Homework 5
Solutions

ECON 101

Summer I 2016

Name: _____

ONYEN: _____

PID: _____

This homework is due on **June 8** by **1PM**. Show work for all questions that require it (including multiple choice questions), attaching extra sheets as necessary. Multiple choice answers should be bubbled in on a scantron. For the short answer section, write legibly and make sure to box final answers. The total number of points available on this assignment is **100**.

Multiple Choice [2 pts each]

1. A closed economy has income of \$1,000, government spending of \$200, taxes of \$150, and investment of \$250. What is private saving?

   (a) \$100

   (b) \$200

   (c) \$300

   (d) \$400

   Solution: National saving = National investment. $Y - C - G = I \Rightarrow 1000 - C - 200 = 250 \Rightarrow C = \$550$. Private saving $= Y - T - C = 1000 - 150 - 550 = \$300$.

2. Acme, LLC is considering purchasing a new factory. If the interest rate falls, then the present value of the returns from the factory will _____, and the company will be _____likely to build the factory.

   (a) increase; less

   (b) decrease; more

   (c) increase; more

   (d) decrease; less

Solution: If the interest rate falls, then the cost of borrowing will decrease and so the present value of the returns increases. This will make the company more likely to build the factory.

3. If the business community becomes more optimistic about the profitability of capital, the _____for loanable funds would shift, driving the equilibrium interest rate _____.

   (a) supply; up

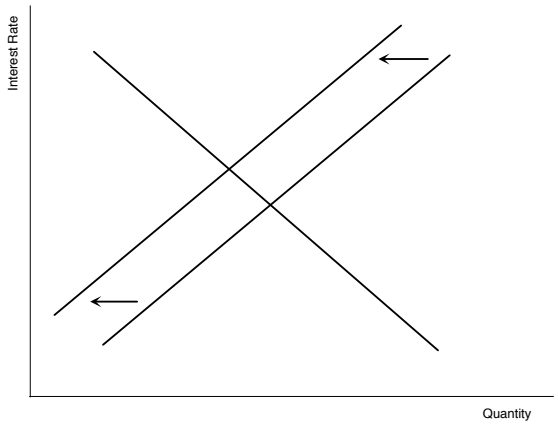
   (b) supply; down

   (c) demand; up

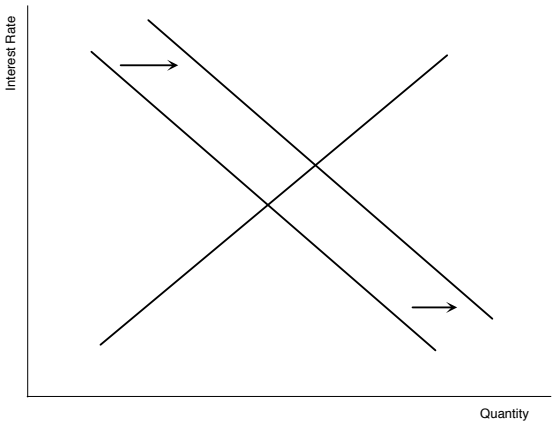
   (d) demand; down

Solution: Demand for loanable funds will increase, which will increase the equilibrium interest rate and quantity of loanable funds.

4. Which of the following graphs of the loanable funds market correctly shows the effect of the imposition of a consumption tax?



(a)



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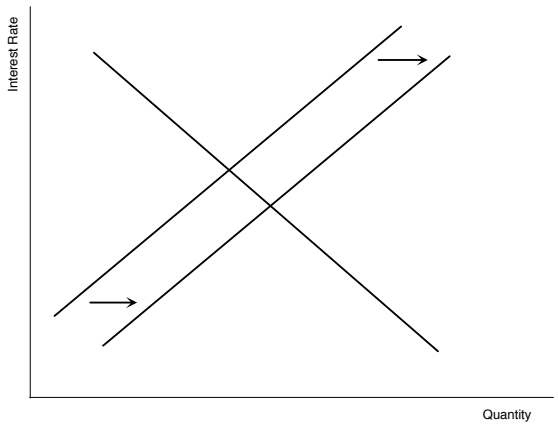
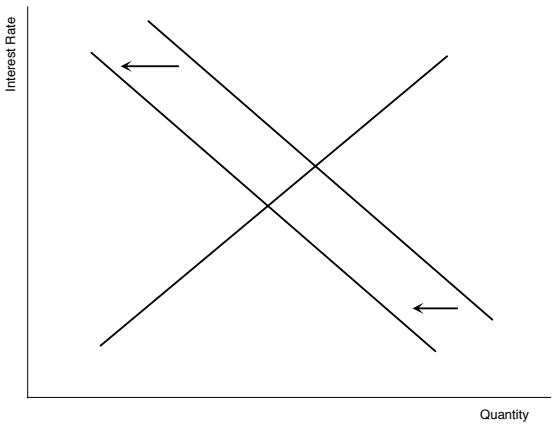


(c)



(d)

Solution: A tax on consumption provides an incentive for people to save more (since we assume you can either spend your income on savings or consumption) and so the supply of loanable funds will increase. Option (c) shows this shift.

5. Always On Time Airlines is considering purchasing a new jet. The company would be *less* likely to purchase a new jet if either
   (a) the price of a new jet decreased or the interest rate decreased.
   (b) the price of a new jet increased or the interest rate decreased.
   (c) the price of a new jet decreased or the interest rate increased.
   (d) the price of a new jet increased or the interest rate increased.

   Solution: The cost of borrowing increases if the price of the jet increases or interest rates increase.

6. What effect will an investment tax credit have on interest rates and the quantity of savings?
   (a) Both interest rates and the quantity of savings will decrease.
   (b) Interest rates will increase, and the quantity of savings will decrease.
   (c) Both interest rates and the quantity of saving will increase.
   (d) Interest rates will decrease, and the quantity of savings will increase.

   Solution: An investment tax credit will increase the demand for loanable funds. This will increase both the equilibrium interest rate and quantity of loanable funds.

7. Suppose you currently hold a bond that promises to pay $100 in a year, $100 in two years, and $1,100 in three years. If you wish to sell the bond today in order to buy a new bicycle, which of the following market interest rates would allow you to sell the bond for the highest price?
   (a) 7%
   (b) 10%
   (c) 5%
   (d) 8%

   Solution: The price of a bond is inversely related to market interest rates.

8. Assuming the supply of loanable funds is made up of national savings, which of the following would be the most likely to cause an increase in the demand for loanable funds?
   (a) A decrease in the interest rate.
   (b) An increase in savings.
   (c) A decrease in consumption.
   (d) An increase in government borrowing.
   (e) None of the above.

Solution: (b) - (d) all affect the supply of loanable funds, while (a) causes a movement along the curves.

9. Other things the same, an increase in the minimum wage
   (a) increases frictional unemployment but leaves the natural rate of unemployment unchanged.
   (b) increases frictional unemployment and increases the natural rate of unemployment.
   (c) increases structural unemployment but leaves the natural rate of unemployment unchanged.
   (d) increases structural unemployment and increases the natural rate of unemployment.

   Solution: The minimum wage would increase structural unemployment, which in turn would increase the natural rate of unemployment.

10. If an unemployed person quits looking for work, then eventually the unemployment rate will _____and the labor force participation rate will _____.
   (a) decrease; remain the same
   (b) decrease; decrease
   (c) remain the same; decrease
   (d) remain the same; remain the same

   Solution: The discouraged worker would no longer be counted as unemployed or as in the labor force, so both the unemployment rate and LFPR would decrease.

11. The actual unemployment rate varies around the
   (a) frictional unemployment rate.
   (b) structural unemployment rate.
   (c) cyclical unemployment rate.
   (d) natural unemployment rate.

   Solution: See class notes.

12. Natalie just graduated from college. In order to devote all her efforts towards her education, she didn't hold a job while in school. Now, she is going to cruise around the country on her motorcycle for awhile before she starts looking for work. As a result, the unemployment rate
   (a) increases, and the labor-force participation rate increases.
   (b) is unaffected, and the labor-force participation rate is unaffected.
   (c) increases, and the labor-force participation rate decreases.
   (d) increases, and the labor-force participation rate is unaffected.

Solution: Natalie was not in the labor force as a student, and will still not be in the labor force while she is not looking for a job. Thus, neither the unemployment rate or LFPR are affected.

13. John Doe looked for a new job for two months when he and his family moved to South Florida, but stopped looking for work six weeks ago because his wife landed a prominent position at the University of Miami. As of right now, John is considered _____ by the BLS.

    (a) frictionally unemployed.

    (b) structurally unemployed.

    (c) cyclically unemployed.

    (d) not in the labor force.

    Solution: John has not actively sought work in the last 4 weeks, so he would not be included in the labor force.

14. Consider Table 1, which shows the people in country Y that are structurally unemployed, cyclically unemployed, and frictionally unemployed.

    Table 1: Unemployment Statistics for Country Y

Type of Unemployment	Number Unemployed
Structural	14 million
Cyclical	8 million
Frictional	10 million

    Additionally, there are 300 million people employed and 350 million adults in the country. What is the natural unemployment rate?

    (a) 7.2%

    (b) 8.0%

    (c) 9.1%

    (d) 9.6%

    Solution: Natural unemployment rate = (structural + frictional unemployment)/(Labor force) = (14 + 10)/(300+14+8+10) = 7.2%.

15. Suppose an economy has 139.2 million adults that are employed, 14.5 million that are unemployed, and 85.2 million that are not in the work force. Given this information, what is the unemployment rate?

    (a) 6.1%

    (b) 9.4%

    (c) 10.4%

    (d) 8.7%

Solution: Unemployment rate = #unemployed/labor force = 14.5/(139.2+14.5) = 9.4%.

16. Frictional unemployment is best defined as
    (a) long-term unemployment caused by changing features of an economy.
    (b) short-term unemployment caused by difficulties of matching employees to employers.
    (c) unemployment caused by cyclical conditions of an economy.
    (d) a normal level of unemployment caused by high wages.

17. While cleaning your apartment, you look under the sofa cushion and find a $50 bill. You deposit the bill in your checking account. The Fed's reserve requirement is 20% of deposits. What is the maximum amount that the money supply could increase?
    (a) $10
    (b) $50
    (c) $200
    (d) $250

    Solution: Your deposit will could increase the money supply through the banking system by $50 \times 1/.20 = \$250$, but you removed $50 in currency and so the maximum increase in the MS is $200.

18. Chloe takes $100 of currency from her wallet and deposits it in a checking account. If the bank adds the entire $100 to reserves, the money supply _____, but if the bank lends out some of the $100, the money supply _____.
    (a) increases; increases even more
    (b) increases; increases by less
    (c) is unchanged; increases
    (d) decreases; decreases by less

19. In a system of fractional-reserve banking, even without any action by the central bank, the money supply declines if households choose to hold _____currency or if banks choose to hold _____excess reserves.
    (a) more; more
    (b) more; less
    (c) less; more
    (d) less; less

    Solution: If people hold more in currency, banks cannot lend out as much money. If banks hold excess reserves, they are not loaning as much money as they could be.

20. Suppose an economy contains 2,000 $1 bills. If people initially deposit half their currency as demand deposits while banks maintain 100% reserves, the maximum quantity of money would be _____. If, however, people initially deposit half their currency as demand deposits while banks maintain 10% reserves, the maximum quantity of money is _____.

(a) $2,000; $10,000
(b) $1,000; $10,000
(c) $1,000; $11,000
(d) $2,000; $11,000

Solution: In a 100% reserve banking system, the money supply does not change if people hold money in deposits. $1,000 are in currency, $1,000 are in deposits. Under a fractional-reserve system, money is created. $1,000 are in currency, and $1,000 $\times$ 1/.10 = $10,000 are potentially created by the banking system.

21. If the Fed wanted to increase the money supply, it could
    (a) purchase government bonds.
    (b) increase the required reserve ratio.
    (c) increase the discount rate.
    (d) increase the interest rate on reserves.

22. Suppose a shift in the money supply caused the value of money to decrease from 1/4 to 1/5. As such, the price level in the economy
    (a) decreased 20%.
    (b) increased 25%.
    (c) increased 20%.
    (d) decreased 25%.

Solution: Value of money = 1/P $\Rightarrow P_0 = 4$, $P_1 = 5$. $\%\Delta P = (5-4)/4 \times 100\% = +25\%$.

23. Suppose the interest rate on a home mortgage was set with the expectation that the price level would decrease by 3%. If through the course of the loan, the price level actually did not change, who was hurt most?
    (a) The mortgage holder
    (b) The bank
    (c) Neither was hurt
    (d) Both were hurt equally

Solution: Actual inflation was greater than expected inflation, so lenders are hurt.

24. You put money in an account that advertises a 5% interest rate. The inflation rate is 3%, and the tax rate on your returns is 20%. Your after-tax nominal rate of interest is _____and your after-tax real rate of interest is _____.
    (a) 1%; 2%
    (b) 1%; .8%
    (c) 4%; 1%
    (d) 4%; .8%

Solution: After-tax nominal rate = 5% × (1-.20) = 4%. After-tax real rate = 4% - 3% = 1%.

25. An economy produces one good – rice. The economy has enough labor, capital, and land to produce 800 bags. The money supply in this economy is $2,000 and rice sells for $5/bag. The nominal GDP in the economy is _____and the velocity of money is _____.

    (a) $4,000; 2
    (b) $2,000; 2
    (c) $4,000; 1
    (d) $2,000; 1

    Solution: Quantity Theory of Money (in levels): $Mv = PY$, where PY = $5 × 800 = $4,000 = nominal GDP. v = 4000/2000 = 2.

26. According to the quantity theory of money and the Fisher effect, if the central bank increases the rate of money growth

    (a) inflation and the nominal rate will both increase.
    (b) inflation and the real interest rate both increase.
    (c) the nominal interest rate and the real interest rate both increase.
    (d) inflation, the real interest rate, and the nominal interest rate all increase.

27. According to the quantity theory of money, an increase in the money supply will cause the price level to

    (a) remain relatively constant since money is neutral.
    (b) increase by the same percentage as the money supply.
    (c) increase by a greater percentage than the money supply.
    (d) increase by a smaller percentage than the money supply.

28. Consider Figure 2, which shows the market for money in Portlandia. P is the overall price level in the economy.

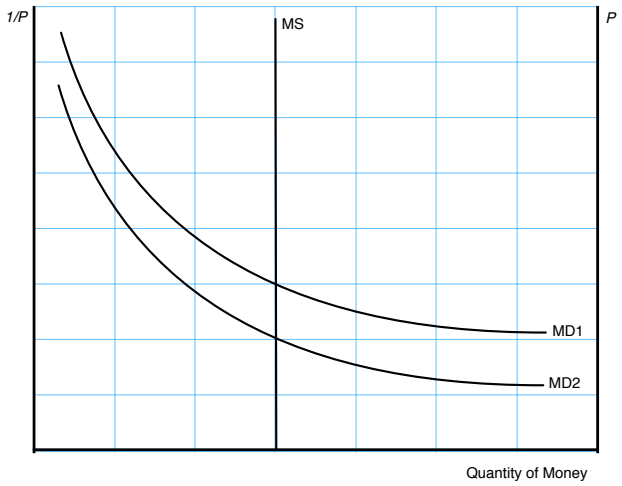


Figure 2: The Money Market

If the demand for money shifts from MD1 to MD2, then we can say that

(a) the value of money will increase, while the price level will decrease.

(b) the value of money and the price level will both increase.

(c) the value of money will decrease, while the price level will increase.

(d) the value of money and the price level will both decrease.

Solution: A decrease in money demand will decrease the value of money and increase the price level (y-axis on the right is inverted).

29. Which of the following is NOT a cost of inflation?

(a) Shoeleather costs

(b) Relative-price stability

(c) Arbitrary redistribution of wealth

(d) Menu costs

30. Unexpected deflation will

(a) lower the real value of debts and redistribute wealth from lenders to borrowers.

(b) lower the real value of debts and redistribute wealth from borrowers to lenders.

(c) raise the real value of debts and redistribute wealth from lenders to borrowers.

(d) raise the real value of debts and redistribute wealth from borrowers to lenders.

Solution: Unexpected deflation implies that actual inflation is less than expected, which increases the real value of debts and so wealth is transferred from borrowers to lenders.

Short Answer

1. Three students have each saved \$500. Each has an investment opportunity in which he or she can invest up to \$1,000. The rates of return on the investment projects are as follows:

Table 2: Rates of Return

Student	Rate of Return (r)
Natalie	5%
Isabella	8%
Noah	15%

(a) Suppose their school opens a market for loanable funds in which students can lend and borrow among themselves at interest rate i. What would determine whether a student would choose to be a borrower or a lender in this market? **[2 pts]**

Solution: If $i > r$, the student would rather lend since they would get a higher return on a loan than on their investment. If $i < r$, the student would rather borrow.

(b) Among these three students, what would be the quantity of loanable funds supplied and quantity demanded at an interest rate of 7%? At 10%? **[4 pts]**

Solution: At $i = 7\%$, Natalie would be a lender while Isabella and Noah would be borrowers. $Q_s = \$500$, $Q_d = \$1{,}000$. At $i = 10\%$, Natalie and Isabella would be lenders while Noah would a be borrower. $Q_s = \$1{,}000$, $Q_d = \$500$.

(c) At what interest rate would the loanable funds market among these students be in equilibrium? Which student(s) would be borrowers and which would be lenders? **[4 pts]**

Solution: $i^* = 8\%$. Natalie would lend \$500 (Q_s), Noah would borrow \$500 (Q_d, and Isabella uses her own funds to invest and would neither borrow or lend.

(d) At this equilibrium interest rate, how much does each student have a year later after the investment projects pay their returns and loans have been repaid? **[4 pts]**

Solution: Isabella invests \$500 and gets an 8% return: \$500(1.08) = \$540.
Natalie lends \$500 and gets 8% interest: \$500(1.08) = \$540.
Noah borrows \$500 at 8% and invests \$1,000 with a 15% return: \$1,000(1.15) - \$500(1.08) = \$610.

2. Suppose an economy contains 5,000 \$1 bills.

(a) If people initially deposit all their currency as demand deposits and banks maintain 100% reserves, what is the maximum quantity of money? **[2 pts]**

Solution: \$5,000, all in deposits.

(b) If people initially deposit half their currency as demand deposits and banks maintain 100% reserves, what is the maximum quantity of money? **[2 pts]**

Solution: \$5,000. \$2,500 in currency, \$2,500 in deposits.

(c) If people initially deposit half their currency as demand deposits and banks maintain 10% reserves, what is the maximum quantity of money? **[2 pts]**

Solution: \$27,500. $\$2{,}500 \times 1/.10 = \$25{,}000$ in deposits, \$2,500 in currency.

(d) Banks always maintain the minimum required reserve ratio set by the central bank (i.e., they hold no excess reserves). If the central bank decreased this requirement to 5%, what would be the effect on the money supply? What if it increased the requirement to 15%? **[4 pts]**

Solution: Decreasing the reserve requirement would increase the quantity of money to $\$2{,}500 + \$2{,}500 \times 1/.05 = \$52{,}500$. Increasing the reserve requirement would decrease the quantity of money to $\$2{,}500 + \$2{,}500 \times 1/.15 = \$19{,}166.67$.

3. Suppose that this year's money supply is \$500 billion, nominal GDP is \$10 trillion, and the real GDP is \$5 trillion.

(a) What is the price level? What is the velocity of money? **[4 pts]**

Solution: $Mv = PY$, where PY = nominal GDP. P = nominal GDP/real GDP = 10,000/5,000 = 2. Velocity = PY/M = 10,000/500 = 20.

(b) Suppose that velocity is constant and the economy's output of goods and services rises by 5% each year. What will happen to nominal GDP and the price level next year if the Fed keeps the money supply constant? **[4 pts]**

Solution: $\vec{M} + \vec{v} = \vec{Y} + \pi$. $\vec{v} = 0$, $\vec{Y} = 5\%$. If $\vec{M} = 0$, $0\% + 0\% = 5\% + \pi \Rightarrow \pi = -5\%$. Prices will decrease by 5% and nominal GDP will be unchanged.

(c) What money supply should the Fed set next year if it wants to keep the price level stable? **[4 pts]**

Solution: $\pi^* = 0\% \Rightarrow \vec{M}^* + 0\% = 5\% + 0\% \Rightarrow \vec{M}^* = 5\%$. $MS_1 = 500(1.05) = 525\text{B}$.

(d) What money supply should the Fed set next year if it wants an inflation of 10%? **[4 pts]**

Solution: $\pi^* = 10\% \Rightarrow \vec{M}^* + 0\% = 5\% + 10\% \Rightarrow \vec{M}^* = 15\%$. $MS_1 = 500(1.15) = 575\text{B}$.

4. What topics or questions gave you the most trouble on this homework assignment or the class material it encompassed?