VALUATION TOOLS: ANALYSIS OF DIVIDEND DISCOUNT MODELS AND PRICE MULTIPLE, REAL VALUATION

Dr. Anjala Kalsie*　　　**Ashima Arora****
*Assistant Professor, Faculty of Management Studies, University of Delhi, Delhi. India.
**Research Scholar, Faculty of Management Studies, University of Delhi, Delhi, India.

Abstract
The objective of the paper is to analyses the various valuation methodology namely Discounted Cash Flows method, Price Multiplies and more recently Real Option valuation tool. All the methods have their own advantages and pitfalls. The users and researcher should take note of benefits and drawback of all the methods. The paper concludes that simple average of all the three methods gives more accurate results of valuating a company rather than relying on one single method.

Key words: Discounted Cash Flows method, Price Multiplies, Real Option Valuation.

1.INTRODUCTION
The valuation technique is initiated with the establishment of purpose of valuation which may range from acquisition/ sale of business or equity stake, corporate restructuring, estimation of value of portfolio of investments by venture capital funds or PE funds.

Traditional valuation techniques are built on the assumption of a going concern, i.e., a firm that has continuing operations and there is no significant threat to these operations. There are many approaches to value equity in a firm, but how far an approach is correct is always a question. There is a growing gap between how the market is pricing some business especially those fraught with uncertainty and the values generated by traditional valuation models such as discounted cash flow valuation. Managers and investors instinctively understand that selected market valuations reflect a combination of known businesses plus a value for opportunities that are to come.

The valuation however, is driven by the 'purpose' or 'intent' of valuation owing to the fact that it is the purpose that defines the value. Thus, the prior knowledge of purpose of valuation gains prominence before initiating valuation exercise. Another aspect mandating awareness prior to valuation exercise is the structure of transaction. Their awareness assists in the effective determination of value. The following is a snapshot of few purposes that necessitate valuation:
- Develop an insight behind the sale/ purchase of business/equity shareholding.
- Determining the swap ratio for Merger/Demerger.
- Corporate Restructuring.
- Determine the incentive for acquisition/sale of intangible assets such as brands, trademarks, etc.
- The valuation in condition of family separation requires the ascertainment of value of family owned business & assets.
- The issuance of employee stock option, as per regulations mandates the establishment of fair value of shares.
- Raising of capital via cataloguing of equity shares on stock exchange requires fair valuation of shares.
- Disinvestment of PSU stocks by the Government.
- Estimation of worth of portfolio of investments by venture capital funds or PE funds.
- Liquidation of company
- Other Corporate restructuring

2.0 SOURCES OF INFORMATION
The valuation exercise foremost requires the compilation of maximum relevant information that would assist in the appropriate assessment of share price of a company. Various sources can be referred and leveraged for this purpose such as:

2.1 Historical Results
The performance of the companies in the future can be estimated from their part recital. And the details of the past recitals can be gathered from their annual reports, while specific particulars about their financials requires unearthing of director's reports, management discussions report, CG reports, auditor's report, etc., However, a caution needs to be maintained while reading and interpreting these reports. The studies have observed that the projection of the companies for their future growth as claimed in their reports to be in stark contrast with their actual performance, and also their current growth prospects and opportunities available. Thus, a detailed analysis of their reports with self-estimated risk and growth appraisal serves as the

foremost step in the valuation procedure. Some of the important aspects to be reviewed by a valuation analyst are non-recurring income/ expenditure, non-operating income, tax benefits availed, etc.

2.2 Future Projections
The projection of future flows serves as another aspect to be reviewed by valuation analyst. The sources which can be referred for this purpose are income and balance sheets, details of cash flows generated by the entity, investments, financing, future expected profitability, etc. The analysis must be done for the complete business cycle which can range from one year to three years to 5-7 years in case of heavy engineering producing entities. The assumptions underlying the projected figures must be observed carefully for their reasonability quotient i.e., assumptions must not be unrealistic.
Some of the few errors committed while estimating future projections are:
1. Assuming production higher than underlying capacities without considering the incremental capital cost attached.
2. Considering arbitrary variations in either cost prices of raw material or selling prices of final products.
3. Unreasonable variations in working capital managements
4. Securing tax benefits even after sunset clause as per taxation rules.
5. Arbitrary changes in costing such as manpower cost, etc.

2.3 Discussions with the Management
The open, fair and detailed discussion with management gains importance in the event of defending the valuation being challenged by any entity post the agreement between management and investor. All the significant stakeholders must be engaged for the discussion and interview to gain a 360 degree outlook on the company. Additionally, all the inputs gathered from the management must be chronicled in written for future reference.

2.4 Market Surveys, Other Publicly available data
Numerous sources including market surveys and external media like newspaper and industry reports on company must be explored for the analysis on the company in contrast to relying on a single source of company sponsored and published reports and data. The industry to which the company belong must also be assessed. An updated data must be employed for the analysis which should also be double verified for its accuracy from other websites storing corporate data. An analysis and valuation based on irrelevant data shall yield inconsistent results and losses to the investors.

2.5 Stock Market quotations
Numerous sources provides ample information related to stocks being traded on stock exchange ranging from different prices (opening/ closing price, high price, etc.,) to volume being traded to the announcements related to the stocks. In addition, the analyst/ investor should also be sensitive to the adjustment required in the share prices due to critical announcements such as bonus issue, rights issue, stock split, thinly traded shares, open offers, buy back, etc. Such announcements have been found to have a significant impact on the share prices and their encapsulation holds immense significance during the valuation process.

2.6 Data on Comparable Companies
The valuation process also advocates the comparison between the companies but necessarily and strictly of comparable characteristics. For instance, companies having different geographical features such as one company located near to source of its raw material and another company positioned far off from its raw material source makes them incomparable. Similarly, companies adhering to different capital structures or different investment decisions also make them incomparable.
Subsequent to the detailed understanding of characteristics relevant for valuation, different methods of valuation are explored in the following section.

3. OBJECTIVE
The objective of the paper is to analyses the various valuation methodology namely Discounted Cash Flows method, Price Multiplies and more recently Real Option valuation tool. The approach is descriptive in nature. The papers discuss in detail the valuation methodology of all the three methods.

4. ANALYSIS OF VARIOUS METHODS OF VALUATION
4.1 Discounted Cash Flow Valuation: t
In his paper, he provides the formula for calculating the value of stock of firm using the formula:

$$Value = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}$$

Here, CF_t = Cash flow in period t

r = discount rate given the riskiness of the cash flow

t = the life of the asset

He also made two propositions in his paper:

Proposition 1: For an asset to have value, the expected cash flows have to be positive sometime over the life of the asset.

Proposition 2: Assets that generate cash flows early in their life will be worth more than assets that generate cash flows later; the latter may however have greater growth and higher cash flows to compensate.

In his paper, he defines the meaning or firm and equity valuation. According to him, firm valuation helps in obtaining the value of the firm which is calculated by discounting the expected cash flows to the firm, i.e., the residual cash flows after meeting all operating expenses and taxes, but prior to debt payments, at the weighted average cost of capital, which is the average cost of distinct sources of capital employed by the firm, weighted by their market value proportions.

The DCF method is used to value a firm. DCF value depends on the present value of the cash flows generated with an asset. The approach requires three main steps: Modeling plausible future cash flows for the short-to-medium term horizon, estimating the terminal value and determining the appropriate discount rate. The sum of the discounted cash flows equals the total value of the asset. By subtracting the initial investment outlay from the asset value, net present value (NPV) of the project is calculated, which corresponds to the economic value generated along the lifespan of the asset.

Based on analysis of the historical financial performance and the current economic environment, the expected Free Cash Flows (FCF) over the life of the project under valuation is estimated. The FCFs are those liquid funds which are available for distribution to the debt and equity holders of the organization after the investment in working capital and fixed assets were carried out. As the level of precision for the cash flow projections diminishes over an extended planning horizon, appraisers resolve this problem by assuming a constant cash flow on a plausible, sustainable level after a pre-specified amount of years.

This is coherent with the assumption that all companies will eventually reach a stable state and generate constant cash flows which are essentially perpetuity and can be valued as such. The present value of these perpetual cash flows, the so-called terminal value, is then discounted together with the free cash flows back to the actual valuation data with an adequate rate of return, which corresponds to the risks associated with the investment. The sum of these discounted values equals the asset's total value. If the project is partly debt financed, the market value of the debt obligations at the valuation date needs to be subtracted to determine the equity value.

4.1.1 Projecting the Cash Flows

The initial decision when forecasting cash flows is to settle on the length of the extraordinary growth period, i.e. after how many years the company is expected to generate a stable level of cash flows. Depending on firm-specific characteristics like the size (smaller firms are more likely to grow for a longer period of time than large ones), the market potential, the current growth rate (firms which are already experiencing rapid growth are more likely to continue to do so) and the sustainability of a competitive advantage, which is necessary to generate consistent growth, the length of the extraordinary growth period can range from 0 to 15 years (Damodaran, 2006). For this planning horizon the annual FCFs are forecasted with a high level of detail.

Usually, as a first reference point, the recent financial performance, especially sales or revenue growth as well as the other value drivers are analyzed instead of starting from scratch. Although the explanatory power of historical growth in regard to future growth is doubted, this analysis can be expected to reveal valuable information on how the company performed and why it was successful or not (Brealey et al., 2006). An analysis of the recent macroeconomic conditions provides further information, as the financial results can only be evaluated in the economic context. Profits or losses from economic boom phases or recessions have to be adjusted to correspond to a more balanced scenario.

4.1.2 Terminal Value Estimation

The Terminal Value corresponds to the present value of all future cash flows which are generated after the detailed planning horizon. There are two different methods of estimating the terminal value under a going concern premise (in contrast to a liquidation premise, where the selling value of the company's accumulated assets would represent the terminal value). One uses a Multiple factor to earnings, revenues or book values. The other approach assumes that the cash flow in the last year of the detailed planning horizon will grow at a constant rate forever. This cash flow stream can be valued using a perpetual growth model:

$$(\text{Terminal value})_t = \text{Cash flow}_{t+1} / (r - g_{\text{Stable}})$$

Where *r* equals the company's discount rate and g_{Stable} is the rate with which the cash flows will grow each year. Depending on the company under valuation, a no-growth ($g_{\text{Stable}} = 0$) or negative growth scenario ($g_{\text{Stable}} < 0$) can also be appropriate.

4.1.3 Deriving the Discount Rate - the Capital Asset Pricing Model
During a DCF valuation, the riskiness of the investment is reflected by the discount rate. It corresponds to the rate of return that investors could expect from an alternative investment which yields cash flows with the same risk pattern. Risk in the valuation context addresses the likelihood of getting a return on the investment which deviates from the expected level. The deviation can either be positive for the investor (the so-called upside risk) as well as negative (downside-risk) and both tendencies are equally considered.

$$\beta_i = \frac{\text{Cov}\left(R_i, R_M\right)}{\text{Var}\left(R_M\right)}$$

$$E\left(R_i\right) = R_f + \beta_i \left[E\left(R_M\right) - R_f\right]$$

According to the CAPM, the expected return for an asset is determined by the rate which investors could expect without taking any risks, plus an individual risk premium. This risk premium depends on the general level of market risk and a factor which measures a stock's exposure to market risk. In the CAPM formula r_f denotes the so-called risk-free rate, which is the expected return from a riskless investment, i.e. where the expected return is known with certainty. In practice, highly-liquid long-term sovereign bonds issued by governments with excellent ratings are considered as risk-free investments and their yields (either current or historical averages) are used. r_M is the average return holders of the market portfolio can expect. Thus the term *(r_M- r_f)*, the so-called Market Risk Premium, measures the extra return investors expect for investing their funds in an asset with average risk (called the market portfolio) instead of the risk-free investment.

4.1.4 SOTP Valuation
Most large companies operate in more than one business. Valuing a diversified company requires separate valuations for each of its businesses and for the corporate headquarters. This method of valuing a company by parts and then adding them up is known as Sum-Of- Parts (SOP) valuation and is commonly used in practice by stock market analysts and companies themselves. Valuing a company by determining what its divisions would be worth if it was broken up and spun off or acquired by another company. Let us understand Sum of Parts valuation using an example of a large conglomerate company (ticker MOJO) operates the following business segments,

There are certain advantages and disadvantages of DCF model which is tabulated below

Advantages	Disadvantages
Theoretically DCF is the soundest method of valuation DCF method is forward-looking, it depends largely on future expectations rather than historical results DCF method is inward-looking, it relies on the fundamental expectations of the business and is influenced to a lesser extent by volatile external factors DCF analysis is focused on cash flow generation and is less affected by accounting practices and assumptions DCF method allows expected operating strategies to be factored into the valuation	The accuracy of the valuation is highly dependent on the quality of the assumptions of FCF, TV & discount rate DCF valuations are expressed as a range of values rather than a single value by using a range of values for key inputs. While the inputs come from a variety of sources, they must be viewed objectively in the aggregate before finalizing the DCF valuation The TV often represents a large percentage of the total DCF valuation. Valuation therefore is largely dependent on TV assumptions rather than operating assumptions for the business or the asset

4.2 Multiple Method
4.2.1 EBITDA Multiple
It is also known as "price-to-EBIDTA multiple", or "enterprise multiple". It is equal to the ratio of value of capital employed (also called enterprise value) to EBIDTA. EBITDA multiple can be computed as:

$$\frac{EV}{EBITDA\ Multiple} = \frac{Enterprise\ Value}{EBITDA}$$
$$= \frac{Market\ Value\ of\ Equity\ +\ Market\ Value\ of\ Debt}{(Earnings\ before\ Interest, Taxes, Depreciation\ \&\ Amortisation)}$$

The substantial differences appearing in depreciation methods are eradicated by this method of EBITDA multiple. It finds frequent employment by analysts for the valuation of capital intensive industries.

A potential acquirer approach is adopted for the valuation of a company through EBITDA multiple method since it considers debt component too in its valuation, a component ignored by other multiples such as P/E ratio, etc.

4.2.2 Sales Multiple Method
It is a frequently used method employed for business valuation which also serves as a yardstick for comparing the values obtained from other methods. This method thus facilitates the cross-checking of values for inter-company comparison belonging to same industry or comparison between the companies with the industry in general.

Sales multiple is equal to the ratio of value of capital employed (enterprise value) to Sales. This method is easy to understand and use.

4.2.3 Market Based Approach
The Market Price Method appraises the value of the company basis the price of its shares on stock exchange. The share price is a reflection of true value of the company as assessed by the investors. This method advocates the employment of average of share price over adequately long period to eliminate the influence of speculative activity during the period of valuation of the company. Similarly, the impact of bonus share or rights share issuance also merits attention of the investor or valuation analyst.

Price-to-earnings ratio, also known as earnings multiple is the most popular price multiple method of valuation. It is defined as the ratio of market price of share of the firm divided by its earnings per share (EPS) for the latest 12 months. Its significance arises from its ability to relay the market's expectation of firm's future performance via "price" component vis-à-vis firm's authentic latest earning's performance. In simple terms, it reveals the price an investor agrees to pay for every unit (Rs. or $) increase in the earnings of a company. For instance, PE ratio of Rs10 means that investors are ready to pay Rs10 for every current or future earnings of Re1. Thus, higher expectation of company's performance by the market drives up the earnings multiple for the investors in anticipation of higher future earnings. This is so because an investor gets compensated for their investments in firm in the form of appreciated dividend and capital gain or either form.

P/E Ratio= Market Price per Share / Earning Per Share
4. 3 Real Option Valuation
For calculating the value Black-Scholes model (Damodaran, 2000) was used.

$$ROV = S.e^{-qt}.N(d_1) - K.e^{-r_f t}.N(d_2)$$

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + (r_f - y + \sigma^2)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

Equ 2

The model is essentially divided into two parts: the first part, *SN(d1)*, multiplies the price by the change in the call premium in relation to a change in the underlying price. This part of the formula shows the expected benefit of purchasing the underlying outright. The second part, *N(d2)Ke^(-rt)*, provides the current value of paying the exercise price upon expiration (remember, the Black-Scholes model applies to European options that are exercisable only on expiration day). The value of the option is calculated by taking the difference between the two parts, as shown in the equation.

N(d1) & N(d2) are normal cumulative distributions which gives the range of the likelihood of the real option being viable before expiration date.

N(d2) : is the probability that the call will be exercised provided one assumes that the asset drift is the risk-free rate.
N(d1) : The present value, using the risk-free interest rate, of the expected asset price at expiration, given that the asset price at expiration is above the exercise price
Value of the underlying asset = S = Value of the firm
Exercise price = K = Face Value of outstanding debt
Life of the option = t = Life of zero-coupon debt
Variance in the value of the underlying asset = s2 = Variance in firm value
q = dividend yield
Riskless rate = r = GOI bond rate corresponding to option life

The above variables used in the model are described below. Value of underlying asset or value of firm can be estimated in three ways
- I.   Cumulate market values of equity and debt (or)
- II. Value the firm using FCFF and WACC (or)
- III. Cumulated market value of assets

All the three methods were used to value the firm. Since debt of this company is not traded the market value of debt is treated as the book value of the debt.

4.3.1 Variance in Firm Value
One can obtain the variance in firm value directly if both stocks and bonds in the firm are traded. Defining e2 as the variance in the stock price and   d2 as the variance in the bond price, 'we' as the market-value weight of equity and 'wd' as the market-value weight of debt, one can write the variance in firm value as
s2 = Variance in firm value
s2firm = we2 se2 + wd2 sd2 + 2 we wd se2 sd2   ed
Where se2 = variance in the stock price 'we' = MV weight of Equity
      sd2 = the variance in the bond price 'wd' = MV weight of debt
Where   ed is the correlation between the stock and the bond prices
Since debt is not traded its standard deviation is assumed to be zero.
So s2firm = we2 se2

4.3.2 Maturity of the debt
Most firms have more than one debt issue on their books and much of the debt comes with coupons. Since the option pricing model allows for only one input for the time to expiration, we have to convert these multiple bonds issues and coupon payments into one equivalent zero-coupon bond.

The paper uses Face value weighted duration of bonds outstanding or weighted maturity of the debt on the balance sheet to come out with the maturity of the debt. Rf – risk free rate on government bonds which is currently 8.5%

4.3.3 Face Value of Debt
When a distressed firm has multiple debt issues outstanding, there are three choices when it comes to what we use as the face value of debt
- One can add up the principal due on all of the debt of the firm and consider it to be the face value of the hypothetical zero coupon bonds that one assumes that the firm has issued. The limitation of this approach is that it will understate what the firm will truly have to pay out over the life of the debt, since there will be coupon payments and interest payments during the period.
- At the other extreme, we could add the expected interest and coupon payments that will come due on the debt to the principal payments to come up with a cumulated face value of debt. Since the interest payments occur in the near years and the principal payments are due only when the debt comes due, we are mixing cash flows up at different points in time. This is, however, the simplest approach of dealing with intermediate interest payments coming due.

The paper uses the first method where one considers the Principal payments.

5. CONCLUSION

The paper concludes that simple average of all the three methods gives more accurate results of valuating a company rather than relying on one single method. All the three methods are based on certain assumptions. The DCF method is very sensitive to the set of assumptions taken. This method is also very sensitive to growth rate in high periods, growth rate in terminal period and also to what extend the projected income statements are prepared. The real option method has its own set of problems like calculation of duration of the debt etc.. The multiple methods again depend upon the competitors. It is a known fact that no two companies are alike. Hence all the methods are correct. Which one is to use depends upon the objective of the user.

BIBLIOGRAPHY
1. Brealey, R. A., Myers, S. C., & Allen, F. (2006). Corporate Finance (Eight Edition ed.). McGraw-Hill.
2. Damodaran, A. (2000). The Promise of Real Options. Journal of Applied Corporate Finance, 13(2).
3. Damodaran, A. (2006, November). Valuation Approaches and Metrics: A Survey of the Theory and Evidence. Retrieved2015,from Stern School of Business, NYU: http://people.stern.nyu.edu / adamoda / pdfiles / Papers /valuesurvey. pdf