

Economics 132.03
Principles of Macroeconomics
Spring 2010

Professor Peter Ireland

<http://www2.bc.edu/~irelandp/ec132.html>

First Midterm Exam

This exam has 8 questions on 3 pages; before you begin, please check to make sure your copy has all 8 questions and all 3 pages. Each of the 8 questions will receive equal weight in determining your overall exam score. You can work on the questions in any order, but please be sure to keep your answers to all of the parts of a specific question together in your exam book.

1. As a result of each of the following economic events, please indicate whether US gross domestic product (GDP) rises, falls, or stays unchanged. Please indicate, as well, which if any of the four main components of GDP (consumption, investment, government purchases, and net exports) change and in which direction (rising or falling).
 - a. The US government sends out social security checks to retired people.
 - b. The city of Newton, Massachusetts (that is, a local government) buys new computer equipment manufactured in the US, but by a Japanese company.
 - c. The city of Newton, Massachusetts (again, a local government) buys new computer equipment manufactured in Ireland, but by a US company.
 - d. You (as an individual consumer in the US) pay a financial planner (also in the US) for his or her advice on how to manage your retirement savings.
 - e. You (again, as an individual consumer in the US) buy a newly constructed house in the US.

2. In each case, please indicate whether the statement is true or false (for this question, you can just write true or false for each part, you don't need to explain why).
 - a. GDP is a flawed measure of national income because it is defined in terms of the market value of goods produced and not the total income earned by workers and businesses economywide.
 - b. GDP is a flawed measure of US consumers' well-being because it only accounts for their purchases of tangible items like food, televisions, and new cars and not intangible items like haircuts, movie tickets, and medical care.

- c. If Ford Motor Company manufactures a new car in the US in December 2009, but that car does not actually get sold to an American consumer until January 2010, the total value of the car still gets counted in 2009's GDP.
 - d. When you buy flour and sugar to bake cookies at home, the value of those ingredients gets counted in GDP, but when a commercial bakery buys flour and sugar to make cookies that get sold in a store, what gets counted in GDP is the value of the cookies themselves, not the value of flour and sugar when they were originally purchased.
 - e. "Net exports" as one of the four main components of GDP is defined as imports minus exports.
3. Consider a simple economy in which only two goods are produced and sold: pizza and beer. The prices and quantities produced of these two goods over a three-year period are shown in the table below.

Year	Price of Pizza	Quantity of Pizza	Price of Beer	Quantity of Beer
2007	\$3	2	\$2	2
2008	\$2	3	\$1	4
2009	\$4	3	\$2	4

- a. Calculate nominal GDP in 2007, 2008, and 2009.
 - b. Next, using 2007 as your base year, calculate real GDP in 2007, 2008, and 2009.
 - c. Does the GDP deflator rise, fall, or stay the same between 2007 and 2008? (*Note: You don't have to actually calculate the deflator for this part and the one just below, you only have to say whether it rises or falls*).
 - d. Does the GDP deflator rise, fall, or stay the same between 2008 and 2009?
4. Go back to the same example from question 3, just above. Consumers in the economy like two goods: pizza and beer. Prices and quantities consumed are the same as before:

Year	Price of Pizza	Quantity of Pizza	Price of Beer	Quantity of Beer
2007	\$3	2	\$2	2
2008	\$2	3	\$1	4
2009	\$4	3	\$2	4

As a first step in computing the consumer price index (CPI), the Bureau of Labor Statistics surveys consumers to determine the "basket of goods" purchased by a typical consumer. Suppose that the BLS chooses 2007 as its base year and, consistent with the data shown in the table, decides that basket of goods in this economy should consist of two pizzas and two beers.

- a. What is the cost of the basket in each year: 2007, 2008, and 2009?
- b. Still using 2007 as the base year, what is the CPI in each year: 2007, 2008, 2009?

5. Explain *briefly* (with no more than a sentence or two) what economists mean when they use the term “substitution bias” with reference to measuring the CPI. Does substitution bias cause changes in the CPI to overstate or understate changes in the true cost of living?
6. Some people like to complain about the rising cost of postage rates in the United States. But the prices of most goods and services tend to rise over time, so their complaints are justified only if the price of stamps rises faster than the overall rate of inflation. Here are some data that will help you examine this issue in more detail.

Year	Price of a First Class Stamp	Consumer Price Index
1983	20 cents	100
2006	39 cents	200

- a. The table indicates that it cost 20 cents to mail a first-class letter in 1983. Use the data on the CPI to determine what the value of those 20 cents was in 2006 dollars.
- b. After adjusting for inflation, when was the price of a first-class postage stamp higher: in 1983 or in 2006?
7. Macroeconomists often think about the determinants of a nation’s standard of living with the help of an “aggregate production function” such as

$$Y = AF(L, K, H, N),$$

where Y denotes real GDP, A denotes the stock of technological knowledge, L denotes the number of workers, K denotes the stock of physical capital, H denotes the stock of human capital, and N denotes the stock of natural resources.

- a. What does it mean to say that holding the stock of technological knowledge fixed, the aggregate production function has the property of constant returns to scale?
- b. Could this aggregate production have the property of constant returns to scale and yet still be consistent with the observation that a relatively poor economy can benefit from a “catch-up effect” that allows it to grow more rapidly at first, when it starts out with very low levels of physical capital per worker? Why or why not?
- c. Does this aggregate production function necessarily imply that an economy’s ability to grow is limited by its stock of natural resources? Why or why not?
8. Many economists believe that governments can best provide the conditions that promote economic growth by protecting property rights and maintaining political stability. These economists base their arguments, at least in part, on the idea that the property rights and political stability make people more willing to accept intertemporal trade-offs, that is, more willing to make sacrifices today so as to enjoy benefits in the future.
- a. What is the intertemporal trade-off involved in the process of physical capital accumulation?
- b. What is the intertemporal trade-off involved in the process of human capital accumulation?

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Solutions to First Midterm Exam

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1. As a result of each of the following economic events, please indicate whether US gross domestic product (GDP) rises, falls, or stays unchanged. Please indicate, as well, which if any of the four main components of GDP (consumption, investment, government purchases, and net exports) change and in which direction (rising or falling).
 - a. The US government sends out social security checks to retired people.

GDP and all of its components remain unchanged, since social security benefits count as a transfer payment not as part of government purchases.

- b. The city of Newton, Massachusetts (that is, a local government) buys new computer equipment manufactured in the US, but by a Japanese company.

GDP rises; government purchases rises. Because the computers were produced in the US they belong in US GDP; and state and local government purchases count together with federal government purchases in determining the total government purchases component of GDP.

- c. The city of Newton, Massachusetts (again, a local government) buys new computer equipment manufactured in Ireland, but by a US company.

GDP stays unchanged; government purchases rises, but net exports fall by an equal amount. The computer equipment was produced in Ireland, so it does not belong in US GDP. Although government purchases rises, so do imports; the resulting fall in net exports exactly offsets the rise in government purchases, leaving total GDP unchanged.

- d. You (as an individual consumer in the US) pay a financial planner (also in the US) for his or her advice on how to manage your retirement savings.

US GDP rises; consumption rises. GDP and consumption include services as well as physical goods.

- e. You (again, as an individual consumer in the US) buy a newly constructed house in the US.

US GDP rises; investment rises. Since the house is newly constructed, it counts as part of GDP. And by convention, households' purchases of new homes get accounted for in the investment component of GDP.

2. In each case, please indicate whether the statement is true or false (for this question, you can just write true or false for each part, you don't need to explain why).

- a. GDP is a flawed measure of national income because it is defined in terms of the market value of goods produced and not the total income earned by workers and businesses economywide.

False. The circular flow diagram tells us that GDP simultaneously measures both total income and total spending.

- b. GDP is a flawed measure of US consumers' well-being because it only accounts for their purchases of tangible items like food, televisions, and new cars and not intangible items like haircuts, movie tickets, and medical care.

False. GDP includes spending on all of the services mentioned as well as on physical goods.

- c. If Ford Motor Company manufactures a new car in the US in December 2009, but that car does not actually get sold to an American consumer until January 2010, the total value of the car still gets counted in 2009's GDP.

True. By convention, when the car gets added to Ford's inventory of unsold vehicles in 2009, it gets counted as investment and its full value gets reflected in 2009 GDP.

- d. When you buy flour and sugar to bake cookies at home, the value of those ingredients gets counted in GDP, but when a commercial bakery buys flour and sugar to make cookies that get sold in a store, what gets counted in GDP is the value of the cookies themselves, not the value of flour and sugar when they were originally purchased.

True. Flour and sugar are final goods when you buy them to make cookies at home, but count as intermediate goods when a commercial bakery buys them to make cookies that sell in a store. Final goods are included in GDP, but intermediate goods are not, precisely so as to avoid the double counting of the value of the flour and sugar, which should be reflected as part of the value of the cookies themselves.

- e. "Net exports" as one of the four main components of GDP is defined as imports minus exports.

False. Net exports are defined as exports minus imports.

3. Consider a simple economy in which only two goods are produced and sold: pizza and beer. The prices and quantities produced of these two goods over a three-year period are shown in the table below.

Year	Price of Pizza	Quantity of Pizza	Price of Beer	Quantity of Beer
2007	\$3	2	\$2	2
2008	\$2	3	\$1	4
2009	\$4	3	\$2	4

- a. Calculate nominal GDP in 2007, 2008, and 2009.

2007: (\$3 per pizza) x (2 pizzas) + (\$2 per beer) x (2 beers) = \$6 + \$4 = \$10.

2008: (\$2 per pizza) x (3 pizzas) + (\$1 per beer) x (4 beers) = \$6 + \$4 = \$10.

2009: (\$4 per pizza) x (3 pizzas) + (\$2 per beer) x (4 beers) = \$12 + \$8 = \$20.

- b. Next, using 2007 as your base year, calculate real GDP in 2007, 2008, and 2009.

2007: (\$3 per pizza) x (2 pizzas) + (\$2 per beer) x (2 beers) = \$6 + \$4 = \$10.

2008: (\$3 per pizza) x (3 pizzas) + (\$2 per beer) x (4 beers) = \$9 + \$8 = \$17.

2009: (\$3 per pizza) x (3 pizzas) + (\$2 per beer) x (4 beers) = \$9 + \$8 = \$17.

- c. Does the GDP deflator rise, fall, or stay the same between 2007 and 2008? (*Note: You don't have to actually calculate the deflator for this part and the one just below, you only have to say whether it rises or falls*).

The GDP deflator falls. The GDP deflator is computed by dividing nominal GDP by real GDP. Since nominal GDP stays unchanged between 2007 and 2008 while real GDP rises, the deflator falls.

- d. Does the GDP deflator rise, fall, or stay the same between 2008 and 2009?

The GDP deflator rises, since nominal GDP rises while real GDP stays unchanged.

4. Go back to the same example from question 3, just above. Consumers in the economy like two goods: pizza and beer. Prices and quantities consumed are the same as before:

Year	Price of Pizza	Quantity of Pizza	Price of Beer	Quantity of Beer
2007	\$3	2	\$2	2
2008	\$2	3	\$1	4
2009	\$4	3	\$2	4

As a first step in computing the consumer price index (CPI), the Bureau of Labor Statistics surveys consumers to determine the “basket of goods” purchased by a typical consumer. Suppose that the BLS chooses 2007 as its base year and, consistent with the data shown in the table, decides that basket of goods in this economy should consist of two pizzas and two beers.

- a. What is the cost of the basket in each year: 2007, 2008, and 2009?

2007: (\$3 per pizza) x (2 pizzas) + (\$2 per beer) x (2 beers) = \$6 + \$4 = \$10.

2008: (\$2 per pizza) x (2 pizzas) + (\$1 per beer) x (2 beers) = \$4 + \$2 = \$6.

2009: (\$4 per pizza) x (2 pizzas) + (\$2 per beer) x (2 beers) = \$8 + \$4 = \$12.

- b. Still using 2007 as the base year, what is the CPI in each year: 2007, 2008, 2009?

2007: (\$10/\$10) x 100 = 100.

2008: (\$6/\$10) x 100 = 60.

2009: (\$12/\$10) x 100 = 120.

5. Explain *briefly* (with no more than a sentence or two) what economists mean when they use the term “substitution bias” with reference to measuring the CPI. Does substitution bias cause changes in the CPI to overstate or understate changes in the true cost of living?

“Substitution bias” refers to the fact that the CPI is computed based on changes in the cost of a fixed basket of goods that remains the same even if, in reality, some consumers shift their spending habits when different prices for different goods rise or fall at different rates. Because the CPI does not reflect this willingness and ability to substitute between different goods, it overstates changes in the true cost of living.

6. Some people like to complain about the rising cost of postage rates in the United States. But the prices of most goods and services tend to rise over time, so their complaints are justified only if the price of stamps rises faster than the overall rate of inflation. Here are some data that will help you examine this issue in more detail.

Year	Price of a First Class Stamp	Consumer Price Index
1983	20 cents	100
2006	39 cents	200

- a. The table indicates that it cost 20 cents to mail a first-class letter in 1983. Use the data on the CPI to determine what the value of those 20 cents was in 2006 dollars.

Value in 2006 dollars = (20 cents in 1983) x (200/100) = 40 cents.

- b. After adjusting for inflation, when was the price of a first-class postage stamp higher: in 1983 or in 2006?

The inflation-adjusted price of a stamp was actually higher in 1983.

7. Macroeconomists often think about the determinants of a nation's standard of living with the help of an "aggregate production function" such as

$$Y = AF(L, K, H, N),$$

where Y denotes real GDP, A denotes the stock of technological knowledge, L denotes the number of workers, K denotes the stock of physical capital, H denotes the stock of human capital, and N denotes the stock of natural resources.

- a. What does it mean to say that holding the stock of technological knowledge fixed, the aggregate production function has the property of constant returns to scale?

The aggregate production function has the property of constant returns to scale if, holding the stock of technological knowledge fixed, a doubling of the number of workers, the stock of physical capital, the stock of human capital, and the stock of natural resources leads to a doubling of output. Or, in terms of the math, if

$$2Y = AF(2L, 2K, 2H, 2N).$$

More generally, this property of constant returns to scale means that, holding A fixed, increasing or decreasing L , K , H , and N by multiplying each quantity by a fixed number x leads to a proportional increase or decrease in output according to

$$xY = AF(xL, xK, xH, xN).$$

- b. Could this aggregate production have the property of constant returns to scale and yet still be consistent with the observation that a relatively poor economy can benefit from a "catch-up effect" that allows it to grow more rapidly at first, when it starts out with very low levels of physical capital per worker? Why or why not?

Yes. The "catch-up effect" depends on diminishing returns when physical capital alone increases, holding fixed the stock of technological knowledge, the number of workers, the stock of human capital, and the stock of natural resources. So the aggregate production function may still have constant returns to scale when the number of workers, the stock of human capital, and the stock of natural resources are allowed to increase together with the stock of physical capital.

- c. Does this aggregate production function necessarily imply that growth in living standards in an economy, as measured by output per worker, an economy's ability to grow is limited by its stock of natural resources? Why or why not?

No. Natural resources may be limited, but output per can still grow because of increases in the stock of technological knowledge, the stock physical capital, or the stock of human capital.

8. Many economists believe that governments can best provide the conditions that promote economic growth by protecting property rights and maintaining political stability. These

economists base their arguments, at least in part, on the idea that the property rights and political stability make people more willing to accept intertemporal trade-offs, that is, more willing to make sacrifices today so as to enjoy benefits in the future.

- a. What is the intertemporal trade-off involved in the process of physical capital accumulation?

Individuals must consume less and save more today in order to accumulate a larger stock of physical capital for the future.

- b. What is the intertemporal trade-off involved in the process of human capital accumulation?

Individuals must spend time in school or otherwise spend time learning new techniques for producing goods and services today, and therefore must pay tuition if necessary and also spend less time earning income today, in order to accumulate a larger stock of human capital for the future.

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Second Midterm Exam

This exam has 9 questions on 5 pages; before you begin, please check to make sure your copy has all 9 questions and all 5 pages. Each of the 9 questions will receive equal weight in determining your overall exam score. You can work on the questions in any order, but please be sure to keep your answers to all of the parts of a specific question together in your exam book.

1. In each case, please indicate whether the statement is true or false (for this question, you can just write true or false for each part, you don't need to explain why).
 - a. When a firm raises funds by selling newly-issued shares of stock, that is called equity finance; when a firm raises funds by selling newly-issued bonds, that is called debt finance.
 - b. When a firm raises funds, either by selling newly-issued shares of stock or newly-issued bonds, that is called direct finance.
 - c. "Investment," as macroeconomists use the term, occurs when a business buys new machines or when an individual consumer buys a newly-produced house.
 - d. "Saving," as macroeconomists use the term, occurs when a worker earns more in income than he or she spends on consumption and then puts the extra money in a bank account, but not when he or she uses the money to buy shares in a mutual fund instead.
 - e. "Junk bonds" are sometimes also called "high-yield bonds," because in the US their interest payments are exempt from the federal income tax.

2. Consider a closed economy in which GDP is \$15 trillion, taxes are \$1 trillion, private saving is \$0.5 trillion, and public saving is \$0.2 trillion.
 - a. Calculate national saving in this economy.
 - b. Calculate consumption in this economy.
 - c. Calculate investment in this economy.
 - d. Calculate government purchases in this economy.
 - e. Is the government running a budget deficit or a budget surplus in this economy?

3. One of the first major policy actions taken in 2009 by the Obama administration in association with the newly-elected Congress was to pass a fiscal stimulus package that called for a large increase in government spending. Supporters of this increase in government spending argued that it was needed to help pull the economy out of recession and also to help workers who lost their jobs because of the recession. But even those supporters had to admit that, as a side effect, the stimulus package meant that the US government's budget deficit increased dramatically as a result.
 - a. When the government runs a larger budget deficit, does that shift the demand curve or the supply curve for loanable funds?
 - b. Use a supply-and-demand diagram for loanable funds to show in which direction the relevant curve shifts.
 - c. According to the loanable funds framework, does the interest rate rise or fall as a result of the larger budget deficit?
 - d. According to the loanable funds framework, does national saving rise or fall as a result of the larger budget deficit?
 - e. According to the loanable funds framework, does investment rise or fall as a result of the larger budget deficit?

4. Every month, the US Bureau of Labor Statistics surveys about 60,000 American adults and, based on their responses to questions on the survey, categorizes each adult as being either employed, unemployed, or not in the labor force. Based on the descriptions of the five individuals given below, please indicate which of the three categories each worker will get assigned to.
 - a. Pat had a full-time job in 2007, which he lost because of the recent recession. So now he's working at a part-time job instead, even though he tells the BLS he'd greatly prefer to have a full-time job.
 - b. John lost his full-time job in 2007, too. After searching for awhile, he couldn't find any new job, full or part-time. So now he doesn't have a job and isn't even looking for a job, even though he tells the BLS that he'll probably start looking again once the economy improves.
 - c. Jane used to work at an automobile manufacturing plant owned by Ford Motor Company. A month ago, Ford's management decided to shut the plant down because of a decline in automobile sales. At that time, it laid off all of the workers at the plant, including Jane, but also told them that they would all get called back to work when the plant reopens next month. So Jane has to tell the BLS that she doesn't have a job right now, but she also explains that she sees no point in looking for a new job because she'll be back at the Ford plant in a few weeks.
 - d. Sarah has a full-time job at General Electric, but she's on vacation the day the BLS asks about her employment status.
 - e. David graduated from college in December; he hasn't found a job yet but he tells the BLS that he's still actively looking for one.

5. This question asks you to use microeconomic supply and demand analysis to find out what happens to employment and unemployment when unionized workers succeed through collective bargaining in getting wages that are higher than the equilibrium wage.
 - a. In a supply-and-demand diagram with the quantity of labor on the horizontal (x) axis and the wage (as the price of labor) on the vertical (y) axis, does the demand curve for labor slope up or down?
 - b. In the same diagram, does the supply curve for labor slope up or down?
 - c. Using the diagram, show what happens to the wages of those workers who remain employed after the union succeeds in bargaining for a wage rate that is above the equilibrium wage.
 - d. Using the same diagram, show what happens to the number of workers who remain employed after the union succeeds in bargaining for a wage rate that is above the equilibrium wage.
 - e. And, still using the same diagram, show what happens to the number of workers that the Bureau of Labor Statistics would count as being unemployed after the union succeeds in bargaining for a wage rate that is above the equilibrium wage.

6. The Congressional Budget Office estimates that the natural rate of unemployment in the US has declined from about 6 percent in the 1970s to around 5 percent today. Please indicate – true or false – whether each of the following factors could help explain this decline in the natural rate of unemployment.
 - a. The internet has made it easier for workers to find jobs and employers to find workers.
 - b. Union membership among US workers has gradually declined since the 1970s.
 - c. State unemployment insurance programs are more generous today than they were during the 1970s.
 - d. The minimum wage has risen since the 1970s, but at a rate that is slower than the rate of overall inflation.
 - e. As bad as the increase in the unemployment rate was during the most recent recession, the unemployment rate was even higher during the recession of the early 1980s.

7. Consider the following table, showing the dollar amounts of different assets outstanding in the US economy:

Asset	Dollar Value Outstanding
Currency	\$10
Demand Deposits	\$8
NOW Accounts	\$3
Money Market Mutual Fund Shares	\$1
Savings Deposits	\$5
Time Deposits (Certificates of Deposit)	\$20

- a. Based on the figures from this table, what is the value of M1?
 - b. Based on the figures from this table, what is the value of M2?
 - c. Does M1 rise, fall, or stay the same when a consumer takes some funds out of his or her checking account (demand deposit) and puts them in a savings account (savings deposit) instead?
 - d. Does M2 rise, fall, or stay the same when a consumer takes some funds out of his or her checking account (demand deposit) and puts them in a savings account (savings deposit) instead?
 - e. Does M2 rise, fall, or stay the same when a consumer takes some funds out of his or her savings account (savings deposit) and puts them in a certificate of deposit (time deposit) instead?
8. In each case, please indicate whether the statement is true or false (again, for this question, there's no need to explain why).
- a. Federal Reserve governors are appointed by the US President and confirmed by the US Senate to serve for 14-year terms.
 - b. Federal Reserve Bank presidents are also appointed by the US President and confirmed by the US Senate.
 - c. As part of the Federal Reserve's role in overseeing the banking system, the Federal Reserve Banks accept deposits from and sometimes make loans to private banks.
 - d. Federal Reserve notes held by individual consumers and businesses outside the banking system are classified as "currency in circulation" and count as part of the money supply.
 - e. Federal Reserve notes held by banks are classified as "reserves" and do not count as part of the money supply.

9. Start by considering an economy in which there are no banks.
- a. In this economy without banks, what happens to the money supply if the Federal Reserve conducts an open market operation in which it uses ten newly-printed \$10 bills (for a total of \$100 in newly-printed dollar bills) to buy \$100 in US Government bonds? Does the money supply rise, fall, or stay the same because of this open market operation? And if it rises or falls, by how much does it rise or fall?
 - b. Now suppose that a bank – call it the First National Bank – opens up for business in this economy. But suppose that to start, the First National Bank holds all of the deposits it receives in the form of reserves; suppose, in other words, that the First National Bank engages in “100% reserve banking.” Compared to the situation described in part (a) without banks, what happens to the money supply (now defined as currency plus deposits) if all ten of the newly-printed \$10 bills (for a total of \$100) that the Fed injected into the economy when conducting its open market operation get deposited in accounts at the First National Bank? Does the money supply rise, fall, or stay the same because of these deposits? And if it rises or falls, by how much does it rise or fall?
 - c. Suppose instead that only five of the newly-printed \$10 bills (so a total of \$50) get deposited in accounts at the First National Bank. Again compared to the situation described in part (a) without banks, does the money supply rise, fall, or stay the same because of these deposits? And if it rises or falls, by how much does it rise or fall?
 - d. Next, suppose that the First National Bank decides to engage in “fractional reserve banking” instead of “100% reserve banking.” Suppose, in particular, that the First National Bank chooses a 10% reserve ratio. Compared to the situation described in part (a) without banks, what happens to the money supply if all ten of the newly-printed \$10 bills (for a total of \$100) that the Fed injected into the economy when conducting its open market operation get deposited in accounts at the First National Bank? Does the money supply rise, fall, or stay the same because of these deposits? And if it rises or falls, by how much does it rise or fall?
 - e. Finally, still assuming that the First National Bank chooses a 10% reserve ratio but supposing now that only five of the newly-printed \$10 bills (so a total of \$50) get deposited in accounts at the First National Bank, what happens to the money supply? Compared to the situation described in part (a) without banks, does the money supply rise, fall, or stay the same because of these deposits? And if it rises or falls, by how much does it rise or fall?

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Solutions to Second Midterm Exam

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1. In each case, please indicate whether the statement is true or false (for this question, you can just write true or false for each part, you don't need to explain why).
 - a. When a firm raises funds by selling newly-issued shares of stock, that is called equity finance; when a firm raises funds by selling newly-issued bonds, that is called debt finance.

True.

- b. When a firm raises funds, either by selling newly-issued shares of stock or newly-issued bonds, that is called direct finance.

True.

- c. "Investment," as macroeconomists use the term, occurs when a business buys new machines or when an individual consumer buys a newly-produced house.

True.

- d. "Saving," as macroeconomists use the term, occurs when a worker earns more in income than he or she spends on consumption and then puts the extra money in a bank account, but not when he or she uses the money to buy shares in a mutual fund instead.

False – saving occurs in both of those cases.

- e. "Junk bonds" are sometimes also called "high-yield bonds," because in the US their interest payments are exempt from the federal income tax.

False – junk bonds are issued by corporations with high degrees of credit risk. Savers demand and generally receive higher interest rates on these bonds to compensate for the extra risk that the firm will default on its debt, but their interest payments are still subject to the US federal income tax.

2. Consider a closed economy in which GDP is \$15 trillion, taxes are \$1 trillion, private saving is \$0.5 trillion, and public saving is \$0.2 trillion.
 - a. Calculate national saving in this economy.

National Saving = Private Saving + Public Saving = \$0.5 trillion + \$0.2 trillion = \$0.7 trillion.

- b. Calculate consumption in this economy.

Since Private Saving = GDP – Taxes – Consumption, Consumption = GDP – Taxes – Private Saving = \$15 trillion – \$1 trillion – \$0.5 trillion = \$13.5 trillion.

- c. Calculate investment in this economy.

Since the economy is closed, investment = national saving = \$0.7 trillion.

- d. Calculate government purchases in this economy.

There are a number of ways to calculate government purchases using the other numbers given above, but one way is to observe that public saving = taxes – government purchases so that government purchases = taxes – public saving = \$1 trillion – \$0.2 trillion = \$0.8 trillion.

- e. Is the government running a budget deficit or a budget surplus in this economy?

Since public saving is positive, the government is running a budget surplus.

3. One of the first major policy actions taken in 2009 by the Obama administration in association with the newly-elected Congress was to pass a fiscal stimulus package that called for a large increase in government spending. Supporters of this increase in government spending argued that it was needed to help pull the economy out of recession and also to help workers who lost their jobs because of the recession. But even those supporters had to admit that, as a side effect, the stimulus package meant that the US government's budget deficit increased dramatically as a result.
 - a. When the government runs a larger budget deficit, does that shift the demand curve or the supply curve for loanable funds?

Since the government is viewed as a supplier of loanable funds, the larger budget deficit means that the supply curve for loanable funds shifts.

- b. Use a supply-and-demand diagram for loanable funds to show in which direction the relevant curve shifts.

The supply curve shifts to the left, since fewer funds are supplied at any given interest rate.

- c. According to the loanable funds framework, does the interest rate rise or fall as a result of the larger budget deficit?

The interest rate rises.

- d. According to the loanable funds framework, does national saving rise or fall as a result of the larger budget deficit?

National saving falls.

- e. According to the loanable funds framework, does investment rise or fall as a result of the larger budget deficit?

Investment falls.

- 4. Every month, the US Bureau of Labor Statistics surveys about 60,000 American adults and, based on their responses to questions, on the survey, categorizes each adult as being either employed, unemployed, or not in the labor force. Based on the descriptions of the five individuals given below, please indicate which of the three categories each worker will get assigned to.
 - a. Pat had a full-time job in 2007, which he lost because of the recent recession. So now he's working at a part-time job instead, even though he tells the BLS he'd greatly prefer to have a full-time job.

Employed.

- b. John lost his full-time job in 2007, too. After searching for awhile, he couldn't find any new job, full or part-time. So now he doesn't have a job and isn't even looking for a job, even though he tells the BLS that he'll probably start looking again once the economy improves.

Not in the labor force.

- c. Jane used to work at an automobile manufacturing plant owned by Ford Motor Company. A month ago, Ford's management decided to shut the plant down because of a decline in automobile sales. At that time, it laid off all of the workers at the plant, including Jane, but also told them that they would all get called back to work when the plant reopens next month. So Jane has to tell the BLS that she doesn't have a job right now, but she also explains that she sees no point in looking for a new job because she'll be back at the Ford plant in a few weeks.

Unemployed.

- d. Sarah has a full-time job at General Electric, but she's on vacation the day the BLS asks about her employment status.

Employed.

- e. David graduated from college in December; he hasn't found a job yet but he tells the BLS that he's still actively looking for one.

Unemployed.

- 5. This question asks you to use microeconomic supply and demand analysis to find out what happens to employment and unemployment when unionized workers succeed through collective bargaining in getting wages that are higher than the equilibrium wage.
 - a. In a supply-and-demand diagram with the quantity of labor on the horizontal (x) axis and the wage (as the price of labor) on the vertical (y) axis, does the demand curve for labor slope up or down?

The demand curve slopes down.

- b. In the same diagram, does the supply curve for labor slope up or down?

The supply curve slopes up.

- c. Using the diagram, show what happens to the wages of those workers who remain employed after the union succeeds in bargaining for a wage rate that is above the equilibrium wage.

The wage of those workers who remain employed rises above the equilibrium wage: from W_E to W_{Union} in the diagram shown on the next page.

- d. Using the same diagram, show what happens to the number of workers who remain employed after the union succeeds in bargaining for a wage rate that is above the equilibrium wage.

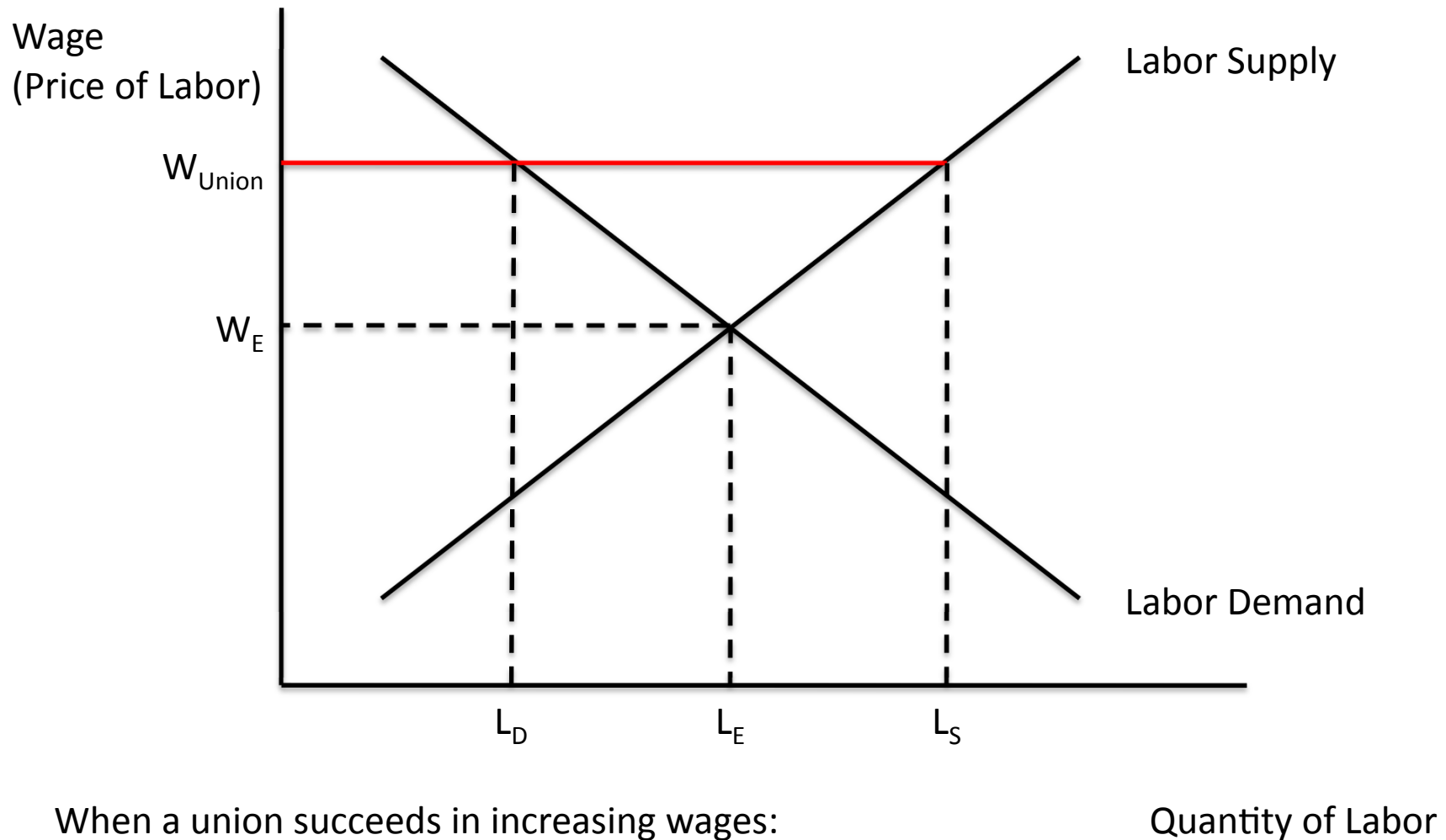
Employment falls from L_E to L_D in the same diagram.

- e. And, still using the same diagram, show what happens to the number of workers that the Bureau of Labor Statistics would count as being unemployed after the union succeeds in bargaining for a wage rate that is above the equilibrium wage.

Unemployment rises from 0 to $L_S - L_D$.

- 6. The Congressional Budget Office estimates that the natural rate of unemployment in the US has declined from about 6 percent in the 1970s to around 5 percent today. Please indicate – true or false – whether each of the following factors could help explain this decline in the natural rate of unemployment.

Unions and Collective Bargaining



When a union succeeds in increasing wages:

Employment falls from L_E to L_D .

Unemployment rises from zero to $L_S - L_D$.

- a. The internet has made it easier for workers to find jobs and employers to find workers.

True.

- b. Union membership among US workers has gradually declined since the 1970s.

True.

- c. State unemployment insurance programs are more generous today than they were during the 1970s.

False.

- d. The minimum wage has risen since the 1970s, but at a rate that is slower than the rate of overall inflation.

True.

- e. As bad as the increase in the unemployment rate was during the most recent recession, the unemployment rate was even higher during the recession of the early 1980s.

False.

7. Consider the following table, showing the dollar amounts of different assets outstanding in the US economy:

Asset	Dollar Value Outstanding
Currency	\$10
Demand Deposits	\$8
NOW Accounts	\$3
Money Market Mutual Fund Shares	\$1
Savings Deposits	\$5
Time Deposits (Certificates of Deposit)	\$20

- a. Based on the figures from this table, what is the value of M1?

$$\mathbf{M1 = Currency + Demand Deposits + NOW Accounts = \$10 + \$8 + \$3 = \$21}$$

- b. Based on the figures from this table, what is the value of M2?

$$\mathbf{M2 = M1 + Money Market Mutual Fund Shares + Savings Deposits + Time Deposits = \$21 + \$1 + \$5 + \$20 = \$47.}$$

- c. Does M1 rise, fall, or stay the same when a consumer takes some funds out of his or her checking account (demand deposit) and puts them in a savings account (savings deposit) instead?

M1 falls, since demand deposits are part of M1 but savings deposits are not.

- d. Does M2 rise, fall, or stay the same when a consumer takes some funds out of his or her checking account (demand deposit) and puts them in a savings account (savings deposit) instead?

M2 stays the same, since demand deposits and savings deposits are both part of M2.

- e. Does M2 rise, fall, or stay the same when a consumer takes some funds out of his or her savings account (savings deposit) and puts them in a certificate of deposit (time deposit) instead?

M2 stays the same, since savings deposits and CD's are both part of M2.

8. In each case, please indicate whether the statement is true or false (again, for this question, there's no need to explain why).
- a. Federal Reserve governors are appointed by the US President and confirmed by the US Senate to serve for 14-year terms.

True.

- b. Federal Reserve Bank presidents are also appointed by the US President and confirmed by the US Senate.

False – they are appointed by the Bank's board of directors.

- c. As part of the Federal Reserve's role in overseeing the banking system, the Federal Reserve Banks accept deposits from and sometimes make loans to private banks.

True.

- d. Federal Reserve notes held by individual consumers and businesses outside the banking system are classified as "currency in circulation" and count as part of the money supply.

True.

- e. Federal Reserve notes held by banks are classified as "reserves" and do not count as part of the money supply.

True.

9. Start by considering an economy in which there are no banks.

- a. In this economy without banks, what happens to the money supply if the Federal Reserve conducts an open market operation in which it uses ten newly-printed \$10 bills (for a total of \$100 in newly-printed dollar bills) to buy \$100 in US Government bonds? Does the money supply rise, fall, or stay the same because of this open market operation? And if it rises or falls, by how much does it rise or fall?

The money supply rises by \$100.

- b. Now suppose that a bank – call it the First National Bank – opens up for business in this economy. But suppose that to start, the First National Bank holds all of the deposits it receives in the form of reserves; suppose, in other words, that the First National Bank engages in “100% reserve banking.” Compared to the situation described in part (a) without banks, what happens to the money supply (now defined as currency plus deposits) if all ten of the newly-printed \$10 bills (for a total of \$100) that the Fed injected into the economy when conducting its open market operation get deposited in accounts at the First National Bank? Does the money supply rise, fall, or stay the same because of these deposits? And if it rises or falls, by how much does it rise or fall?

The money supply does not change. With 100% reserve banking, banks affect the composition of the money supply in terms of the split between currency and deposits but not the overall level of the money supply.

- c. Suppose instead that only five of the newly-printed \$10 bills (so a total of \$50) get deposited in accounts at the First National Bank. Again compared to the situation described in part (a) without banks, does the money supply rise, fall, or stay the same because of these deposits? And if it rises or falls, by how much does it rise or fall?

Once again and for the same reasons noted in part (b), the money supply does not change.

- d. Next, suppose that the First National Bank decides to engage in “fractional reserve banking” instead of “100% reserve banking.” Suppose, in particular, that the First National Bank chooses a 10% reserve ratio. Compared to the situation described in part (a) without banks, what happens to the money supply if all ten of the newly-printed \$10 bills (for a total of \$100) that the Fed injected into the economy when conducting its open market operation get deposited in accounts at the First National Bank? Does the money supply rise, fall, or stay the same because of these deposits? And if it rises or falls, by how much does it rise or fall?

The money supply rises by an additional \$90. Compared to the situation in part (a), the First National Bank’s depositors simply have \$100 in deposits instead of \$100 in currency. But the First National Bank takes its \$100 in deposits, holds \$10 (10%) as reserves and lends the remaining \$90 out. Now, the First National Bank’s borrowers have \$90 in currency, bringing the total money supply up by another \$90.

- e. Finally, still assuming that the First National Bank chooses a 10% reserve ratio but supposing now that only five of the newly-printed \$10 bills (so a total of \$50) get deposited in accounts at the First National Bank, what happens to the money supply? Compared to the situation

described in part (a) without banks, does the money supply rise, fall, or stay the same because of these deposits? And if it rises or falls, by how much does it rise or fall?

Now the money supply rises by an additional \$45. Compared to the situation in part (a), the First National Bank's depositors have \$50 in currency and \$50 in deposits instead of \$100 in currency. But the First National Bank takes its \$50 in deposits, holds \$5 (10%) as reserves and lends the remaining \$45 out. Now, the First National Bank's borrowers have \$45 in currency, bringing the total money supply up by another \$45.

Economics 132.03
Principles of Macroeconomics
Spring 2010

Professor Peter Ireland

<http://www2.bc.edu/~irelandp/ec132.html>

Final Exam

This exam has 12 questions on 5 pages; before you begin, please check to make sure your copy has all 12 questions and all 5 pages. Each of the 12 questions will receive equal weight in determining your overall exam score. You can work on the questions in any order, but please be sure to keep your answers to all of the parts of a specific question together in your exam book.

1. Consider an economy in which individual consumers and nonbank businesses hold all of their money in the form of deposits and therefore do not hold currency. Suppose that all banks in this economy hold 10% of their deposits as reserves and lend the rest out. And suppose that in this economy, the central bank decides to conduct an open market operation in which it purchases \$100 in government bonds.
 - a. Will this open market operation work to increase or decrease the money supply?
 - b. Once the entire process through which the banking system accepts additional deposits and makes new loans as a result of this open market operation comes to an end, by how much will the total amount of reserves in the banking system have changed?
 - c. Once the entire process through which the banking system accepts additional deposits and makes new loans as a result of this open market operation comes to an end, by how much will the total money supply have changed?
 - d. Now suppose instead that some consumers and nonbank businesses do decide to hold some of their money in the form of currency as opposed to deposits. In this case, will the effect of the open market operation on the total money supply be larger or smaller than the answer you gave for part (c), above?
 - e. Finally, go back to assuming that consumers and nonbank businesses hold all of their money in the form of deposits instead of currency, but suppose that some banks in the economy hold more than 10% of their deposits as reserves. In this case, will the effect of the open market operation on the total money supply be larger or smaller than the answer you gave for part (c), above?

2. Between the beginning of 2007 and the end of 2008, the Federal Reserve lowered its target for the federal funds rate from 5.25% all the way down to close to zero.
 - a. In order to bring about this decline in its target for the federal funds rate, did the Fed have to conduct open market operations in which it bought US government bonds or open market operations in which it sold US government bonds?
 - b. Did these open market operations increase or decrease the total amount of reserves that the Fed supplied to the banking system?
 - c. Did these open market operations work to increase or decrease the total money supply?
 - d. Suppose that starting from the current situation, where the Fed has its federal funds rate target close to zero, banks' demand for reserves suddenly increases. In order to keep the actual funds rate close to its target of zero, what will the Fed have to do: conduct another open market operation in which it buys US government bonds or conduct another open market operation in which it sells US government bonds?

3. Consider the following bank balance sheet:

First National Bank	
Assets	Liabilities
Reserves \$10 Loans \$90 Other Assets \$5	Deposits \$100 Shareholders' Equity \$x

where, on the asset side, the entry for "other assets" simply refers to the value of the buildings, office equipment, and other physical assets that the bank needs to conduct its business and where, on the liability side, the dollar amount for the "shareholders' equity" entry has intentionally been left blank.

- a. What is the value of the bank's shareholders' equity?
- b. If the bank charges interest on its loans at a 10% annual rate, how much interest income will it earn during the next year, assuming for simplicity that it holds all its reserves in the form of vault cash as opposed to deposits at the Fed and that it does not make any additional loans beyond those shown on the balance sheet now?
- c. If the bank pays interest on its deposits at a 5% annual rate, how much interest expenses will it incur during the next year, assuming for simplicity that it does not accept any additional deposits or lose any existing deposits beyond those shown on the balance sheet now?
- d. Suppose that some of the bank's borrowers go bankrupt, so that \$50 of the bank's loans never get repaid, but that nothing happens to the bank's deposits. Is the bank "insolvent" or "illiquid?"
- e. Suppose that the bank experiences a \$50 deposit outflow, but that nothing happens to the bank's loans, so that it continues to expect that all of the loans will eventually get fully repaid. Is the bank "insolvent" or "illiquid?"

4. This question asks you to use microeconomic supply and demand analysis applied to the market for money to consider the long-run effects of an increase in the money supply.
 - a. To begin, draw a diagram with the quantity of money measured in dollars on the x-axis and the “goods price of money” measured as $1/P$, where P is the economy-wide price level, on the y-axis. Then draw in a demand curve for money.
 - b. Assuming for simplicity that the Federal Reserve is able to fix the money supply at some initial level M^* , draw in the supply curve for money.
 - c. Show what happens in the graph when the Federal Reserve acts to increase the money supply to a new, higher level M^{**} .
 - d. What happens to the price level P as a result of this increase in the money supply?

5. Suppose that the money supply (M) is \$100, real GDP (Y) is 100, and the price level (P) is 2.
 - a. What is the value for nominal GDP?
 - b. What is the value for the velocity of money?
 - c. Assuming that velocity stays constant and “money is neutral in the long run,” what value will nominal GDP have in the long run if the Fed acts to increase the money supply to \$200?
 - d. Still assuming that velocity stays constant and “money is neutral in the long run,” what value will real GDP have in the long run if the Fed acts to increase the money supply to \$200?
 - e. And again still assuming that velocity stays constant and “money is neutral in the long run,” what value will the price level have in the long run if the Fed acts to increase the money supply to \$200?

6. Please indicate whether each of the following ideas helps explain why, in the aggregate demand/aggregate supply diagram: (i) the aggregate demand curve slopes down, (ii) the long-run aggregate supply curve is vertical, or (iii) the short-run aggregate supply curve slopes up.
 - a. Some individual goods prices, once set by firms, remain “sticky” for a period of time.
 - b. Wages for some workers, once negotiated, also remain “sticky” for a period of time.
 - c. In the long run, the amount of output produced economy-wide is determined by productivity, not by the amount of money in circulation.
 - d. When the price level rises, real monetary wealth declines, causing some consumers to buy fewer goods.
 - e. When the price level rises, real monetary wealth declines, causing some consumers to buy fewer bonds.

7. Please indicate whether, in the aggregate demand/aggregate supply diagram, each of the following events will work initially (that is, in the short run) to shift the (i) aggregate demand curve, (ii) the long-run aggregate supply curve, or (iii) the short-run aggregate supply curve. Please indicate, as well, whether the relevant curve shifts to the left or to the right.
- Congress raises taxes, lowering consumers' after-tax income.
 - Workers economywide succeed in negotiating for higher wages.
 - Congress passes a "fiscal stimulus package" that calls for large increases in government spending.
 - Businesses become more confident about future economic prospects.
 - Consumers become more confident about future economic prospects.
8. Suppose that the economy starts in a "long-run equilibrium" in which: (i) actual output Y equals the natural rate Y^* and (ii) the actual price level P equals the expected price level P^E .
- Now suppose that real estate prices rise dramatically. In the aggregate demand and aggregate supply diagram, will this increase in home prices shift the aggregate demand curve or the (short-run) aggregate supply curve?
 - Assuming that the Federal Reserve and Congress do not take any monetary or fiscal policy actions at first, what will happen to output Y in the short run: does it increase, decrease, or stay the same?
 - Still assuming that the Federal Reserve and Congress do not take any monetary or fiscal policy actions at first, what will happen to the price level P in the short run: does it increase, decrease, or stay the same?
 - Now suppose instead that Federal Reserve officials decide that they want to prevent output Y and the price level P from changing when this boom in real estate prices occurs. What should they do: raise or lower their target for the federal funds rate?
 - Will the change in the federal funds rate target you mentioned in your answer to part (d), above, work to shift the aggregate demand curve, the short-run aggregate supply curve, or the long-run aggregate supply curve?
9. Suppose that the US Congress changes the tax code in order to offer firms new investment tax credits, giving businesses tax advantages if they build new factories or buy new machinery to expand existing factories.
- In the loanable funds market, would this policy change shift the supply curve or the demand curve for loanable funds?
 - Would the curve you mentioned above – either supply or demand – shift to the left or to the right in the loanable funds diagram?
 - According to the loanable funds model, what affect would this policy change have on investment: would it rise, fall, or stay the same?
 - According to the loanable funds model, what affect would this policy change have on saving: would it rise, fall, or stay the same?
 - According to the loanable funds model, what affect would this policy change have on the interest rate: would it rise, fall, or stay the same?

10. Macroeconomists often use the story of Robinson Crusoe to help identify and understand the determinants of productivity in more complex economies like the United States.
- When macroeconomists say that Robinson Crusoe's productivity depends on how much training he has in the latest fishing techniques, what counterpart do they have in mind as to how productivity is determined in the US?
 - When they say that Robinson Crusoe's productivity depends on how plentiful fish are in the waters surrounding his island, what counterpart do they have in mind as to how productivity is determined in the US?
 - When they say that Robinson Crusoe's productivity depends on how many fishing poles he has, what counterpart do they have in mind as to how productivity is determined in the US?
 - When they say that Robinson Crusoe's productivity depends on how good he is at inventing new techniques for fishing, what counterpart do they have in mind as to how productivity is determined the US?
11. Each month, the Bureau of Labor Statistics conducts the Current Population Survey, known more popularly as the "household" survey. And based on the responses it receives, the BLS classifies each American adult, age 16 and over, as being either (i) employed, (ii) unemployed, or (iii) not in the labor force.
- Based on the number of workers in these categories, what is the formula that the BLS uses to calculate the size of the total labor force?
 - And what is the formula that the BLS uses to calculate the unemployment rate?
 - And what is the formula that the BLS uses to calculate the labor force participation rate?
 - On Friday, May 7 – just a little more than one week ago – the BLS released the results of its household survey for April 2010. This most recent household survey showed that the number of employed workers increased by 550,000 during April compared to March, while the unemployment rate also increased to 9.9 percent in April versus 9.7 percent in March. Explain briefly (in no more than a sentence or two) how it is possible that **both** of these numbers – the number of workers who are employed **and** the unemployment rate – can increase at the same time.
12. Please indicate whether each of the following statements is true or false.
- The "classical dichotomy" draws a distinction between "real variables" like real GDP and unemployment that are measured in physical units of goods or workers and "nominal variables" like the level of prices economywide that are measured in units of the local currency (in the US, units of dollars).
 - The "classical theory of inflation" implies that in the US, if Federal Reserve officials want to change the economy's long-run rate of inflation, they can do so by taking policy actions that change the long-run growth rate of the money supply.
 - The "Phillips curve" refers to the short-run relationship that often appears in data from the US and other countries, according to which inflation is low when unemployment is high and inflation is high when unemployment is low.

Economics 132.03
Principles of Macroeconomics
Spring 2010

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<http://www2.bc.edu/~irelandp/ec132.html>

Solutions to Final Exam

This exam has 12 questions on 5 pages; before you begin, please check to make sure your copy has all 12 questions and all 5 pages. Each of the 12 questions will receive equal weight in determining your overall exam score. You can work on the questions in any order, but please be sure to keep your answers to all of the parts of a specific question together in your exam book.

1. Consider an economy in which individual consumers and nonbank businesses hold all of their money in the form of deposits and therefore do not hold currency. Suppose that all banks in this economy hold 10% of their deposits as reserves and lend the rest out. And suppose that in this economy, the central bank decides to conduct an open market operation in which it purchases \$100 in government bonds.

- a. Will this open market operation work to increase or decrease the money supply?

Increase.

- b. Once the entire process through which the banking system accepts additional deposits and makes new loans as a result of this open market operation comes to an end, by how much will the total amount of reserves in the banking system have changed?

By \$100.

- c. Once the entire process through which the banking system accepts additional deposits and makes new loans as a result of this open market operation comes to an end, by how much will the total money supply have changed?

By \$1000.

- d. Now suppose instead that some consumers and nonbank businesses do decide to hold some of their money in the form of currency as opposed to deposits. In this case, will the effect of the open market operation on the total money supply be larger or smaller than the answer you gave for part (c), above?

Smaller.

- e. Finally, go back to assuming that consumers and nonbank businesses hold all of their money in the form of deposits instead of currency, but suppose that some banks in the economy hold more than 10% of their deposits as reserves. In this case, will the effect of the open market operation on the total money supply be larger or smaller than the answer you gave for part (c), above?

Smaller.

2. Between the beginning of 2007 and the end of 2008, the Federal Reserve lowered its target for the federal funds rate from 5.25% all the way down to close to zero.
- a. In order to bring about this decline in its target for the federal funds rate, did the Fed have to conduct open market operations in which it bought US government bonds or open market operations in which it sold US government bonds?

It had to conduct open market operations in which it bought US government bonds.

- b. Did these open market operations increase or decrease the total amount of reserves that the Fed supplied to the banking system?

These open market operations increased the total amount of reserves that the Fed supplied to the banking system.

- c. Did these open market operations work to increase or decrease the total money supply?

These open market operations worked to increase the money supply.

- d. Suppose that starting from the current situation, where the Fed has its federal funds rate target close to zero, banks' demand for reserves suddenly increases. In order to keep the actual funds rate close to its target of zero, what will the Fed have to do: conduct another open market operation in which it buys US government bonds or conduct another open market operation in which it sells US government bonds?

It will have to conduct another open market operation in which it buys US government bonds.

3. Consider the following bank balance sheet:

First National Bank	
Assets	Liabilities
Reserves \$10 Loans \$90 Other Assets \$5	Deposits \$100 Shareholders' Equity \$x

where, on the asset side, the entry for “other assets” simply refers to the value of the buildings, office equipment, and other physical assets that the bank needs to conduct its business and where, on the liability side, the dollar amount for the “shareholders’ equity” entry has intentionally been left blank.

- a. What is the value of the bank’s shareholders’ equity?

\$5.

- b. If the bank charges interest on its loans at a 10% annual rate, how much interest income will it earn during the next year, assuming for simplicity that it holds all its reserves in the form of vault cash as opposed to deposits at the Fed and that it does not make any additional loans beyond those shown on the balance sheet now?

\$9.

- c. If the bank pays interest on its deposits at a 5% annual rate, how much interest expenses will it incur during the next year, assuming for simplicity that it does not accept any additional deposits or lose any existing deposits beyond those shown on the balance sheet now?

\$5.

- d. Suppose that some of the bank’s borrowers go bankrupt, so that \$50 of the bank’s loans never get repaid, but that nothing happens to the bank’s deposits. Is the bank “insolvent” or “illiquid?”

The bank is insolvent.

- e. Suppose that the bank experiences a \$50 deposit outflow, but that nothing happens to the bank’s loans, so that it continues to expect that all of the loans will eventually get fully repaid. Is the bank “insolvent” or “illiquid?”

The bank is illiquid.

4. This question asks you to use microeconomic supply and demand analysis applied to the market for money to consider the long-run effects of an increase in the money supply.
- a. To begin, draw a diagram with the quantity of money measured in dollars on the x-axis and the “goods price of money” measured as $1/P$, where P is the economy-wide price level, on the y-axis. Then draw in a demand curve for money.

The demand curve for money should be downward-sloping.

- b. Assuming for simplicity that the Federal Reserve is able to fix the money supply at some initial level M^* , draw in the supply curve for money.

The supply curve for money should be vertical.

- c. Show what happens in the graph when the Federal Reserve acts to increase the money supply to a new, higher level M^{**} .

The vertical supply curve should shift to the right.

- d. What happens to the price level P as a result of this decrease in the money supply?

The price level P rises, since the goods price of money $1/P$ falls.

5. Suppose that the money supply (M) is \$100, real GDP (Y) is 100, and the price level (P) is 2.
- a. What is the value for nominal GDP?

Nominal GDP = Real GDP x Price Level = $100 \times 2 = 200$.

- b. What is the value for the velocity of money?

Velocity = Nominal GDP/Money Supply = $200/100 = 2$.

- c. Assuming that velocity stays constant and “money is neutral in the long run,” what value will nominal GDP have in the long run if the Fed acts to increase the money supply to \$200?

Nominal GDP will rise to 400, since the money supply is now 200 and velocity stays constant at 2.

- d. Still assuming that velocity stays constant and “money is neutral in the long run,” what value will real GDP have in the long run if the Fed acts to increase the money supply to \$200?

Real GDP will stay unchanged at 100, since it is not affected by the increase in the money supply.

- e. And again still assuming that velocity stays constant and “money is neutral in the long run,” what value will the price level (once again measured by the GDP deflator) have in the long run if the Fed acts to increase the money supply to \$200?

The price level will rise to 4, since nominal GDP is now 400 and real GDP is now 100.

6. Please indicate whether each of the following ideas helps explain why, in the aggregate demand/aggregate supply diagram: (i) the aggregate demand curve slopes down, (ii) the long-run aggregate supply curve is vertical, or (iii) the short-run aggregate supply curve slopes up.
- a. Some individual goods prices, once set by firms, remain “sticky” for a period of time.

Explains why the SRAS curve slopes up.

- b. Wages for some workers, once negotiated, also remain “sticky” for a period of time.

Explains why the SRAS curve slopes up.

- c. In the long run, the amount of output produced economy-wide is determined by productivity, not by the amount of money in circulation.

Explains why the LRAS curve is vertical.

- d. When the price level rises, real monetary wealth declines, causing some consumers to buy fewer goods.

Explains why the AD curve slopes down.

- e. When the price level rises, real monetary wealth declines, causing some consumers to buy fewer bonds.

Explains why the AD curve slopes down.

7. Please indicate whether, in the aggregate demand/aggregate supply diagram, each of the following events will work initially (that is, in the short run) to shift the (i) aggregate demand curve, (ii) the long-run aggregate supply curve, or (iii) the short-run aggregate supply curve. Please indicate, as well, whether the relevant curve shifts to the left or to the right.
 - a. Congress raises taxes, lowering consumers' after-tax income.

Shifts the AD curve to the left.

- b. Workers economywide succeed in negotiating for higher wages.

Shifts the SRAS curve to the left.

- c. Congress passes a "fiscal stimulus package" that calls for large increases in government spending.

Shifts the AD curve to the right.

- d. Businesses become more confident about future economic prospects.

Shifts the AD curve to the right.

- e. Consumers become more confident about future economic prospects.

Shifts the AD curve to the right.

8. Suppose that the economy starts in a "long-run equilibrium" in which: (i) actual output Y equals the natural rate Y^* and (ii) the actual price level P equals the expected price level P^E .

- a. Now suppose that real estate prices rise dramatically. In the aggregate demand and aggregate supply diagram, will this increase in home prices shift the aggregate demand curve or the (short-run) aggregate supply curve?

The increase in home prices shifts the AD curve.

- b. Assuming that the Federal Reserve and Congress do not take any monetary or fiscal policy actions at first, what will happen to output Y in the short run: does it increase, decrease, or stay the same?

Output Y increases in the short run.

- c. Still assuming that the Federal Reserve and Congress do not take any monetary or fiscal policy actions at first, what will happen to the price level P in the short run: does it increase, decrease, or stay the same?

The price level P increases in the short run.

- d. Now suppose instead that Federal Reserve officials decide that they want to prevent output Y and the price level P from changing when this boom in real estate prices occurs. What should they do: raise or lower their target for the federal funds rate?

The Fed should raise its target for the federal funds rate.

- e. Will the change in the federal funds rate target you mentioned in your answer to part (d), above, work to shift the aggregate demand curve, the short-run aggregate supply curve, or the long-run aggregate supply curve?

This change in Fed policy will shift the aggregate demand curve.

9. Suppose that the US Congress changes the tax code in order to offer firms new investment tax credits, giving businesses tax advantages if they build new factories or buy new machinery to expand existing factories.
- a. In the loanable funds market, would this policy change shift the supply curve or the demand curve for loanable funds?

The investment tax credit shifts the demand curve for loanable funds.

- b. Would the curve you mentioned above – either supply or demand – shift to the left or to the right in the loanable funds diagram?

The demand curve shifts to the right.

- c. According to the loanable funds model, what affect would this policy change have on investment: would it rise, fall, or stay the same?

Investment rises.

- d. According to the loanable funds model, what affect would this policy change have on saving: would it rise, fall, or stay the same?

Saving rises.

- e. According to the loanable funds model, what affect would this policy change have on the interest rate: would it rise, fall, or stay the same?

The interest rate rises.

10. Macroeconomists often use the story of Robinson Crusoe to help identify and understand the determinants of productivity in more complex economies like the United States.
 - a. When macroeconomists say that Robinson Crusoe's productivity depends on how much training he has in the latest fishing techniques, what counterpart do they have in mind as to how productivity is determined in the US?

Human capital per worker (H/L).

- b. When they say that Robinson Crusoe's productivity depends on how plentiful fish are in the waters surrounding his island, what counterpart do they have in mind as to how productivity is determined in the US?

Natural resources per worker (N/L).

- c. When they say that Robinson Crusoe's productivity depends on how many fishing poles he has, what counterpart do they have in mind as to how productivity is determined in the US?

Physical capital per worker (K/L).

- d. When they say that Robinson Crusoe's productivity depends on how good he is at inventing new techniques for fishing, what counterpart do they have in mind as to how productivity is determined in the US?

The stock of technological knowledge (A).

11. Each month, the Bureau of Labor Statistics conducts the Current Population Survey, known more popularly as the "household" survey. And based on the responses it receives, the BLS classifies each American adult, age 16 and over, as being either (i) employed, (ii) unemployed, or (iii) not in the labor force.
 - a. Based on the number of workers in these categories, what is the formula that the BLS uses to calculate the size of the total labor force?

Total labor force = employed + unemployed.

- b. And what is the formula that the BLS uses to calculate the unemployment rate?

Unemployment rate = (Unemployed)/(Labor force) x 100.

- c. And what is the formula that the BLS uses to calculate the labor force participation rate?

Labor force participation rate = (Labor force)/(Total adult population) x 100.

- d. On Friday, May 7 – just a little more than one week ago – the BLS released the results of its household survey for April 2010. This most recent household survey showed that the number of employed workers increased by 550,000 during April compared to March, while the unemployment rate also increased to 9.9 percent in April versus 9.7 percent in March. Explain briefly (in no more than a sentence or two) how it is possible that **both** of these numbers – the number of workers who are employed **and** the unemployment rate – can increase at the same time.

The unemployment rate can go up even as the number of employed workers goes up because the number of unemployed workers can go up, too, if the labor force as a whole is increasing in size. This can happen if previously discouraged workers begin looking for jobs again and therefore get reclassified by the BLS as being unemployed instead of not in the labor force.

12. Please indicate whether each of the following statements is true or false.

- a. The “classical dichotomy” draws a distinction between “real variables” like real GDP and unemployment that are measured in physical units of goods or workers and “nominal variables” like the level of prices economywide that are measured in units of the local currency (in the US, units of dollars).

True.

- b. The “classical theory of inflation” implies that in the US, if Federal Reserve officials want to change the economy’s long-run rate of inflation, they can do so by taking policy actions that change the long-run growth rate of the money supply.

True.

- c. The “Phillips curve” refers to the short-run relationship that often appears in data from the US and other countries, according to which inflation is low when unemployment is high and inflation is high when unemployment is low.

True.