth rate—in percent per year—of population between 8000 BC and 1800?

b. What was the average annual growth rate of population between 8000 BC and today?

c. What was the average annual growth rate of GDP per capita between 8000 BC and 1800?

d. What was the average annual growth rate of GDP per capita between 1800 and today?

e. What was the average annual growth rate of total world GDP between 8000 BC and 1800?

f. What was the average annual growth rate of total world GDP between 1800 and today?

g. Why do they call it the "Industrial Revolution"?