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# THE STANDARD MULTIPLES VALUATION METHOD AND ITS CRITICISM

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***Abstract**: This research shows how to utilize multiples to yield proper estimates of a firm's value. To identify the underlying drivers of different multiples, intrinsic multiples are derived from fundamental equity valuation models. An overview of the standard multiples valuation method and its criticism initiates an analysis of the four-step multiple valuation process. The key criteria for the selection of value relevant measures and for identification of comparable firms, so as strengths and weaknesses of this method are investigated.*

***Keywords:** equity, methods, multiples, valuation*

## Introduction

Accounting-based market multiples are the most common technique in equity valuation. Multiples are used in research reports and stock recommendations of both buy-side and sell-side analysts, in fairness opinions, and pitch books of investment bankers, or at road shows of firms seeking an IPO (Initial public offering). Even in cases where the value of a corporation depends on discounted cash flow, multiples, such as P/E (price-to-equity) or M/B (market-to-book), play the important role of providing a second opinion. Multiples thus form an important basis of investment and transaction decisions of various types of investors including corporate executives, hedge funds, institutional investors, private equity firms, and also private investors.

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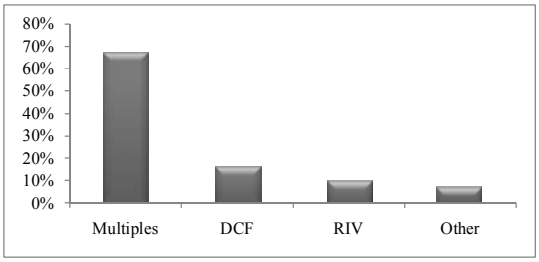
In spite of their prevalent usage in practice, not so much theoretical background is provided to guide the practical application of multiples. The literature on corporate valuation gives only sparse evidence on how to apply multiples, or on why individual multiples or comparable firms should be selected in a particular context.

Equity valuation is a primary application of finance and accounting theory. The theoretical emphasis usually focuses on DCF (Discounted cash flow) and RIV (Residual income valuation) models. However, these models are sensitive to various assumptions. Consequently, practitioners regularly revert to valuations based on multiples, such as P/E multiple, as a substitute to more complex valuation techniques [17, p.44]. They also appear in valuations associated with corporate transactions, e.g. IPO, LBO (leveraged buyout), MBO (management buyout), M&A (mergers and acquisition), spin offs, etc. [1, p. 139-151].

**Figure 1. Usage of valuation models in analysts' reports**




Source: Based on data from tables 4 and 5 in [10, p.230-231]

The primary reason for the popularity of multiples is their simplicity. A multiple is simply the ratio of a market price variable (e.g. stock price) to a particular value driver (e.g. earnings) of a firm. Based on how the market values comparable firms within the same industry or, sometimes, comparable corporate transactions, practitioners can quickly come up with estimations of a target firm's equity value. The multiples valuation method represents an indirect, market-based valuation approach, also known as the method of comparables, usually carried out in four steps.

The first two steps involve the selection of value relevant measures, the value drivers, and the identification of comparable firms (the peer group). Together with the market price variables, the value drivers form the basis for the calculation of the corresponding multiples of the comparables. Step 3 concentrates on the aggregation of these multiples into single numbers through the estimation of synthetic peer group multiples. Finally, to

determine the value of the target firm, the synthetic peer group multiples must be applied to the corresponding value driver of the firm being valued [2, p.307-308]. Unlike DCF and RIV models, the method of comparables does not require detailed multi-year forecasts about a variety of parameters, including profitability, growth, and risk.

## 1. The main research questions

The main objective of this research is to investigate the role of multiples in equity valuation and to advance the standard multiples valuation method in a comprehensive framework for using multiples in equity valuation, which corresponds to economic theory. Breaking down the main objective involves the formulation of research questions. Based on the underlying concept of market-based valuation and the strengths and weaknesses of the standard valuation method, there are three research questions established for the theoretical construction of the comprehensive multiples valuation model.

The loose definition of a firm's multiple as the ratio of a market price variable to a particular value driver implies both, the ample score and a high degree of uncertainty. Uncertainty, because the definition does not tell a user which market price variable or which value driver has to be used in specific context. The user can choose between two market price variables, i.e. stock price or market capitalization ($p^{equity}$) and enterprise value ($p^{entity}$), and, basically, any value driver from the financial statements. The first question, therefore, aims at decreasing the uncertainty in the selection process of value relevant measures: *Research question 1 - What are the most criteria for the selection of value relevant measures for the calculation of single multiples?*

The first important step in a thorough multiples valuation is selecting appropriate measures, and another vital aspect is identification of the peer group. The ultimate goal of a multiples valuation is to approximate the future cash flow which provides necessity of forecasting future profitability, growth, and risk. The practitioners usually turn to firms from the same industry in the search of such comparables. This involves several problems. First, there are various industry classification systems available, which consist of different subindustry levels. Hence, the number of firms in an industry peer group depends on the both factors [5, p. 747-748]. Second, the incorporation of foreign firms with different accounting and regulatory standards raises complications. Third, many firms operate in several industries making it difficult to identify representative benchmarks [22,

ch.11, p. 7]. Finally, the theoretical justification why firms from the same industry should have a similar profitability, growth, and risk profile is weak [15, p. 210]. The second research question addresses the foundation of a mechanism for the identification of comparable firms that respects concerns of both valuation theory and practice: *Research question 2 - What are the most important criteria for the identification of comparable firms for the peer group?*

Multiples usually rely on accounting numbers. The relation between market values and accounting numbers forms the core of the multiples valuation method. The same holds true for the most important innovation in accounting based valuation theory in recent years: the Ohlson (1995) and Feltham & Ohlson (1995) residual income valuation model which builds on Marshall (1898), Preinreich (1938), Edwards & Bell (1961), and Peasnell (1981/1982). This model defines the value of a firm as the sum of the book value of a common equity and the discounted present value of expected future abnormal earnings. The model is a transformation of the dividend discount model (DDM), but expresses value directly in terms of current and future accounting numbers, book values, and earnings [16, p. 142]. There might be a potential to also combine book values and earnings in a multiple-based valuation framework. This potential is examined as: *Research question 3 – Is it useful, from a theoretical point of view, to combine information from book values and earnings into a two-factor multiples valuation model?*

## 2. Theoretical Concept of Fundamental Equity Valuation Model

Shareholders, investors, and lenders have an obvious interest in the value of a firm. In an efficient market, firm's value is defined as the present value of payoffs which the firm is expected to deliver to its shareholders in the future, discounted to the appropriate risk adjusted rate of return [16, p. 108-109]. It is evident that dividends are payoffs to shareholders, but also well recognized that dividend discount approach have practical problems. Finance and accounting literature, therefore, offer a number of alternative valuation methods which are theoretically equivalent to dividend discounting.

Although the multiples valuation method does not require forecasting pro forma financial statements and discounting future payoffs, it would be wrong to conclude that multiples have no economic value. Multiples are simply derivations of fundamental equity models.

A firm's current performance as summarized in its financial statements constitutes an important input to the market's assessment of the firm's valuation. Fundamental analysis is the method of analyzing information in current and past financial statements, in conjunction with other firm specific, industry, and macroeconomic data to forecast future payoffs and eventually arrive at a firm's intrinsic value [24, p. 74-75]. The main motivation of fundamental analysis is to identify mispriced stocks for investment purposes. However, even in an efficient market there is an important role for fundamental analysis, since it helps to understand the determinants of a firm's market value, thus facilitates investment decisions and valuation of private firms [16, p. 171]. Below, four fundamental equity models are summarized.

## 2.1. Dividend Discount Model (DDM)

A shareholder's payoffs from holding shares in a firm consist of the dividend payments during the holding period as well as of the market value of the shares when selling them. Therefore, a firm's value should be based on the stream of dividends $D_1, D_2, \ldots, D_T$ it is expected to pay in the future plus the market value of common equity $p_t^{equity}$ at the end of the forecast horizon $T$. If the forecast horizon is assumed infinite, the DDM formalizes this notion and defines the intrinsic value of a firm as the present value of expected future dividends discounted at their risk adjusted expected rate of return. Formally,

$$v_t^{equity} = \sum_{i=1}^{\infty} \frac{E_t(D_{t+1})}{(1 + r_{t+1}^{equity})^i} \tag{1}$$

Where $v_t^{equity}$ is the firm's intrinsic value of common equity at time t, $E_t$ $(D_{t+1})$ is expected future cash dividend in period t + i conditional information available at time t, and $r_{t+1}^{equity}$ is the cost of equity in period $t + i$. A frequently neglected assumption of the DDM is that the transversality condition holds. That is, the expected market value discounted at the appropriate cost of equity converges to zero as time goes to infinity $lim_{t+\infty} E_t (p_{t+T}^{equity})/(1 + r_{t+T}^{equity})^T = 0$ (Spermann, 2005, p. 59-61). As seen in formula (1), value is dependent on the forecasts of future dividends and discount rates. Gordon (1962) makes simplifying assumptions about both the dividend process and discount rates to derive a simple valuation formula, which is referred to as the Gordon growth model (GGM). If the cost of

equity remains constant through time and dividends grow geometrically at a constant rate $g^D$, *i.e.* $D, D\cdot(1+g^D), D\cdot(1+g^D)^2, \ldots,$ *and* $g^D < r^{equity}$, than

$$v_t^{equity} = \frac{D_{t+1}}{r^{equity} - g^D} \tag{2}$$

The DDM and the GGM, as a special case of the DDM, have two well-known weaknesses. First, they disregard internal growth through retained earnings. In practice, many young firms with a high growth potential tend to retain most of their earnings or, sometimes, do not plan to pay any dividends within a finite forecast horizon [28, p. 155-160]. The market values of such firms are usually much higher than indicated by either formula (1) or (2). Second, the DDM requires the prediction of dividends to infinity for going concerns, but the Miller and Modigliani (1961) dividend irrelevance proposition states that value is unrelated to the timing of expected payouts prior to or after any finite horizon. Forecasted dividends are uninformative about value. The both weaknesses stem from a common problem. The DDM targets the actual cash distribution to shareholders, but cash distribution is not necessarily tied to value generation. E.g. firms can simply borrow money to pay dividends, which has nothing do to with creating value through investing or operating activities [24, p. 90].

### 2.2. Discounted cash flow model (DCF)

The DCF model moves away from cash distribution to cash generation. By considering only cash and ignoring other assets and liabilities, the DCF model deals with a narrow aspect of a firm's value. Instead focusing on value generation, DCF model focuses only on cash generation (14, p. 3). The basic idea of the DCF model is to determine the present value of free cash flow (FCF) which a firm is expected to earn in the future. FCF earned in a certain period $t$ defined as the after-tax cash flow available to all investors of a firm. FCF equals net operating profit after taxes (NOPAT) less the change in invested capital:

$$NOPAT_1 = EBIT_1 \cdot (1\text{-tax rate}) \tag{3}$$

The FCF can be calculated from information in financial statements. It starts with NOPAT calculated from the income statement using equation (3), add back depreciation and amortization, deduct increases in working capital, and deduct capital expenditures [19, p.462]:

$$\begin{aligned} FCF &= NOPAT +/- \Delta Wc*(1-DFPWc) + \\ &+ D\&A*(1-DFPD\&A) - Cex*(1-DFPCex) \end{aligned} \tag{4}$$

where: $\Delta \boldsymbol{Wc}$ – change in working capital, $\boldsymbol{D\&A}$ – Depreciation and Amortization, $\boldsymbol{Cex}$ – Capital expenditures, $\boldsymbol{DFP_{Wc}}$ – Debt financing proportion of working capital, $\boldsymbol{DFP_{D\&A}}$ – Debt financing proportion of depreciation and amortization, $\boldsymbol{DFP_{Cex}}$ – Debt financing proportion of capital expenditures.

Firms use DCF to distribute dividends, pay debt holders, or simply retain the cash. Consequently, the present value of future FCF represents the intrinsic value of common equity plus the market value of debt including preferred stock less cash and equivalents. The future FCF can also be viewed:

$$v_t^{entity} = \sum_{i=1}^{\infty} \frac{\mathrm{Et}(\mathrm{FCF}_{t+i})}{(1+\mathrm{r}^{\mathrm{wacc}})^i} \tag{5}$$

Where $v_t^{entity}$ is entity value at time *t*, $E_t\ (FCF_{t+i})$ is the expected future FCF in period $t + i$ conditional on information available at time *t*, and $r^{wacc}$ is the weighted average cost of capital, indicated as a constant. From $v_t^{entity}$, the market value of debt must be subtracted, including preferred stock less cash and equivalents at time *t* (this subtotal is defined as the market value of net debt $p_t^{netdebt}$ at time *t*) in order to receive the equity value $v_t^{equity}$ at time *t*.

$$v_t^{equity} = \sum_{i=1}^{\infty} \frac{\mathrm{Et}(\mathrm{FCF}_{t+i})}{(1+\mathrm{r}^{\mathrm{wacc}})^i} - p_t^{netdebt} \tag{6}$$

FCF model has specific deficiencies. First, it is difficult to measure FCF when the separation between operating, investing and financing activities is blurry. Second, equation (4) identifies FCF as value added selling services and products but negative treatment of investments is troublesome. Anticipated investments made with ex ante positive net present values reduce FCF even if they create value. For extended horizons, the subsequent cash inflows of these investments are captured within the horizons and this ultimate matching of cash outflows and cash inflows captures the anticipated value added. However, for a firm as a going concern, investments roll over into new investments and the horizon may have to be very long to get this matching. Indeed, a lot of good firms have negative FCF for a long time as new investments exceed operating cash flow each year [25, p. 350]. The negative treatment of investments gives managers an arbitrary opportunity to manipulate FCF in the short terms by delaying new investments. Third, because FCF are not contemporaneous with value generation, it is difficult to be forecasted [Gode, Ohlson, 2006, p. 4-5].

### 2.3. Residual income valuation model (RIV)

The RIV model derives forecasts for its key measure residual income (RI), also referred to as abnormal earnings (AE), directly from earnings forecasts. RI is defined as:

$$RI_t = Ni_t - r^{equity} \cdot B_{t-1} \quad (7)$$

Where $RI_t$ is the residual income in time *t*, $NI_t$ denotes net income for the period ending at time *t*, $r^{equity}$ is the cost of equity, and $B_{t-1}$ is the book value of common equity at time *t-1*. The charge for the use of capital can be viewed as the opportunity cost of invested capital [23, p. 54].

Under the DDM, the intrinsic value of a firm's equity equals the present value of future expected dividends. By using an accounting identity between dividends, net income and changes in the book value of equity, the value of a firm can be reexpressed as the present value of a combination of net income and book value of equity. This accounting identity, called clean surplus relation, states that all changes in the book value of equity during a fiscal period are reflected in that period's net income or dividend distributed to common shareholders [20, p. 230-231]. Formally,

$$B_t - B_{t-1} = NI_t - D_t \quad (8)$$

Where $B_t$ is the book value of common equity at time *t*, $NI_t$ is the net income for the period from *t-1* to *t*, and $D_t$ is the cash dividend paid to common shareholders at time *t*. Solving for $D_t$ in the clean surplus relation and substituting into the DDM formula (1), yields the RIV model:

$$v_t^{equity} = B_t + \sum_{i=1}^{\infty} \frac{Et\,(RI_{t+i})}{(1 + r^{equity})^i} \quad (9)$$

This model has two major problems in practical application. First, the clean surplus relation only holds if equity related capital transactions are value neutral and measured by their market values. In practice, capital transactions are often driven by market inefficiencies and thus have an impact on the value of a firm. Second, RIV anchors on book values by deriving the intrinsic value of a firm as its book value of equity plus a premium for expected growth in the book value of equity. Such an emphasis on book values is only justified if they approximate market values reasonably well, as it is the case for firms in the financial industry. However, the focus on book values is misplaced in many other industries, especially when accounting is conservative [14, p. 5].

### 2.4. Abnormal earnings growth model (AEG)

AEG model legitimizes the common practice of using earnings estimates. It shows how to convert analysts' earnings forecasts to a valuation formula, which relies neither on the clean surplus relation nor on book value of equity.

Given the clean surplus formula (8), AEG at time *t* is equal to the change in RI between *t-1* and *t*. for a constant of equity $r^{equity}$, it is possible to express AEF without the book value by rearranging terms:

$$AEG = NI_t + r^{equity} \cdot D_{t-1} - (1 + r^{equity}) \cdot NI_{t-1} \quad (10)$$

Utilizing the RIV (9) formula together with identity (10), the AEG valuation model can be derived:

$$v_t^{equity} = \frac{E_t(NI_{t+i})}{r^{equity}} + \frac{1}{r^{equity}} \cdot \left[ \sum_{i=2}^{\infty} (1 + r^{equity})^{i-1} \cdot E_t(AEG_{t+i}) \right] \quad (11)$$

Where $v_t^{equity}$ is the intrinsic value of common equity at time *t*, $E(NI_{t+1})$ is the expected net income in period $t + i$, $Et(AEG_{t+i})$ is the expected growth in abnormal earnings in period $t + i$ both conditional on information available at time *t*, and $r^{equity}$ is the cost of equity, indicated as a constant.

AEG also comes with some reservations. The $B_t=E_t(NI^{t+i})/r^{equity}$ is set arbitrarily. In reality, no economic justification exists to start a valuation at the steady state, and then to allow for abnormal earnings in subsequent periods. What is more, this is not a number which can be found in the financial statements. It is a forecast, based on speculation. Besides that, no empirical evidence on the performance neither for AEG nor its simplification exists so far.

Taking the practical limitations of the presented fundamental equity valuation models into account, it is difficult to argue that practitioners ought to rely on either DDM, DCF, RIV or AEG method when it comes to real world applications.

## 3. The Concept of Multiples Valuation Method

In general, literature discusses two broad approaches to estimating the value of firms. The first is fundamental equity valuation in which the value of a firm is estimated directly from its expected future payoffs without appeal to the current market value of other firms. It is based on dividends,

free cash flow, or earnings (abnormal), and involves the computation of the present value of expected future payoffs. This research does not discuss liquidation valuation in which a firm is valued at the break-up value of its assets. Commonly used in valuing firms in financial distress, the fundamental equity valuation method is not appropriate for most going concerns [3, p. 413]. The second is market-based valuation in which value estimates are obtained by examining market values of comparable firms. This approach involves applying a synthetic market multiple (e.g. the P/E multiple) from the comparable firms to the corresponding value driver (e.g. earnings) of the firm being valuated to secure a value estimate [3, p. 413-414][1].

In market-based valuation, also referred to as relative valuation, a target firm's value equals the product of a synthetic peer group multiple and the target firm's corresponding value driver. The value driver is treated as a summary statistic for the value of the firm. Assuming the target firm in its current state deserves the same market multiple as the typical firm of the peer group, this procedure allows to estimate what the market would pay for the target firm. [4, p. 12]. Fundamental analysis helps in identifying firms which deserve the same multiple as the target firm. Explicit expressions for the most of commonly used multiples can be derived using either DDM, DCF or RIV method, or a few additional assumptions. These expressions make interpreting observed patterns in multiples easier (e.g. why growth firms and industries have higher earnings multiples than stable firms and industries). Such explicit expressions, derived from fundamental equity valuation models, are the P/E, EV/EBIT and the P/B multiple. They are called intrinsic multiples:

**Table 1. Intrinsic multiples derived from fundamental valuation models**

| Multiple | P/E | EV/EBIT | P/B |
|---|---|---|---|
| Valuation model | DDM | DCF | RIV |
| Valuation formula | $v_t^{equity} = \sum_{i=1}^{\infty} \frac{\mathrm{Et}(\mathrm{Dt+1})}{(1+r_{t+1}^{\mathrm{equity}})^i}$ | $v_t^{entity} = \sum_{i=1}^{\infty} \frac{\mathrm{Et}(\mathrm{FCF_{t+i}})}{(1+r^{\mathrm{wacc}})^i}$ | $v_t^{equity} = B_t + \sum_{i=1}^{\infty} \frac{\mathrm{Et}(\mathrm{RI_{t+i}})}{(1+r^{\mathrm{equity}})^i}$ |
| Simplified formula | $v_t^{equity} = \frac{\mathrm{D_{t+1}}}{r^{\mathrm{equity}} - g^D}$ | $v_t^{entity} = \frac{FCF_{t+1}}{r^{wacc} - g^{FCF}}$ | $v_t^{equity} = B_t + \frac{\mathrm{RI_{t+1}}}{(r^{\mathrm{equity}} - g^{\mathrm{RI}}) \cdot (1+r^{\mathrm{equity}})}$ |
| Intrinsic multiple | $\frac{v_t^{equity}}{NI_t} = \frac{\mathrm{PR} \cdot (1+g^{\mathrm{NI}})}{r^{\mathrm{equity}} - g^{\mathrm{NI}}}$ | $\frac{v_t^{equity}}{EBIT_t} = \frac{(1+g^{\mathrm{FCF}}) \cdot (1-taxrate) \cdot \left(1 - \frac{g^{FCF}}{ROIC_t}\right)}{r^{\mathrm{wacc}} - g^{\mathrm{FCFI}}}$ | $\frac{v_t^{equity}}{B_t} = 1 + \frac{(\mathrm{ROCE_{t+1}} - r^{equity})}{(r^{\mathrm{equity}} - g^{\mathrm{BI}}) \cdot (1+r^{equity})}$ |

[1] A third approach, not covered in this paper, is contingent claim valuation based on option pricing theory elaborated in textbooks such as Brealy and Myers (2000), Damodoran (2001), Copeland, Weston and Shastri (2004) etc.

The objectives of the valuation method is to determine a firm's equity value based on how the market prices comparable firms, or, sometimes, comparable transactions. That is, practitioners try to approximate a firm's value by looking at the market value of a peer group. If the firms within the peer group are comparable to the target firm and the market is correct, on average, in the way it prices the comparables, the application of a peer group multiple to the corresponding value driver of the target firm yields the intrinsic value [8, ch. 7, p. 2]. The underlying concept of market-based valuation is the law of one price, which states that in an (at least on average) efficient market, similar assets should trade at similar prices [12, p. 24]. In practice, the concept embodies the problem that even if the market is efficient, similar firms are hard to identify or do not always exist. Other reasons why multiples vary across firms are accounting and regulatory differences, fluctuations in accruals or cash flow, or market mispricing. A recognized study comparing IFRS and US-GAAP identifies over 250 differences between the two accounting standards [29, p. 6].

Independent of the specific context, the multiples valuation method consists of four steps: selection of value relevant measures, identification of comparables, estimation of synthetic peer group multiples, and actual application of the synthetic peer group multiple to the corresponding value driver of the target firm.

### 3.1. Selection of Value Relevant Measures

To value a firm using multiples, we must first determine which value relevant measures we want to use. Practitioner prefer using equity value multiples because market capitalization does not require a further adjustment for net debt as it is the case with entity value multiples. The most widespread equity value multiples are the P/E, P/B, P/SA and P/OFC multiple which scale the market price of common equity by the most important summary numbers in the financial statements: net income, book value of common equity, sales or revenues, and cash flow from operating activities [24, p. 66]. The general description of the selection process of value relevant measures in the preceding paragraphs leaves three open issues:

- The computation of equity value multiples is straightforward, but is there any other reason why to favor equity value multiples over entity value multiples?