ECON 110, Prof. Hogendorn

Problem Set 9

1. *SW25.3* While gardening in his backyard, Bob finds a jar containing $100,000 in cash. He deposits the money in his bank, where the reserve requirement is 5%. Show the relevant changes on the bank's balance sheet. How much will the money supply eventually increase due to Bob's deposit? How would your answer be different if Bob only deposited $95,000, keeping $5,000 in cash to himself?

2. *OldGermansMoney.* Suppose that Germany output is $Y = 4374$ beers now, and will fall to $Y = 3713$ beers in the future due to population decline. If the European Central Bank (which acts as Germany's central bank plus the other countries that use the Euro) does not change the money supply over the years and velocity does not change, will there be deflation or inflation in Germany? Show what happens on a graph of P as a function of M and also mathematically.

3. *Sticky.* Let the economy-wide labor demand curve be $L(w) = 1000 - 20w$. Let economy-wide labor supply be $\mathcal{L} = 800$.

   (a) Draw the labor market and show the equilibrium wage.

   (b) Let firms reduce hiring, shifting labor demand to $L^r(w) = 800 - 20w$. If the labor market clears, show what happens to wages and employment.

   (c) Now suppose that wages are completely sticky and do not adjust. Show what happens to wages and employment.

(d) If the Ministry of Labor of this economy did a telephone survey to find the unemployment rate, which would be the most realistic unemployment rate under the conditions of part (c): 30%, 25%, or 20%? Explain.

4. *SimpleKeynes.* Suppose that the ADI curve for a simple economy with one good is given by $\pi = 0.04 - (Y - 1)$ where π is inflation, Y is the GDP, and 1 is the full employment level of GDP.

   (a) Graph the ADI curve and the full employment level of output. If inflation is stuck at 4.5% ($\pi = 0.045$), what is the short-run equilibrium output?

   (b) Suppose that firms in this economy become very excited by a new technology and decide to increase desired investment by 0.02 units of GDP. (I.e. the ADI shifts 0.02 units to the right.) Inflation remains stuck at 4.5%. Graph and find the new equilibrium output.

   (c) In the long run, inflation can adjust. What will happen?

Review Problems only, not to turn in:

5. *UchitelleMoney.* Consider the change from part (a) to (c) of the Uchitelle problem, but now suppose there is money in the economy. Specifically, the money supply is 10 dollars and velocity is 10. Price is initially 1.

   (a) If the money supply and velocity do not change, what is the change in the *nominal* price of hamburgers and the *nominal* wage?

   (b) If the central bank wanted to maintain the price of 1, how would it have to change the money supply? Illustrate your answer with a graph of money supply and money demand.

6. *OkunsLaw.* Suppose the natural rate of unemployment is 4%. Let current unempoyment be 6% due to a Keynesian recession.

  (a) Is the difference between U and U^* attributable to frictional or cyclical unemployment? Explain.

  (b) How large is the GDP gap?

Answers to Review Problem:

5. *UchitelleMoney_a.* After the change, we still need $MV = PY$. Since $MV = 100$ is unchanged, and the new Y is 108.6, then the only way to maintain the quantity equation is for the price of hamburgers to fall to $P = 0.92$. We know that the real wage rises from 0.78 hamburgers to 0.95 hamburgers, but the nominal wage only rises from $0.78 \cdot 1$ to $0.95 \cdot 0.92{=}0.87$. Thus, if Uchitelle is thinking in nominal terms, he would not see a very large increase in nominal wages. This might make him think that things are worse than they really are.

If the central bank wants to maintain $P = 1$, then $PY = 108.6$. With $V = 10$, a money supply of $M = 10.86$ would maintain the quantity equation. Thus, the central bank would have to create 86 cents.

6. *OkunsLaw_a.*

  (a) Since the natural rate of unemployment already includes prevailing frictional and structural unemployment, the only type of unemployment that occurs when the economy is away from "full employment" is cyclical.

  (b) Using Okun's Law, we know that the unemployment gap is 2%. Thus, the GDP gap is 4%.