

The Value of Common Stocks

Stocks & Stock Market

Primary Market

- Market in which shares are first sold to the investors.

Secondary Market

- Market in which already issued securities are traded by investors.

Valuation : Fundamental Analysis

Fundamental analysis models a company's value by assessing its current and future profitability.

- identify mispriced stocks relative to some measure of “true” value derived from financial data.

- Dividend Discount Models

- Price/Earnings Ratios

- Free Cash Flow Models

Analysis

Analysis of the Economy

Analysis of the Industry

Analysis of the Company

Two approaches

- Top-down approach
- Bottom-up approach

Comparable Multiples Method

- It gives an estimate of the value assuming that the firm that we are considering is similar to the other firms in the industry.
- Since profitability and growth opportunities may be different for different firms in the same industry, this will help us get to a possible range of values for the given firm.
- The value that is obtained using industry P/E, P/B or other multiples will give us a range of possible values but will require effort to narrow down this range.
- Valuation by comparable is most useful when you don't have a stock price, example for pricing IPOs or acquisition of an unlisted firm.

	Sales	Price	P/E
Fortis Health	6,892	716.90	82.50
Global Health	2,280	1097.40	77.50
Max Healthcare	5,406	1185.50	108.86
Apollo Hospital	19,059	7230.2	87.87
Lalpath Labs	2,226	3016.20	62.82

Valuation by Comparable Multiples

How Common Stocks are Valued

Discounted Cash Flow (DCF) Formula

- Value of a stock = present value of future cash flows

$$PV(\text{stock}) = PV(\text{expected future dividends})$$

How Common Stocks are Valued

Expected Return

- Percentage yield forecast from specific investment over time period
- Sometimes called market capitalization rate

$$\text{Expected return} = r = \frac{Div_1 + P_1 - P_0}{P_0}$$

Expected Return = Dividend Yield + Capital Appreciation

How Common Stocks are Valued

Example

- ABC stock sells for Rs.100 per share today; they are expected to sell for Rs.110 in one year. What is expected return if dividend in one year is forecasted to be Rs. 5.00?

$$\text{Expected return} = \frac{5 + 110 - 100}{100} = .15$$

How Common Stocks are Valued

Price of share of stock is present value of future cash flows

For a stock, future cash flows are dividends and ultimate sales price

$$\text{Price} = P_0 = \frac{\text{Div}_1 + P_1}{1 + r}$$

How Common Stocks are Valued

Example

- ABC Stock price

$$\text{Price} = P_0 = \frac{5 + 110}{1.15} = 100$$

How Common Stocks are Valued

Dividend Discount Model

- Computation of today's stock price: share value equals present value of all expected future dividends
- H: Time horizon for investment

$$P_0 = \frac{Div_1}{(1+r)^1} + \frac{Div_2}{(1+r)^2} + \dots + \frac{Div_H + P_H}{(1+r)^H}$$

How Common Stocks are Valued

Modified Formula

$$P_0 = \frac{Div_1}{(1+r)^1} + \frac{Div_2}{(1+r)^2} + \dots + \frac{Div_H + P_H}{(1+r)^H}$$

$$P_0 = \sum_{t=1}^H \frac{Div_t}{(1+r)^t} + \frac{P_H}{(1+r)^H}$$

How Common Stocks are Valued

Example

- ABC Stock is forecasted to pay Rs. 5.00 dividend at end of year 1 and Rs. 5.50 dividend at end of year 2. End-of-second-year stock will be sold for Rs.121. Discount rate is 15%. What is the price of stock?

$$PV = \frac{5.00}{(1 + .15)^1} + \frac{5.50 + 121}{(1 + .15)^2}$$

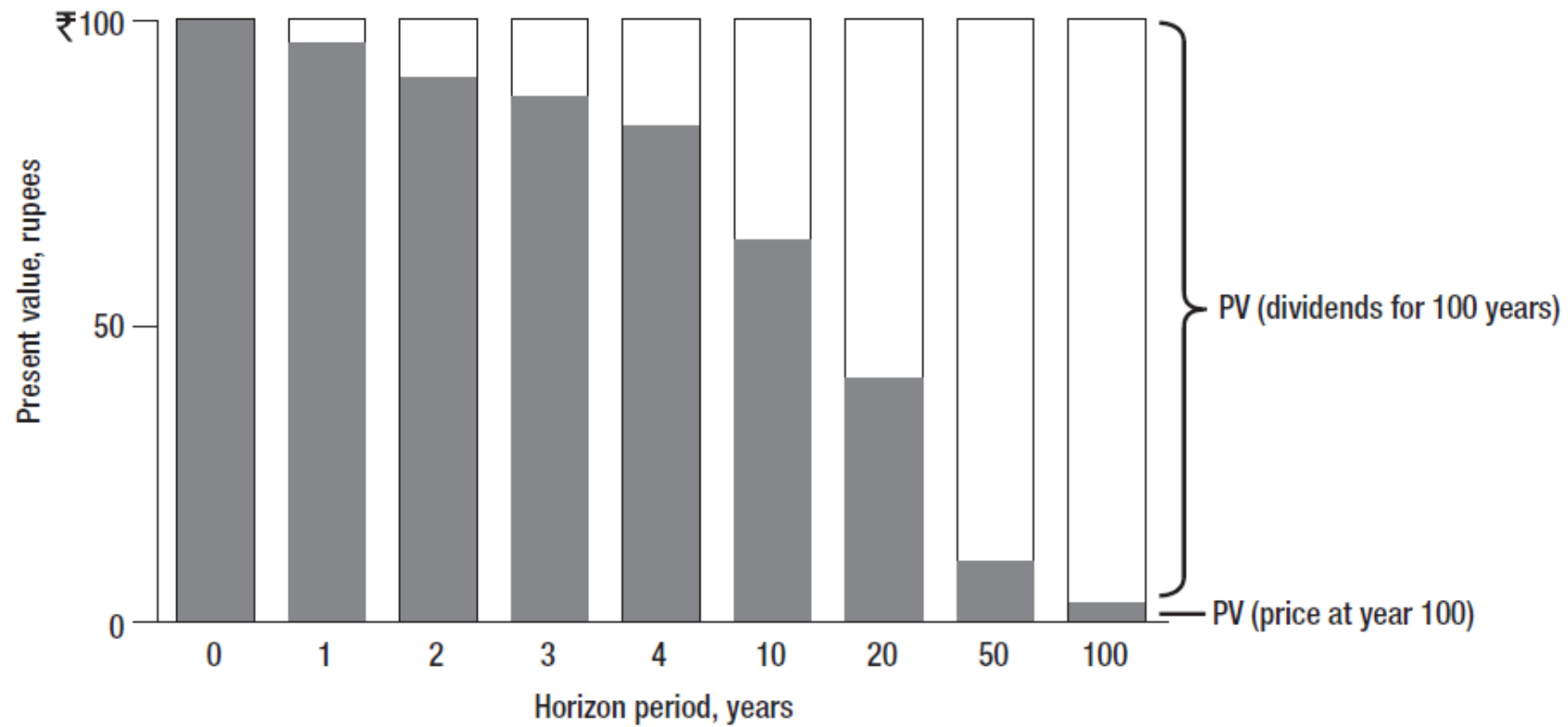
$$PV = ` 100.00$$

How Common Stocks are Valued

	Expected Future Values		Present Values		
Horizon Period (H)	Dividend (DIV_t)	Price (P_t)	Cumulative Dividends	Future Price	Total
0		100.00			100
1	5.00	110.00	4.35	95.65	100
2	5.50	121.00	8.51	91.49	100
3	6.05	133.10	12.48	87.52	100
4	6.66	146.41	16.29	83.71	100
10	11.79	259.37	35.89	64.11	100
20	30.58	672.75	58.89	41.11	100
50	533.59	11739.09	89.17	10.83	100
100	62639.15	1378061.23	98.83	1.17	100

Dividends increase at 10% per year, compounded; Capitalization rate is 15%

How Common Stocks are Valued



As you increase investment horizon, the present value of the future price declines and the present value of the stream of dividends increases.

How Common Stocks are Valued

Example

- XYZ Company will pay dividends of Rs.3, Rs.3.24, and Rs.3.50 over next three years. After three years, stock sells for Rs.94.48. What is the price of stock given 12% expected return?

$$PV = \frac{3.00}{(1+.12)^1} + \frac{3.24}{(1+.12)^2} + \frac{3.50 + 94.48}{(1+.12)^3}$$

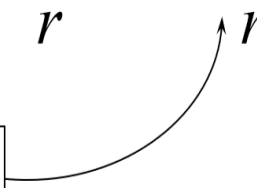
$$PV = ₹ 75.00$$

How Common Stocks are Valued

If we forecast no growth, and plan to hold out stock indefinitely, we will then value the stock as a PERPETUITY.

$$\textit{Perpetuity} = P_0 = \frac{\textit{Div}_1}{r} \textit{ or } \frac{\textit{EPS}_1}{r}$$

Assumes all earnings are paid to shareholders.



How Common Stocks are Valued

Constant Growth DDM - A version of the dividend growth model in which dividends grow at a constant rate (Gordon Growth Model).

$$P_0 = \frac{Div1}{(1+r)} + \frac{Div2}{(1+r)^2} + \frac{Div3}{(1+r)^3} + \dots$$

$$P_0 = \frac{Div0*(1+g)}{(1+r)} + \frac{Div0*(1+g)^2}{(1+r)^2} + \frac{Div0*(1+g)^3}{(1+r)^3} + \dots$$

$$P_0 = \frac{Div0*(1+g)}{(r-g)} = \frac{Div1}{(r-g)}$$

Please note: This model assumes constant growth rate, $g < r$.

How Common Stocks are Valued

Market Capitalization Rate

- Estimated using perpetuity formula
- Also called cost of equity capital

$$P_0 = \frac{\text{Div}_1}{r - g}$$

$$r = \frac{\text{Div}_1}{P_0} + g$$

Example

Suppose Big D, Inc., just paid a dividend of \$.50.

It is expected to increase its dividend by 2% per year.

If the market requires a return of 15% on assets of this risk level, how much should the stock be selling for?

$$P_0 = .50(1+.02) / (.15 - .02) = \$3.92$$

Return Measurements

$$\text{Dividend yield} = \frac{Div_1}{P_0}$$

Return on Equity = ROE

$$\text{ROE} = \frac{\text{EPS}}{\text{Book equity per share}}$$

How Common Stocks are Valued

Payout Ratio - Fraction of earnings paid out as dividends

Plowback Ratio - Fraction of earnings retained by the firm

Dividend Growth Rate

- Derived by applying return on equity to percentage of earnings reinvested in operations
- $g = \text{return on equity} \times \text{plowback ratio}$

If a firm elects to pay a lower dividend, and reinvest the funds, the stock price may increase because future dividends would be higher assuming that the firm is investing in positive NPV projects.

DCF Models with Two Stages of Growth

Growth Tech Inc., is a firm with $\text{Div}_1 = \$0.50$ and $P_0 = \$50$.

The firm has plowed back 80% of earnings and has had a ROE of 25%.

Dividend growth rate = ROE x plowback ratio = 25% x 80% = 20%

Will future long-term growth rate remain 20% forever?

Implied $r = 0.5/50 + 20\% = 21\%$

Eventually ROE will decline, and the plowback ratio will also decline as profitability and growth opportunities for the firm decline.

To address this issue, we try to model such firms with 2 stages or 3 stages of growth.

Non-constant growth

- Phoenix pays dividends in three consecutive years of 0, .31, and .65. Year-4 dividend is estimated at .67 with perpetuity growth at 4%. With 10% discount rate, what is stock price?

$$\text{PV} = \frac{0}{(1+.1)^1} + \frac{.31}{(1+.1)^2} + \frac{.65}{(1+.1)^3} + \left[\frac{1}{(1+.1)^3} \times \frac{.67}{(.10 - .04)} \right]$$
$$= 9.13$$

Example

Company plans Rs. 8.33 dividend next year (100% of earnings). Investors will get 15% expected return. Instead, company plows back 40% of earnings at firm's current return on equity of 25%. What is the stock value before and after plowback decision?

No Growth

$$P_0 = \frac{8.33}{.15} = ` 55.56$$

With Growth

$$g = .25 \times .40 = .10$$

$$P_0 = \frac{5.00}{.15 - .10} = ` 100.00$$

Example (Continued)

- Stock price remains at Rs.55.56 with no earnings plowed back
- With plowback, price is Rs. 100.00
- Difference is called present value of growth opportunities (PVGO)

$$\text{PVGO} = 100.00 - 55.56 = 44.44$$

Stock Price and Earnings Per Share

Present Value of Growth Opportunities (PVGO)

- Net present value of firm's future investments

If all EPS paid out as dividends, expected return, $r = \text{Div}_1/P_0 = \text{EPS}_1/P_0$

$$P_0 = \text{Div}_1/r = \text{EPS}_1/r$$

If firm has +ve NPV investment opportunity, then $P_0 = \text{EPS}_1/r + \text{PVGO}$

Growth firms are those with PVGO being a significant proportion of their current stock price

$$\text{PRICE OF SHARE} = \text{PRICE WITHOUT GROWTH} + \text{PVGO}$$

Valuing a Business

Valuing a Business or Project

- Usually computed as discounted value of FCF to valuation horizon (H)
- Valuation horizon sometimes called terminal value and calculated like PVGO

$$\text{PV} = \frac{\text{FCF}_1}{(1+r)^1} + \frac{\text{FCF}_2}{(1+r)^2} + \dots + \frac{\text{FCF}_H}{(1+r)^H} + \frac{\text{PV}_H}{(1+r)^H}$$

PV (free cash flows) PV (horizon value)

Free Cash Flow to the Firm Approach

Value the firm by discounting free cash flow at WACC.

Free cash flow to the firm, FCFF, equals:

After tax EBIT

Plus depreciation

Minus capital expenditures

Minus increase in net working capital

$$FCFF = EBIT \times (1 - t) + Depreciation - Cap. Exp. - \Delta NWC$$

Free Cash Flow to the Firm Approach

Value of the Firm:

$$\text{Firm Value} = \sum_{t=1}^T \frac{FCFF_t}{(1+WACC)^t} + \frac{V_t}{(1+WACC)^T}$$

Where

$$V_t = \frac{FCFF_{T+1}}{WACC - g}$$

Comparing the Valuation Models

In practice

- Values from these models may differ
- Analysts are always forced to make simplifying assumptions

Problems with DCF

- Calculations are sensitive to small changes in inputs
- Growth opportunities and growth rates are hard to pin down