Problem Set I

Answers

Problems from the textbook:

Chapter 1:

9. The interest rate on three-month Treasury bills fluctuates more than the other interest rates and is lower on average. The interest rate on Baa corporate bonds is higher on average than the other interest rates.

11. Higher stock prices means that consumers' wealth is higher and so they will be more likely to increase their spending.

Chapter 2:

2. Yes, I should take out the loan, because I will be better off as a result of doing so. My interest payment will be $4,500 (90% of $5,000), but as a result, I will earn an additional $10,000, so I will be ahead of the game by $5,500. Since Larry's loan-sharking business can make some people better off, as in this example, loan sharking may have social benefits. (One argument against legalizing loan sharking, however, is that it is frequently a violent activity.)

4. The principal debt instruments used were foreign bonds, which were sold in Britain and denominated in pounds. The British gained because they were able to earn higher interest rates as a result of lending to Americans, while the Americans gained because they now had access to capital to start up profitable businesses such as railroads.

8. I will leave this to you – it’s your personal experience!

10. They might not work hard enough while you are not looking or may steal or commit fraud.

12. True. If there are no information or transactions costs, people could make loans to each other at no cost and would thus have no need for financial intermediaries.

Chapter 3:

5. Wine is more difficult to transport than gold and is also more perishable. Gold is thus a better store of value than wine and also leads to lower transactions cost. It is therefore a better candidate for use as money.
8. The ranking is (a) and (c) the most liquid; then, in descending order of liquidity, (e), (f), (b), and (d).

10. Because of the rapid inflation in Brazil, the domestic currency, the real, is a poor store of value. Thus many people would rather hold dollars, which are a better store of value, and use them in their daily shopping.

14. The highest weight would be assigned to currency and NOW accounts, because they are the most liquid (have the greatest degree of "moneyness"). Savings account deposits and U.S. Savings Bonds would receive lower weight because they are somewhat less liquid, while houses and furniture would receive the lowest weights, because they are the most illiquid.
12. You would rather be holding long-term bonds because their price would increase more than the price of the short-term bonds, giving them a higher return.

14. People are more likely to buy houses because the real interest rate when purchasing a house has fallen from 3 percent (= 5 percent - 2 percent) to 1 percent (= 10 percent - 9 percent). The real cost of financing the house is thus lower, even though mortgage rates have risen. (If the tax deductibility of interest payments is allowed for, then it becomes even more likely that people will buy houses.)
Solutions to additional problems

1. Price level = \( P \)
   Real value of money = \( \frac{1}{P} \) goods
   If price level changes from \( P_1 \) to \( P_2 \), the real value of money changes from \( \frac{1}{P_1} \) to \( \frac{1}{P_2} \). Then, the gross real return on money is
   \[
   \frac{\text{Final real value}}{\text{Initial real value}} = \frac{\frac{1}{P_2}}{\frac{1}{P_1}} = \frac{P_1}{P_2}
   \]
   Hence, if price level rises by 10% i.e., \( \frac{P_2}{P_1} = 1.1 \), Gross return \( \frac{P_1}{P_2} = \frac{1}{1.1} = 0.91 \). Net return is
   \[
   \frac{\text{Final real value} - \text{Initial real value}}{\text{Initial real value}} = \frac{P_1}{P_2} - 1 = 0.91 - 1 = -0.09
   \]
   Ans: Gross real return: 91%, Net real return: 9%.

2. Number of relative price tags in a barter economy give \( n \) number of goods:
   \[
   n(n-1) / 2
   \]
   Here \( n = 10 \). Hence, number of price tags = \( \frac{10 \times 9}{2} = 45 \)
   Ans: 45

3. Since Bank A compounds annually, the rate \( i_A = 0.08 \) is already the effective annual rate. For Bank B, we have to convert. The microperiod here is a month, so we first need the monthly rate
   \[
   i_{B, \text{monthly}} = \frac{0.079}{12} = 0.00658
   \]
   Now we compound monthly to get the effective annual rate, call it \( i_B \). This is given by the future value of one dollar at the end of the year, minus one
   \[
   i_B = (1 + i_{B, \text{monthly}})^{12} - 1 = (1 + 0.00658)^{12} - 1 = 0.819
   \]
   Ans: 8.19% (Here is a message: frequent compounding can make seemingly smaller APR loan have a larger effective interest rate. Beware.)
4. **Part a.**

At a coupon rate of 10% and yield to maturity 2 years, the cash flow will be $100 (10% of face value) coupon payment after first year, plus $100 coupon payment and $1000 face value payment after two years. Given that its yield to maturity is 3.86%, the price will be

\[ P_{2002} = PV \text{ (at YTM)} = \frac{100}{1.0386} + \frac{100}{1.0386^2} + \frac{1000}{1.0386^2} = 1116 \]

**Part b.** At 16% interest rate the price will fall (why? because the market competition will ensure that every similar investment yields the same interest rate i.e., yield to maturity). Since the remaining cash flow is only $100 coupon payment and $1000 face value payment, both after one year, the new price will be

\[ P_{2003} = PV \text{ (at 16\%)} = \frac{100}{1.16} + \frac{1000}{1.16} = 948.28 \]

Hence, the rate of return will be

\[ RET = \frac{C + P_{t+1} - P_t}{P_t} = \frac{100 + 948.28 - 1116}{1116} = -0.06068 \]

\[ = -6.07\%. \]

**Part c.** If you could hold it until its maturity of full two years, then, as in part a, its return will be equal to its yield to maturity = 3.86%. But, if you held it for full two years, you would forego 16% interest rate during the second year. As economists, we should always compare the costs and the benefits with alternatives. Hence, you still loose money.

5. First, we should find its nominal return, which is equal to the yield to maturity. YTM can be obtained from

\[ 900 = \frac{1000}{(1 + i)^2} \]

which implies that

\[ i = \left( \frac{1000}{900} \right)^{\frac{1}{2}} - 1 = 0.0541 \]

Hence, nominal return = 11.8%. If the annual rate of inflation is 4%, the expected real return is

\[ i_r = i - \pi = 5.41\% - 4 = 1.41\% \]

If the actual inflation rate turns out to be 6%, then the real rate of return is

\[ i - \pi = 5.41\% - 6 = -0.59\% \]

The issuer expected to pay 1.41% in real terms, but ended up getting 0.59% additional gain instead. Hence, the issuer is better off.