Equities

Common Stock

- Common stock represents equity, an ownership position, in a corporation.
- There are two components of possible cash flows for a piece of equity security.
  1. Dividends:
     - **Cash dividend.**
     - **Stock dividend.**
  - Growth companies typically don't pay dividends. But they are valuable because of that capital gains or price appreciation.

  2. Capital gains or price appreciation

Characteristics of common stock

- The legal structure for equities is different than for bonds. Contrary to payments to bondholders, payments to stockholders are uncertain in both magnitude and timing.
  1. **Residual claim** - stockholders have claim to firm's cash flows/assets after all obligations to bondholders or creditors are met.
     - get access to all of the upside of a company's growth and success.
  2. **Limited liability** - stockholders may lose their investments, but no more.
     - equities have ability to provide proper motivation and incentives for innovation.

3. **Voting rights** - stockholders are entitled to vote for the board of directors and on other matters.
   - make sure that the board of directors, will take decision in the best interests of the shareholders.
4. **Access to public markets**
   - power of the masses for development of innovation and capital formation, to co-invest.
5. **Ease of short sales -**
   - short sell allows investors to get information into the market price as quickly and as easily as possible.

Preferred stocks

- Preferred stock is a form of equity that is usually issued in addition to common stock.
- Preferred stocks typically pay fixed dividends, which makes them similar to other fixed-income securities such as bonds.
- It is called preferred because its holders have priority over owners of common stock to receive dividends and to file property claims in bankruptcy liquidation.
- Preferred stock provides limited shareholder rights and appreciation potential.

Organization of Stock Markets

- There are two markets for equities

1. Primary market (underwriting)– the market where securities are issued for the very first time for the purpose of raising capital or fund.
    - Venture capital: A company issues shares to investment partnerships, investment institutions and wealthy individuals.
    - Initial public offering (IPO): A company issues shares to general public for the first time (i.e., going public).
    - Secondary offerings: A public company issues additional shares.
        - Stock issuing to the public is usually organized by investment bank who act an underwriters: it buys part or all of the issue and resells it to the public.

2. Secondary market (resale market)- securities are traded after being initially offered to the public in the primary market and/or listed on the Stock Exchange.
    - secondary market provides an efficient platform for trading of securities.
    - secondary equity markets serve as a monitoring and control channel
    - majority of the trading is done in the secondary market
    - secondary market could be either auction or dealer market
    - stock exchange is the part of an auction market
    - Over-the-Counter (OTC) is a part of the dealer market

    – Organized exchanges: NSE, BSE, NASDAQ, etc.
    – Specialists, broker/dealers, and electronic market-making (ECNs)
    – OTC: NASDAQ

- A listed company are companies that are included on a given stock exchange so that its stock can be traded. Companies tend to prefer to be listed on the major exchanges, since they provide the most liquidity and visibility for a company's stock.
- An unlisted public company is one which is not listed on any stock exchange but can have an unlimited number of shareholders to raise capital. The trading of the shares is over the counter.

Dividend Discount Model

- Dividend Discount Model (DDM) is the most basic valuation model for common stock.
- It starts with the recognition that, when you invest in a company, you're getting the rights to the flow of cash forever.
- Not all stocks pay dividends, but eventually the stock will pay dividend at some point.
  - If a company is growing and it has value, then it will pay a dividend at some point. If a company never, ever pays dividends, then, it pays no cash forever, that seems like a very bad asset of worth 0.
  - If the company doesn't pay dividends and it gets liquidated, then shareholders get a pro rata share of whatever's in the company.

- Unlike bonds, where we know the coupons in advance, we don't know the dividends in advance.
- Stock price is the value of sequence of future cash flows is simply equal to the expectation today at time t, of future dividends paid out into the infinite future, discounted back by the appropriate risk-adjusted rate of return.

$$P_t = \frac{E_t[D_{t+1}]}{(1 + r_{t+1})} + \frac{E_t[D_{t+2}]}{(1 + r_{t+2})^2} + \cdots$$

$$P_t = \sum_{k=1}^{\infty} \frac{E_t[D_{t+k}]}{(1 + r_{t+k})^k}$$

- Notation:
  - *P_t: Expected stock price at t*
  - *D_t: Expected cash dividend at t*
  - *r_t: Risk-adjusted (*that is commensurate with the risks of the dividends) *discount rate for cash flow at t.*

- Contrary to payments to bondholders, payments to stockholders are lot more complicated than fixed income instruments. Because there are two sources of uncertainty for stockholders
  1. Discount rate: it's the risk-adjusted discount rate, and if risks change over time, the discount rate should change.
  2. Timing: company's cash flows and market condition may change

- Two additional simplifying assumptions:

$$E_t[D_{t+k}] = D, \qquad r_{t+k} = r$$

- In this case, we have the first version of the dividend discount model or the **discounted cashflow (DCF) model.** Stock price is the present values of future dividends.
- For constant dividend (growth=0):

$$P_t = \sum_{k=1}^{\infty} \frac{E_t[D_{t+k}]}{(1+r_{t+k})^k}$$

$$E_t[D_{t+k}] = D, \qquad r_{t+k} = r$$

$$P_0 = \sum_{k=1}^{\infty} \frac{D}{(1+r)^k} = \frac{D}{r}$$

- This formula is really meant to be steady state dividends

- The discount rate has to be risk-adjusted in a way to reflect the risks of the numerator, as well as general market conditions. It has to be commensurate with the risks of that particular numerator.

- It's not the company that gets to determine the discount rate, but rather it's the company's riskiness-- or rather the riskiness of the cash flows and the market's assessment of the cost of that riskiness-- that determines the interest rate.

Significance of the DDM

- The price of common stock is an increasing function of the expected cash flows in the form of future dividends.
  - So if we expect there to be higher dividends going forward, the price should go up, and if we expect lower dividends going forward, the price should go down.
- The price of a stock is inversely proportional to its discount rate. If interest rates go up in general,
  - future cash flows are going to have to be discounted at a higher rate lowering the stock's present value.
  - the demand for stocks will not be as great, because now the opportunity for earning higher return exists in other securities, that will reduce the demand for stocks and the price will come down.
- Dividend can never be negative.

DDM for Finite Holding Period

Let stock price be P_0 at $t = 0$.

For one - year holding period, the discounted present value is equal to the sum of next period's dividend plus next period's stock price.

i.e., $$P_0 = \frac{D_1 + P_1}{1 + r}$$

Similarly, P_1 is determined as, $$P_1 = \frac{D_2 + P_2}{1 + r}$$

Thus, $$P_0 = \frac{D_1}{1 + r} + \frac{P_1}{1 + r} = \frac{D_1}{1 + r} + \frac{1}{1 + r} . \frac{D_2 + P_2}{1 + r}$$

$$= \frac{D_1}{1 + r} + \frac{D_2}{(1 + r)^2} + \frac{P_2}{(1 + r)^2}$$

Using this fundamental - value equation repeatedly we have the infinit series as :

$$P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \cdots$$

$$= \sum_{t=1}^{\infty} \frac{D_t}{(1+r)^t}$$

Example: A company with D_0= \$1 and r= 20% grows at 6% for the first 7 years and then drops to zero thereafter. What should its current price be?

The price today will be the discounted cash flows of future dividends
till 7 years and the terminal value of price after 7 years.
Now, $D_1 = D_0(1+g), D_2 = D_1(1+g) = D_0(1+g)^2$ and so on.
After 7 years there is no growth, hence, $P_7 = \frac{D_7}{r}$ *(present value of all future cash flows which is D_7)*

$$P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \cdots + \frac{D_7}{(1+r)^7} + \frac{P_7}{(1+r)^7}$$

$$P_0 = \frac{1.06}{1.2} + \frac{1.06^2}{1.2^2} + \cdots + \frac{1.06^7}{1.2^7} + \frac{1.06^7/0.2}{1.2^7} = \$6.49$$

Gordon growth model

- Suppose dividends grow at a constant rate ***g*** *over time :*

  i.e., Dividend in year 1, $D_1 = (1+g)D_0$,

  similarly, Dividend in year 2, $D_2 = (1+g)D_1 = (1+g)^2 \times D_0, \cdots$

  and in general, $D_{t+1} = (1+g)D_t$

  So, $P_0 = \frac{D_0(1+g)}{1+r} + \frac{D_0(1+g)^2}{(1+r)^2} + \frac{D_0(1+g)^3}{(1+r)^3} + \cdots$

  $$P_0 = \sum_{k=1}^{\infty} \frac{D_0(1+g)^k}{(1+r)^k} = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}, \qquad r > g$$

- This is the ***Gordon growth model***.
- Note: *g must be the long-run stable growth rate. S*ince the growth rate in the firm's dividends is expected to last forever, the firm's other measures of performance (including earnings) can also be expected to grow at the same rate.

- This provides a convenient expression for the discount rate:

$$P_0 = \frac{D_1}{r - g}, \quad r > g$$

$$r - g = \frac{D_1}{P_0}$$

$$r = \frac{D_1}{P_0} + g = \frac{D_0(1+g)}{P_0} + g$$

- Where we define, D/P= **Dividend price ratio, or dividend yield**
- D_0= the most recent or current dividend
- The growth rate has to be less than or equal to the growth rate of the economy in which the firm operates.

- The rate of return of the company is not just the dividend that gives a company value, it's the ability for companies to grow over time.
- The market determine the discount rate as well as the growth rate on the dividend.
- What will happen if r<g? Is the growth rate sustainable out of the perpetuity?
  - Suppose the interest rate r were less than g, so the rate at which assets in the future are being deflated to the present is actually less than the rate at what the wealth is growing. Which means that if it is continue into perpetuity, then in very short period the total wealth become bigger than the entire planet's GDP.
  - Hence, this growth rate is not sustainable, or, this formula doesn't work if r<g.

- **Example:** Dividends are expected to grow at 6% per year and the current dividend is $1 per share. The expected rate of return is 20%. The current stock price should be

$$P_0 = \frac{1 \times 1.06}{0.20 - 0.06} = \$7.57$$

- DCF with constant growth gives a relation between current stock price, current dividend, dividend growth rate and the expected return. Knowing three of the variables, we can determine the fourth.

Example: Determine the cost of capital of Duke Power. In 09/92, the dividend yield for Duke Power was $D_0/P_0 = 0.052$. Estimates of long-run growth forecasted by two research agencies Value Line and I/B/E/S are as follows:

Info Source	Value Line (VL)	I/B/E/S
Growth (g)	0.049	0.041

- The cost of capital is given by $$r = \frac{D_0(1+g)}{P_0} + g$$

- Thus,

	Cost of Capital
VL	$r = (0.052)(1.049)+0.049 = 10.35\%$
IBES	$r = (0.052)(1.041)+0.041 = 9.51\%$

- **Example:** Estimate dividend growth rate. WSJ reported the following data on AT&T stock:

AT&T	DIV	YLD	P/E	High	Low	Last Chg
	1.32	3.4 60	38.5	38.5	38.125	+.25

- Question. What is the market's estimate of dividend growth rate, if *r = 12%?*

$$r = \frac{D_0(1+g)}{P_0} + g \Rightarrow g = \frac{r - D_0 / P_0}{1 + D_0 / P_0}$$

- Since, *P_0 = Average price=(38.5+38.125)/2 = 38.3125;*
- *D_0/P_0 = 1.32/38.3125 = 0.03445*

- We have $g = \frac{0.12 - 0.03445}{1.03445} = 8.27\%$

DCF with Multiple-Stage Growth

- Firms often evolve through different stages in their growth. For example, some may have three stages during their lifetime:
  1. Growth stage - rapidly expanding sales, high profit margins, and abnormally high growth in earnings per share, many new investment opportunities, low dividend payout ratio.
  2. Transition stage - growth rate and profit margin reduced by competition, fewer new investment opportunities, high payout ratio.
  3. Maturity stage - earnings growth, payout ratio and average return on equity stabilizes for the remaining life of the firm.

Relative Valuation

- DCF is appropriate for comparing investments across different asset classes. Actual forecast of dividends often involves many practical issues.
- In relative valuation, the value of an asset is compared to the values assessed by the market for similar or comparable assets.
- Relative valuation can be completed with far fewer assumptions and far more quickly than a DCF valuation.
- Relative valuation is much more likely to reflect market perceptions and moods than discounted cash flow valuation.
- Most equity research reports and many acquisition valuations are based upon a multiple such as a price to earnings ratio, price to book value ratio or the Value to EBITDA multiple.

P/E Ratio

- Price-to-Earnings ratio (P/E) can be estimated using current earnings per share, or an expected earnings per share in the next year.

  P/E = Market Price per Share / Earnings per Share
- P/E ratio is referred to as “multiple” because it shows how much investors are willing to pay per dollar of earning. The P/E ratio actually is a reflection of the market’s optimism concerning a firm’s growth prospects.
- The marketplace determine the P/E ratio. The P/E ratio may differ considerably for two companies within the same industry.
- Consider Sturbucks’ 2020 end P/E of 43 compared with the P/E ratio of 7 for General Motors. These ratio tell us that investors expect Sturbucks’ earnings to grow much more rapidly than GM’s.

- High P/E
  - Companies with a high P/E ratio are often considered to be ***growth stocks***. This indicates a positive future performance, and investors have higher expectations for future earnings growth and are willing to pay more for them.
  - A high P/E ratio also could mean that a company's stock is over-valued and are expected to go low. This is because growth stock will eventually have to live up to the high rating by substantially increasing its earnings, or the stock price will need to drop.
- Low P/E
  - Companies with a low P/E ratio are often considered to be ***value stocks***. It means they are undervalued because their stock price trade lower relative to its earning fundamentals. This mispricing will be a great bargain and will prompt investors to buy the stock before the market corrects it.

Valuation using earning multiples

- There are a number of variants on the basic P/E ratio in use.
  - Price:
    - usually the current price
    - or average price for the year
  - EPS:
    - time variants
      - EPS in most recent financial year (current)
      - EPS in most recent four quarters (trailing)
      - EPS expected in next fiscal year (forward)
      - EPS in some future year
    - primary or diluted

Valuation using P/E ratio for current EPS

With the constant growth dividend discount model, $P_0 = \frac{D_1}{r-g}$

where, $D_1 = D_0(1+g)$

Dividing both sides by the earnings, we obtain the P/E ratio for a stable growth firm:

$$\frac{P_0}{E_0} = \frac{(D_0/E_0) * (1+g)}{r-g}$$

$$or, \frac{P_0}{E_0} = \frac{\text{Payout ratio} * (1+g)}{r-g},$$

where E_0 is the current EPS.

Earnings= total profit net of depreciation and taxes

Valuation using P/E ratio for forward EPS

Now, D_1 can be written as $\mathrm{D}_1 = E_1\ (1\ - b)$

where b= Plowback ratio (also called retention ratio)= retained earnings/total earnings,

Retained earnings= (earnings - dividends)

E_1 is the forward EPS

Pay out ratio= dividend/earnings = DPS/EPS = p (the fraction of earnings paid out as dividends),

Then b= Plowback ratio =1-payout ratio =1-p

Therefore, $P_0 = \dfrac{D_1}{r - g}$ can also be written as,

$$P_0 = \frac{E_1\ (1\ - b)}{r - g}$$

$$Hence, \frac{P}{E} = \frac{P_0}{E_1} = \frac{1 - b}{r - g}$$

$$= \frac{1 - b}{r - ROE * b}$$

where, $g = ROE * b$

ROE= Return on book equity = Net Earnings /Book value of Equity

Book value (BV)= cumulative retained earnings

- Note: these ratios are mostly based on accounting data, not market values

Example

- ABC stock has an expected ROE of 12% per year, expected earnings per share of $2, and expected dividends of $1.50 per share. Its required rate of return is 10% per year.
  - a. What are its expected growth rate, its price, and its P/E ratio?
  - b. If the plowback ratio were 0.4, what would be the expected dividend per share?

a. The expected *growth rate, g=b x ROE*

now, b= Plowback ratio =1-payout ratio

Payout ratio= DPS/EPS=1.5/2.0=0.75,

b=1-payout ratio=1-0.75=0.25

growth rate, g=b x ROE=0.25 x 12%=3%.

$P_0 = D_1/(r-g)= 1.5/(0.10-0.03)=\$21.43$

$P_0/E_1 =21.43/2=10.71$

b. If b=0.4, that means 40% would be reinvested then dividend payout ratio (DPS/EPS)

=1-b=1-04=0.6.

Therefore, dividend per share (DPS) would be 60% of earnings, or 0.60x2=$1.20 would be paid as dividends.

- **Example:** Hyper Mega Net (HMN)has an EPS of $2 last year. It has a payout ratio of 25% and ROE of 10%. If investors expect a return of 10% from the firm,
  - What is HMN's stock price?
  - What is HMN's P/E ratio?
- ROE = 10% , DPS/EPS=*p*= payout ratio=0.25

  or, D_0= 2x0.25=0.50

  g= ROE x b=ROE x (1-p)= 0.10.(1- 0.25)= 0.075

  $P_0=D_1/(r-g)=D_0(1+g)/(r-g)=(0.50 \times 1.075)/(0.10-0.075)=\$21.50$

  $P/E=P_0 / EPS_1 =\$21.50/(2x\ 1.075)=10$

  where, $EPS_1 =EPS_0 (1+g)=(2x\ 1.075)$

Value/Earnings

- Price earnings ratios look at the market value of equity relative to earnings to equity investors.
- Value earnings ratios look at the market value of the operating assets of the firm (Enterprise value or EV) relative to operating earnings or cash flows.

  where, EV = Market value of equity + Market value of Debt – Cash

- In practice, what we observe more commonly are firm values as multiples of operating income (EBIT), after-tax operating income or EBITDA (earnings before interest, taxes, depreciation and amortization).

$$\frac{\text{Enterprise Value}}{\text{EBITDA}} = \frac{\text{Market Value of Equity} + \text{Market Value of Debt} - \text{Cash}}{\text{Earnings before Interest, Taxes and Depreciation}}$$

Disadvantages of multiples

- **Multiples can be misleading**.
  - It requires the fundamentals values to determine the multiple
  - Understanding about how changes in these fundamentals change the multiple
  - Need to ensure that both the denominator and numerator represents claims to the same group
  - Need to ensure that the firms are comparable

Free Cash Flow Valuation Approach

- The free cash flow (FCF) of the firm is the after-tax operating income netted against the net capital expenditures and working capital needs of the firm.

  $FCF_t \equiv$ Free Cash Flow= Earnings - Net Investment

  where, Net investment = Capital expenditure - Depreciation

- The free cash flow to the firm approach discounts year-by-year cash flows plus some estimate of terminal value, V_T . *We use the constant-growth model to* estimate terminal value and discount at the weighted-average cost of capital.

$$\text{Firm Value} = PV = \sum_{t=1}^{T} \frac{FC_t}{(1+r)^t} + \frac{PV_T}{(1+r)^T}, \qquad \text{where } PV_T = \frac{FCF_{T+1}}{r-g}$$