

Final Exam

Name: ANSWER KEY

Part I: Multiple Choice (20 points)

1. Which of the following is included in the measure of U.S. GDP?
 - A. The flour purchased by Interstate Bakeries and used to make Wonder Bread
 - B. A loaf of Wonder Bread produced and sold in the United States**
 - C. Any services produced in Canada or Mexico because these countries are part of the North American Free Trade Agreement
 - D. A loaf of Wonder Bread produced in Canada
2. Which of the following are included in the income approach to calculating GDP?
 - A. Rental income; compensation of employees; net exports of goods and services
 - B. Compensation of employees; consumption expenditure; investment
 - C. Rental income; consumption expenditure
 - D. Rental income; compensation of employees**
3. In the United States, the CPI basket consists of items that _____. _____ has the greatest weight in the CPI basket.
 - A. An average urban household buys; Housing**
 - B. A middle-income household buys; Food and beverages
 - C. An average American household buys; Apparel
 - D. All households buy; Transportation
4. The capital stock increases whenever
 - A. net investment is positive.**
 - B. net investment exceeds gross investment.
 - C. gross investment exceeds net investment.
 - D. gross investment is negative.
5. If the real interest rate increases from 3 percent to 5 percent,
 - A. there will be a movement up along the demand for loanable funds curve.**
 - B. the supply of loanable funds curve will shift rightward.
 - C. the nominal interest rate will also increase.
 - D. the demand for loanable funds curve will shift rightward.
6. If you have \$1,000 in wealth and the price level increases by 20 percent, then
 - A. the real value of the \$1,000 increases.
 - B. the \$1,000 dollars will buy 20 percent more goods and services.
 - C. you will be able to buy fewer goods, but the real value of those goods will increase.
 - D. the \$1,000 will buy fewer goods and services.**
7. In a diagram with the consumption function, the _____ shows all points where disposable income equals consumption expenditures.
 - A. saving function
 - B. consumption function
 - C. 45-degree line**
 - D. aggregate demand curve

8. In general, the flatter the aggregate expenditure curve, the
- A. larger the multiplier.
 - B. larger the marginal propensity to consume.
 - C. greater the autonomous expenditure.
 - D. smaller the multiplier.
9. In a world with no money, costs are expressed in terms of other goods. If one video game costs two hamburgers, and a hamburger costs three sodas, how many sodas would it take to buy a video game?
- A. 6
 - B. 5
 - C. 3
 - D. $3/2$
10. *This question is excluded from grading.*
- A commercial bank puts the funds it receives from various sources into
- A. loans, notes and coins in the bank's vault and deposits.
 - B. securities, cash assets and deposits.
 - C. securities, cash assets and loans.
 - D. reserves, deposits and loans.
11. Depository institutions are good at minimizing
- A. the costs of monitoring borrowers.
 - B. liquidity.
 - C. risky borrowers.
 - D. all of the above
12. The use of discretionary fiscal policy to end a recession is limited because
- A. in the real world, taxes are not induced.
 - B. potential GDP changes too rapidly.
 - C. the legislative process is slow.
 - D. the real-world multiplier is too small to have an impact on real GDP.
13. Which of the following policies shifts the AD curve the farthest leftward?
- A. a decrease in both government expenditure and taxes of \$10 billion
 - B. a cut in taxes of \$10 billion
 - C. a rise in taxes of \$10 billion
 - D. a decrease in government expenditure of \$10 billion
14. In response to the financial crisis of 2007 and the ensuing recession, the Fed announced three rounds of "quantitative easing", where the Fed purchased billions of dollars of securities. What impact would quantitative easing have on the monetary base?
- A. While the monetary base would change, it is impossible to predict in which direction.
 - B. The monetary base would increase.
 - C. The monetary base would not change.
 - D. The monetary base would decrease.
15. The higher the federal funds rate, the _____ the opportunity cost of holding reserves, which _____ the incentive to hold less excess reserves.
- A. lower; decreases
 - B. higher; decreases
 - C. lower; increases
 - D. higher; increases

Part II. Fill-in-the-Blank (30 points, 3 points each)

Pick at least 10 (the rest is extra credit of 1 point for each correct answer).

1. Value added approach of measuring GDP was created to avoid double counting.
2. Exponential growth is a process by which a quantity grows at a constant rate.
3. Positive and relatively steady growth of a country's economy over a long period of time is called sustained growth.
4. The law of diminishing marginal returns/more is better is one of the two main properties of the aggregate production function.
5. Depreciation is the decrease in the quantity of capital that results from wear and tear and obsolescence.
6. The main assumption of the Keynesian model (AE model) is that the price level is fixed.
7. The smallest part of the U.S. aggregate expenditure is net exports.
8. The part of the aggregate planned expenditure that varies with real GDP is called induced expenditure.
9. A forecast that is based on all the relevant information is called a rational expectation.
10. A property of being instantly convertible into a means of payment with no or little loss of value is called liquidity.
11. US/China/UK/Japan is one of the countries with the highest government budget deficit in the world.
12. One historic example of an unconventional monetary policy in the U.S. is QE1/QE2/QE3/Operation Twist.

Part III. Problems (50 points)

1. (25 points, 25 minutes)

On 01/31/2013 you bought 50 T-bills, each priced at \$900, that promise to pay \$1,000 each at maturity. T-bills do not pay interest before they mature. On 01/31/2014, the T-bills matured, and you cashed them in. You made no other investments that paid interest or matured in 2014.

a) (3 points) What was your nominal capital gain in 2014?

$$\text{Capital gain} = \$1,000 \cdot 50 - \$900 \cdot 50 = (\$1,000 - \$900) \cdot 50 = \$100 \cdot 50 = \mathbf{\$5,000.00}$$

Answer: **\$5,000.00**

b) (3 points) The CPI was 232.803 on 01/31/2013 and 235.356 on 01/31/2014. What was your real capital gain in 2014 (in 2014 dollars)?

First, calculate the 2013 T-bill real price in 2014 dollars:

$$\text{price}_{2013}^{2014} = \frac{\text{price}_{2013}^N}{CPI^{2013}} \cdot CPI^{2014} = \frac{\$900}{232.803} \cdot 235.356 = \$909.87$$

Now, use the above price to calculate the real capital gain in 2014 dollars:

$$\text{Real capital gain} = \$1,000 \cdot 50 - \$909.87 \cdot 50 = (\$1,000 - \$909.87) \cdot 50 = \$90.13 \cdot 50 = \mathbf{\$4,506.50}$$

Answer: **\$4,506.50**

c) (3 points) What is the real interest rate you earned on your investment (denote by r^{BT})? Express your answer in percentages and round it to 2 decimal points.

$$r^{BT} = \frac{\$1,000 - \$909.87}{\$909.87} \cdot 100 = \frac{\$90.13}{\$909.87} \cdot 100 = \mathbf{9.91\%}$$

Answer: **9.91%**

d) (3 points) By law, you have to pay federal tax if you make profit from an investment. In 2014, the tax rate on *nominal* capital gains was 15%. How much tax did you pay on the profit you had made from each T-bills (profit per 1 T-bill)?

$$\text{Tax paid} = \frac{\text{nominal capital gain} \cdot \text{tax rate}}{\text{number of T-bills}} = \frac{\$5,000 \cdot 0.15}{50} = \mathbf{\$15.00}$$

Answer: **\$15.00**

e) (5 points) What is your *real* after-tax interest rate (denote by r^{AT})?

The real after-tax interest is:

$$r^{AT} = \frac{(\$1,000 - \$15) - \$909.87}{\$909.87} \cdot 100 = \frac{\$75.13}{\$909.87} \cdot 100 = \mathbf{8.26\%}$$

Answer: 8.26%

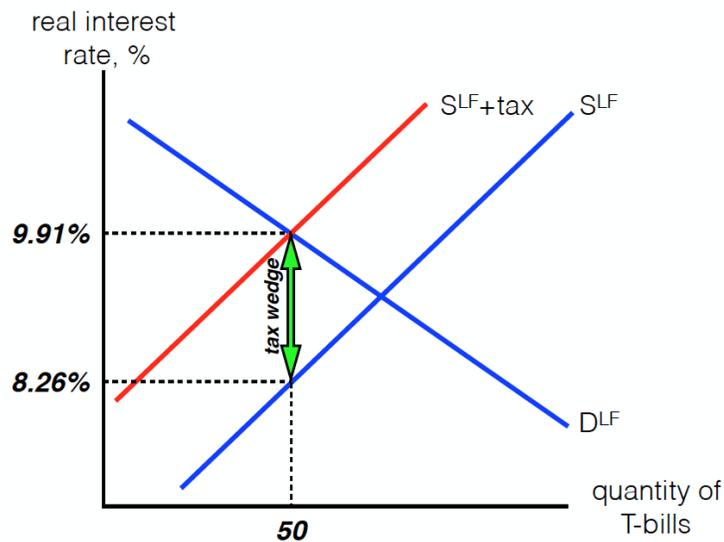
f) (3 points) What is your tax wedge?

The tax wedge is:

$$\text{tax wedge} = r^{BT} - r^{AT} = 9.91\% - 8.26\% = 1.65\%$$

Answer: 1.65%

g) (5 points) Using the numbers you found above, complete the graph for the loanable funds market below, assuming you are the only supplier of the loanable funds. The demand for loanable funds is independent from the tax rate on capital gains, but supply does depend on the tax rate. *Clearly mark the tax wedge and all the relevant numbers. Label every curve.*



2. (25 points, 25 minutes) Consider the economy with a bank, a firm, and the Fed. The firm sells hotdogs from vending machines. The vending machines are the only input that the firm uses. In January of 2015 the value of each vending machine was \$3,000, i.e. the firm's owner could sell them at this price if he wanted to sell the business. The balance sheet items for each entity on 01/01/2015 are described below.

The Fed has:

- 300 thousand dollars in T-bills

The bank has:

- 150 thousand dollars in T-bills
- 100 thousand dollars in cash (notes only)
- deposit account at the Fed with 200 thousand dollars in it
- a loan from the Fed in amount of 100 thousand dollars

The firm has:

- a business loan from the bank in amount of 400 thousand dollars
- a deposit account at the bank with 200 thousand dollars in it
- 100 thousand dollars in cash
- 100 hotdog stands

- a) (5 points) Construct balance sheets for the Fed, the bank, and the firm on 01/01/2015.

The Fed:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
T-bills	\$300	Bank's deposits	\$200
Bank loan	\$100	Currency	\$200
Total assets	\$400	Total liabilities	\$400

The bank:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
T-bills	\$150	Firm's deposits	\$200
Business loan	\$400	Loan from the Fed	\$100
Deposits at the Fed	\$200		
Cash	\$100		
Total assets	\$850	Total liabilities	\$300

The firm:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
Deposits at the bank	\$200	Business loan	\$400
Cash	\$100		
Vending machines	\$300		
Total assets	\$600	Total liabilities	\$400

b) (4 points) The required reserve ratio (RR) is 15%. What are the bank's excess reserves?

Total reserves = Cash + Deposits at the Fed = \$200 + \$100 = 300 thousand dollars

Required reserves = RR · firm's deposits = 0.15 · \$200 = 30 thousand dollars

Excess reserves = Total reserves - Required reserves = \$300 - \$30 = 270 thousand dollars

Answer: **270 thousand dollars**

c) (4 points) The Fed estimates that, currently, the actual unemployment rate is higher than the natural unemployment rate. Thus, it wants to stimulate the economy. The Fed calculates that in order to go back to full employment, the economy needs twice as many hotdog vending machines. To double the number of the machines, the firm would need a long-term loan from the bank in the amount of 400 thousand dollars. Assume that the firm cannot use any of its current assets. How much money does the Fed need to inject in the economy so the bank can provide such a loan to the firm?

The available loanable funds from the bank are the bank's excess reserves. The bank currently has 270 thousand dollars available to lend. Since the firm needs to borrow 400 thousand dollars, the Fed has to increase the bank's excess reserves by 130 thousand dollars.

Answer: **130 thousand dollars**

d) (5 points) On 01/02/2015 The Fed proceeds with buying the required number of T-bills (the number you found in part c) from the bank. Construct the balance sheets for the Fed, the bank, and the firm on 01/02/2015.

The Fed:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
T-bills	\$430	Bank's deposits	\$330
Bank loan	\$100	Currency	\$200
Total assets	\$530	Total liabilities	\$530

The bank:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
T-bills	\$20	Firm's deposits	\$200
Business loan	\$400	Loan from the Fed	\$100
Deposits at the Fed	\$330		
Cash	\$100		
Total assets	\$850	Total liabilities	\$300

The firm:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
Deposits at the bank	\$200	Business loan	\$400
Cash	\$100		
Vending machines	\$300		
Total assets	\$600	Total liabilities	\$400

- e) (5 points) On the next day, the firm's owner comes to the bank to apply for the loan. The loan officer at the bank approves the application. The firm's owner immediately gets a loan for the required 400 thousand dollars in cash. Assume that the firm first exhausts its deposits at the Fed, and then cash to issue the loan amount to the firm. Note that the Fed can easily convert bank's deposits to cash and vice versa. Construct the balance sheets for the Fed, the bank, and the firm on 01/03/2015. Assume that the firm doesn't buy the vending machines until a week later.

The Fed:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
T-bills	\$430	Bank's deposits	\$0
Bank loan	\$100	Currency	\$530
Total assets	\$530	Total liabilities	\$530

The bank:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
T-bills	\$20	Firm's deposits	\$200
Business loan	\$800	Loan from the Fed	\$100
Deposits at the Fed	\$0		
Cash	\$30		
Total assets	\$850	Total liabilities	\$300

The firm:

Assets, in thousands		Liabilities, in thousands	
<i>Item</i>	<i>value</i>	<i>Item</i>	<i>value</i>
Deposits at the bank	\$200	Business loan	\$800
Cash	\$500		
Vending machines	\$300		
Total assets	\$1000	Total liabilities	\$800

- f) (2 points) What are the bank's excess reserves on 01/03/2015?

$$\text{Excess reserves} = \text{Total reserves} - \text{Required reserves} = \$30 - \$30 = \$0$$

Answer: **0 dollars**

- g) (*extra credit, 2 points) Fill out the table below:

$$\text{Net worth} = \text{Total assets} - \text{Total liabilities}$$

Date	Net Worth		
	<i>The Fed</i>	<i>The Bank</i>	<i>The Firm</i>
01/01/2015	\$0	\$550	\$200
01/02/2015	\$0	\$550	\$200
01/03/2015	\$0	\$550	\$200

Extra Credit, (5 points)

Fill in the blanks with words from the list below.

U.S. Treasury Secretary, the Chairman of the Federal Reserve Board of Governors, Ben Bernanke, Hank Paulson, Morgan Stanley, Lehman Brothers, Bear Stearns, Bank of America, investment, investment bank, commercial bank, private bank, toxic assets, reserves, required reserves, excess reserves, the Congress, the Senate, the President, was, was not, Troubled Asset, supply of credit, demand for credit, supply of money, demand for money, mortgage-backed securities, commercial loans, commercial, the Fed, 2008, 2007, 2009.

Hank Paulson, the U.S. Treasury Secretary, is the main character in the movie. He is trying to deal with the financial crisis that had started in 2008. Lehman Brothers was an investment bank that was largely affected by the subprime mortgage crisis. Its CEO, Dick Fuld, was reluctant to declare bankruptcy because he was sure that the U.S. Treasury would bail his company out, similarly to what the Treasury had done for Bear Stearns. The solution offered by Hank Paulson was to purchase toxic assets/ mortgage-backed securities from the big investment banks in order to increase their available reserves. In order to do so, Paulson and Geitner tried to arrange mergers between the biggest investment banks and commercial banks, because without the act of The Congress, investment banks cannot use the Fed's discount window. This was not successful, and the Fed continued with Troubled Asset Relief Program. The latter helped to increase the supply of credit in the economy, but the Fed could not dictate to banks what they should do with the available funds.