

Exercise 1: (MCQ) [10]

1. Which of the following investment alternatives would provide the greatest ending wealth for your investment?
 - a) 10% compounded daily
 - b) 10.5% compounded annually.
 - c) 10.25% compounded quarterly.
 - d) 10.75% compounded monthly.

2. With continuous compounding at 10 percent for 30 years, the future value of an initial investment of \$2,000 is closest to:
 - a) 34,898.
 - b) 40,171.
 - c) 164,500
 - d) 328,282

3. Manal deposits \$10,000 today and is promised a return of \$17,000 in eight years. What is the implied annual rate of return?
 - a) 6.86%
 - b) 7.06%
 - c) 5.99%
 - d) 6.07%

4. A rate of 8 percent APR with monthly payments, then EAR is:
 - a) 8.30%
 - b) 8.005%
 - c) 3.80 %
 - d) 4.80%

5. Saad plans to invest an equal amount of \$2,000 in an equity fund every year-end beginning this year. The expected annual return on the fund is 15 percent. He plans to invest for 20 years. How much could he expect to have at the end of 20 years?
 - a) \$237,620
 - b) \$176,424
 - c) \$204,887
 - d) \$178,424

6. Addison Company will issue a zero-coupon bond this coming month. The projected yield for the bond is 7%. If the par value of the bond is \$1,000, what is the price of the bond using a semiannual convention and a maturity of 20 years?
- a) 252.57
 - b) 250.50
 - c) 225.45
 - d) 230
7. You are considering borrowing \$100,000 for 30 years at a compound annual interest rate of 9%. The loan agreement calls for 30 equal annual payments, to be paid at the end of each of the next 30 years (payments include both principal and interest). What is the annual payment that will fully amortize the loan?
- a) 3,333.33
 - b) 6,400.30
 - c) 9,733.33
 - d) 12,333.33
8. A company X will pay a \$2 dividend next year on its common stock, which is currently selling at \$50 per share. What is the market's required return on this investment if the dividend is expected to grow at 5% forever?
- a) 4%
 - b) 5%
 - c) 7%
 - d) 9%
9. Which of the following are examples of a primary market transaction?
- a) A company issues new common stock.
 - b) A company issues new bond.
 - c) An investor asks his broker to purchase 1,000 shares of Microsoft common stock.
 - d) **Statements A and B are correct.**
10. What is the major difference between a stock and a bond?
- a) A bond is an ownership in a company, but a stock is a loan.
 - b) A bond can always be resold for its face value, but a stock cannot.
 - c) **A stock is ownership in a company, but a bond is a loan.**
 - d) A stock can always be resold for its face value, but a bond cannot.

Exercise 2. [5]

- 1) If investors require a 10 percent real rate of return, and the inflation rate is 8 percent, what must be the approximate nominal rate? The exact nominal rate?
- 2) Suppose you want to withdraw money each year for the next three years, and you want each withdrawal to have \$35,000 worth of purchasing power as measured in current dollars. If the inflation rate is 4% per year, what is the present value of these cash flows if the appropriate nominal discount rate is 10%?

Answer

1) The nominal rate is approximately equal to the sum of the real rate and the inflation rate: $10\% + 8\% = 18\%$. From the Fisher effect, we have: $1+R = (1+r)(1+h)$
 $1.10 \times 1.08 = 1.1880$ Therefore, the nominal rate will actually be closer to 19 percent.

2)

3) The withdrawals each year will thus be:

$$C_1 = \$35,000 (1.04) = \$36,400$$

$$C_2 = \$35,000 (1.04)^2 = \$37,856$$

$$C_3 = \$35,000 (1.04)^3 = \$39,370.24$$

The present value of these cash flows if the appropriate nominal discount rate is 10 percent

$$Pv = \$36,400/1.10 + \$37,856/1.10^2 + \$39,370.24/1.10^3 = \$93,956.30$$

To calculate the present value using real cash flows, we need the real discount rate. Using the Fisher equation, the real discount rate is

$$1 + R = (1 + r) \times (1 + h)$$

$1 + 0.10 = (1 + r) \times (1 + 0.04)$, then $r = .0577$, The real cash flows are an annuity of \$25,000 per year. So, the present value in real terms is:

$$PV = \$35,000 [1 - (1/1.0577^3)] / .0577 = \$93,956.30$$

Exercise 3 [5]:

Faisal has received a job offer from a large investment bank as a clerk to an associate banker. His base salary will be \$52,000. He will receive his first annual salary payment one year from the day he begins to work. In addition, he will get an immediate \$10,000 bonus for joining the company. His salary will grow at 3.5% each year and he will receive a bonus equal to 10% of his salary each year. Faisal is expected to work for 35 years. What is the present value of the offer if the discount rate is 9%?

Answer

The present value of Faisal's job offer, which includes the base salary, the annual growing bonuses, and the initial bonus, can be calculated using the growing annuity present value formula for each component. After finding the present values of the salary (PV_salary) and annual bonus (PV_bonus), sum up these values and add the initial bonus of \$10,000 to find the total present value (PV_total):

1 $PV_{total} = PV_{salary} + PV_{bonus} + \$10,000$

The cash flows described in the question from end of year 1 to end of year 35 represent a growing annuity for 35 years. The present value of a growing annuity is calculated as follows:

2 $PV = \frac{P}{i-g} [1 - (\frac{1+g}{1+i})^n]$

I=interest rate, g growth rate, n= number of payment periods

. $i=9\%$, $g=3.5\%$, $n=35$

Where P is the first year basis salary 52,000+10% of his salary is (5,200)

Then first payment=57,200

Present value of the offer = 10,000 received immediately + PV of the growing annuity

$$Pv=10,000+\left[\frac{57,200}{9\%-3.5\%}\right] * \left[1 - \left[\frac{1+3.5\%}{1+9\%}\right]^{35}\right]$$

2

$$Pv= 10000+1040000*[0.0.8367005151]$$

$$Pv=10,000+870168.5357$$

$$Pv=880,168.5357$$

Exercise 4 [5]:

- A) Investment X offers to pay you \$6,000 per year for nine years, whereas Investment Y offers to pay you \$8,000 per year for six years. Which of these investments would you choose if the discount rate is 5 %?
- B) Live Forever Life Insurance Co. is selling a perpetuity contract that pays \$1,800 monthly. The contract currently sells for \$95,000. What is the monthly return on this investment vehicle? What is the APR? The effective annual return?

Answer

A)

To determine which investment has a higher present value, we need to calculate the present value(PV) of each investment using the formula of an annuity

$$Pv=p\left[\frac{1-(1+r)^{-n}}{r}\right]$$

Where p is the payment, r is the interest rate, and n is the number of periods

For investment X

P=\$6000

And n=9

At 5% discount rate (by financial calculator)

Pv= 42,646.93

For investment Y

P=\$8000

N= 6 years

At 5% discount rate

Pv= 40,605.536

Investment X has a higher present value

B)Solution Monthly return = $1800/95,000 = 0.018947$ (1.8947 % monthly) APR = $12*0.018947 = 0.227368 = 22.7368$ annual

2

$$\text{EAR} = (1+0.018947)^{12} - 1 = 0.0252619 = 25.26194\%$$

Exercise 5. [5]

Prepare an amortization schedule for a five-year loan of \$5000. The interest rate is 2.5 percent per year, and the loan calls for an equal annual principal for the first four years of 1050.

Answer

year	Beginning Balance	Total payment	Interest rate	Principal paid	Ending Balance
1	5000	1175	125	1050	3950
2	3950	1148.75	98.75	1050	2900
3	2900	1122.5	72.5	1050	1850
4	1850	1096.25	46.25	1050	800
5	800	820	20	800	0
Total		5362.5	362.5	5000	

5

Exercise 6 [5]:

Bond P is a premium bond with a 12% coupon. Bond D is a 6% coupon bond currently selling at a discount. Both bonds make annual payments, have a YTM of 9 percent, have five years to maturity, and a par value of 1000.

- a) What is the current yield for bond P? For bond D?
- b) If interest rates remain unchanged, what is the expected capital gains yield over the next year for bond P? For bond D?

Answer:

2) To find the Capital gains yield and the current yield we need to find the price of bond.

$$P_0 = 120 (\text{annuity at } N=5, i=9) + 1000 (1+9\%)^{-5}$$

$$P_0 = 1,116.6895$$

The current price of Bond P after 1 year.

$$P_1 = 120 (\text{annuity at } N=4, i=9) + 1000 (1+9\%)^{-4}$$

$$P_1 = 1,097.19$$

$$\text{Current yield} = 120 / 1,116.6895 = 1.028$$

The current price of Bond D after 1 year.

To find the Capital gains yield and the current yield we need to find the bond price.

$$P_0 = 60 (\text{annuity at } N=5, i=9) + 1000 (1+9\%)^{-5}$$

$$P_0 = 883.310$$

$$P_1 = 60 (\text{annuity at } N=4, i=9) + 1000 (1+9\%)^{-4}$$

$$P_1 = 902.808$$

$$\text{Current yield} = 60 / 883.310 = 0.0679$$

4

If the interest rate remains unchanged, what is the expected capital gain yield over the next year for bond Pand D? The Capital gains yield is

$$\text{For Bond P} = \frac{(\text{new price} - \text{Original Price}) / \text{original Price} = (1,097.19 - 1,116.6895)}{1,116.6895}$$

9

The Capital Gains Yield For Bond P= -0.01746

Similar way for Bond D

? The Capital gains yield is

$$\text{For Bond D} = \frac{(\text{new price} - \text{Original Price}) / \text{original Price} = (902.808 - 883.310) / 883.310$$

The Capital Gains Yield For Bond D= 0.0220

Exercise 7 [5]:

The Brigapenski Co. has just paid a cash dividend of \$2 per share. Investors require a 16% return from investments such as this.

- a) If the dividend is expected to grow at a steady 8% per year, what is the current value of the stock? What will the stock be worth in five years?
- b) if the dividend was expected to grow at 20% per year for the next three years and then settle down to 8% per year indefinitely?

Answer

A)

a) Current Value:

$$Dt=2$$

$$g=8\%$$

$$R=16\%$$

$$P0 = D0 * (1+g) / (R-g)$$

$$P0 = 2 * (1.08) / (.16 - .08)$$

$$P0 = 2.16 / .08$$

$$P0 = 27$$

2

Value in 5 years:

We assume the dividend has grown steadily over 5 years and use the Dividend Constant Growth Model to compute the value.

$$D_5 = D_0 \cdot (1+g)^t$$

$$D_5 = 2 \cdot (1.08)^5$$

$$D_5 = 2.938$$

Next, we use the DGM again with our new dividend value and assume the rest has remained the same.

$$P_5 = D_5 \cdot (1+g) / (R-g)$$

$$P_5 = 2.938 \cdot (1.08) / (.16 - .08)$$

$$P_5 = 39.663$$

B) First Three Years:

We compute the cash flows for each year and then use the D3 amount for the DGM to find the price of the stock at year 3.

$$D_1 = 2 \cdot (1.2) = \$2.4$$

$$D_2 = 2.4 \cdot (1.2) = \$2.88$$

$$D_3 = 2.88 \cdot (1.2) = 3.456$$

$$P_3 = 3.456 \cdot (1.08) / (.16 - .08)$$

$$P_3 = 46.656$$

Indefinitely:

Next, we find the sum of these nonconstant growth payments:

$$P_0 = D_0 / (1+R) + D_1 / (1+R)^2 + D_2 / (1+R)^3 + D_3 / (1+R)^3$$

$$P_0 = 2.4 / (1+.16) + 2.88 / (1+.16)^2 + 3.456 / (1+.16)^3 + 46.656 / (1+.16)^3$$

$$P_0 = 36.31$$

EXTRA PAGE