Principles of Finance FNCE10002

Contents

Introduction to Financial Mathematics……..3

Debt Valuation……..……..……..……..…….10

Equity Valuation……..……..……..……..…..15

Modern Portfolio Theory……..……..…….20

Asset Pricing ……..……..……..……..…….32

Capital Budgeting……..……..…….. 38

Capital Structure and Payout Policy……..48

Options……..……..……..……..……..……62

Introduction to Financial Mathematics

1. **Finance** is the study of how individuals, businesses and institutions acquire, spend and manage financial resources
   - **Investment analysis and management**
     - Where and how to invest
     - Valuation of stocks and bonds (and derivatives)
     - Portfolio theory
     - Asset pricing and market efficiency
   - **Corporate finance**
     - Decisions of companies and their management
     - Capital budgeting
     - Capital Structure
     - Payout policy

2. **Corporations**
   - A corporation is a **legal entity separate from its owners**
   - Ownership is represented by shares of stock
     - No limit to amount of shareholder or amount of shares that can be sold
     - Shareholders entitled to discretionary dividend payments
   - Direct control via elected Board of Directors, day-to-day control via senior management (CFO)

3. **The Finance Function**

- The *main* goal of management is to maximise the firm's market value of equity
  - **Equity value = *present value of future expected cash flows***
- *Market value of equity = Share price x number of shares*
  - Maximising the market value of equity is the same as maximising the share price
  - This maximises the wealth of shareholders
- **Shareholder wealth = present value of shareholders' future expected cash flows**
- Management *does not* always maximise firm value - what are the consequences?

- In order to examine the goal of *maximising the market value* of a firm's equity we to to understand:

(a) The role of information and capital market efficiency
   - *Capital market efficiency* is the idea that market prices we observe should reflect *all relevant* information available at that point in time
     - Relevant information: *present future expected cash flows*
     - The role of *market expectation* in determining market prices

(b) The time value of money and interest rates
   - Most finance problems deal with analysing the *costs and benefits of decisions* involving cash flows at different points in time
   - The ***valuation principle*** states that if the **value of benefits exceed the value of costs the decision will increase the value of the firm**
     - In an i*nformationally efficient* market these benefits and costs can be determined using competitive market prices - the market prices contain **all** information we know to be informationally efficient

(c) The time value of money is the difference between the value of money today and the value of money in the future

- **Riskfree interest rate** measures the *rate of exchange over time*
- By *depositing* money in a bank account one can convert money **today** into money in the **future**
  - Money today is worth more than money in the future because you can invest it
- By *borrowing* money from a bank one can exchange money in the **future** for money **today**
- $(1 + r_f)$ = interest rate factor
  - r_f = riskfree interest rate
  - An "exchange rate" across time
  - $ in one year for $ today

4. Riskless arbitrage and the law of one price

- **Riskless arbitrage** is the practice of **buying and selling equivalent financial instruments or securities in different markets** to take advance of an existing price difference
  - A riskless arbitrage opportunity occurs when it is possible to make a positive profit *without taking any risk or making any investment*
- The **law of one price** states that if equivalent investment opportunities trade simultaneously in different competitive markets, then they *must* trade for the *same price* in both markets
  - If these equivalent opportunities are selling at different prices, investors will buy where it is cheap and sell where it is expensive, thus *equalising the price*
    - If the price is **lower** than what it should be, **buy** the security.
    - If the price is **higher** than what it should be, **sell** the security.

5. Simple versus Compound interest

- **Simple interest** is the value of a cash flow calculated *without including any accrued interest to the principal*
- Future value using simple interest:

$$FV_n = PV_0(1 + n \times r)$$

  - PV = present value at year zero.

- The present value today of a given future amount:

$$PV_0 = FV_n/(1 + n \times r)$$

- **Compounded interest** is when the interest that is a*ccrued (earned) is added back to the principal and reinvested*
  - The (future) value of cash flow is calculated based on the principal and interest accrued
  - This compounding interest over time is referred to as *interest on interest*
  - Compound interest rises exponentially
  - Money can be made, but sometimes the value can be eroded by inflation