
VALUE WIZARD INSIGHTER - November 1999

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1. Approximate Values

A company can have different values depending on the purpose of the valuation or appraisal. The value you want to determine is the value that will help you achieve your goal. In addition, for any given type of value, the benefit of an accurate estimate is offset by the time and cost to derive it. The Value Wizard estimate of intrinsic value of a common stock is a rough approximation at best, regardless of its great precision which is necessarily spurious. These simple models are not recommended for complex businesses such as conglomerates or holding companies, companies with preferred stocks outstanding, companies with more than one class of common stock, venture capital startups or early-stage companies, estate and gift taxes, and litigation. These valuation situations are best handled with models that are fundamentally the same as the simple models but with different emphases.

For example, a company with a preferred stock authorized, issued and outstanding has two types of equity securities and owners with different priority of claims on the company. The senior equity security is the preferred, and the junior equity security is the common. With a preferred stock

outstanding, free cash flow to equity (FCFE) applies to both types of equity. To determine free cash flow to common stock equity (FCFCE) only, it is necessary to make an adjustment to exclude the effects of the preferred based on the features of the subject preferred stock issue. The major features to consider are convertible or non-convertible (into common stock), cumulative or non-cumulative dividend, fixed-rate or variable-rate dividend, and dividends paid in cash or in kind (common or preferred stock, either in the subject company or another company). Thus, even a simple valuation of the common stock of a company with a preferred stock outstanding requires a model that specifically accounts for the preferred.

The Value Wizard input data form is short, but it is not a rule of thumb or back of the envelope calculation. It is designed to give a quick but reasonably accurate approximation of the amount a financial buyer should expect to pay for a non-controlling minority ownership interest in the subject company. The models rely on the subject company's financial statements for the most recent fiscal year and on the investor's projection of cash returns for the intended holding period until sale of the stock. The annual cash flows are calculated and discounted back to the present. The value of the business is computed so that the investor can realize a fair rate of return and have a reasonable margin of safety in the form of a current market buying price that represents a discount from the estimated intrinsic value per share.

The Value Wizard features an assortment of models to help investors determine the intrinsic value of common stocks and identify stocks that are significantly overpriced or underpriced. The basic principles and techniques used in the Value Wizard models are long known and widely accepted and are used by both serious academicians and financial professionals.

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2. Rate of Return

The rate of return is a useful check on the calculated intrinsic value per share and desired safety margin. It is usually calculated as the internal rate of return (IRR) which assumes that all cash generated by the investment is reinvested at this same rate of return. By definition, if the future unfolds exactly as forecast, then the rate of return would be the same as the discount rate used in the calculation if one purchased the common stock at its estimated intrinsic value per share, all else being equal and no broker loans to buy the stock on margin. But there are so-called trading frictions in the form of transaction fees (broker commissions, foreign currency exchange fees, etc.) and income taxes that reduce this required rate or hurdle rate. Even if the discount rate is adjusted to make allowances for these frictions, the actual rate of return will vary with the safety margin.

An IRR of 10% at a buy price equal to the intrinsic value per share becomes an IRR of 20% at a buy price equal to the intrinsic value per share minus a 50% safety margin, ignoring frictions and all else being equal. The long-term rate of return on common stocks in the U.S. from the 1920's to the 1990's is about 10% to 11% compounded annually. A common stock purchased at an intrinsic value based on the current long-term U.S. Treasury bond yield of about 6% combined with a

safety margin of 40% potentially could produce a return of 10% per year [6% divided by (1-0.40)], ignoring frictions and if everything came out as forecast.

The example calculation of intrinsic value for Yahoo common stock using the 1-Stage Single-Point Value model and a discount rate of 6% is $95.24 per share. The rate of return for a purchase of 100 shares at a price of $95.24 per share and no safety margin is 4.53%. The difference between the 6% discount rate and the 4.53% internal rate is due to frictions.

Safety Margin	Buy Price	IRR	IRR Change
0 %	$ 95.24	4.53 %	NA
10 %	$ 85.72	5.09 %	0.56 %
20 %	$ 76.19	5.73 %	0.64 %
30 %	$ 66.67	6.47 %	0.74 %
40 %	$ 57.14	7.34 %	0.87 %
50 %	$ 47.62	8.40 %	1.06 %

A graph of Return versus Safety Margin is presented in the results of the 1-Stage Return and 2-Stage Return models. The data for the Yahoo analysis using the 1-Stage model are in the nearby table.

The change in IRR from one safety margin to the next is not linear but rather increases as the safety margin increases. This is because the frictions have relatively less weight with the larger safety margins that result in lower buy prices.

Unlike a control investor, a minority ownership (non-control) investor has no opportunity to initiate resource conversions of the company whose shares he or she buys. Therefore, it is necessary to be extremely "price conscious" and buy shares in a continuing going concern with a 40% to 50% safety margin below the estimated intrinsic value per share.

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3. Model-Specific Sensitivity

There are two kinds of sensitivity that pertain to stock valuation models. One kind is the sensitivity of the output variable such as value per share to changes in the value of an input variable such as the growth rate or the discount rate. We can refer to this kind as intra-model sensitivity or variable-specific sensitivity. The other kind is the sensitivity of the same output variable to changes in the value of the same input variable for each of two models such as the dividend discount model (DDM) and a discounted cash flow (DCF) model. We can refer to this kind as inter-model sensitivity or model-specific sensitivity. It is sometimes not recognized that every sensitivity analysis is a combination of intra- and inter-model sensitivities, or variable-specific and model-specific sensitivities. The inter-model sensitivities are usually latent because most valuations are done with one model only.

There is wide variation in the inter-model sensitivity of valuation results to changes in the values of the input variables. Especially sensitive are models that have an infinite investment horizon. Such models are generally valid only when the growth rate is less than the discount rate. If dividends were expected to grow forever (in perpetuity) at a rate higher than the discount rate, the value of the stock would be infinite. This is the point of the St. Petersburg Paradox which is answered by the Allais Paradox, both of which are discussed at the Global Value Investing website.

One example of an infinite-horizon model is the academic model known as the constant-growth dividend discount model (DDM). The model formula is V = D*(1+g)/(k-g) where V is intrinsic value in the base period, D is the dividend in the base period, g is the dividend growth rate, and k is the required rate of return or interest rate used in discounting the forecast dividends to the base period. This is the valuation formula for a growing perpetuity. If dividends were expected to be constant or g=0, then the dividend stream would be a simple perpetuity, and the formula would be V = D/k.

The stock value calculated by the DDM differs from that calculated by the Value Wizard S-Curve model. We consider S-Curve model with the inflection in year 5 (S5) and in year 20 (S20). The differences in values demonstrate the relative sensitivity of these models to the spread between their assumed growth rates and discount rates, as summarized in the nearby table .

D	k	g	V	V	V
divid					

high discount rates have no meaning in terms of opportunity cost or other economic concept. Saying such a high discount rate is a "risk premium" merely begs the question and introduces a spurious definition of risk for purposes of valuation. The use of the DDM is often a case of forcing reality to fit assumptions.

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4. Price Fluctuations

Changes in market prices can be expressed in different ways. When comparing the fluctuations of the prices for two common stocks or the prices of one common stock with itself at a different time, what measure is most appropriate?

Absolute currency unit? or relative percentage? or standardized sigma?

Currency units such as US dollars are adequate for comparing price changes of the same stock adjusted for any splits and stock dividends, but they can be misleading when the prices of two different stocks are compared, especially when they trade at widely differing prices. For example, a $5 price change from $10 per share means something quite different that the same $5 change from $100 per share.

Percentages are adequate for comparing price changes of the same stock and comparing price changes of two different stocks, again adjusted for any splits and any stock dividends during the period between the beginning and ending prices. Yet percentages can be misleading for such comparisons when there is a widely differing history of price variation during the period of comparison when one stock is compared with its prior state or when two stocks are compared.

Sigma, or standard deviation unit (SDU), is a metric that is used to measure the dispersion from a central tendency, usually a mean. The value of sigma depends on a specific sample of price data with a sample-specific mean. Sample observations could be historical prices or randomly generated draws from a conventional probability distribution. The frequency and time period of historical data will affect the value of sigma -- for example, daily closes versus weekly or monthly closes, and 40 trading days versus 100 or 200 trading days. The 200-day moving standard deviation (200-Day MSD) will be used for illustration.

Some hypothetical market data using US$ appear in the nearby table

	Alpha, Inc.	Zed, Ltd.
Last Daily Close	20	165
Prior Daily Close	25	150
Daily Change	down 5	up 15
Daily Change %	-20%	+10%
52-Week High	50	165

52-Week Low	10	130
52-Week Range	40	35
200-Day MST	25.0	30.0
Daily Change SDU	0.2	0.5

During the past 52 weeks, the common stock of Alpha company has traded in a high-low daily closing price range of $40, and the common stock of Zed company has traded in a high-low daily closing price range of $35. Which stock has fluctuated more in price during this period? The absolute range of price is greater for Alpha.

Alpha most recently closed at $20 with a change from the prior close of $5 down, and Zed most recently closed at $165 with a change from the prior close of $15 up. Which stock has fluctuated more in price? The relative change of price is minus 20% (5/25) for Alpha and plus 10% (15/150) for Zed. The most recent daily absolute change is greater for Zed ($5 Alpha vs. $15 Zed), but the relative change is greater for Alpha (20% Alpha vs. 10% Zed).

The absolute 200-Day MST for Alpha is $25 and for Zed is $30. Which stock has fluctuated more? The change in standardized price dispersion between the last and prior daily close is 0.2 sigma ($5/$25) for Alpha and 0.5 sigma ($15/$30) for Zed, and thus the standardized change is greater for Zed.

Each of these measures of variability can be used in appropriate situations, as long as it is properly interpreted. Generally, the most reliable and consistent of these measures of price variability is sigma because it controls for the largest number of other factors that can confound interpretation of the data. The 200-Day MSD is not a commonly reported market statistic, but the necessary data is readily available and used currently in the calculation of the 200-Day MA (200-Day Moving Average price) which is a popular indicator for so-called technical analysis or charting.

The terms "volatility" and "beta" have been avoided in this discussion of price fluctuations. Both are market-generated statistics that are arbitrary in the sense that their values depend on sample-specific data. In addition, there are different definitions of price volatility and different Capital Asset Pricing Models to estimate beta.

A volatility metric is used by both technical analysts and short-term traders. Without price volatility, the chartists would not have interesting patterns to interpret. And a marketable security without significant price volatility would offer few opportunities to short-term traders.

Beta is a measure of so-called market risk according to academic finance theory. The beta factor in the Capital Asset Pricing Model is the slope coefficient of the Capital Market Line. It is predicated on the assumption that price is identical to value. Beta is the ratio of a covariance of a stock to a covariance of a proxy of the overall market, such as the S&P 500 Index. Covariance is a statistic derived from variance, and variance is a statistic equal to the square of standard deviation. Yet the standard deviation is a sufficient measure of variability in and of itself.

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5. Demographic Profile

The demographic profile of the visitors to the Value Wizard main page is of interest for placing advertising to support automatic data retrieval for the next generation of the calculator models. The profile is summarized and disclosed in aggregated form only so that no individual information is revealed. Those visitors who subscribe through the ListBot and complete the optional confidential survey help us to better identify and serve the Value Wizard audience. Any current subscriber who has not subscribed by using the ListBot may still do so.

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Users of the Value Wizard intrinsic value calculator are likely to have demographics comparable to visitors at the Global Value Investing home page. In addition to demographics, we are interested also in browser types, access times, and access locations. About three-fourths of the visitors use a browser that is JavaScript-capable and therefore are able to use the online Value Wizard calculator. The average traffic for each hour of the day is busiest between 7 a.m. and 10 p.m. with a slowdown at 6 p.m. and slowest between 11 p.m. and 6 a.m. The average traffic is about the same for each day of the week, although some Saturdays average significantly lower than the other days. This indicates that the website is visited both at work and at home at about the same rate, and it is visited on weekdays and on weekends at about the same rate. About two-thirds of the visitors are in the Americas (primarily US and Canada), and the remaining one-third are located about equally in Europe-Mideast-Africa and in Asia-Pacific. Thus, most of the visitors speak English as a first or second language.

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