CHAPTER II

LITERATURE REVIEW

2.1. Value Definition and Concept

Every asset, financial as well as real has a value. The key to successfully investing and managing these assets lies in understanding not only what the value is but also the source of the value. Any asset can be valued, but some assets are easier to value than others and the details of valuation will vary from case to case. Thus, the valuation of a share of a real estate property for example will require different information and follow a different format than the valuation of a publicly traded stock.

What, then, is value? Quoted from Jim Horvath presentation on Indonesian Society of Appraisers September (MAPPI) 2007, Delloitt and Touch LLP about value definition from several experts, value could be defined as :

"Value is a word of many meanings"

- Justice Louis D. Brandeis

"Price is what you pay. Value is what you get."

- Warren Buffett

"The cynic knows the price of everything and the Value of nothing."

- Oscar Wilde

When does an article or commodity possess value? Something possesses value when it is an object of man's desire, and can be obtained only by man's efforts. Anything upon which these two conditions unite will have value that is a power in exchange. In other words value is the exchange power which one commodity or service has in relation to another. Referenceforbusiness.com, 2010. Value Creation. Available at http://www.referenceforbusiness.com/management/Tr-Z/Value-Creation.html (accessed December 2010)

An object to possess value, must be desired by someone who is willing to render a service or equivalent in order to obtain it, for the reason that he cannot have it without. It is what a man gets, what another will give, that determines value. Other perspectives on value serve as the foundation for the variety of valuation models available to the equity analyst. Intrinsic value is the necessary starting point, but other concepts of value such going concern value, liquidation value, and fair value are also important.

According to Pinto, Henry, and Robinson, Stowe, 2010, p.2-4, a value can be breakdown into :

1. *Intrinsic Value*

   The intrinsic value of any asset is the value of the asset given a hypothetically complete understanding of the asset's investment characteristics.

   An important theoretical counter to the notion that market price and intrinsic value are identical can be found in the Grossman-Stiglitz paradox. If market prices, which are essentially freely obtainable, perfectly reflect a security's intrinsic value, then a rational investor would not incur the costs of obtaining and

analyzing information to obtain a second estimate of the security's value. If no investor obtains and analyzes information about a security, however, then how can the market price reflect the security's intrinsic value? The rational efficient markets formulation (Grossman and Stiglitz, 1980) recognizes that investors will not rationally incur the expenses of gathering information unless they expect to be rewarded by higher gross returns compared with the free alternative of accepting the market price.

Furthermore, modern theorists recognize that when intrinsic value is difficult to determine, as is the case for common stock, and when trading costs exist, even further room exists for price to diverge from value (Lee, Myers, and Swaminathan, 1999).

2. *Going Concern Value*

The going concern value of a company is its value under a going concern assumption. A company generally has one value if it is to be immediately dissolved and another value if it will continue in operation. In estimating value, a going concern assumption is the assumption that the company will continue its business activities into the foreseeable future.

3. *Liquidation Value*

An alternative to a company's going concern value is its value if it were dissolved and its assets sold individually, known as its liquidation value.

4. *Fair Market Value*

Fair market value is the price at which an asset (or liability) would change hands between a willing buyer and a willing seller when the former is not under any compulsion to buy and the latter is not under any compulsion to sell.

5. *Investment Value*

The concept of value to a specific buyer taking account of potential synergies and based on the investor's requirements and expectations is called investment value.

There are many areas in valuation where there is room for disagreement, including how to estimate true value and how long it will take for prices to adjust to true value. But there is one point on which there can be no disagreement. Asset prices cannot be justified by merely using the argument that there will be other investors around willing to pay a higher price in the future.

The guiding principle of value creation is that companies create value by using capital they raise from investors to generate future cash flows at rates of return exceeding the cost of capital (the rate investors require as payment). The faster companies can increase their revenues and deploy more capital at attractive rates of return, the more value they create. The combination of growth and return on invested capital (ROIC) relative to its cost is what drives value. Companies can sustain strong growth and high returns on invested capital only if they have a well-defined competitive advantage. This is how competitive advantage, the core concept of business strategy, links to the guiding principle of value creation. (Koller, Goedhart, David, 2010).

According to Koller, the value of a company is determined by its discounted future cash flow. Value is created when companies invest capital at returns that exceed that cost of capital (Koller, 1994, p.87)

The value of a firm can generally be considered a function of four key inputs (Damodaran, 2002, p.25) :

1. First is the cash flow from assets in place or investments already made.
2. Second is the expected growth rate in the cash flows during what we can term a period of both high growth and excess returns (where the firm earns more than its cost of capital on its investments)
3. Third is the length of time before the firm becomes a stable growth firm earning no excess returns
4. The final input is the discount rate reflecting both the risk of the investment.

Value is determined based on expected cash flows of the company and riskiness of these expected cash flows. The risk determines the discount rate. Both the cash flows and the risk are determined based on forecasts. Forecasts are inherently uncertain, since they relate to future events and are based on assumptions which may not remain valid for the whole of the relevant period. Unanticipated events and circumstances could occur which may materially alter the conclusions. The challenge of making appropriate forecast gets tougher for new companies, products or innovations. The valuation of unquoted companies is not an exact science and the conclusions arrived at in many cases will be subjective and dependant on the exercise of individual judgment. (Carter, Ejara, 2008, p.58-76).

There are some reasons why we value of a value (Copeland, 1994, p.103-104) :

1. First in discounted cash flow model value is the best metric to oversee a company's performance.
2. Second shareholders' ultimate goal is seeking the maximal value of a firm for their own claim which simultaneously maximizes everyone's claim.
3. Finally when companies fail to perform they would find that capital flow will fly from them towards their competitors

2.2. Spinoffs

A corporate spinoff divides a company into two or more independent firms and offers a firm an opportunity to improve managerial incentives with fresh compensation packages directly tied to its own stock price (Pyo, 2007, p.341)

A corporate spinoffs themselves act as incentives for divisional managers because the stock value of a diversified parent firm is a noisy signal of the productivity of any division and that of a spinoff subsidiary reflects a cleaner measure of the performance of a division (Aron, 1991, p.505-518)

2.3. Valuation Model

Many analysts use a wide range of models to value assets in practice, ranging from the simple to the sophisticated. These models often make very different

assumptions about pricing, but they do share some common characteristics and can be classified in broader terms.

According to Damodaran, in general terms, there are three approaches to valuation (Damodaran, 2002) :

1. *Discounted Cash Flow Valuation*

   Discounted Cash Flow relates the value of an asset to the present value of expected future cash flows on that asset. Further discussion about DCF will be elaborate in next sub chapter 2.3.3 and writer will be use this method for calculation

2. *Relative Valuation*

   Relative valuation estimates the value of an asset by looking at the pricing of 'comparable' assets relative to a common variable such as earnings, cash flows, book value or sales.

   There are three multiple approach of relative valuation :

   a. First, the use of an industry-average price-earnings ratio to value a firm. This assumes that the other firms in the industry are comparable to the firm being valued and that the market, on average, prices these firms correctly.
   b. Second, the price to book value ratio, with firms selling at a discount on book value, relative to comparable firms, being considered undervalued.
   c. Third, the multiple of price to sales is also used to value firms, with the average price-sales ratios of firms with similar characteristics being used for comparison.

3. Contingent Claim Valuation (Real Option)

Contingent claim valuation uses option pricing models to measure the value of assets that share option characteristics. Some of these assets are traded financial assets like warrants, and some of these options are not traded and are based on real assets – projects, patents and oil reserves are examples. The latter are often called real options.

Approach for contingent claim or option pays off only under certain contingencies - if the value of the underlying asset exceeds a pre-specified value for a call option, or is less than a pre-specified value for a put option.

An option can be valued as a function of the following variables - the current value, the variance in value of the underlying asset, the strike price, the time to expiration of the option and the riskless interest rate. This was first established by Black and Scholes (1972). While the Black-Scholes option pricing model ignored dividends and assumed that options would not be exercised early, it can be modified to allow for both.

A discrete-time variant, the binomial option pricing model, has also been developed to price options. An asset can be valued as an option if the payoffs are a function of the value of an underlying asset. It can be valued as a call option if the payoff is contingent on the value of the asset exceeding a pre-specified level. It can be valued as a put option if the payoff increases as the value of the underlying asset drops below a pre-specified level.

The following diagram illustrates the payoffs on call and put options as a function of the value of the underlying assets :

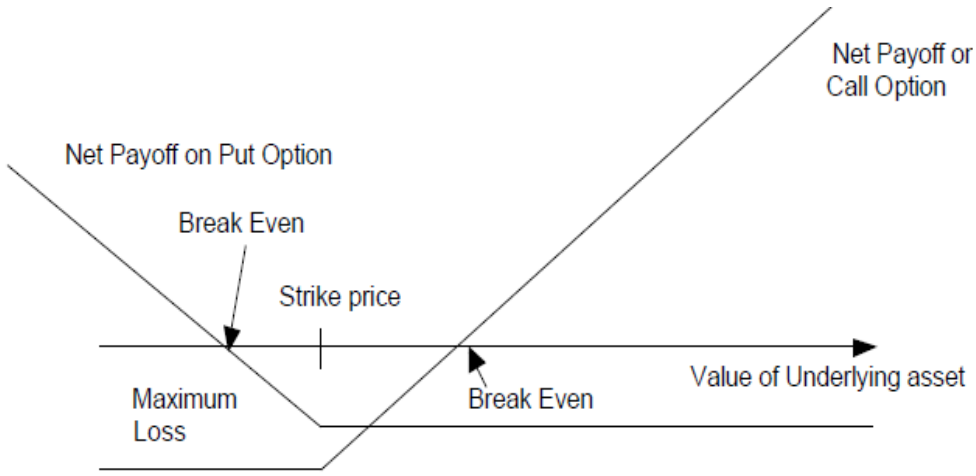

Figure 2.1 Payoff Diagram on Call and Put Option

2.3.1. Valuation Process

According to Pinto, Henry, Robinson, Stowe (2010, p 7-8) a valuation process generally can be synthesized as follow :

1. *Understanding the Business.*

   Industry and competitive analysis, together with an analysis of financial statements and other company disclosures, provides a basis for forecasting company performance.

   To forecast a company's financial performance that will in turn, determine the value of an investment in the company or its securities, it is helpful to understand the economic and industry context in which the company operates, the company ' s strategy, and the company's previous financial performance.

2. *Forecasting Company Performance.*

Forecasts of sales, earnings, dividends, and financial position (proforma analysis) provide the inputs for most valuation models. A forecasting company performance can be viewed from two perspectives, the economic environment in which the company operates and the company's own operating and financial characteristics. In general, analysts integrate insights from industry and competitive analysis with financial statement analysis to formulate specific forecasts of such items as a company's sales, earnings, and cash flow. Analysts generally consider qualitative as well as quantitative factors in financial forecasting and valuation.

3. *Selecting the Appropriate Valuation Model.*

Depending on the characteristics of the company and the context of valuation, some valuation models will be more appropriate than others. Some valuation models those commonly used while doing valuation such as absolute valuation, relative valuation, valuation of the total entity and its components.

There are three broad criteria for model selection :

- Consistent with the characteristics of the company being valued.
- Appropriate given the availability and quality of data.
- Consistent with the purpose of valuation, including the analyst's perspective.

4. *Converting Forecasts to a Valuation.*

Converting forecasts to valuation involves more than inputting the forecast amounts to a model to obtain an estimate of the value of a company or its

securities. Two important aspects of converting forecasts to valuation are sensitivity analysis and situational adjustments. Sensitivity analysis is an analysis to determine how changes in an assumed input would affect the outcome. On the other side situational adjustments may be required to incorporate the valuation impact of specific issues.

5. *Applying the Valuation Conclusions.*

Depending on the purpose, an analyst may use the valuation conclusions to make an investment recommendation about a particular stock, provide an opinion about the price of a transaction, or evaluate the economic merits of a potential strategic investment.

2.3.2. Component in Valuing a Firm

While doing valuation of company, we will find many terminologies that we need to have strong understanding of those terms in order to get reliable valuation. Free cash flow as one of the component in doing valuation of a company plays important role.

Quoting from Investopedia.com, 2010, Free Cash Flow. Available at http://www.investopedia.com/terms/f/freecashflow.asp, free cash flow is defined :

"*Free cash flow (FCF) represents the cash that a company is able to generate after laying out the money required to maintain or expand its asset base. Free cash*

flow is important because it allows a company to pursue opportunities that enhance shareholder value."

To do valuation we require financial statements such balance sheet, income statement, cash flow statement. From financial statements we can obtain data to be incorporated into formula for calculating free cash flow to equity (FCFE). After calculating FCFE we can calculate value of free cash flow to firm (FCFF). Then we calculate weighted average cost of capital (WACC). To calculate WACC we need to know the degree of leverage which shows the proportion of total debt to total capital. Other parameter should be calculated such cost of equity (k_e), cost of debt (k_d) and beta (β)

2.3.2.1 Terminal Value

Since we cannot estimate cash flows forever, we generally impose closure in discounted cash flow valuation by stopping estimation of cash flows sometime in the future and then computing a terminal value that reflects the value of the firm at that point.

Damodaran in his book Investment Valuation 2nd edition (Damodaran, 2002) defined the firm value formula as : (2.1)

$$\text{Value of firm} = \sum_{t=1}^{t=n} \frac{\text{CF to Firm}_t}{(1 + \text{WACC})^t} + \frac{\text{Terminal Value}_n}{(1 + \text{WACC})^n}$$

We can find the terminal value in one of three ways.

a. Assume a liquidation of the firm's assets in the terminal year and estimate what others would pay for the assets that the firm has accumulated at that point.

   There are two ways in which the liquidation value can be estimated :

   a.1 Base on the book value of the assets, adjusted for any inflation during the period. The formula is shown as : (2.2)

   $$\text{Expected Liquidation value} = \text{Book Value of Assets}_{\text{Term yr}} (1+ \text{inflation rate})^{\text{Average life of assets}}$$

   a.2 The alternative approach is to estimate the value based upon the earning power of the assets. To make this estimate, we would first have to estimate the expected cash flows from the assets and then discount these cash flows back to the present, using an appropriate discount rate.

b. Value the firm as a going concern at the time of the terminal value estimation by applying a multiple to earnings, revenues or book value to estimate the value in the terminal year. In this approach, the value of a firm in a future year is estimated by applying a multiple to the firm's earnings or revenues in that year. For instance, a firm with expected revenues of $6 billion ten years from now will have an estimated terminal value in that year of $12 billion if a value to sales multiple of 2 is used. When valuing equity, we use equity multiples such as price earnings ratios to arrive at the terminal value.

c. Assume that the cash flows of the firm will grow at a constant rate forever a stable growth rate. With stable growth, the terminal value can be estimated using a perpetual growth model.

c.1. If we assume that cash flows, beyond the terminal year, will grow at a constant rate forever, the terminal value can be estimated as :

$$\text{Terminal Value}_t = \frac{\text{Cash Flow}_{t+1}}{r - g_{stable}} \quad (2.3)$$

c.2. If we are valuing the equity, the terminal value of equity can be written as :

$$\text{Terminal value of Equity}_n = \frac{\text{Cashflow to Equity}_{n+1}}{\text{Cost of Equity}_{n+1} - g_n} \quad (2.4)$$

The cash flow to equity can be defined strictly as dividends (in the dividend discount model) or as free cash flow to equity.

c.3. If valuing a firm, the terminal value can be written as :

$$\text{Terminal value}_n = \frac{\text{Cashflow to Firm}_{n+1}}{\text{Cost of Capital}_{n+1} - g_n} \quad (2.5)$$

The fact that a stable growth rate is constant forever, however, puts strong constraints on how high it can be. Since no firm can grow forever at a rate higher than the growth rate of the economy in which it operates, the constant growth rate cannot be greater than the overall growth rate of the economy. In making a judgment on what the limits on stable growth rate are, we have to consider the following questions :

- Is the company constrained to operate as a domestic company or does it operate (or have the capacity) to operate multi-nationally? If a firm is a purely domestic company, the growth rate in the domestic economy will be the

limiting value. If the company is a multinational or has aspirations to be one, the growth rate in the global economy will be the limiting value.

- Is the valuation being done in nominal or real terms? If the valuation is a nominal valuation, the stable growth rate should also be a nominal growth rate, i.e. include an expected inflation component. If the valuation is a real valuation, the stable growth rate will be constrained to be lower.
- What currency is being used to estimate cash flows and discount rates in the valuation? The limits on stable growth will vary depending upon what currency is used in the valuation. If a high-inflation currency is used to estimate cash flows and discount rates, the limits on stable growth will be much higher, since the expected inflation rate is added on to real growth. If a low-inflation currency is used to estimate cash flows, the limits on stable growth will be much lower.

2.3.2.2 Free Cash Flow to a Firm

According to Damodaran (Damodaran 2002), the free cash flow to the firm is the sum of the cash flows to all claim holders in the firm, including stockholders, bondholders and preferred stockholders.

There are two ways of measuring the free cash flow to the firm (FCFF).

1. One is to add up the cash flows to the claim holders, which would include cash flows to equity (defined either as free cash flow to equity or dividends),

cash flows to lenders (which would include principal payments, interest expenses and new debt issues) and cash flows to preferred stockholders (usually preferred dividends). (2.6)

Free Cash Flow to Firm (FCFF) =

Free Cash flow to Equity + Interest Expense (1-tax rate) + Principal Repayments - New Debt Issues + Preferred Dividends

2. A simpler way of getting to free cash flow to the firm is to estimate the cash flows prior to any of these claims. Thus, we could begin with the earnings before interest and taxes, net out taxes and reinvestment needs and arrive at an estimate of the free cash flow to the firm. (2.7)

Free Cash Flow to Firm (FCFF) =

EBIT (1-tax rate) + Depreciation - Capital Expenditure - Δ Working Capital

Since this cash flow is prior to debt payments, it is often referred to as an unlevered cash flow.

2.3.2.3 Free Cash Flow to Equity

To estimate how much cash a firm can afford to return to its stockholders, we begin with the net income the accounting measure of the stockholders' earnings during the period and convert it to a cash flow by subtracting out a firm's reinvestment needs. (Damodaran 2002)

- First, any capital expenditures, defined broadly to include acquisitions, are subtracted from the net income, since they represent cash outflows. Depreciation and amortization, on the other hand, are added back in because they are non-cash charges. The difference between capital expenditures and depreciation is referred to as *net capital expenditures* and is usually a function of the growth characteristics of the firm.
- Second, increases in working capital drain a firm's cash flows, while decreases in working capital increase the cash flows available to equity investors. Firms that are growing fast, in industries with high working capital requirements (retailing, for instance), typically have large increases in working capital.
- Finally, equity investors also have to consider the effect of changes in the levels of debt on their cash flows. Repaying the principal on existing debt represents a cash outflow; but the debt repayment may be fully or partially financed by the issue of new debt, which is a cash inflow. Again, netting the

repayment of old debt against the new debt issues provides a measure of the cash flow effects of changes in debt.

Allowing for the cash flow effects of net capital expenditures, changes in working capital and net changes in debt on equity investors, we can define the cash flows left over after these changes as the free cash flow to equity (FCFE). (2.8)

Free Cash Flow to Equity (FCFE) =

Net Income - (Capital Expenditures – Depreciation) - (Change in Non-cash Working Capital) + (New Debt Issued - Debt Repayments)

2.3.2.4 Cost of Debt

The cost of debt measures the current cost to the firm of borrowing funds to finance projects. In general terms, it is determined by the following variables (Damodaran, 2002) :

1. The riskless rate

   As the riskless increases, the cost of debt for firms will also increase.

2. The default risk (and associated default spread) of the company

   As the default risk of a firm increases, the cost of borrowing money will also increase.

3. The tax advantage associated with debt

   Since interest is tax deductible, the after-tax cost of debt is a function of the tax rate. The tax benefit that accrues from paying interest makes the after-tax cost of debt lower than the pre-tax cost. Furthermore, this benefit increases as the tax rate increases.

   The formula is shown as : (2.9)

After-tax cost of debt = *Pre-tax cost of debt (1 - tax rate)*

2.3.2.5 Cost of Equity

The cost of equity is the rate of return investors require on an equity investment in a firm. The risk and return models described a riskless rate and a risk premium (in the CAPM) or premiums (in the APM and multi-factor models). They also need measures of a firm's exposure to market risk in the form of betas. These inputs are used to arrive at an expected return on an equity investment using the CAPM. The formula is shown as :

$$E(R_i) = R_f + \beta_i (E(R_m) - R_f)$$

where,

$E(R_i)$ = Expected Return on asset i

R_f = Risk-free Rate

$E(R_m)$ = Expected Return on market portfolio

β_i = Beta of investment i

(2.10)

This expected return to equity investors includes compensation for the market risk in the investment and is the cost of equity. To calculate risk and return, Capital Asset Pricing Model (CAPM) is the most widely model used in valuation. CAPM provides a basis for determining the investor's required rate of return from investing in common stock. There are three elements while using CAPM :

1. Risk free rate (k_{rf})
2. The systematic risk of the common stock returns to the market as a whole (beta coefficient, β)
3. Market risk premium which equal to the difference in expected rate of return for the market as a whole, that is the expected rate of return "average security" minus the risk free rate ($k_m - k_{rf}$)

According to Damodaran, there are few assumptions used while using CAPM calculation :

1. The capital asset pricing model assumes that there are no transactions costs, all assets are traded and investments are infinitely divisible.
2. It also assumes that everyone has access to the same information and that investors therefore cannot find under or overvalued assets in the market place.

The CAPM is derived from the capital market. It attempts to provide a measure of market relationship based on the theory of expected return if investors behave in the manner prescribe by portfolio theory.

Another perspective about CAPM as we can find in the journal, Paulo commented some factors that should be considered when making investment decisions. According to Paulo, analysis, valuations, and decisions that contribute to

the success of the company invariably are dependent at some stage on a reliable and valid cost of capital when making investment, financing, and dividend decisions (Paulo S. 2010, p.253-264).

The capital asset pricing model (henceforth CAPM) is widely used to calculate the cost of capital, expected rates of return, and to evaluate the performance of management (Fama and French, 2004, pp. 25, 26, 43, 44), and has been described as: ‘‘. . . the centre piece of MBA investment courses’’ (Fama and French, 2004, p. 25). Empirical investigation over many decades has failed to validate the CAPM (Fama and French, 2004); accordingly, it should not be used to calculate the cost of capital, expected rates of return, or to evaluate managerial performance (Fama and French, 1996, 2004).

2.3.2.6 Beta

Beta measures the volatility of the excess return on those individual securities relative to that of the market as a whole. Securities with beta bigger than 1.0 are considered more risky, on the other hand securities with beta less than 1.0 are considered more conservative investment.

The calculate beta, the formula is shown as follow (Damodaran, 2002) :

$$\text{Beta of an asset i} = \frac{\text{Covariance of asset i with Market Portfolio}}{\text{Variance of the Market Portfolio}} = \frac{Cov_{im}}{\sigma_m^2} \qquad (2.11)$$

According to Hitchner, 2006, a firm beta is determined by :

1. *Type of business where the company operates.*

   The more sensitive the firms to market condition, the higher beta value. Cyclical companies are expected to have higher beta than non-cyclical companies, assuming other factors are being equal (ceteris paribus).

2. *Degree of Operating Leverage (DOL) of the company*

   The firm with high operating leverage which has a high fixed cost relative to the total cost, will have variability in EBIT compared with a company that produces the same product with low operating leverage. The higher variance in EBIT will cause a higher beta for the company that has high operating leverage, assuming other factors are being equal.

3. *Degree Financial Leverage*

   Assuming other factors being equal, the increase in DFL will increase the equity of the company's beta. Logically we can conclude that debt interest payments will increase the variance of the company's net income.

Beta is a measure of the systematic (non-diversifiable) risk of a stock or sector index. A company's beta indicates how much its stock is expected to move in relation to the market as a whole. A beta is greater than 1 suggest that the stock will move in the same direction as the market but by a greater amount. The larger company's or sector's beta, it is argued, the greater the returns investor expects and hence the greater cost of capital. (Anema, Goedhart, 2003, no.1, p.6-9).

2.3.2.7 WACC

Weighted average cost of capital (WACC) is the blended cost of the company's capital structure, each weighted by the market value of that capital component. The use of WACC method to determine value can be appropriate when the objective is to value the entire capital structure of the enterprise or invested capital (Hitchner, 2006)

A company's WACC is calculated in three steps (Hitchner, 2006) :

1. Determine the proportionate weighting of each source of capital financing based on their market values.
2. Calculate the after tax rate of return (cost) of each source.
3. Calculate the weighted average cost of all sources.

WACC formula can be shown as : (2.12)

$$\text{WACC} = (\text{Cost of Equity})\left(\frac{\text{Equity}}{\text{Equity} + \text{Debt}}\right) + (\text{After - tax Cost of Debt})\left(\frac{\text{Debt}}{\text{Equity} + \text{Debt}}\right)$$

2.3.3 D C F Analysis

Intuitively, the value of any asset should be a function of three variables : how much the asset generates in cash flows, when these cash flows are expected to occur, and what uncertainty is associated with these cash flows. Discounted cash flow valuation brings all three of these variables together by computing the value of any

asset to be the present value of its expected future cash flows. (Carter, Ejara, 2008, p.58-76).

DCF analysis involves estimating the cash flow associated with the company and then discounting those cash flow by a discount rate commensurate with their risk level (Lie, Lie, 2002, p.44)

Another perspective of discounted cash flow (DCF) analysis, sometimes operationalized as the capitalization of forecasted earnings or dividends. DCF analysis is not the sole equity valuation technique. One plausible explanation is that DCF generated equity values are sensitive to the cash flow and discount rate assumptions of insider-managers. Thus, while DCF analysis may be useful in assessing equity values in a given use or to a given bidder, it is not a very credible means of convincing outside stockholders that those values are fair (DeAngelo, 1990, p.100)

According to Damodaran, discounted cash flow is the foundation on which all other valuation approaches are built. This approach has its foundation in the present value rule, where the value of any asset is the present value of expected future cash flows that the asset generates. (Damodaran, 2002)

A formula for discounted cash flow can be shown as follow :

$$\text{Value} = \sum_{t=1}^{t=n} \frac{\text{Cash Flow}_t}{(1 + r)^t} \qquad (2.13)$$

Where : n = Life of the asset

Cash Flow_t = Cash flow in period t

r = Discount rate reflecting the riskiness of the estimated cash flows

The cash flows will vary from asset to asset dividends for stocks, coupons (interest) and the face value for bonds and after-tax cash flows for a real project. The discount rate will be a function of the riskiness of the estimated cash flows, with higher rates for riskier assets and lower rates for safer projects.

There are three paths to discounted cash flow valuation according to Damodaran (Damodaran 2002) :

2.3.3.1 First, To Value just the Equity Stake in the Business

The value of equity is obtained by discounting expected cash flows to equity, i.e., the residual cash flows after meeting all expenses, reinvestment needs, tax obligations and net debt payments (interest, principal payments and new debt issuance), at the cost of equity, i.e., the rate of return required by equity investors in the firm.

$$\text{Value to equity} = \sum_{t=1}^{t=n} \frac{\text{CF to Equity}_t}{(1 + k_e)^t} \qquad (2.14)$$

Where : n = Life of the asset

CF to Equity$_t$ = Expected cash flow to equity in period t

k_e = Cost of equity

2.3.3.2. Second, To Value the Entire Firm

The value of the firm is obtained by discounting expected cash flows to the firm, i.e., the residual cash flows after meeting all operating expenses, reinvestment needs and taxes, but prior to any payments to either debt or equity holders, at the weighted average cost of capital (WACC), which is the cost of the different components of financing used by the firm, weighted by their market value proportions.

The formula can be shown as follow :

$$\text{Value of firm} = \sum_{t=1}^{t=n} \frac{\text{CF to firm}_t}{(1 + \text{WACC})^t} \qquad (2.15)$$

Where : n = Life of the asset

CF to Firm$_t$ = Expected cash flow to firm in period t

WACC = Weighted Average Cost of Capital

2.3.3.3. Third, To Value the Firm in Pieces

The value of the firm can also be obtained by valuing each claim on the firm separately. In this approach, which is called adjusted present value (APV), we begin by valuing equity in the firm, assuming that it was financed only with equity. We then consider the value added (or taken away) by debt by considering the present value of the tax benefits that flow from debt and the expected bankruptcy costs.

The formula can be shown as follow : (2.16)

Value of Firm =

Value of all equity financed firm + PV of tax benefits + Expected Bankruptcy Costs.

Another explanation about DCF we can find in their book (Rosenbaum, Pearl, 2009). In a DCF, a company's FCF is typically projected for a period of five years. The projection period, however, may be longer depending on the company's sector, stage of development, and the underlying predictability of its financial performance. Given the inherent difficulties in accurately projecting a company's financial performance over an extended period of time (and through various business and economic cycles), a terminal value is used to capture the remaining value of the target beyond the projection period (i.e., its "going concern" value).

The projected FCF and terminal value are discounted to the present at the target's weighted average cost of capital (WACC), which is a discount rate

commensurate with its business and financial risks. The present value of the FCF and terminal value are summed to determine an enterprise value, which serves as the basis for the DCF valuation.

The WACC and terminal value assumptions typically have a substantial impact on the output, with even slight variations producing meaningful differences in valuation. As a result, a DCF output is viewed in terms of a valuation range based on a range of key input assumptions, rather than as a single value. The impact of these assumptions on valuation is tested using sensitivity analysis.

There are some steps to construct DCF analysis according to (Rosenbaum, Pearl, 2009, p.110). The steps are :

1. *Study the Target and Determine Key Performance Drivers.*

   The first step in performing a DCF, as with any valuation exercise, is to study and learn as much as possible about the target and its sector. Shortcuts in this critical area of due diligence may lead to misguided assumptions and valuation distortions later on. This exercise involves determining the key drivers of financial performance (in particular sales growth, profitability, and FCF generation), which enables the banker to craft (or support) a defensible set of projections for the target.

2. *Project Free Cash Flow (FCF).*

   The projection of the target's unlevered FCF forms the core of a DCF. Unlevered FCF, is the cash generated by a company after paying all cash operating expenses and taxes, as well as the funding of capital expenditure (capex) and working capital, but prior to the payment of any interest expense.

The target's projected FCF is driven by assumptions underlying its future financial performance, including sales growth rates, profit margins, capex, and working capital requirements. Historical performance, combined with third party and/or management guidance, helps in developing these assumptions.

The goal is to project FCF to a point in the future when the target's financial performance is deemed to have reached a "steady state" that can serve as the basis for a terminal value calculation.

3. *Calculate Weighted Average Cost of Capital (WACC)*

Using DCF model, WACC is the rate used to discount the target's projected FCF and terminal value to the present. It is designed to fairly reflect the target's business and financial risks.

As its name connotes, WACC represents the "weighted average" of the required return on the invested capital (customarily debt and equity) in a given company. It is also commonly referred to as a company's "discount rate" or "cost of capital". As debt and equity components generally have significantly different risk profiles and tax ramifications, WACC is dependent on capital structure.

4. *Determine Terminal Value.*

The DCF approach to valuation is based on determining the present value of future FCF produced by the target. Given the challenges of projecting the target's FCF indefinitely, a terminal value is used to quantify the remaining value of the target after the projection period. The terminal value typically accounts for a substantial portion of the target's value in a DCF. Therefore, it is important that the target's financial data in the final year of the projection period ("terminal

year") represents a steady state or normalized level of financial performance, as opposed to a cyclical high or low.

There are two widely accepted methods used to calculate a company's terminal value : the exit multiple method (EMM) and the perpetuity growth method (PGM). The EMM calculates the remaining value of the target after the projection period on the basis of a multiple of the target's terminal year EBITDA (or EBIT). The PGM calculates terminal value by treating the target's terminal year FCF as a perpetuity growing at an assumed rate.

5. *Calculate Present Value and Determine Valuation.*

The target's projected FCF and terminal value are discounted to the present and summed to calculate its enterprise value. Implied equity value and share price (if relevant) can then be derived from the calculated enterprise value. The present value calculation is performed by multiplying the FCF for each year in the projection period, as well as the terminal value, by its respective discount factor.

The discount factor represents the present value of one dollar received at a given future date assuming a given discount rate. As a DCF incorporates numerous assumptions about key performance drivers, WACC, and terminal value, it is used to produce a valuation range rather than a single value. The exercise of driving a valuation range by varying key inputs is called sensitivity analysis. Core DCF valuation drivers such as WACC, exit multiple or perpetuity growth rate, sales growth rates, and margins are the most commonly sensitized inputs. Once determined, the valuation range implied by the DCF should be compared to those derived from other methodologies such as comparable

companies, precedent transactions, and LBO analysis (if applicable) as a sanity check.

Advantage and disadvantage of DCF analysis (Rosenbaum, Pearl, 2009, p.108-110):

1. A DCF is also valuable when there are limited (or no) pure play, peer companies or comparable acquisitions.
2. The use of defensible assumptions regarding financial projections, WACC, and terminal value helps shield the target's valuation from market distortions that occur periodically
3. A DCF provides the flexibility to analyze the target's valuation under different scenarios by changing the underlying inputs and examining the resulting impact
4. A DCF is only as strong as its assumptions

2.4. Financial Ratio

The financial ratio analysis is used to compare the performance of different firm in same industry. One of the purposes is to help stakeholders make right decisions such as investments, credits, tax, etc. White et all (2003) noted that *"Such decisions require an evaluation of changes in performance over time for particular investment and a comparison among all firms within a single industry at a specific point of time"*. White, et al on their book "The analysis and Use of Financial Statements" stated four type of ratio to measure a company performance.

2.4.1 Activity Ratio

Activity ratios describe the relationship between the firm's level of operations (usually defined as sale) and the assets needed to sustain operating activities. The higher ratio, the more efficient the firm's operations, as relatively fewer assets are required to maintain a given level of operations (sales) (White, et al.. 2003). Activity ratio can be divided into :

1. Short Term (Operating) Activity Ratio

- Receivable Turnover : (2.17)

$$\text{Receivable Turnover} = \frac{\text{Sales}}{\text{Average Trade Receivable}}$$

- Average Days of Receivable Outstanding : (2.18)

$$\text{Average No. Days Receivable Outstanding} = \frac{365}{\text{Receivable Turnover}}$$

- Inventory Turnover : (2.19)

$$\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

- Average Days of Inventory in Stock (2.20)

$$\text{Average No. Days Inventory In Stock} = \frac{365}{\text{Inventory Turnover}}$$

2. Long Term (Operating) Activity Ratio

- Fixed Asset Turnover : (2.21)

$$\text{Fixed Asset Turnover} = \frac{\text{Sales}}{\text{Average Fixed Assets}}$$

- Total Asset Turnover : (2.22)

$$\text{Total Asset Turnover} = \frac{\text{Sales}}{\text{Average Total Assets}}$$

2.4.2 Liquidity Ratio

Short term lenders and creditors must assess the ability of a firm to meet its current obligations. The ability depends on the cash resources available of the balance sheet date and the cash to be generated through the operating cycle of the firm (White et al..2003)

1. Current Ratio (2.23)

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liability}}$$

2. Quick Ratio (2.24)

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Marketable Securities} + \text{Accounts Receivable}}{\text{Current Liability}}$$

3. Cash Ratio (2.25)

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Marketable Securities}}{\text{Current Liability}}$$

2.4.3 Long Term Debt

Long term debt analysis ratio is to see how company can meet the obligations, the inability to meet these obligations can lead to default and possible bankruptcy (White et al., 2003). The ratio analysis as follow :

1. Debt Ratio (2.26)

$$\text{Debt to Total Capital} = \frac{\text{Total Debt(Current + Long – Term)}}{\text{Total Capital(Debt + Equity)}}$$

2. Debt to Equity Ratio (2.27)

$$\text{Debt to Equity} = \frac{\text{Total Debt}}{\text{Total Equity}}$$

3. Interest Coverage Ratio (2.28)

$$\text{Times Interest Earned} = \frac{\text{EBIT}}{\text{Interest Expense}}$$

2.4.4 Profitability Analysis Ratio

The profitability ratio is to measure the firm's ability to generate profits.

1. Return on Sales

   - Gross Profit Margin (2.29)

$$\text{Gross Margin} = \frac{\text{Gross Profit}}{\text{Sales}}$$

- The Operating Margin (2.30)

$$\text{Operating Margin} = \frac{\text{Operating Income}}{\text{Sales}}$$

- The pretax margin (2.31)

$$\text{Pretax Margin} = \frac{\text{Earnings Before Tax (EBT)}}{\text{Sales}}$$

- Profit Margin (2.32)

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}}$$

2. Return on Investment (ROI)

- Return on Asset (ROA) (2.33)

$$\text{ROA} = \frac{\text{EBIT}}{\text{Total Assets}}$$

- Return on Total Capital (ROTC) (2.34)

$$\text{ROTC} = \frac{\text{EBIT}}{\text{Average (Total Debt + Stockholder's Equity)}}$$

- Return on Equity (ROE) (2.35)

$$\text{ROE} = \frac{\text{Net Income}}{\text{Average Stockholders' Equity}}$$