A UNIVERSAL VALUATION MODEL FOR CLOSELY HELD BUSINESSES

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Introduction

There is a belief among many appraisers and others involved in the valuation of closely held businesses that no single formula exists that will value a business under all circumstances. In fact, the primary guide for appraisers in tax situations, Revenue Ruling 59-60, specifically states in Sec. 3.01 that "No formula can be devised that will be generally applicable to the multitude of different valuation issues arising in estate and gift tax cases."

Almost without exception, valuation books and articles discuss a number of valuation methods. The methods are usually grouped into major categories with several variations in each category. The major methods are usually market comparison methods, income methods, liquidation or asset based approaches, and, in some cases, rules of thumb as a fourth category.

The market comparison approach is theoretically superior *if* sufficient comparison data are available. However, there are two major problems with this approach. First, for practical purposes many businesses are unique or at least possess characteristics that make them significantly different from other businesses, even those in the same industry or geographic area.

Second, in most instances there is limited information available on sales of closely held businesses and directly comparable market comparison data simply do not exist. In instances where information is available, there is seldom a sufficient number of comparison sales of a particular type of business within close proximity to allow the use of market comparison as the primary valuation method. The net result is that some version of income valuation supplemented by a market comparison is the primary approach often used to value closely held companies.

Choosing the appropriate income model is a problem. Appraisal publications generally recommend that appraisers consider several methods, in many cases including combinations of income and market comparison or income- and asset-based methods, and choose one depending on the specifics of the appraisal at hand. This implies that several significantly different methods exist. A decreasing but still significant number of books and publications recommend a final value based on a weighted average of several valuation methods also implying the existence of conceptually different methods. To its credit, Rev. Ruling 59-60 in Sec. 7 specifically says that there is no benefit in averaging methods and discourages it.

However, if the appraiser accepts four basic tenets, the only logical conclusion that can be reached is that there is only one valuation model and that all others are simply variations on a single theme with differing assumptions. These tenets are straightforward and should be non-controversial. They are:

1. Investors will only pay for future expected returns from an investment;
2. The return that investors are seeking is cash;
3. Money has time value; and
4. Investors are risk averse.

Each of these assumptions is intuitively appealing and supported by widely accepted economic theory, empirical research, and common sense. This article presents the arguments in support of these tenets, the universal valuation model that results from them, and mathematical proofs of the model's equality with other widely used valuation models.

The Four Tenets

The four tenets that underlie the universal valuation model are generally accepted by economists, the investment community, academic theorists, and business appraisers and have great intuitive appeal.

Tenet 1: Investors will only pay for expected future returns from an investment.

This idea is basic to all of investment theory and practice. Earnings a firm has achieved in the past have been the basis for paying dividends and building the company. Past dividends obviously are just that: past. They do not currently affect the company and in fact have been removed from the company and paid to owners. The company has no assets as a result of these paid out dividends and neither the company nor its owners will directly benefit in the future from past earnings. Likewise, assets the company owned in the past but no longer owns have no effect on the future. Only existing assets and liabilities can affect the company in the future.

Past profitability and success the company has achieved are certainly important to the extent they affect and help predict the future. The first analysis a prudent investor should make is of past operations. Past performance is the single best predictor of the future, but it is not a perfect predictor. Good profitability in the past indicates that a company has good products and services, a competent management team and work force, good marketing, good locations, and other factors that go into success. However, it does not necessarily translate to future success as many cases in American business history have shown. There have been many instances in which highly profitable and successful companies ran into significant problems which resulted in large drops in stock price and, in some cases, bankruptcy and liquidation. At the point that the market recognized problems and the stock price began to drop, the companies still had a successful history but the price dropped because of future expectations. Obviously if two companies have identical histories and one has just been destroyed by a natural disaster, say a hurricane, in all likelihood they do not have similar futures and will not have the same market values.

A number of appraisal methodologies take an average of past profits or other historical measures of return as the basis of value. There is nothing inherently wrong with this if past trends and conditions are expected to continue into the future. The appraiser is really forecasting, simply with the implicit assumption that the past is indicative of the future. In fact, Revenue Ruling 59-60 explicitly states in Sec. 3.03 that "Valuation of securities is, in essence, a prophesy as to the future and must be based on facts available at the required date of appraisal." The ruling goes on to make the further point that prices in publicly traded markets are a function of investors' expectations. To the extent that historical data are used by investors to derive expectations, the valuation relies on past trends. But the only bases of value are the future earning power of the company or the liquidation of existing assets and liabilities.

Tenet 2: The return that investors are seeking is cash.

This idea is, surprisingly, perhaps the most controversial of the four, but it based on economic logic and empirical evidence. Many valuation models- including price-earnings, capitalization of earnings, and many other variations- are supposedly based on accounting profit; however, accounting profit has no direct investment value. Accounting profits cannot be used to pay creditors, employees, or other bills and it cannot be deposited in a bank. Among other factors, investors are interested in how much cash an investment will require and how much cash they will receive in return. Accounting profit has no economic value unless it signals the receipt of cash.

Increases or decreases in reported accounting profit bring about changes in stock prices only if they also bring about changes in expected cash flow. In many cases, this is true because there is a correlation between accounting profit and cash flow. Higher accounting profit may indicate an increase in cash flow and lower profit may indicate lower cash flow. In other cases, a change in reported accounting profit may be accompanied by an opposite change or no change in cash flow. If value is a function of accounting profit, increases in profit should be accompanied by increases in value and vice versa. Studies in several areas have refuted this presupposition.

For example, a change from FIFO to LIFO accounting for inventory will have opposite effects on accounting profit and cash flow. In periods of rising prices, when most of the changes occur, pre-tax profit for both book and tax purposes will fall since companies must report inventory flows using the same method for GAAP and IRS reporting. Since actual tax paid falls, cash flow will rise. If accounting profits are the driving force behind value, companies which make the FIFO to LIFO switch should experience price drops. Several studies, including one by Biddle and Lindahl (1982)[1], have found evidence that switches resulting in increased cash flow also experienced an increase in share price, even though reported profit fell. Other studies centering on the use of the purchase and pooling-of-interest methods in accounting for mergers and acquisitions found no difference in value effects even though pooling-of -interest treatment generally results in higher reported profits[2]. In short, cash flow affects value directly; accounting profit only affects value indirectly and only to the extent that it conveys information about cash flow.

This is not to say that the concept of accounting profit is unimportant; obviously, it is. Accounting profit is an excellent measure of past economic performance and position. GAAPs are structured to capture economic inflows and outflows in the business and to limit the short-term manipulation of results by companies. When the perspective turns to investments and future expectations, for the reasons stated above, accounting profits are less indicative than cash flow of the returns investors are seeking.

The elements of cash flow are generally the same as those included in the accounting statement of cash flows, adjusted to the interest being valued. They are (1) operating cash flow, (2) investing cash flow, and (3) financing cash flow. Operating and investing cash flow are identical to those included in the statement of cash flows; however, financing cash flow must be calculated consistent with the subject interest in the business that is being appraised. For instance, if the interest being valued is common equity, the financing cash flows would include all flows to and from debt financing, including after-tax interest and principal payments and new issues. It would also encompass all cash flows to and from preferred stock, including dividends, retirements, or new issues. No cash flows from equity, such as dividends, would be added or subtracted in the calculation of financing cash flows since the cash flow stream to be valued is the residual cash flow available to equity holders.

Tenet 3: Money has time value

Everything else equal, the farther cash flows occur in the future, the less their value today. This idea is universally accepted and should not be controversial.

Tenet 4: Investors are risk averse

The greater the risk of an investment, the greater the return investors should demand and expect from the investment. The price of the company’s stock and its total value will reflect the risk level that investors perceive it to have through the required return used to discount expected future cash flows. This tenet also should be universally accepted.

If these four tenets are true, the following model will value any business, business component, or any other financial asset:

$$Business\ Value = CF_0 + \left[\sum_{t=1}^{n} \frac{CF_t}{(1+k_e)^t} + \left(\frac{CF_{n+1}}{k_e - g_l} X \frac{1}{(1+k_e)^n} \right) \right] X\ IPAF \quad (Eq.1)$$

where:

where:	CF_0	=	initial cash inflows or outflows to equity holders from the asset or business;
	CF_t	=	independently forecast cash flow to equity holders in each year *t* of the short run period *n*;
	n	=	number of years in the short run where cash flow patterns are expected to be different from the long run;
	k_e	=	return required by investors on equity investment given the risk level of the business;
	CF_{n+1}	=	cash flow available to equity holders in the first year of the long run,
	g_l	=	long-run growth rate in cash flow; and
	$IPAF$	=	intra-year cash flow pattern adjustment factor.

Most of the terms in the model are widely used and should be familiar; however, several need explanation. CF_0 represents cash flows that would occur at or soon after the purchase of the business being appraised. For example, the sales, expenses, and other items for a grocery store may be forecast assuming the counters, shelving, coolers, and other fixtures are well maintained and of normal serviceability. If past due maintenance of $200,000 is necessary to bring the assets up to this standard to be consistent with the projections, CF_0 would be

-\$200,000. Conversely, if there is surplus inventory that could be sold to net \$25,000 after taxes without affecting the cash flow stream, CF_0 would be +\$25,000.

The variable n may represent a situationally determined short-run period in which cash flows may grow faster or slower than expected in the long run, or it may represent a period of variable cash flows with no steady pattern. The company may be a restaurant chain in a high-population-growth area with cash flow growth expected to be 14 percent in the first year after the appraisal date and decreasing by 2 percent per year until it reaches its long run expected level of 6 percent in year 5. In this case, n would be 4 and the long run would begin in $n + 1$, or Year 5.

IPAF is a factor to adjust the standard present value equation for intra-year cash flow patterns. The standard equation assumes that all cash flows occur at the end of each year. A simple adjustment is the mid-year adjustment that multiplies total present value, except for CF_0, by: the square root of $(1 + k_e)$. This is an approximation of assuming that cash flows occur evenly throughout the year.[3]

The model is specifically constructed in terms of equity valuation. As discussed below, it can be easily adjusted to value debt, preferred stock, or any business interest.

Description and Advantages of the Universal Valuation Model

The universal valuation model is consistent with the four tenets discussed above: (1) it is based on future expectations; (2) returns in the model are cash flows available to equity holders or other interest being valued; (3) the equation accounts for the time value of each year's cash flow; and (4) the specific level of risk is included through the required return on equity. The model also has several additional characteristics that make it attractive. First, it is based on sound economics and is theoretically correct. The four tenets are basic economic principles and the more directly a model includes them, the better the model. For example, models based on accounting profit lose some precision by using profit as a proxy for cash flow because the cash flow to equity holders from profit may be deferred. If cash flow is used directly in the valuation model, its time value precision is increased. All valuation models are based on future expectations and therefore are subject to a large number of prediction errors. This is a necessary evil and cannot be eliminated. However, prediction errors can be reduced by including the best economic measure of future investment return, cash flow, in the model rather than a more imprecise measure such as net profit or pretax profit.

Second, the universal model is specific and forces the appraiser or analyst to think through underlying assumptions and explicitly specify them in the input to the model. Most models implicitly include broad input generalizations. The approaches based on multiples, such as price-earnings and sales multiples, fold many explicit assumptions into one, reflected in the multiple used in the valuation model. The specific assumptions that are implicitly included in the overall multiple include such critical factors as future growth rates in sales and expenses, fixed and variable expense relationships, asset structure and growth, and capital structure. For instance, the price-earnings (PE) multiple approach uses a single earnings per share (EPS) figure multiplied by an earnings multiple. The use of a single EPS implies a constant relationship between sales, expenses, and profit. In addition, it implicitly assumes a constant relationship in asset growth and capital structure. The input to the universal model can be adjusted year by year over the short run forecasting period for changing relationships among sales, expenses, assets, and capital structure. Like other models, the universal model assumes constant, steady state relationships for the long run.

The third attractive characteristic of the universal model is that it is flexible. It can be adjusted directly, easily, and specifically for factors such as varying levels of risk. Risk is reflected in the model through the specification of a required rate of return used to reduce future cash flows to present value. The model can be easily adjusted for risk by simply varying the required return for different risk levels.

In addition, the universal model will handle almost any growth pattern of sales, expenses, cash flows or any other factor in situations in which the business is expected to continue for the infinite future, in which it is expected to have a significant but finite life, or in which it is expected to be liquidated. Many of the widely used income valuation models, such as the PE multiple, implicitly assume a single average growth rate for the company's returns and that the company will have an infinite life.

Relationships between factors can also be specifically adjusted over different time periods. The appraisal scenario may include periods in which cost of goods sold is expected to increase or decrease as a percentage of sales over time, certain expenses are expected to experience a rate of inflation different than sales, assets are expected to grow faster or slower than sales, or capital structure is expected to change over time. Many models force the appraiser or analyst to reflect these factors by an adjustment to a general valuation variable such as the PE or sales multiple.

The model can also be adjusted to accommodate specific discount for factors such as key person, minority interest, and marketability. This can be done by varying the discount rate or by a separate discount to total value at the end of the appraisal process. The result of the flexibility of the universal model is that it can accommodate almost any valuation scenario and can be adjusted to handle a wide variety of cash flow patterns.

Application of the Universal Valuation Model to Various Cash Flow Patterns

Infinite Cash Flows

This is the business life implicit in most widely used valuation models such as the PE multiple and capitalization of earnings.

1. Smooth and equal short-run and long-run growth rates

Short- and long- run growth = 10% per year

Year 1	Year 2	Year 3	Year 4	Year 5 . . . . infinity
\$100	\$110	\$121	\$133	\$146 . . . .

In this pattern, the short-run cash flows are expected to grow at the same rate as long-run cash flows and the long run is expected to be financial equivalent of forever, making the equation a perpetuity. Under these assumptions, the universal model reduces to the familiar Gordon or capitalization model (see proof in Appendix 1):

$$Business\,Value = \frac{CF_1}{k_e - g} \qquad (Eq.\,2)$$

The universal model also has almost complete flexibility in handling many other cash flow patterns.

2. Constant cash flow

Year 1	Year 2	Year 3	Year 4	Year 5 . . . . infinity
\$100	\$100	\$100	\$100	\$100 . . . .

Under this pattern, the universal model becomes:

$$Business\,Value = \frac{CF}{k} \qquad (Eq.3)$$

where: CF = annual constant cash flow; and

k = required return for the interest being valued.

This version of the model can be used for valuing securities such as preferred stock or perpetual bonds.

3. Smooth short-run growth with a different long-run growth rate

Short run: growth = 10% per year Long run: growth = 6%

Year 1	Year 2	Year 3	Year 4	Year 5 . . . . infinity
$100	$110	$121	$133	$141 . . . .

The business may be expected to grow at one rate in the short run and another rate in the long run. If so, the short-run annual cash flows CF_t can be projected at the short-run growth rate for whatever number of years, n, constitutes the short run. Time period "n + 1" begins the long run. Cash flows in this year serve as the basis for applying the Gordon or capitalization model to capture the value of the long run which is assumed to be infinite or its practical equivalent. The term in the model "$1/(1+k_e)^n$" reduces the capitalized value from time n, the beginning of the long run, to the present.

For this pattern, the model can also be easily modified for two, three, or any number of differing cash flow growth patterns in the short run and a smooth long-run growth. For example, the short-run growth may be expected to equal 10 percent for four years, followed by four years at 8 percent, and 6 percent annually in the long run. To accommodate this pattern, another term can be added after the first term for a second four-year period.

4. Variable short run with smooth long run cash flows

The model is constructed to this specific cash flow pattern. In the model, the cash flow for each year of the short run is forecast independently and growth is assumed to achieve a smooth steady state after the short run.

Short run: variable growth				Long Run: growth = 6%
Year 1	Year 2	Year 3	Year 4	Year 5 . . . . infinity
$100	$120	$140	$120	$147 . . . .

Of course, the long run is not actually expected to be perfectly smooth. A variety of factors such as general or local economic cycles would cause it to be variable to some extent. However, given the time into the future that the variability will occur, the discount rates normally used for closely held businesses, and the impossibility of accurately forecasting economic swings years into the future, the assumption of smooth growth is the best unbiased estimate of the long run cash flow pattern.

Finite Cash Flows

The model can also value businesses expected to have finite lives. In this case, there is no long run past period *n* and the entire term to the right of the "+" in Eq. 1 simply disappears.

5. Significant but finite life

Six-year expected life with liquidation at end.

						End of business's life
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
$100	$120	$120	$130	$110	$200	

Liquidation

The model can also handle immediate liquidation situations. In this case, cash flows expected to be received over the period of liquidation are substituted for CF_t. If the liquidation is expected to be completed within a short time period, all cash flows would take place at time 0 and no discounting is required. If the liquidation is expected to be spread over a period of months or possibly even years, the cash flow stream has a short, finite life and the discounting is performed as described above. The discount rate used here may be lower than that used for valuing a going concern if the proceeds to be received are less uncertain.

Another adjustment that should be made in liquidation situations is the mid-year adjustment factor "the square roof of $(1 + k)$." If the cash flows are expected to occur at specific points in time- for example the sale of a piece of real estate- and do not represent cash flows over a period of time, this term should not be used. The same would be true if the terminal cash flow represents the liquidation of the business and not a capitalization of future income.

6. Immediate liquidation

Today	*End of business's life*
\$300	

7. Liquidation over a limited period

Cash flow pattern for liquidation over one year period.

Today	Year 1	*End of business's life*
\$300	\$250	

Initial Cash Flows

For a going concern, there also may be situations in which there are time 0 cash flows, either negative or positive. The model includes these flows as the term CF_0 at the beginning of the valuation period which is the valuation date.

8. *Negative initial cash flows*

Growth = 5%

Today	Year 1	Year 2	Year 3	Year 4. . . infinity
($80)	$100	$105	$110	$116 . . . .

9. *Positive initial cash flows*

Growth = 5%

Today	Year 1	Year 2	Year 3	Year 4. . . infinity
$75	$100	$105	$110	$116 . . . .

All of these cash flow patterns occur and, in fact, most of them are common. Most of the widely used models are difficult to specifically adjust for the different patterns. However, the universal model can be adapted to each of these patterns with relatively little difficulty.

The Equivalency of the Universal Model to Other Valuation Methods

The universal model is economically and mathematically equivalent to other widely used models, both income and liquidation. As long as the four basic tenets are accepted and the underlying assumptions concerning earning capacity, future growth, risk, and other valuation factors are the same, the models are identical. If the universal model and another valuation model result in different values, it is because underlying assumptions are different, not because the underlying economics are different.

Several proofs showing the equality of the universal model and other widely accepted valuation models can demonstrate this assertion. The models to be illustrated are those that in the authors' experience are the most widely used in the appraisal and investment communities. They are (1) the Gordon or Constant Growth Dividend Valuation Model; (2) the Price-Earnings or PE Multiple; (3) the Capitalized Earnings Method; (4) Discounted Future Earnings; and (5) the Price to Revenue or Sales Multiple Method.

The Universal Model and the Gordon Model

The Constant Growth Dividend Valuation or Gordon model is widely used in the investment community, by academics, and to a more limited extent by business appraisers. The model is a dividend capacity model based on future expected cash dividends and is consistent with discounted cash flow and Rev. Ruling 59-60's dividend-paying capacity provisions. It contains several implicit assumptions: (1) the life of the company is expected to be infinite; (2) dividends are the only receipts investors will receive; and (3) dividends will grow at a constant rate over the life of the company. If the expected life of the subject company is effectively infinite and dividends are expected to be paid either at a constant amount or in a constantly growing pattern, the universal model reduces to the Gordon model as shown in Appendix 1.

Under the assumptions noted in the proof, the universal model and the Gordon model are equivalent. The difficulty with the Gordon model, as with most general models, is that the implicit assumptions are usually too restrictive and unrealistic for most real-world valuation situations.

The Universal Model and the Price-Earnings Model

Another widely used model is the price-earnings (PE) multiple. This model is ostensibly based on historical accounting profits and is often viewed as being economically different than discounted cash flow. Again however, if the same assumptions are used for the PE multiple and the universal model, their equality can be demonstrated as in Appendix 2. Thus, if the universal model is applied using the same implicit assumptions that underlie the PE multiple model, they result in identical values. If the universal model and the price earnings model result in different values, it is because at least one underlying assumption is different, not because the models are different.

The Universal Model and Capitalized Earnings

The capitalized earnings method normalizes earnings and determines a capitalization rate that is used to convert the net income to present value. Specifically, the value is derived as:

$$Business\ Value = \frac{E_1}{Capitalization\ Rate} \qquad (Eq. 4)$$

where:

E_1 = next year's normalized earnings.

Although many presentations of the capitalized earnings method do not conceptually describe the capitalization rate, it is actually "k_e-g." Thus, Equation 4 becomes:

$$Business\,Value = \frac{E_1}{k_e - g} \qquad (Eq.5)$$

where:

k_e = the cost of equity capital; and

g = the growth rate in earnings, assumed to be constant forever.

If the firm has no depreciation expense or the appraiser assumes that capital purchases equal depreciation, all revenue and expenses represent cash flow in the year they are actually reported, and all earnings are distributed as cash flow to owners, the Equation 5 becomes:

$$Business\,Value = \frac{CF_1}{k_e - g} \qquad (Eq.6)$$

where:

CF_1 = next year's cash flow to equity holders.

Thus, under the set of assumptions in which the net cash flow to equity holders is exactly equal to the earnings, and that the entire cash flow is paid to equity holders (i.e., there are no retained earnings), the capitalized earnings method would derive the same business value as the universal model.

In many cases, it is inappropriate to assume that all earnings will be distributed as dividends, since the business may need to retain some earnings to finance growth. In these cases, even if the firm's net operating cash flow were exactly equal to its earnings, the capitalized earnings method and universal model will not derive the same value of a business. The capitalized earnings method would generate an incorrect value because it counts earnings that would be reinvested as retained earnings as if the cash were distributed to owners. The model also does not directly consider asset and liability growth.

If the business reports depreciation expense that is different than the actual amount of capital purchases and all other original assumptions held, the company's annual cash flow would be higher or lower than its reported earnings. The capitalized earnings method would be inappropriate because it would ignore the differences in earnings and the annual cash flow actually distributed to owners that was caused by the difference in depreciation expense and actual capital outlays.

Another problem with capitalized earnings lies with the economic concept of a discount rate. Since net income has no investable value, it has no time value. Thus, there is no conceptual method to determine a discount rate to apply to net income as there is with cash flow. Some authors have suggested a method for adjusting a discounted cash flow discount rate to an equivalent rate applicable to capitalized earnings and discounted future earnings[4]; however, this method simply makes an adjustment in such a way as to force the values determined under discounted cash flow and the earnings methods to be approximately equal. There is no direct conceptual basis to the resulting discount rate to be applied to accounting earnings. In addition, there is a practical disadvantage in that additional work is required that is unnecessary. If the discounted cash flow methodology is applied, there is no reason to perform the additional work necessary to go through the less desirable capitalized or discounted future earnings approach.

Beyond the limitations described above, the capitalized earnings method is not sufficiently flexible when earnings growth varies over time. Consider a case in which all original assumptions held except constant growth. If the firm's future earnings pattern was expected to grow unevenly in the short run, the capitalized earnings method would be subject to error because of its implicit assumption of a single growth rate over all time periods.

The Universal Model and Discounted Future Earnings

The discounted future earnings method determines the value of a business to be the present value of future expected earnings as:

$$Business\ Value = \sum_{t=1}^{n} \frac{E_t}{(1+k_e)^t} \qquad (Eq.7)$$

This method can be preferable to the capitalized earnings method because it allows for uneven change in earnings growth. In practice, the earnings are commonly expected to grow at some constant rate after some future point in time. The present value of this portion of the earnings stream can be written as:

$$\left(\frac{E_{n+1}}{k_e - g_l} X \frac{1}{(1+k_e)^n}\right) \qquad (Eq.8)$$

where:

E_{n+1} = earnings in the first year of the long-run period in which earnings grow at a constant rate; and

g_l = the long-term growth rate in earnings.

As in the universal model, the first term is the present value of capitalized earnings as of the beginning of time at which earnings begin the long-term constant growth, and the second term discounts that value back to today, the valuation date. The equation combining the short-run period of erratic earnings and the long-run period of constant growth is;

$$Business\,Value = [\sum_{t=1}^{n} \frac{E_t}{(1+k_e)^t} + (\frac{E_{n+1}}{k_e - g_l} X \frac{1}{(1+k_e)^n})] \qquad (Eq.9)$$

The equation above is identical to the universal model, without initial cash flows and the intra-period adjustment factor, except that the cash flow (*CF*) is replaced with earnings (*E*). Thus, the universal model and discounted earnings model will derive identical business values if the earnings are exactly equal to the cash flow distributed to owners each year. The same assumptions specified earlier for the capitalized earnings model would be necessary to make the discounted earnings model derive the identical business value on the universal model. First, the firm has no depreciation expense or its capital expenditures are exactly equal to depreciation. Second, all revenues and expenses other than depreciation are realized in cash flow in the year they are actually reported. Third, there are no changes in assets other than those represented by depreciation and there are no changes in debt. Fourth, all earnings of the firm are distributed as cash flows to owners.

In the event that any of these assumptions are violated, the discounted earnings model will not derive the same business value as the universal model. In this case, the discounted earnings model would not be appropriate because it would not properly estimate cash flow to owners and the resulting economic value in the year that the cash flow was ultimately received by owners.

In addition, the same problem exists with the conceptual basis of the discount rate as discussed in the previous section. There is no theoretically acceptable method for directly determining a discount rate to apply to a factor which cannot be invested, such as accounting net income, and thus has no direct present value.

The Universal Model and Sales Multiples

The universal model can also be shown to be equivalent to more general models based on industry rules of thumb, such as the sales multiple. The sales multiple is a variation of the Gordon model, which as shown above and in Appendix 1, is equivalent to the universal model. The sales multiple model contains the following assumptions in addition to the normal assumptions underlying the Gordon model:

1. The sales revenue of the firm is expected to grow at a constant rate of growth and this rate is expected to be the same as the growth rate in its cash dividends; and

2. The firm's net profit margin (net income/sales) and dividend payout ratio remain constant.

The proof of equality of the sales multiple and the universal model is shown in Appendix 3. As shown in the proof, the sales multiple is equivalent to the Gordon model which makes it equivalent to the universal model when the same assumptions are applied. The universal model will yield exactly the same results as the sales multiple model *if* the same underlying assumptions are used. Other rules of thumb, such as those based on unit sales volume per year or month, fees per year, monthly revenues, and others are simply variations of the sales multiple and the proof of their equality with the universal model would follow the same logic.

The problem with the sales multiple model- as with the Gordon model, the earnings models, and other widely used models- is that the underlying assumptions implicit in the models are almost always too simplistic or restrictive, or they are simply inappropriate in a specific valuation situation. The universal model overcomes this problem by allowing the appraiser great freedom to specifically adjust inputs to better represent actual conditions.

Using the Universal Model in the Real World

The authors collectively have significant experience in both the academic and practitioners' worlds. This article in no way intends to imply that the universal model, or any other model, should be applied naively and by rote, as a formula through which a set of numbers is mechanically run to produce a value. Every valuation assignment requires knowledge, diligence, judgment, experience, common sense, and tests of reasonableness. All of these factors are critical and must be an integral part of the valuation process.

If a formula approach is used as the primary method, tests of reasonableness based on available market comparison data, industry rules of thumb, and common sense should be compared to the final result to determine if they seem reasonable in the circumstance. If not, the information and assumptions used should be reevaluated and adjusted. If the market comparison approach is used as the primary method, the formula approach can be used similarly as a test of reasonableness.

No matter how a formula is used, as either a primary or secondary method, the model should be as realistic and flexible as possible, while maintaining its theoretical integrity. The universal model meets this test.

Other Uses of the Universal Model

Managing for Value Maximization

The model is also useful in the actual management of a business. The model requires projections of all factors included in the income statement, balance sheet, and statement of cash flows. Developing a valuation for an individual company requires developing a forecast that forces management to think through every factor and relationship in the financial statements, make specific forecasts for each factor, analyze the risk of the company, and specify in a comprehensive manner how management believes these factors are going to interact and behave in the future. The model also allows management to use scenario analysis to gain a better perspective on how a specific decision is likely to affect the company before it is actually implemented.

Purchase and Sale Analysis

The model can be used to establish value under different scenarios and different definitions of value. For example, a seller can establish fair market value as well as the investment value of the company to himself or herself and to a buyer. This gives the seller better insight on the value of the company and how the company might look to a buyer; it may give the seller a much better negotiating position. A buyer can perform a similar analysis.

Valuing Debt, Patents, and Other Assets

The model as stated above is expressed in terms of common equity valuation, but it can be used to value any financial asset. The preferred stock version of the model has already been illustrated. The universal model can be adapted to value debt by placing the debt instrument's cash flows in the numerator and the required return on the debt in the denominator of the equation.

A similar adaptation can be made for the cash flows and required return of a patent, trademark, copyright, or any other asset expected to produce cash flows in the future. In fact by definition, these assets are unique and developing a market comparison is extremely difficult, if not impossible. In such situations, an income based approach by necessity may be the only applicable method and the structure and accuracy of the model as a stand-alone method becomes even more critical.

The model can also be used to establish the total asset value of a company. Total after-tax operating cash flows and investing cash flows are forecast to estimate the cash flows available to service both debt and equity. To estimate total asset value, these cash flows are then discounted by the weighted average cost of capital rather than the cost of equity.

Summary

Contrary to popular belief, there is a universal valuation formula. The model presented in this article is based on four basic and widely accepted economic tenets. If these tenets are accepted, the resulting universal model is economically and mathematically equivalent to the widely used earnings and liquidation valuation models. In addition, the universal model is extremely flexible and can be used for almost any future growth pattern, risk level, or business life expectancy and to value any business interest.

Notes

[1]Biddle, Gary C., and Frederick W. Lindahl. "Stock Price Reactions to LIFO Adoptions: The Association between Excess Returns and LIFO Tax Savings." *Journal of Accounting Research* Autumn 1982: 551-558.

[2]For an excellent and more extensive discussion of this point see: Copeland, Tom, Tim Koller, and Jack Murrin, "Cash is King." In *VALUATION: Measuring and Managing the Value of Companies*. New York: John Wiley & Sons, 1990.

[3]For an in depth discussion of this point, see: Wiggins, C. Donald, B. Perry Woodside, and Dilip D. Kare., "Intra-Year Cash Flow Patterns: A Simple Solution for an Unnecessary Appraisal Error." *The Journal of Real Estate Appraisal and Economics* Winter 1991: 51-56.

[4]For example, see: Fishman, Jay E., Shannon P. Pratt, J. Clifford Griffith, and D. Keith Wilson, *Guide to Business Valuations*. Fort Worth, Texas: Practitioners Publishing Company, 5-4 - 5-13.

[5]Moses, Edward A., and John M. Cheney. *Investments: Analysis, Selection, and Management* (St. Paul: West Publishing Co., 1989), 318.

Appendix 1

Proof of Equality of the Universal Model and the Gordon Model

The universal model in Eq. 1 above is:

$$Business\,Value = CF_0 + [\sum_{t=1}^{n} \frac{CF_t}{(1+k_e)^t} + (\frac{CF_{n+1}}{k_e - g_l}\ X\ \frac{1}{(1+k_e)^n})]\ X\ IPAF \qquad (Eq.1-1)$$

If no initial cash flows are expected and the intra-period adjustment is not made, the model becomes:

$$Business\,Value = \sum_{t=1}^{n} \frac{CF_t}{(1+k_e)^t} + (\frac{CF_{n+1}}{k_e - g_l}\ X\ \frac{1}{(1+k_e)^n}) \qquad (Eq.1-2)$$

If the short-run growth rate is smooth and expected to grow from the base of the most recent past cash flow (CF_0), the model becomes:

$$Business\,Value = \sum_{t=1}^{n} \frac{CF_0(1+g_s)}{(1+k_e)^t} + (\frac{CF_{n+1}}{k_e - g_l}\ X\ \frac{1}{(1+k_e)^n}) \qquad (Eq.1-3)$$

If short-run growth is expected to be equal to the long-run growth rate, the model becomes:

$$Business\,Value = \sum_{t=1}^{n} \frac{CF_0(1+g)^t}{(1+k_e)^t} \qquad (Eq.1-4)$$

As the expected life of the business, *n*, approaches infinity, this equation becomes:

$$Business\ Value = \sum_{t=1}^{\infty} \frac{CF_0(1+g)^t}{(1+k_e)^t} \qquad (Eq. 1-5)$$

If the equation is expressed in per share terms, the cash flow an investor will receive from each share in year 1 is expected dividends:

$$CF_0(1+g)^1 = D_1 \qquad (Eq.\ 1\text{-}6)$$

In per share terms, the value equation becomes the limit of the geometric series as An≅ becomes infinitely large is:

$$Share\ Price = \frac{D_1}{k_e - g} \qquad (Eq. 1-7)$$

Of course, this is the common form of the Gordon model. For total business value, total dividends are substituted in the numerator of the equation or the calculated share price is multiplied by the number of shares outstanding.

Appendix 2

Proof of Equality of the Universal Model and the PE Multiple Model

The PE multiple takes the form:

$$Share\ Price = EPS\ X\ PE \qquad (Eq.\ 2\text{-}1)$$

where:

EPS = most recent reported accounting earnings per share (shown as EPS_0 below); and

PE = subject company's share price to earnings per share multiple.

The expanded equation for the PE multiple is:

$$Price\ Earnings\ Multiple = \frac{\dfrac{D_0\, x(1+g)}{EPS_0}}{k_e - g} \qquad (Eq. 2 - 2)$$

where:

D_0/EPS_0 = the dividend payout ratio the company has had in the past and expects to continue in the future.[5]

If this equation is substituted in the PE multiple model, the model becomes:

$$Share\ Price = EPS_0\ X\ \frac{\dfrac{D_0\, x(1+g)}{EPS_0}}{k_e - g} = \frac{D_0(1+g)}{k_e - g} \qquad (Eq. 2 - 3)$$

Since $D_0(1+g)$ equals D_1, or next year's expected dividend, the equation becomes:

$$Share\ Price = \frac{D_1}{k_e - g} \qquad (Eq. 2 - 4)$$

This equation is also the Gordon model and is equivalent to the universal model as shown in Appendix 1.

Appendix 3

Proof of Equality of the Universal Model and the Sales Multiple Model

The sales multiple model takes the form:

$$Share\ Price \quad = \quad S_0 \ x \ M_s \qquad (Eq.\ 3\text{-}1)$$

The firm's current cash dividend per share, D_0 is:

$$D_0 = EPS \ x \ POR \qquad (Eq.\ 3\text{-}2)$$

where:

POR is the dividend payout ratio, and

EPS is the earnings per share of the firm.

Further:

$$EPS = S_0 \ x \ NPM \qquad (Eq.\ 3\text{-}3)$$

where:

NPM is the firm's net profit margin and S_0 is the current level of the dollar sales per share.

Thus,

$$D_0 = EPS \ x \ POR = S_0 \ x \ NPM \ x \ POR \qquad (Eq.\ 3\text{-}4)$$

Since the sales multiple model assumes *NPM* and *POR* remain constant, the next year's cash dividend will be:

$$D_1 = S_1 \ x \ NPM \ x \ POR \qquad (Eq.\ 3\text{-}5)$$

Since sales are assumed to be growing at a constant rate:

$$S_1 = S_0 \ x \ (1 + g) \qquad (Eq.\ 3\text{-}6)$$

Substituting Eq. 3-6 in Eq. 3-5:

$$D_1 = S_0 \ x \ (1 + g) \ x \ NPM \ x \ POR \qquad (Eq.\ 3\text{-}7)$$

Using similar reasoning, the general expression for dividends in any time period *t* is:

$$D_t = S_0 \ x \ (1 + g)^t \ x \ NPM \ X \ POR \qquad (Eq.\ 3\text{-}8)$$

Using the basic valuation model, the current share price can be determined as follows:

$$Share\ Price = \sum_{t=1}^{n} \frac{D_t}{(1+k_e)^t} \qquad (Eq.3-9)$$

Substituting for D_t:

$$Share\ Price = \sum_{t=1}^{n} \frac{S_0\ x\ (1+g)^t\ x\ NPM\ x\ POR}{(1+k_e)^t} \qquad (Eq.3-10)$$

As the time span *n* of this geometric series approaches infinity, share price becomes:

$$Share\ Price = \frac{S_0\ x\ [(1+g)^1\ x\ NPM\ x\ POR]}{k_e - g} \qquad (Eq.3-11)$$

Rewritten, this becomes:

$$Share\ Price = S_0\ x\ \frac{[(1+g)\ x\ NPM\ x\ POR]}{k_e - g} \qquad (Eq.3-12)$$

Let:

$$\frac{[(1+g)\ x\ NPM\ x\ POR]}{k_e - g} = M_s \qquad (Eq.3-13)$$

where:

M_s = the sales multiplier

Then:

$$Share\ Price = S_0\ x\ M_s \qquad (Eq.\ 3\text{-}14)$$

The numerator of Eq. 3-12 is equivalent to Eq. 3-15:

$$EPS_0 \ X \ \frac{D_0}{EPS_0}(1+g) = D_0(1+g) \qquad (Eq. 3-15)$$

Substituting Eq. 3-15 in Eq. 3-12, Eq. 3-12 becomes:

$$Share\ Price = EPS_0 \ X \ \frac{\frac{D_0}{EPS_0}(1+g)}{k_e - g} = \frac{D_0(1+g)}{k_e - g} = \frac{D_1}{k_e - g} \qquad (Eq. 3-16)$$

The last equation is the Gordon model which has been shown to be equivalent to the universal model.

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Article Summary

Many authors and publications suggest the use of several valuation methods in performing business valuations with the implication that there are significant economic differences among the methods. This article argues that, if four basic tenets are accepted, there is a universal valuation model for closely held companies. In addition, the article presents the model, discusses it advantages and flexibility, and presents proofs of the equality of the model with other widely used valuation models.

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