ECON 110, Professor Hogendorn

Review Problem Set 10

1. *GrowthIsGood2.* Economic growth is generally a great thing for a country, but it can also complicate economic analysis. Let's look at some ways this can happen. Suppose an country starts out with production function

$$Y = f(L) = 67L^{4/5}$$

but then it experiences 4% growth in total factor productivity.

   (a) What is the new production function? Graph the new and old production functions.

   (b) What are the old and new economy-wide labor demand curves in this economy?

   (c) Suppose the supply of labor is 243 and does not change. Suppose that wages are completely sticky in the short run. What happens to the marginal product of labor? Explain.

   (d) Suppose the country was initially at long-run equilibrium with inflation expectations of 4%. Show this on an AD/IA diagram, and then show what changes as a result of the TFP growth. Hint: what happens to the full employment level of output?

   (e) Is there a recession? What is likely to happen next?

2. *Recession.* Suppose the economy begins with a labor supply of $L^S = 10,000$ and a production function of $Y = f(L) = L^{1/4}$. There is no money, so the "price" of output is just 1.

   (a) Graph the labor market and find the equilibrium real wage for this economy (*assuming the labor market clears*). Note

that you will have to find the equation for the labor demand curve to do this.

(b) Suppose that government statistics show a 4% unemployment rate at the time period corresponding to part (a). Since the labor market clears, how could this be?

(c) Now suppose that a drop in aggregate demand occurs, resulting in a parallel shift of labor demand. Wages are completely sticky, and unemployment rises to 10%. Show the situation on a graph of the labor market.

(d) Recall that Okun's Law is

$$\frac{Y^P - Y}{Y^P} \approx 2(U - U^N)$$

Assuming that Okun's Law holds, draw an AD/IA diagram of the economy, showing the situation in parts (a) and (c). Make sure to find and label the *numerical* levels of GDP and explain how you did this.

(e) Draw the capital market diagram for this economy, with savings supply and investment demand. Show how a government budget deficit affects the capital market in two cases: (i) the capital market always clears at real interest rate that makes S=I , and (ii) the capital market does not clear because the real interest rate is struck above the equilibrium level.

(f) Suppose the government of this economy was originally running a balanced budget $T = G$. In response to the recession, it increases G. Show this change in the AD/IA diagram.

3. *TaxCut.* As this problem is being written in December 2017, the U.S. Congress is planning to pass a significant tax cut that will be financed by borrowing. The economy is at or above full employment at this moment in time. Normalize the US working population to $L^P = 1$, and let labor supply be perfectly inelastic so

$L^s = 1$. Let the US have an economy-wide production function $Y = f(L) = 18L^{1/3}$.

The firms represented by this function are owned by the households. Set the price of Y equal to 1, and note that with the given production function, full employment GDP is 18, i.e. \$18 trillion.

(a) Find the equilibrium real wage in the US labor market and graph the labor market. Also graph the production function.

(b) National income, NI, is the income from wages plus the income of from capital (the profits of the firms). How big are these for the US based on the wage found in part (a)?

(c) Let private saving be perfectly inelastic at $S_p = 3.3$. Let taxes be $T = 2.5$, government spending be $G = 3.2$, and private investment demand be $I(r) = 8 - 110r$. Let the world real interest rate be $r = 0.04$. Graph the capital market. What is the net capital flow (NCF) into the US from abroad?

(d) Suppose the tax cut is equal to about 0.12, and that the world real interest rate remains unchanged. Also assume that all of the tax cut goes to an increase in consumption C, and that the IA curve is flat at 2.5%. Show the effects of the tax cut in the capital market and in an AD/IA diagram.

(e) Take a position that the tax cut is a good policy or a bad policy, and explain your reasoning by saying what you expect will shift in the AD/IA diagram over the coming years.[1]

(f) How much is US consumption C before and after the tax cut, given the above information? Explain how you figured it out.

Review Problems only, not to turn in:

[1] For the record, I predict above-average growth of wages and output in 2018 and 2019, but also growing speculative investment and asset price bubbles. These will overcorrect, leading to a recession in late 2019 or sometime in 2020. But whether right or wrong, this doesn't answer the question.

4. *AverageJoe.* This problem's title comes from an old *Wall Street Journal* article entitled "Average Joe saw inflation coming."

   The idea that inflation expectations could grow on their own is intriguing.

   (a) Draw the AD and IA curves, showing a long-run equilibrium where inflation expectations are 3%.

   (b) Now suppose inflation expectations rise to 5%. Graph and label the new IA curve and the new level of output.

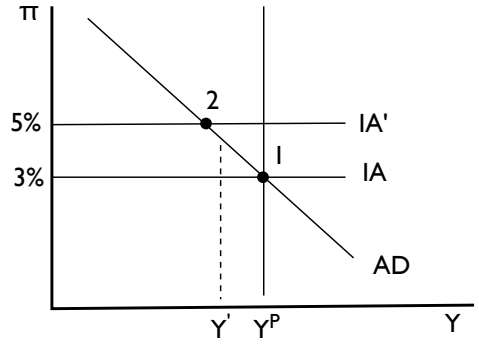
   (c) Illustrate the movement from part (a) to (b) on a labor market diagram. Note that it's not labor demand that will shift, it's the wages that will go up due to the higher inflation expectations. Show that this causes unemployment in a sticky-wage environment.

   (d) Suppose the parliament of this economy grew concerned about the higher inflation, but were not able to convince the central bank to make any monetary policy changes. Could they bring inflation down themselves by raising taxes? Explain how this would/would not work.

Answers:

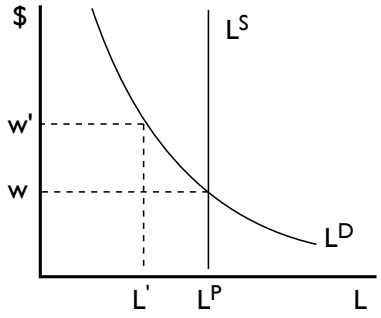
4. *AverageJoe_a.*

   (a) Output will be at full employment at point 1.



(b) The rise in inflation expectations causes an upward shift of the IA curve, and thus a movement along the AD curve. The economy moves into recession (point 2). Since these inflation expectations are irrational, there is downward pressure to go back to the old expectations, but it might take some time for people to realize this.

(c) Wages rise due to the higher expected inflation. There is no corresponding shift in labor demand, so the level of employment falls to L'.



(d) Suppose the government raised taxes. If nothing else changed, this would increase government savings ($S_G = T - G$), and if prices are sticky, this would shift AD left. Since output is then even more below full employment, there is even more downward pressure on inflation expectations, and prices would come down quicker. So yes, this would work, but at the expense of a deeper recession.