Problem 1. Define the following terms:

(a) surplus spending units

(b) deficit spending units

(c) direct finance

(d) indirect finance

Answer 1.

(a) When people have more money than they need to spend on consumption goods, they have surplus spending units.

(b) When people need more money than they have, they have deficit spending units.

(c) In direct finance, a person with surplus spending units lends that surplus directly to a person with deficit spending units.

(d) In indirect finance, a person with surplus spending units gives their surplus to a **financial intermediary**, e.g. a bank. Then the bank finds a suitable person with deficit spending units to lend those surplus units to.

Problem 2. Explain the following functions of a financial system:

(a) aggregation

(b) diversification

(c) provision of liquidity

(d) provision of information

(e) maturity transformation

Answer 2.

(a) *Aggregation.* Suppose a firm needs to borrow a lot of money for a major investment. They'll probably have difficulty finding one lender with enough money. Banks will package up (i.e. aggregate) smaller loans into one big loan for the firm.

(b) *Diversification.* When you put money in a bank, they're unlikely to lend all of it to just one project. They'll probably loan some if it to one project, some to another project, some to yet another project, etc. They'll essentially diversify for you.

(c) *Provision of Liquidity.* Banks provide liquid assets. If you lend your money to your sketchy cousin, chances are you won't have access to that money for a while. If you put your money into a bank, you can usually get it back pretty quickly.

(d) *Provision of Information.* Ascertaining whether a borrower is responsible or not can be difficult and time consuming. Banks are experts at it, and they'll do it better than you – they'll get better information. Similarly, they can better determine whether a project is likely to be successful or not before lending to it.

(e) *Maturity Transformation.* If someone wants to borrow money for a house, they take out a mortgage up to 30 years in length. Most people don't want to lend money for 30 years. Most people instead make short term loans to banks (e.g. checking or savings account). If the bank's quantity of deposits (regardless of the exact sources) is large enough, they can use those funds for a long-term loan.

Maturity Transformation and Financial Crises

Suppose we all deposit our money into the bank as savings accounts. The bank takes 90% of this money and loans it as a 30-year mortgage. (They 10% they keep are called *reserves*.) They are hoping that, at no given time, people will want to withdraw more than 10% of that money. Because if that happens, the bank doesn't have the money and won't for a long time – they loaned it away for 30 years.

This is called a *bank run*: when large numbers of people all simultaneously want to withdraw their money from a bank, and the bank cannot give everyone back their money because they've loaned too much of it out. This causes financial crises and was seen, for example, right before the Great Depression.

To avoid the probability of a bank run, the U.S. government created the Federal Deposit Insurance Corporation (FDIC). Even if there is a bank run and your bank can't give you back your money, the FDIC will guarantee you'll get a maximum of $250,000 back.

There is a downside to the FDIC however. Since banks know the government is going to pay people back up to $250,000 no matter what, banks will feel comfortable taking on more risk. This is an example of **moral hazard**.

Problem 3. Which are the following statements is correct?

(a) If, all else the same, the real interest rate increases, the quantity of loanable funds supplied will increase.

(b) If, all else the same, the real interest rate increases, the quantity of loanable funds supplied will decrease.

(c) If, all else the same, the real interest rate decreases, the quantity of loanable funds supplied will increase.

(d) If, all else the same, the real interest rate increases, demand for money will decrease.

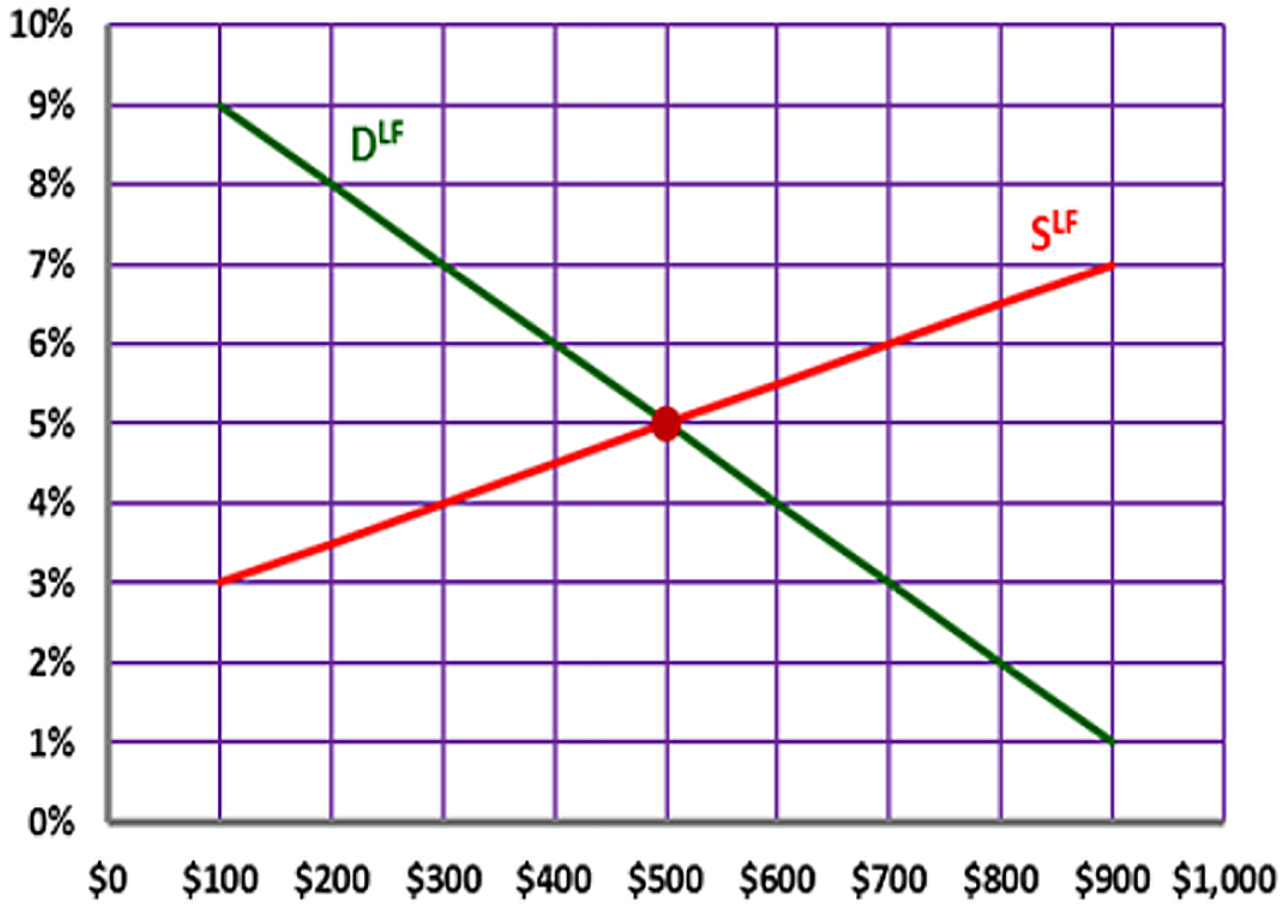
(e) None of the above.

Answer 3: a. The real interest rate represents two things:

- how much benefit lenders get from lending (lenders supply loanable funds)
- how much cost borrowers pay in order to borrow (borrowers demand loanable funds)

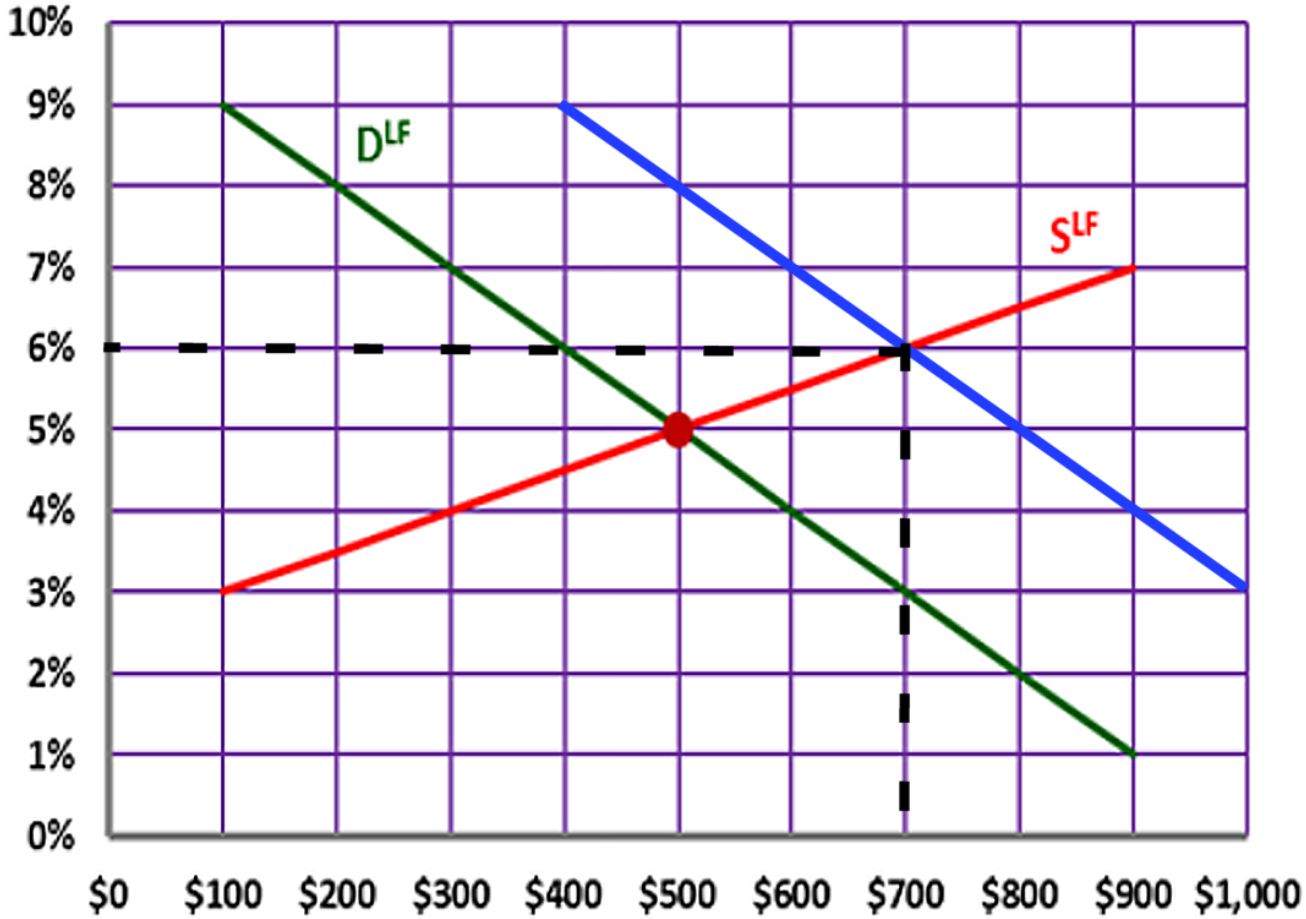
If the real interest rate increases, this means lenders get more benefit from lending, whereas borrowers pay a higher cost in order to borrow. So lenders will want to lend more, thus the quantity supplied of loanable funds will increase. This explains the upward sloping supply of loanable funds. The opposite happens for demand.

Problem 4.



If demand for loanable funds increases by $300, what happens to the equilibrium interest rate?

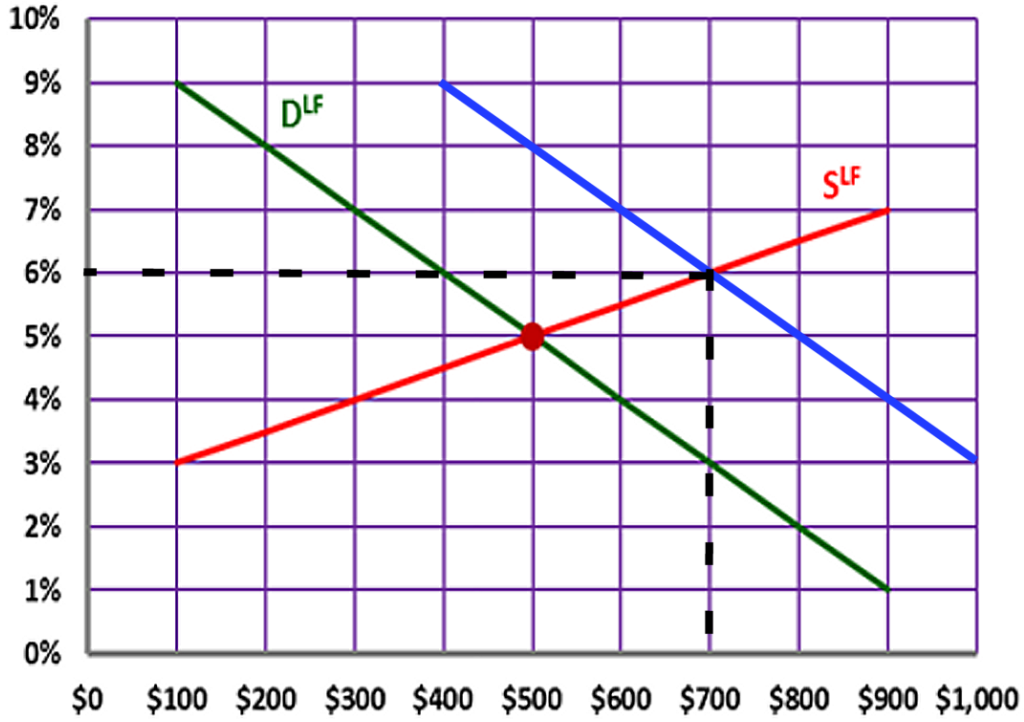
Answer 4.



The real interest rate increases to 6% and the quantity of loanable funds increases to $700.

Problem 5. If the government increases spending by $300 without raising taxes or printing money, then the new equilibrium interest rate will be what? How much will the quantity of loanable funds increase by? How much private borrowing is crowded out?

Answer 5. Unfunded increase in gov't spending by \$300 increases demand for loanable funds by \$300. We have 6% interest rate and loanable funds increases to \$700.



The gov't is borrowing \$300, yet quantity of loanable funds only increases by \$200. So there must be some other \$100 in loans that have stopped being made. The idea is that since the real interest rate rose from 5% to 6%, consumers and firms don't want to borrow as much as they used to. The missing \$100 is a *reduction in private spending caused by an unfunded increase in government spending*. We call this **crowding out**.

Problem 6. If lenders and borrowers expect the inflation rate to increase by 2%, according to the Fisher effect the equilibrium nominal interest rate will increase by how much?

Answer 6. The *Fisher effect* says that a change in expected inflation will cause a one-for-one adjustment of the nominal interest rate. So if expected inflation rises by 2%, then the nominal interest rate will increase by 2%. Then the idea is that expected inflation will not affect the *fundamentals* of the economy—the real interest rate is independent of changes in the price level—and therefore a change in π^e won't cause any change in r^e. Thus it must be the case that R changes instead.

Visually, π^e is an axis variable so neither supply nor demand for loanable funds changes when π^e changes. Therefore equilibrium r^e doesn't change either. Since r^e is unchanged, it must be the case that R has changed by the same amount because $r = R - \pi^e$ implies

$$\Delta r^e = \Delta R - \Delta \pi^e \implies 0 = \Delta R - \Delta \pi^e \implies \Delta R = \Delta \pi^e.$$

Note that inflation and the nominal interest rate are both *nominal* variables. What we're saying here is that a change in one nominal variable, π^e, only affects the other nominal variable R but has on effect on the real variable r^e. This separation of real and nominal variables will be important later on.

Problem 7. If the volatility of inflation rate increases, then

(a) Both supply and demand will increase

(b) Both supply and demand will decrease

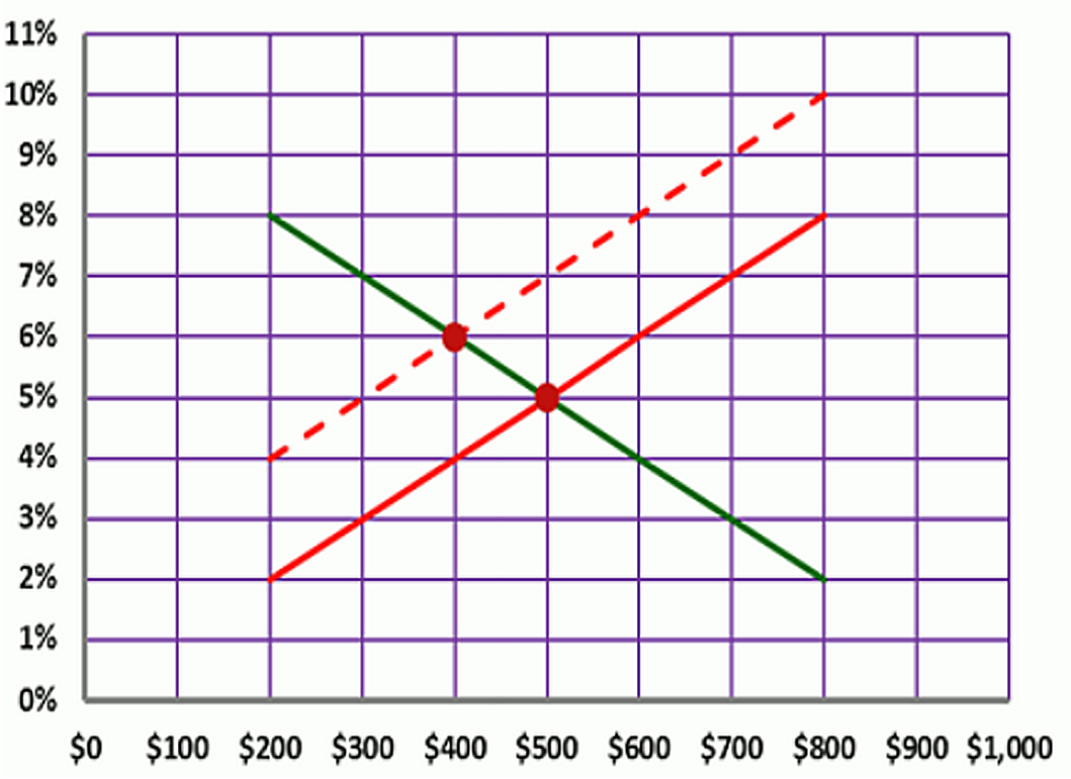
(c) Supply will increase, demand will decrease

(d) Supply will increase, demand will decrease

(e) None of the above

Answer 7: b. If inflation becomes very volatile, then it's very hard for borrowers and lenders to come up with a reasonable expectation for inflation. Thus they can't form a reliable belief about the ex-ante interest rate. Loans are less likely to be made when people are very uncertain about what the real terms of the loan will actually be. So demand and supply both decrease.

Problem 8. Which of the following could cause the following event?



(a) a recession

(b) an increase in expected future corporate profits

(c) a decrease in the expected rate of inflation

(d) an increase in credit risk

(e) none of the above

Answer 8: d.

(a) a recession would reduce both supply and demand for loanable funds

(b) if firms expected more future profits, they'd want to borrow more so they could exploit those future profits; this shifts demand to the right

(c) a decrease in the expected rate of inflation would have no effect because of the Fisher effect

(d) an increase in credit risk means lenders expect more of their loans to go bad, so they are less willing to loan at every interest rate, i.e. supply shifts left

Shifts in Demand of Loanable funds

(a) Expected future economic conditions. If you feel good about the future, you feel like you can afford to borrow more (shift right). If you feel bad about the future, you act cautious and borrow less (shift left).

(b) Uncertainty about the level of future profits. If firms are uncertain about the future, they are hesitant to borrow (shift left).

(c) Government budget deficit. If the government is spending more than it brings in in tax revenue, it has to borrow to cover the spending (shift right).

(d) Inflation volatility. If inflation is volatile, then borrowers cannot form reliable beliefs about the future and hence will not want to borrow (shift left).

Shifts in the Supply of Loanable Funds

(a) Income and wealth. As the income and wealth of households increase, they can save more and, thus, lend more (shift right).

(b) Credit risk. If lending is riskier, then lenders don't lend out as much (shift left).

(c) Inflation volatility. If inflation is volatile, then lenders cannot form reliable beliefs about the future and hence will not want to borrow (shift left).