Research on Theory and Methods of Corporate Valuation

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Abstract: Corporate evaluation has been a long-history research field, mostly in finance. There are traditional methods such as DCF, CAPM and APT, which were the most popular valuation method being used in 20th century. Nevertheless, more neoclassical theories have been brought up recently, from the perspectives of investment, pricing or other qualitative areas. Besides, the specific times in post-pandemic environment provide valuable research samples of how company keep survived during the period of declination in economic. Based on the previous traditional research as well as neoclassical and recent studies on business' new valuation model, this article gives a more comprehensive overview and appraisal about corporate valuation theories, ranging from absolute to relative valuation models, and finally to recent neoclassical models such as EVA valuation, along with other elements that need to concern when processing corporate valuation, which might contribute to the practical use of corporation acquisition and other investor's decisions in both capital and money market.

Keywords: corporate valuation, absolute valuation, relative valuation, neoclassical models

1. Introduction

In an inefficient market with multilateral investment and financing choices, along with the companies' pursuit of optimum daily operations, the position of corporate finance and valuation is becoming increasingly vital. Corporate finance is a sub-field of finance that applying financial formulas to address the investment, financing, working capital management and other daily operating decision-makings, while these methods contributes to the companies when evaluating enterprise value or making choices when it comes to business combination. Overall, both corporate finance and valuation have evolved and supplemented for each other during the past few decades. However, increasing neoclassical theories and qualitative approach on determining valuation methods enrich the total theory structure, including traditional absolute and relative methods. Moreover, during pandemic times companies have provided more practical evidence in constructing novel valuation methods in coping with future economic shocks.

This article is a literature review of the previous methods of corporate valuation, ranging from traditional absolute method like DCF(discounted cash flow) and CAPM(Capital Asset Pricing Model) to contemporary studies about valuation in pandemic and post-pandemic era. The data and studies have been accessed from academic website such as Social Science Citation Index and Science Citation Index Expanded.

The overall literature review across those decades could provide new perspectives in respect of decision-makings in external investments, business combination, organizational control and other internal or external financial decisions.

2. Classifacation and Valuation Methods

2.1. Valuation Classification

Back in the 1930s, John Burr Williams proposed the earliest DCF(Discounted cash flow) method based on the idea of discounted cash flow, focusing on intrinsic value generated from the company, and relating the discount rate with capital structure, which could be defined as WACC(Weighted Average Cost of Capital). Afterwards, risk-focused CAPM valuation model by William F. Sharpe and John Lintner [1, 2], along with Ross's Arbitrage Pricing Theory had provided different perspectives, considering the relationship between capital market risk assessment, discounted interest rate and other macroeconomic factors that concern systematic risk [3, 4].

Traditionally, from different valuation perspective, corporate valuation could also be composed of "absolute value" and "relative value" method. According to Juma'h et al.: the current corporate finance and valuation theories of the companies could be divided into four categories literally: from the perspective of financial, investment and economics, along with concerns about other qualitative factors [5]. However, business valuation are mostly based on a company's financial standing, focusing on company's capital structure as well as market price, which is determined by its competitiveness and popularity among the investors.

The article's objective is to provide a literature review of the different traditional corporate valuation methods, along with the appraisal of some neoclassical models such as EVA and other qualitative ones.

2.2. Traditional Valuation Methods

2.2.1. DCF (Discounted Cash Flow) Method.

Traditionally speaking, DCF lays the foundation for most of the subsequent theories considering future value inflow as fundamental predecessor. The simplicity and objectivity based on concerns on future cash flow allow for its practical application for most of the companies. However, it is difficult to determine the amount of future cash inflow, expected value and discount rate, which might allow more subjectivity to the predictions [6].

The principle of this model is the price of stock could be estimated by the aggregate of its expected future cash flow discounted by constant interest rate (WACC). The most basic formula could be written as follows:

$$\text{Current Value} = \sum_{t=1}^{\infty} \frac{EV_t}{(1+i)^t} \tag{1}$$

Where:

EV_t is the expected value or free cash flow in at future time spot t;

i is interest rate, also known as continuous discount rate, which could be estimated as cost of capital(WACC) considering company's internal capital structure.

Based on this theory, investors could consider whether to invest the project or the business by comparing the discounted cash flow with initial investment. If the present money invested is lower than the future cash flow generated from the company, there is an opportunity of obtaining additional payback in the future. On the flip side, companies with high levels of cash flow management and

sound capital structure could generate high quality and versatile free cash to improve the ability of repaying debts and avoiding risks.

Following the DCF method, Gordon's popularized Dividend Discount Model(DDM) was introduced, using dividend as expected future income of investors who buy the current shares [7]. The revised model's outlook is as follows:

$$CV(share\ price) = D_0 \sum_{t=1}^{\infty} \frac{(1+g)^t}{(1+i)^t} \qquad (2)$$

And ultimate share price could be done by calculating as:

$$CV = P_0 = D_0 \frac{(1+g)}{r-g} = \frac{D_1}{r-g} \qquad (3)$$

Where:
P_0 is estimated share price in current year;
D_0 is current year's dividend paid;
g is assumed constant growth rate of dividend each year.

2.2.2. Gordon's Growth Model.

Which is the most common variant of DVM, indicate that g of dividend growth rate could be evaluated through two different ways, first is the direct mathematical way by calculating the average g based on previous year's dividend [8]:

$$g = \sqrt[n]{\frac{last\ year's\ dividend}{first\ year's\ dividend}} - 1 \qquad (4)$$

Nevertheless, the pure calculation to get the average year's g considers no risks and return based on the company's inner capital structure, thus the present and the most popular formula is developed as follows:

$$g = b \times r_e \qquad (5)$$

r_e is return on equity ratio;
b is the retention ratio, which is retained earnings divided by profit after tax, indicating that retained earnings is the only source of capital that generate the growth in return. The assumption is that if re>0, there is a positive signal of the future profit for the company, as well as the indication of "going concern" for the business, as retained earnings is seen as "the resources remained in order to continue to operate indefinitely" [9].

Generally speaking, Gordon's Growth Model is the most commonly used model to calculate the company's current share price, and because of not considering other factors such as risks, scale and market competitiveness of each company, the model could be used to compare all companies with different features.

Most of the criticism of DDM method concentrates on the relation between g and r, which there might be a situation when growth rate of the dividend might exceed cost of capital(r); Keown et al. have stressed out another concern is that some of the companies do not pay dividends [10]. Furthermore, from the perspective of investors, the extreme assumption that the growth of dividend is

constant is impractical, and other situations need to be considered such as investors could resale the company's share as well as stock dividend gained from bonus issue.

However, DDM model has been extended and optimized in directions differ from Gordon's Growth Model as the possibility of dividends following a Markov process was proposed by Hurley and Johnson[8, 11], while Donaldson and Kamstra used nonlinear artificial network model to acquire dividend forecasts [12]. Those neoclassical methods are based on DDM's assumption, providing a more appropriate DCF-based explanation under the real world circumstances.

2.2.3. CAPM (Capital Asset Pricing Model).

In early 1960s, William Sharpe (and others) introduced CAPM model based on the concern of systematic risk, which is a vital topic in measuring the cost of equity(ke) when considering company's capital structure. Markowitz first proposed portfolio theory, which concerns the optimum selection portfolio of assets to gain most returns under certain amount of total risk [13]. Afterwards, Sharpe and Lintner reformed the portfolio theory concentrating on situation that need to be dealt with only systematic risk, also known as asset non-diversifiable risk [1, 2, 14], followed by CAPM formula:

$$E(R_i) = R_f + \beta(E(R_m) - R_f) \tag{6}$$

In this formula,

$E(R_i)$ is the return on equity(re), which could be seen as the presumed return viewed by the investors;

R_f is the risk free rate of return, the theoretical rate of return with zero risk, which could be often seen as the government bond return rate;

$E(R_m)$ is the market overall risk or market expected return for stocks;

The expression "$E(R_m) - R_f$" is market risk premium, representing the risk premium of systematic risk, indicating the return that an asset is expected to yield in excess of the risk free rate of return.

Overall, the CAPM model depicts that the required rate of return on investment $E(Ri)$ is equal to the risk free rate of return plus a risk premium [5], it is a single-variable linear model that relates the market expected return and risk premium, in which the slope, called β (asset β or equity β), serves as a measure of sensitivity of an asset's return comparing to the overall market return, which could be considered as how much additional risk the investment would add to the security apart from the existing free risk. If β is higher than 1, then the stock would have risk that higher than the market level; similarly, if a stock has a β less than 1, then the formula assumes that it will have risk under average market level.

2.2.4. Arbitrage Pricing Theory (APT).

Proposed by Stephen Ross, which is one of the most classical alternative of CAPM model, explaining that the market return depends on the risk-free rate of return and other independent variables relating to macroeconomic environment [3]. The underlying basic formula explains those relations:

$$E(R_i) = R_f + E_i \times \beta_i \tag{7}$$

The E_i in the formula represents the risk premium associated with factor i, while β_i demonstrates the sensitivity of asset returns to changes in certain macroeconomic variables. Changes in inflation, gross domestic product (GDP), growth national product (GNP) and exchange rates are factors that are commonly accepted as price predictors.

Other extended CAPM model also shed light on the relationship between market share price and risk premium. C-CAPM model, which is introduced by Douglas Breeden [15]. By replacing the asset β with consumption β, the theory gives the assumption that the consumption β reflects the movements risk premium affected by consumption growth, which is practical when estimating the relationship between current market price and consumption growth. Darrat, Li and Park have considered cross-sectional consumption risk in heterogeneous world CCAPM, in which the share invested could be transmitted between different international investors [16].

However, concerns about CAPM models becoming negligible as well as low correlation between current market price and consumption growth are main critiques CAPM and its alternatives facing [17-20]. Nevertheless, asset β is still widely acceptable as a measure of risk [5]. Barberis et al. have come up with an new extrapolative capital asset pricing model(X-CAPM) considering both the rational investors and price extrapolators which hold believes of pricing constantly following the current trend in the future period [20]. This model has provided new advice for investors in the capital market with swift share price changing.

In summary, absolute valuation methods provide estimation of market share price on an intrinsic view of the company's capital structure along with its risk assessment under the whole capital market environment. With DVM model concerning about future cash flow and assumed discount rate, and CAPM model focusing on the risk premium comparing with market overall systematic risk, absolute valuations shed light on the intrinsic value of the shares generate and provide the benchmark for neoclassical models to develop. Nevertheless, absolute valuation methods are also difficult to determine parameters such as cost of capital, deviations in discount rate and cash flow forecast mathematically, and volatility in future dividends might affect the accuracy of the valuation. Moreover, absolute valuation has no considerations upon the whole market situation, company's competitiveness and other competitors' situation.

2.3. Relative Valuation Method

Relative Valuation Method, known as comparing the value of a company with that of its competitors to have a more comprehensive understanding about the positioning of the company in an industrial level. Apart from that, relative valuation focuses externally on an industrial basis, and considering relative multiples instead of absolute figures. It can timely reflect changes in investors' perceptions of the company in the capital market. With its simplicity and low requirement of expertise, this model is often used as practical mining tools for investors to explore companies with solid market foundation but lower market value [21]. Besides, the results obtained by the relative valuation method could also be used as a good reference for determining the price of initial public offerings and additional offerings of companies that are about to be listed.

Types of relative valuation multiples are various, popular ones are P/E ratio, EV/EBIT, EV/EBITDA as well as operating margin, with P/E ratio being the generally accepted one. Comparable firm analysis is a common type of multiples valuation. First step is to find the right companies with similar attributes, such as size, risk profile, main products and operations and growth potentials; then gathering the financial information based on the multiples chosen of each company; after that, comparison between average industrial multiples and that of the company could determine whether the company is overvalued or undervalued.

Nevertheless, critiques of relative methods still exist. For investors, multiples valuation requires conditions for overall developed industry with numerous comparable peer companies, and valuation could also bring much problem when the industry is overvalued or undervalued as a whole when the market is in its depression or reaches its peak. Moreover, focusing on the flip side of absolute valuation, specific capital structure and equity policies of the target company are often overlooked. In addition, there could be situation that earnings of the target company could be negative, thus using P/E ratio to perform the multiple valuation could be negligible.

2.4. Neoclassical Method - EVA Model

Recently, some neoclassical theories have arrived to cast a deeper understanding of the corporate valuation. EVA model, founded by the management consulting firm of Stern Stewart & Co in 1980s, focusing on economics profit that the company earns, which is more comprehensive and generates less risk to the prediction of cost of capital. EVA main focus is on residual wealth, indicating that the real profit occurs when there is additional wealth left for shareholders. The EVA equals to operating profit after tax minus the cost of capital multiplied by invested capital, whose formula is shown below:

$$EVA = NOPAT - (Invested\ Capital * WACC) \tag{8}$$

The NOPAT represents the net operating profit after tax, which is profit after tax adding back the net interest expense.

WACC in this formula is the average return of a company expects to pay its investors, which is calculated below:

$$WACC = \frac{E}{E+D} \times ke + \frac{D}{E+D} \times (1 - t) \times kd \tag{9}$$

The weights $\frac{E}{E+D}$ and $\frac{D}{E+D}$ are derived as a fraction of each financial source in a company's capital structure, which is normally provided. The ke in the formula could be counted as return of equity by using the CAPM model, where the ke could be calculated as the combination of risk-free rate of return and the risk premium multiplied by equity β.

A positive EVA shows a project is generating returns in excess of the required minimum return than the other firms in the same industry, while a negative one indicates that the company generates wealth less than the money invested in the business.

EVA valuation method positively correlated with market return and increase when co concentrate on their core business, and also inversely related to CEO turnover [22], which provides new perspective in valuating business in high tech software and service industry.

Nevertheless, estimation on historical data is subjective, and could be arbitrary when only making calculations based on financial statements, thus EVA is criticized due to it taking no consideration of non-financial data [5].

3.   Other Elements

3.1. Corporate Governance and Firm Valuation

Theoretically, there could be a relationship between expected cash flow and internal agency problem, as the former one could be influenced by the decisions of management about the money accruing to

investors, thus, agency effects may decline the initiative of the investors, which might impact the cost of capital and lead to increasing stock price [23].

Evidence has shown that good corporate governance is positively related with public firm's valuation [24]. More studies have been found that good corporate governance could enhance operating performance and lower capital expenditures [25]. Furthermore, Beiner et al. have proved the relationship between internal governance and Tobin's Q based on the listed Swiss firms [26], with constructing a broad governance index and six governance mechanisms, by developing simultaneous equations to avoid endogeneity, it is found that there is a positive relationship between those mechanisms and Tobin's Q, which indicates that governance could indirectly affect the choice of the investing decisions, and then to the total firm value. Besides, reverse casuality of governance and valuation are also found in the empirical research.

Considering the potential correlation between corporate governance and firm valuation, Barniv and Bao have evaluated the assumption based on B and H shares in China mainland and Hong Kong [27]. Evidence shows that better governance and equity structure such as relatively high public ownership could increase the explanatory power of the valuation model's performance on company, which could also impact the foreign investors' decisions of buying the shares.

3.2. Firm Reputation, Geographic Dispersion, Pandemic and Corporate Valuation

During valuation process, other non-financial external factors such as corporate reputation, geographic dispersion, and pandemic could also affect the results of corporate valuation. (1) Corporate reputation's ascent could affect the future cost of equity to decrease [28], which could affect the company's capital structure; (2) and studies have found that firms with subsidiaries experiencing geographical dispersion could have a negative influence on its valuation, which is also leads to agency problems and corporate policies [29]. (3) In addition, research has also found that the social distance effect could have positive correlation to the stock price of the company, especially in company with input-output linkages, where the indirect impact of social distancing of selling products to other sectors in the business is as important as the direct distancing of the workers [30]. However, company with deep cash pockets are found to be better dealing with the distancing effect and deterioration to the distribution channels to suppliers and customers, this is because they obtain better cash and capital management as well as the support financial activities from government and central banks.

4. Conclusion

Overall, the article provides a depiction of the past research about corporate valuation methods and models, including formulas, brief introduction and appraisals. The models included are divided into absolute and relative methods based on the valued objects, from the perspectives of internal and external view of the company's wealth. The valuation varies from traditional DCF to CAPM and also neoclassical models like EVA method, which provides a comprehensive overview to the total valuation research progress. Moreover, the multiple valuation provides a measurement tool of the future expectation of the company. Besides, other factors such as corporate governance and reputation, geographical dispersion and pandemic effects are also considered into the overall evaluation of the corporate valuation methods.

Admittedly, the valuation models have evolved along with novel market structures and relevant theories, whereas the basic introduction could not cover the future needs of the investors or corporate inner managers. Nevertheless, those investment tools in the article could always shed light on the development of the corporate finance and valuation, and provide a valuable reference to the novel models in the foreseeable future.

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