Stock Market – Basics

- **Capital Market**
  - A market for intermediate or long-term debt or corporate stocks.

- **Stock Market and Stock Exchange**
  - A stock exchange is the most important component of a stock market. It is an organized and regulated financial market where securities (bonds, notes, shares) are bought and sold at prices governed by the forces of demand and supply.
  - To be able to trade, a security on a certain stock exchange, it has to be listed there. Trade on an exchange is by members only.

- **Over-the-Counter (OTC) Market**
  - There is usually no compulsion to issue stock via the stock exchange, such trading is said to be *off exchange* or *over-the-counter.* This is the usual way that bonds are traded.
  - The OTC market is a negotiated market in which investors negotiate directly with the dealers. In contrast, the registered exchanges are markets in which the broker acts as an intermediary between the buyer and seller.
  - The term “OTC” has changed in meaning over the years. OTC used to simply refer to any trading system that did not have a trading floor. However, the term OTC has changed to refer instead to those stocks that do not meet the listing requirements of any of the major exchanges.

Stock Market – Basics

- **Primary Market**
  - A market where corporations raise new capital.
- **Secondary Market**
  - A market where existing or outstanding securities are traded among investors.
- **Third Market**
  - Stocks listed on a registered exchange may also be traded in the OTC market. Non-member investment firms can make markets in and trade registered securities without going through the exchange. This segment of the OTC market is called the *third* market.
- **Fourth Market**
  - The *fourth* market describes the direct exchange of securities between investors without using the services of a broker as an intermediary. Directly negotiated sales are done by investors to save transaction costs.

Stock Market – Key Concepts

- Listed Companies
- Members
- Dealers/Brokers
- Central Depository Company
- Investors
  - Corporate
  - Individuals
- Liquidity Providers
- Regulators

Terminologies

- Fair Market Value
- Ready Price
- Future/Forward Price
- Dividend
- Common Stock
- Preferred Stock
- IPO
- Secondary Issue
- Right Issue
- Market Index

Efficient Markets & Abnormal Returns

- We need to define what we mean by:

  Can we make money by trading stocks?

- One definition:

  We can make money
  =
  We can find a (riskless) arbitrage

- We adopt a broader definition:

  We can make money
  =
  We can achieve an expected return which is “large” relative to the risk.

Market Efficiency

- Definition 1: A market is **efficient** if we cannot achieve significant abnormal returns.
- Definition 2: A market is **efficient** if price changes are not predictable.
- The two definitions are consistent:
  - If price changes were predictable, then we could achieve abnormal returns.

Efficient Market Hypothesis (EMH)

- The EMH, developed by Eugene Fama in his influential paper published in 1960s, states that it is impossible to consistently outperform or beat the market by using any information that the market already knows, except through luck.
- According to the EMH, stocks always trade at their fair value on stock exchanges and thus its is impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices or in other words to consistently make abnormal returns.

Three Forms of Market Efficiency

- Three forms of market efficiency are:
  - **Weak form.**
  - **Semi-strong form.**
  - **Strong form.**

1. The Weak Form

- A market is **weak-form efficient** if we cannot achieve abnormal returns by using information contained in past prices.

- The conclusion is that an investor *cannot achieve excess returns* using technical analysis.

Example: Weak-form efficiency implies that the following statement is incorrect:

– Years when the market goes up are expected to be followed by years when it goes down.

- If a market is weak-form efficient, then technical analysis (the search for predictable patterns in prices) is futile.

2. The Semi-Strong Form

- A market is **semi-strong form efficient** if we cannot achieve abnormal returns by using publicly available information.

- The conclusion is that an investor *cannot achieve abnormal returns using fundamental* analysis.

- Publicly available information consists of past prices, trading volume, company announcements, macroeconomic announcements, etc.

Example: Semi-strong form efficiency implies that the following statement is incorrect:

– After a dividend decrease, the price decreases but the decrease takes place gradually over several days.

3. The Strong Form

- A market is **strong-form efficient** if we cannot achieve returns by using all publicly available and private information.

- Private information is information of a company's insiders not yet available to all investors.

- *As a base level knowledge of the EMH, we should know that:*
  - *Weak form addresses security market information;*
  - *The semi-strong form addresses security market and non-market public information;* ***and the***
  - *Strong form addresses security market, non-market and inside or private information.*

Theoretical Reasons for Market Efficiency

- There are good theoretical reasons to expect markets to be weak and semi-strong form efficient:
  - There are many sophisticated investors.
  - These investors have access to publicly available information.
  - They can eliminate any abnormal returns.

- There is no good reason to expect markets to be strong-form efficient.
  - Sophisticated investors may not have access to private information.

Principles of Valuation

Time Value of Money

- Present Value
- Opportunity Cost of Capital

Valuation

Applications

- Real Assets (Capital Budgeting)
- Bonds (Financing Decisions)
- Stocks and Firms (Financing Decisions)

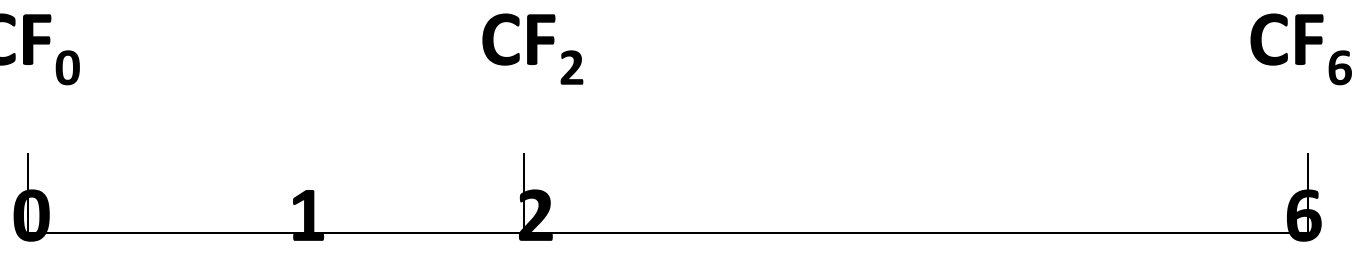
Common Feature

Invest cash today in exchange for expected, but generally risky, cash flows in the future.

Time	0	1	2	3	4	…
Cost	CF_0					...
Payoff		CF_1	CF_2	CF_3	CF_4	…

Valuation (cont'd …)

Asset



What determines the value of the asset? What factors are important?

Valuation (cont'd …)

Time Value of Money

- $1 today is worth more than $1 in the future.
- Principle of the **time value of money:**
  - If receiving a fixed sum, want it as soon as possible.
  - If paying a fixed sum, delay payment for as long as possible.

Valuation (cont'd …)

Suppose CF_t is riskless

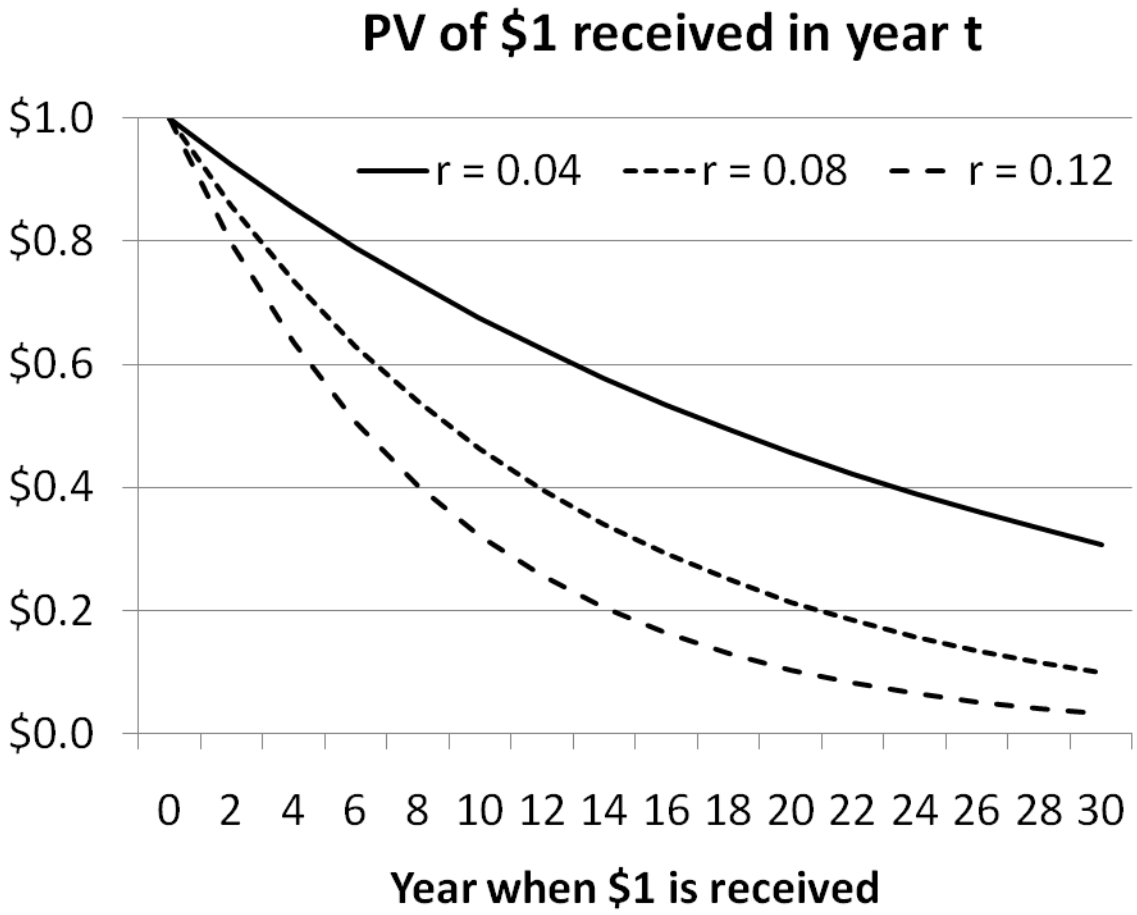
Time value of money

A $1 received in the future is always worth less than $1 received today.

If the interest rate is r, then the 'present value' of a riskless cash flow CF_t received in t years is:

$$\text{Present value} = \frac{CF_t}{(1+r)^t}$$

Valuation (cont'd …)



Time Value of Money

You have $1 today and the interest rate on risk free investments (Treasury bills) is 5%

How much will you have in …

1 year …	$1 x 1.05 = $ 1.05
2 years …	$1 x 1.05 x 1.05 = $1.103
t years …	$1 x 1.05 x 1.05 x 1.05 = $1.05^t

These cash flows are equivalent to each other. They all have the same value.

- $1 today is equivalent to $(1+r)$^t in t years
- $1 in t years is equivalent to $1(1+r)$^t today

Fundamental Principle

The value of any asset or investment equals the **net present value of the expected cash flows:**

$$NPV = CF_0 + \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} \ldots$$

Fundamental Principle (cont'd …)

Risk should be incorporated into r

The discount rate for the investment equals the rate of return that could be earned on an investment in the financial markets with similar risk

r = 'opportunity cost of capital' or 'required rate of return'

A project creates value only if it generates a higher return that similar investments in the financial market.

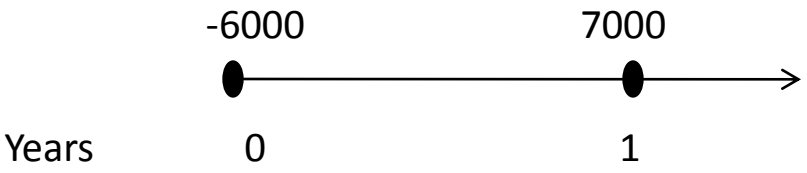
Importance of required rate of return

Example

- You have invented a new search algorithm for computer database. One company offers you $7000 for the idea, but first you must develop a software that implements the idea. A second company offers $500 but does not require you to develop the software. A programmer requires $6000 payable immediately to program your idea. Programming will take one year. What should you do?

Example (cont'd …)

- We need to evaluate a stream of cash flows.
- Basic idea: Convert all cash flows into current (today's) cash flows.
- Cash flows are:



- Suppose that $7000 in a year is worth *x* today. Suppose also that the annual interest rate is 5%. Then

$$x(1+5\%) = \$7000$$
$$x = \$6667$$

- PV in our example:

$$PV = -6000 + 6667 = 667 > 500$$

⟹ Choose first company

Example (cont'd …)

- What if annual interest rate were 20%?

$$x\,(1 + 20\%) = \$7000$$

$$x = \$5833$$

$$PV = -6000 + 5833 = -167 < 500$$

⟶ Choose second company

Shortcut Formulas

Present value

$$PV = \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4}{(1+r)^4} + \frac{CF_5}{(1+r)^5} + \ldots$$

- **Annuity**
  Level cash flow for a given number of years

- **Perpetuity**
  Level cash flow stream forever

- **Growing Perpetuity**
  Cash flows grow by a fixed percent forever

Annuity (level cash flow for t years)

$$PV = C \times \left[\frac{1}{r} - \frac{1}{r(1+r)^t} \right]$$

Perpetuity (level cash flow forever)

$$PV = \frac{C}{r}$$

Growing Perpetuity (growing cash flow forever)

$$PV = \frac{C}{r-g}$$

Example

Firms in the KSE 100 are expected to pay, collectively, $20 in dividends next year. If growth is constant, what should the level of the index be if dividends are expected to grow 5% annually? 6% annually? Assume r = 8%.

- **Growing Perpetuity**

$$g = 5\%: \quad PV = \frac{20.0}{0.08 - 0.05} = \$667$$

$$g = 6\%: \quad PV = \frac{20.0}{0.08 - 0.06} = \$1{,}000$$

Example

You just moved to Dubai and after seeing the affordable prices, decide to get a home. If you borrow $800,000, what is your monthly mortgage payment? The interest rate on a 30 year fixed rate mortgage is 5.7% (or 0.475% monthly, 5.7% / 12)

- **Annuity**

$$PV = 800{,}000 = C \times \underbrace{\left[\frac{1}{0.00475} - \frac{1}{0.00475(1.00475)^{360}} \right]}_{172.295}$$

$C = 800{,}000 / 172.295 = \$4{,}643.20$

Cost of Capital (Warm – up)

Cost of Capital: K_D, K_E, K_P, WACC & MCC

- *Cost of Capital is the expected rate of return that the market requires in order to attract funds to a particular investment.*

- *In economic terms, the cost of capital for a particular investment is an opportunity cost – the cost of forgoing the next best alternative investment.* In this, it relates to the *economic principle of substitution* – that is, an investor will invest in a particular asset if there is a more attractive substitute.

- Since the cost of anything can be defined as the price one must pay to get it, the cost of capital is the return a company must promise in order to get capital from the market, either debt or equity. A company does not set its own cost of capital; it must go into the market to discover it. Yet meeting this cost is the financial market's one basic yardstick for determining whether a company's performance is adequate.

Most Common Source of Capital

- Debt
  - Bank loans
  - Bond issues
  - Convertible bonds
  - Delaying payment on accounts payable
- Preferred Equity
- Common Equity
  - Common stock issues
  - Retained Earnings

Cost of Equity "KE," Debt "KD," Preferred Stocks "KP"

- The *cost of equity* K_E is the rate of return investors require on an equity investment in a firm.
- The *cost of debt* K_D is the yield that the investors require on a long-term lending to a firm.
- The *cost of preferred equity* K_P is the rate of return investors require on investments in a firm's preferred shares.

Effect of taxes on the cost of capital

- Interest payments are a deductible expense, but returns to stockholders (i.e., dividends, retained earnings) are not.
- For every dollar of return paid on equity, the firm must earn 1/(1-t) dollars of income before taxes.
- For every dollar of interest paid, the firm needs to earn one dollar of income before taxes.
- The effective 'after-tax' cost of debt = (1-t) K_D
- The after-tax cost of equity is rs.

Weighted Average Cost of Capital (WACC)

- When we talk about the cost of ownership capital (i.e., the expected return to a stock or partnership investor), we usually use the phrase “cost of equity capital.”

- When we talk about the cost of capital to the firm overall (i.e., the average cost of capital for both ownership interests and debt) we usually use the phrase “weighted average cost of capital (WACC).”

- The most obvious instance in which to use WACC is when the objective is to value the entire capital structure of a company.

- Sometimes WACC is also used even when the objective is ultimately to value only the equity. One would value the entire capital structure and then subtract the market value of the debt to estimate the value of the equity. This procedure frequently is used in highly leveraged situations.

WACC (cont'd …)

- The critical point in WACC's calculation is that *relative weightings of debt and equity or other capital components are based on the market values of each component and not on the book values.*

$$WACC = k_D (1-t) \frac{D}{D+E} + k_E \frac{E}{D+E}$$

Marginal Cost of Capital

- Incremental cost the firm will need to pay to raise an additional dollar of capital.

Example

- Lets say Company XYZ has the following capital structure:

Source	$	Weight	Cost (after-tax)	WACC
Debt	10m	50%	6%	3.0%
Common Stock	10m	50%	15%	7.5%
	20m			10.5%

Example (cont'd …)

- Due to increased need for higher capital expenditure, Company XYZ's capital has now changed to:

Source	$	Weight	Cost (after-tax)	WACC
Debt	30m	75%	10%	7.5%
Common Stock	10m	25%	15%	3.8%
	20m			11.3%

- With the raising of incremental $20m of capital, the marginal cost of capital is 0.8% from 10.5%(old) to 11.3%(new).

Riskless Rates & Risk Premiums

- An asset is risk free if we know the expected returns on it with certainty – i.e., the actual return is always equal to the expected return.

Practical Implication:

- When doing investment analysis on longer term projects or valuation, the risk free rate should be the long term government bond rate.

- If the analysis is shorter term, the short term government security rate can be used as the risk free rate.

Risk Premiums

- A premium for risk is an expected amount of return over and above the risk-free rate to compensate the investor for accepting risk.
- The generalized cost of capital relationship is as:

$$E(R_i) = R_f + RP_i$$

where:

$E(R_i)$ = Expected return of security i

R_f = Risk-free rate

Rp_i = Risk premium for security i

Types of Risks

- Financial economics divides risk into three major categories: *maturity, systematic* and *unsystematic.*

- ***Maturity Risk*** is the reflection of changes in interest rates over the term of the investment. Maturity risk (also called horizon risk or interest rate risk) is the risk that the value of an investment may go up or down because of changes in the general level of interest rates.

  The longer the term of the investment, the greater the maturity risk. For example, market prices of long-term bonds fluctuate much more in response to changes in levels of interest rates than do short-term securities.

Types of Risks (cont'd …)

- ***Systematic Risk*** can be defined as the uncertainty of future returns due to uncontrollable movements in the market as a whole.

  This type of risk generally arises from external, macroeconomic factors that affect all economic assets within the economy as a whole.

For publicly held companies, systematic risk is captured by a measurement referred to as the ***beta of an enterprise.***

BETA (β)

- β measures the risk of the company being valued, i.e., it is the correlation of the risk of that company and the market.
- $\beta = \dfrac{\text{Covariance } (R_m, R_{company})}{\sigma_m^2}$

- β measures systematic/market risk sensitivity.
- β of a risk free security is zero.
- Lower the β, safer the company.

Types of Risks (cont'd …)

- ***Unsystematic Risk*** is the uncertainty of future returns as a function of something other than movements in market rates of return, such as the characteristics of an industry, enterprise or type of investment.

  Examples of circumstances that can create or increase unsystematic risk include high product or technological obsolescence, unforeseen loss of management expertise, and negative changes in labor relations.

  Unsystematic risk has four primary sources: the size of the firm, its macro environment, its industry and specific company attributes.

  The estimation of unsystematic risk is one of the more difficult aspects of calculating rates of return.

Interpreting Beta

- **Beta > 1.0**

  when market rates of return move up or down, the rates of return for the subject tend to move in the same direction and with greater magnitude.

  Example: For a stock with no dividend, if the market is up 10%, the price of a stock with a beta of 1.2 would be expected to be up by 12%. If the market is down by 10%, the price of the same stock would be expected to be down by 12%.

- **Beta = 1.0**

  Fluctuations in rates of return for the subject tend to equal fluctuations in rates of return for the market.

Interpreting Beta (cont'd ….)

- **Beta < 1.0**

  When market rates of return move up or down, rates of return for the subject tend to move up or down but to a lesser extent.

  Example: For a stock with no dividend, if the market is up 10%, the price of a stock with a beta of 0.8 would be expected to be up 8%.

- **Negative beta (very rare)**

  A negative beta simply means that the stock is inversely correlated with the market. Many precious metals and precious metal related stocks are beta negative as their value tends to increase when the general market is down and vice versa.