Corporate Finance Exercise

Time value of Money

horizontal line

Q1. Suppose you are offered an investment that will allow you to double your money in 6 years. You have 10,000 to invest. What is the implied rate of interest?

Q2. Suppose you have a 1-year old son and you want to provide $75,000 in 17 years towards his college education. You currently have $5,000 to invest. What interest rate must you earn to have the $75,000 when you need it?

Q3. Suppose you want to buy a new house. You currently have 15,000 and you figure you need to have a 10% down payment plus closing costs. Closing costs are 15% of total borrowing. If the type of house you want costs about 150,000 and you can earn 7.5% per year, how long will it be before you have enough money for the down payment and closing costs?

Q4. *Excel Exercise:*

Download Excel Exercise from Google Excel. Then fill in the blank with formula and Excel functions.

|  |  |  |  |
| --- | --- | --- | --- |
| Present Value | Years | Interest Rate | Future Value |
| 81550 | 17 | 12% |  |
|  | 14 | 22% | 886073 |
| 1000 | 5 |  | 2000 |
| 221 | 4 |  | 307 |
| 250 |  | 4% | 1105 |
| 1000 |  | 5% | 2000 |
| 12000 | 10 | 10% |  |
|  | 10 | 12% | 1000 |

Q5. I am buying a stock which promised me dividend payment of 100$ every year. What is the (present) value of the stock with a rate of return of 10%?

Q6. What is your monthly payment (compounded monthly) if you take a 10-year loan for your house which costs 100,000$.

Q7. Suppose you borrow a student loan of $7,000 at 3% annual rate and you are going to make a monthly payment of $90 (monthly compounded). How long does it take before you can pay off the loan?

Q8. I am buying a share in the year of 2020. The share promised me dividend payment of 1$ every year since the year of 2023. What is the present value of the share as of the year 2020 if the rate of return is 10%?

Q9. I am buying a share in the year of 2020. The share promised me payment of 1$ in the year of 2023 and grows at a rate of 5% thereafter. What is the present value of the share as of the year 2020 if the rate of return is 10%?

Q10. I am currently 17 years old, my aunt will give me 10,000$ as a gift starting from the age of 20 (including year 20) and the gifts will grow at a rate of 5% until I am 39. What is the value of the gift with the discount rate of 10%.

Q11. *Excel Exercise* of Time value of Money

Excel 1). Your firm plans to buy a warehouse for 100,000$. The bank offers you a 30-year loan with equal annual payments and an interest rate of 8% per year. The bank requires that your firm pay 20% of the purchase price as a down payment, so you can borrow the rest. What is the annual loan payment?

Excel 2). Jessica has just graduated with her MBA. She decided to go into business for herself. A bank was so impressed with Jessica that it has decided to fund her business. In return for an initial business loan of $1 million, Jessica has agreed to pay back 125,000 at the end of each year for the next 30 years, what is the internal rate of return?

Excel 3). You are saving a down payment for a house. You have 10,500 saved already, and you can afford to save an additional 5000 per year at the end of each year. If you earn 7.25% per year on your savings, how long will it take for you to have/withdraw 60,000?

Excel 4). Suppose that you invest 20,000 in an account paying 8% interest. You plan to withdraw 2000 at the end of each year for 15 years. How much money will it be left in the account after 15 years?

Excel 5). You want to purchase a new car and you are willing to pay 10,000. If you can invest at 10% per year and you currently have 7500, how long will it be before you have enough money to pay cash for the car?

Interest rate

horizontal line

Q1. How much are you effectively earning with an APR (annual percentage rate) of 20% with quarterly compounding?

Q2. You borrow 5,000 3-year loan at 5% from a bank. You are using the amortization schedule of Fixed Payment Schedule, what is your amortization scheme? List your interest and principal payments every year.

Q3. You borrow 5,000 3-year loan at 5% from a bank. You are using the amortization schedule of Fixed Principal Schedule, what is your interest payment at the end of second year?

Q4. How much are you effectively earning with an APR (annual percentage rate) of 20% with continuously compounding?

Q5. An investment offers a 15% total return over the coming year. You think the total real return on this investment will be only 9%. What do you believe the inflation rate will be over the next year**?**

Investment Decision Criteria

horizontal line

Q1. Consider following two mutually exclusive projects.

1) What are the NPV for both projects with 8% required rate of return? What is the Excel formula for computing the IRR for the projects?

2) What is the Excel formula for computing the cross-over rate for the project?

3) Which project would you choose if the cross-over rate is 5.89% and the required rate of return is 8%?

|  |  |  |
| --- | --- | --- |
| Year | Project A | Project B |
| 0 | -21,000 | -10,500 |
| 1 | 4,000 | 2,500 |
| 2 | 7,500 | 3,800 |
| 3 | 8,200 | 3,600 |
| 4 | 6,300 | 3,900 |

Q2. An investment provides you with four annual cash flows of 400 starting in year 3.   
If you require 5% return on your funds what is the present value of these cash flows? What is the net present value of the investment if the project requires an initial cost of 1000, is it worth investing?

Q3. The Sisyphean Company is planning on investing in a new project. This will involve the purchase of some new machinery costing $450,000. The Sisyphean Company expects cash inflows from this project as detailed below  
Year One Year Two Year Three Year Four  
$200,000 $225,000 $275,000 $200,000  
The appropriate discount rate for this project is 16%. What is the ~~profitability index~~ NPV for this project?

~~Q4. ABC Corp. has a total of 800$ available to spend and has to choose from the following projects. Which projects would it go for?~~

|  |  |  |
| --- | --- | --- |
| ~~Project~~ | ~~NPV~~ | ~~Initial investment~~ |
| ~~A~~ | ~~240~~ | ~~50~~ |
| ~~B~~ | ~~500~~ | ~~350~~ |
| ~~C~~ | ~~1200~~ | ~~700~~ |
| ~~D~~ | ~~50~~ | ~~40~~ |
| ~~E~~ | ~~120~~ | ~~100~~ |

Q5. Consider the following two mutually exclusive projects:

Whichever project you choose based on the following criteria, if you will require a 15% return on your investment.

1. If you apply the payback criterion, which project will you choose?
2. If you apply the NPV criterion, which project will you choose?
3. What is the NPV for Project A when the discount rate is 28%, what is its NPV when the discount

rate is 26%. And then use Trial and Error to estimate its IRR for project A.

|  |  |  |
| --- | --- | --- |
| Year | Cash flow (A) | Cash flow (B) |
| 0 | -252,000 | -24,000 |
| 1 | 18,000 | 14,400 |
| 2 | 36,000 | 12,600 |
| 3 | 38,400 | 11,400 |
| 4 | 510,000 | 9,800 |

Chapter 4. Fundamentals of capital budgeting

horizontal line

Q1. A project has an estimated life of 2 years with the following information:

Revenue Estimates: Sales = 1,000 units/year Per Unit Price = $47 Per Unit Cost = $19

Cost Estimates: Up-Front R &D for the project = $15,000

Up-Front New Equipment = $7,500, Expected life of the new equipment is two years.

Annual Overhead = $3,000

Accounts receivables/payables is equal to 15% of sales/cost of goods sold

Discount rate is 12% and tax rate is 20%.

What is the NPV of the project?

Q2. Assume all costs and expenses occur in the same year. Vidia Inc. is a company that produces plant and machinery for use in the automotive sector. During the last year it generated net income of $69m and operating cash flows of $74m, paid dividends of $12m, bought $23m of property, plant and equipment to maintain the capital base, increased $14m of inventory and redeemed $10m of bonds. The after-tax cost of debt (after-tax interest) was $5m during the year. Answer the following questions.

2.1 Vidia’s change of net working capital ("∆NWC") is closest to?

2.2 Vidia’s depreciation is closest to?

2.3 Vidia's free cash flow to the firm is closest to?

Q3. Bay Properties is considering starting a commercial property. It has prepared the following 4-year forecast of free cash flow. Assume cash flow after 4 year will grow at 3% per year. What is the continuation value at year 4 and the value of today assuming the cost of capital of 14%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Year 1 | Year 2 | Year 3 | Year 4 |
| Free cash flow | -185,000 | 12,000 | 99,000 | 240,000 |

Dividends and stock pricing

horizontal line

Q1. Company K has just paid a dividend of $6.75 per share. You project that its dividend grows at a rate of 5%, what should be the fair price of K today if 𝑟=13.75%?

Q2. Assume Microsoft has the following information for the year of 2010.

|  |  |  |
| --- | --- | --- |
| Quarters | Dividends | Price |
| 2009Q4 | 0.13 | 28.67 |
| 2010Q1 | 0.13 | 25.80 |
| 2010Q2 | 0.13 | 23.47 |
| 2010Q3 | 0.16 | 25.26 |
| 2010Q4 | 0.16 | 27.91 |

What are realized returns from 2010Q2 to 2011Q1?

What are the annualized returns?

What are the average returns and standard deviation of returns?

Q3. Suppose your company has an equity beta of 0.58 and the current risk-free rate is 6.1%. If the expected market risk premium is 8.6%, what is your cost of equity capital?

Financial Options

horizontal line

Q1. You buy/long a call option on Dellibar with a strike price of $15. What is the payoff of your call option if the current share price of Dellibar is

1. 13
2. 15
3. 17

Q2. You buy/long a put option on Dellibar with a strike price of $15. What is the payoff of your long put option if the current share price of Dellibar is

1. 13.5
2. 15
3. 17

Q3. You sell a call option on Dellibar with a strike price of $15. What is the payoff of your short call option if the current share price of Dellibar is

1. $13.5
2. $15
3. $17

Q4. You sell a put option on Dellibar with a strike price of $15. What is the payoff of your short put option if the current share price of Dellibar is

1. $13.5
2. $15
3. $17