

VALUING COMPANIES—AN OVERVIEW OF ANALYTICAL APPROACHES

Practitioners have devised numerous frameworks and analytic techniques to value companies. Such valuation approaches are also used to value portions of existing companies (e.g. divisions) or investment proposals (e.g. to build a new facility). Each approach has its strengths and weaknesses and a combination of approaches often provides insights not obtainable from a single technique. This note highlights major approaches to valuation.

One can partition valuation approaches into four groups as shown in Table 1. Within each category there are many variations, but each category is motivated by a different philosophy of valuation.

This technical note was prepared by Robert S. Harris. This technical note was written as a basis for class discussion rather than to illustrate effective or ineffective handling of an administrative situation. Support for this work came from funds provided the Darden Foundation and the TVA. Copyright © 1997 by the University of Virginia Darden School Foundation, Charlottesville, VA. All rights reserved. *To order copies, send an e-mail to dardencases@virginia.edu. No part of this publication may be reproduced, stored in a retrieval system, used in a spreadsheet, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the permission of the Darden School Foundation. Rev. 7/02.*

Table 1: Valuation Approaches	
<u>Approach</u>	<u>Philosophy</u>
Specific Asset Values—based on accounting, liquidation or replacement cost data.	A company is a collection of assets which can be sold; the company value is the sum of the individual values of specific assets (e.g. buildings, equipment).
Multiples—values derived using multiples from comparable companies, comparable transactions or past experience.	The way to value one company is to see how <u>other</u> comparable companies have been valued. The first task is to find comparable companies and their values. The second is to find meaningful “common denominators” by which to understand these values in terms of multiples (e.g. multiples of sales, earnings or cash flow).
Options Pricing—value estimates from applying options pricing theory.	Financial assets, such as a company’s stock, can often be viewed as options on the underlying real assets. If we can estimate key properties of the underlying asset (e.g. oil reserves), we can use options pricing to value the “options” on these assets.
Present Value Models—values based on discounting a stream of expected future benefits back to present value.	Any company or financial asset creates a stream of future benefits for the owner. Value is simply the present value of this future stream.

As the philosophies suggest, the efficacy of a particular valuation approach will vary from case to case. For instance, specific asset values may be the best approach to valuing a moribund company when the buyer’s strategy is to dismantle the company. In contrast, such a valuation approach may have little merit if the company is a going concern with earnings potential based on unique human talents and technological advantages. The accomplished analyst knows a number of techniques and when each technique is or is not appropriate. Choice of techniques also depends, in part, on the availability of information needed to apply a particular framework.

Specific Asset Values

This approach requires detail work to understand the nature and value of specific assets. Given that accounting values are largely based on historical costs and involve formula-based (rather than economic based) depreciation rules, book values may tell you little about the prices at which the assets could be sold. Sometimes there are active secondary markets for assets (e.g. trucks, rail cars) so an objective basis for a liquidation value is available. Other times estimates

of sale values are more subjective. The cost of replacing the assets sometimes serves as a useful gauge of value (e.g. if the buyer's strategic alternative is to purchase the company's facility or to build a new one), however, changes in technology often cloud interpretation of replacement costs; new assets may have different capabilities than the older ones being replaced.

Multiples

The strength of multiples is that they can be used to capture valuation information already revealed in market transactions. If another comparable company is currently trading in the market at a price-earnings multiple of 10, this 10 multiple reflects market views about risk and growth potential in a particular type of venture. To the extent that one is valuing a truly comparable company, the 10 multiple is thus informative. It is a measure of *relative* value.

Yet multiples have their own set of weaknesses. It may be difficult (if not impossible) to find comparable companies or transactions. Multiples often use accounting data which are subject to the vagaries of historical cost accrual accounting. Moreover, the focus of multiples varies widely—multiples of sales, earnings, cash flow, hospital beds. The best type of multiple may vary from one type of company (e.g. a mature cash flow generating business) to another (e.g. a high growth company in a phase of high capital expenditures).

Often multiples are not as easy to use as one may initially suspect. For instance, two companies in the same industry may have different multiples based on investors' different perceptions of how healthy the business prospects are for the two companies. All other things equal, higher expected growth increases a multiple and high risk decreases the multiple. Inevitably, choosing multiples involves judgments. Application of multiples, like much of valuation, depends on critical judgments by the analyst.

A fundamental weakness of multiples based on comparable companies or transactions is that they rely heavily on another person's judgment (e.g. the buyer of the comparable company) of value. Three primary sources are typically employed for multiples: publicly traded companies, recent acquisition (or initial public offering) transactions and past experience of the analyst. The third source is sometimes used by individuals who have purchased a number of companies and observed which transactions seemed to have worked out well or not. That experience may shed light on a maximum price one can pay for a company.

Options Pricing

A major valuation breakthrough of the last 25 years has been options pricing theory. Application of option models has become commonplace for valuing a wide array of derivative securities traded in markets. Since the derivative's (e.g. call option on stock) value depends on the value of the underlying asset (e.g. the stock), we can value the derivative based on key attributes of the underlying asset (primarily its price and a measure of its risk), the terms of the option (e.g. maturity and exercise price) and current financial market conditions (e.g. interest rates). The difficulty in applying options pricing directly to companies or stocks is that the underlying asset is now a set of real assets over which it may be difficult to find estimates of risk

parameters. Moreover, real assets are not characterized by the near frictionless markets for financial assets that gives rise to the options pricing equations. While useful in certain cases when information is available (e.g. on oil prices and geological data on drilling wells), options pricing is, as of yet, not widely used to value companies themselves. Rather, once the value of a company is known, options pricing can shed light on the value of options on the company.

Present Value

Present value analysis is the application to corporate valuation of basic techniques often used to understand bond pricing. Any asset is viewed as a stream of future benefits (coupon and principal payments in the case of the bond) whose value is found by discounting that stream at a rate reflecting the investor's required return. Such a return requirement depends on the investor's opportunities to invest elsewhere in comparable risk alternatives. Use of a present value approach requires an explicit forecast of a whole stream of future benefits and a determination of an appropriate required return. A strength of the approach is that it accommodates detailed forecasts that require many assumptions. The forecasting process prods the analyst to consider a wide array of issues critical to the company. A second benefit is that through selection of a required return the approach benchmarks against current financial market opportunities available to investors. As a result, it takes into account both time delays and risk in estimating value. On the downside, such present value techniques often can lead to quite disparate estimates of value based on relatively small variations in forecast assumptions. Moreover, the choice of a discount rate requires an assessment of risk that is often difficult.

Variations of Present Value Techniques

“Necessity is the mother of invention.” Even when analysts adopt a present value approach, there is considerable variation in technique. Variations result from differences in definition of the stream to be discounted, treatment of a company's use of debt and equity financing, and assumptions about the constancy of required returns over time. Consider the widely applied version of the dividend growth model to value stock which is shown in equation (1).

$$V_0 = \text{DIV}_1 / (K - g) \tag{1}$$

- where V_0 = estimated value per share at time 0,
 DIV_1 = expected cash dividend per share at time 1,
 g = growth rate in dividends for the indefinite future, and
 K = investor's required return on this investment.

This approach defines future benefits as cash dividends to be received by an equity owner and further assumes that these dividends will grow at a constant rate g indefinitely. It takes the perspective of valuing the stock of the company, thus interest charges on debt have already been subtracted out in the cash flow stream before the resultant dividends. Moreover, taking the stock

(“equity”) perspective implies that K is the investor’s requirement on an equity investment with the risk of this stock. Finally, the model assumes that the required return (as well as the growth rate) is the same for all future periods. Analysts in the fixed income area frequently use models that allow for different discount rates for cash flows in different years, following the term structure of interest rates. In company valuation, however, term structure considerations are typically dwarfed by difficulties of estimating future cash benefits and assessing risk of these benefits. As a consequence, the primary variations in present value approaches arise from differences in their definition of the stream to be discounted and the treatment of a company’s use of debt and equity.¹ Table 2 highlights key features of five major present value approaches.

Each of the approaches in Table 2 has strengths. Moreover, if applied with consistent assumptions each can lead to the same conclusion about the value of the company. However, each approach invites the analyst to focus on different attributes of the company’s prospective performance and provides different avenues for estimating the valuation consequences of a particular economic scenario. The last column of Table 2 highlights some of these issues. For instance, the equity residual method appeals to equity owners in leveraged buyouts since the financing plan is a critical part of the transaction. In contrast, the Weighted Average Cost of Capital (WACC) approach is well suited to decentralized decision making contexts such as often found within a large company. In such companies, financing is at the corporate level and capital is allocated within the company. Many projects are funded from general corporate sources and no explicit financing plan is linked to the project. The WACC approach allows one set of people with business expertise (e.g. in a division) to make key forecasts about sales, costs and asset utilization issues. These forecasts are interwoven to create operating cash flow estimates. Another set of people (e.g. in corporate treasury) may determine the discount rate (or set of rates) which is dispersed within the company. The WACC approach may have substantive administrative benefits in such a context.

¹Application of these approaches also vary in terms of models analysts employ to risk adjust required returns.

Table 2: Alternate Present Value Approaches to Estimate Value

<u>Approach</u>	<u>Value Estimated</u>	<u>Benefit Stream</u>	<u>Discount Rate</u>	<u>Comment</u>
Dividend Growth Model (DGM)	Value of Equity	Dividends	Cost of Equity	<ul style="list-style-type: none"> -often used by external equity analyst -promotes a focus on earnings and dividend payout projections -may use multi-stage growth approaches
Weighted Average Cost of Capital (WACC)	Value of Enterprise* (Debt plus Equity)	After Tax Operating Cash Flow	After-Tax Weighted Average of Debt and Equity Costs	<ul style="list-style-type: none"> -often used by corporate managers in project valuation or strategic buyers in takeovers -promotes focus on key <u>business</u> assumptions affecting operating cash flow -allows for decentralized decision making in which discount rate handles financing issues -values entire enterprise
Adjusted Present Value (APV)	Value of Enterprise = (1) Value of Unlevered Enterprise plus (2) Extra Value of Financing Benefits	<ul style="list-style-type: none"> ·<u>Step 1</u> After Tax Operating Cash Flow ·<u>Step 2</u> Benefits of Financing 	<ul style="list-style-type: none"> ·<u>Step 1</u> Unlevered Cost of Capital—Cost of Equity Assuming all Equity Financing ·<u>Step 2</u> Rate Appropriate for the Financing Benefits 	<ul style="list-style-type: none"> -may fit situation in which financing is specifically tied to investment -focus on business assumptions in Step 1 -makes an explicit estimate (Step 2) of the value created by financing -requires analyst to estimate unlevered cost of capital -values entire enterprise
Economic Value Added (EVA)	Value of Enterprise	After Tax Economic Profit	After-Tax Weighted Average of Debt and Equity Costs	<ul style="list-style-type: none"> -more often used as an annual measure of performance -promotes focus on key business assumptions -uses economic profit versus cash flow and hence requires economic depreciation estimates and other allocation estimates -EVA promotes focus on firm's ability to earn super competitive rates and hence provides insights on terminal values
Equity Residual Method (ER)	Value of Equity	Residual Cash Flow to Equity	Cost of Equity	<ul style="list-style-type: none"> -often used in leveraged buyouts -fits situations in which financing is integral part of the decision -requires explicit forecast of financing plan over time -invites focus on both financing and business issues -less adaptable to decentralized decision making