

Write all answers in your blue book. **Show all of your work.**

1. Consider the Cobb-Douglas production function where real aggregate output Y is given by $Y = A K^\alpha (LxE)^{1-\alpha}$, in which $A=8$ is a parameter measuring the productivity of the available technology, K is the amount of capital employed, L is the amount of labor employed, and $\alpha=0.30$. Here, E indicates the effectiveness of each worker, so that LxE is the amount of effective workers employed. The depreciation rate in this economy is 0.06, the savings rate is 0.35, the population grows at the rate 0.02, and the measure of labor effectiveness, E , grows at the rate 0.01.

- (a) (15) Find the steady-state level of consumption per effective worker ($c = C/(LxE)$).
- (b) (5pts) After this economy reaches its steady-state, will standards of living improve in later years? Explain your answer.
- (c) (10pts) Find the golden rule steady-state level of consumption per effective worker.
- (d) (2pts) Does an economy automatically reach its golden rule steady-state? Explain your answer.

2. (5pts) Consider the model of the natural rate of unemployment that Greg Mankiw presents in Macroeconomics. Suppose an economy has a natural rate of unemployment of 6.5%, and a monthly rate of job separation of 2.5%. This economy currently has 4.5 million unemployed people. How many people will find a job in the next month?

3. (a) (5pts) Define efficiency wage theory, and describe how it can help explain the wage rigidity that causes structural unemployment.

(b) (5pts) Describe two other sources of wage rigidity and how they cause structural unemployment, according to Greg Mankiw in Macroeconomics.

4. Suppose there is one kind of deposit in the banking industry. Bank A holds deposits of \$500 million, and total reserves of \$80 million, of which \$25 million are required reserves. Suppose that all banks in this economy hold the same ratio of excess reserves to deposits. Suppose further that the public chooses a ratio of currency to deposits that is 0.27.

- (a) (4pts) What is the required reserve ratio in this economy?
- (b) (4pts) What is the ratio of excess reserves to deposits?
- (c) (5pts) What is the money multiplier for this economy?

For parts (d) and (e) below, assume that there is no financial crisis in this economy, so the money multiplier stays constant at the value you calculated in part (c).

(d) (5pts) Suppose that this economy's Central Bank buys \$300 million of Treasury bills. What exactly would happen to the money supply as a result of this open market operation?

(e) (5pts) Suppose that this economy's Central Bank sells \$50 million of Treasury bills. What exactly would happen to the money supply as a result of this open market operation?

5. (a) (2pts) According to the Quantity Theory of Money, how (if at all) does a change in the money supply affect the velocity of money? Explain.

(b) (2pts) According to the Quantity Theory of Money, how (if at all) does a change in the money supply affect potential real aggregate output? Explain.

(c) (6pts) According to the Quantity Theory of Money, how (if at all) does a change in the money supply affect the price level? Explain.

6. In the March 29, 2013 p. C1 *Wall Street Journal* article entitled “S&P High is Show of Faith in the Fed” journalist E.S. Browning describes a strategist at Bank of America Merrill Lynch explaining to his clients how “easy money from the world’s central banks” in the form of “\$11.6 trillion of new central-bank liquidity” over the past six years helped cause the current rally in the stock market. Mr. Browning goes on to quote the strategist saying that how long stocks continuing rising “will depend on whether European and Chinese growth expectations recover before inflation in the U.S and Japan” forces central banks to “slow the flow of easy money.” Mr. Browning then notes that “so far, annual inflation has been benign.”

(5pts) Suppose the Quantity Theory of Money holds. Describe what the United States Federal Reserve will do over time to the money supply to maintain the Fed’s inflation target. Be explicit in your answer.

(3pts) What actions will the Fed eventually take to remove liquidity, thereby slowing the “flow of easy money”?

7. Countries with higher levels of inflation uncertainty typically have lower levels of growth of real Gross Domestic Product (GDP). Economic studies suggest that inflation uncertainty reduces real GDP growth because it reduces the quality and quantity of the investment component of GDP.

(a) (4pts) Define the investment component of GDP.

Consider the credit market experiment we ran in class on March 25. Each participant in the experiment had an investment project that he or she could undertake. However, only some participants had the funds to finance a project.

(b) (8pts) Explain how and why higher inflation uncertainty reduced the **quality** of the investment projects undertaken in the experiment. Be explicit in your explanation.