

While it is easy to look up the selling price of a stock, determining its true value is a much more difficult process. Many techniques are in use today to value stocks. They range from the relatively simple single variable models such as the dividend discount model (DDM) to proprietary models that calculate a valuation estimate based upon many variables.

Until recently, these more advanced models were widely available only to professionals—money managers, brokerage firm analysts, and broker clients. However, several sites are now offering stock valuations using sophisticated models to the general public, many at no cost.

This article will introduce seven of those sites. The majority, six in all, provides a fair or intrinsic value for a company's stock. Fair value represents an estimate of what a stock should be priced at given current estimates of growth, risk, and market conditions. Stocks trading at prices below the fair value are considered undervalued and should be considered for purchase, while overvalued stocks should be sold or avoided. The seventh site, MSN Money, provides a rating based on a scale of one through 10, where 10 is the best possible rating.

The level of complexity of the models varies among the sites, and we describe the techniques used by each site to arrive at their valuation. No matter how simple or complex a given model, assumptions and estimates are critical factors in determining the reasonableness of a valuation or rating. The old saying "garbage in, garbage out" holds true no matter how complex a given model.

The level of user interaction allowed by these seven sites varies, with some allowing users to alter the underlying variables and assumptions used by a given valuation model. Others simply generate a value using a proprietary model without letting users alter the

assumptions underlying the model. Table 1 provides a summary of the features found on valuation segments of these sites—any costs associated with accessing the valuations, the number of stocks for which valuations or ratings are available, a synopsis of the methodology used to derive valuations, and the key assumptions underlying the valuations and whether users can modify valuation assumptions.

To see how valuations can vary with different assumptions and models, Table 2 presents the primary valuation or rating generated by each site for four stocks—independent power producer Capline Corporation, alcohol importer and distributor Central European Distribution Corp., semiconductor maker Intel Corp., and fast-food chain Sonic Corp.

Morningstar Fair Value

www.morningstar.com

The fair values offered at the Morningstar Web site are a derivation of the discounted cash flow method. Discounted cash flow models project the future cash flow and then calculate the present value of cash flows considering company risk and the market environment. The higher the cash flow, lower the risk, and lower the discount rate, the higher the valuation. An article at the Morningstar Web site fully explains their methodology. The primary elements of the model are revenue growth, profitability, and asset efficiency.

Morningstar analysts estimate revenue growth rates for each of the next five years, considering the industry in which the company operates and the company's position within that industry.

They also consider the firm's profitability over the next five years, which they define as earnings before interest, taxes, depreciation, and amortization (EBITDA) as a percentage of sales.

In considering profitability, the analysts make assumptions regarding a firm's ability to turn sales into earnings, including the level of competition in the industry, pricing power, and management's ability to control costs.

Asset efficiency is measured using total asset turnover—sales divided by assets. Here analysts make assumptions regarding the amount of investment that will be needed to generate forecasted growth. Implicit in this assumption is the company's level of capital spending and, therefore, how much additional capital the company must raise. By having an idea of the company's capital requirements, analysts can make assumptions regarding the company's debt levels and, conversely, its interest expense.

Unlike a standard discount cash flow model, which discounts future revenues and expenses to the present, the Morningstar model deducts the dollar return on investment to reflect the true economic profit of the company, not just the accounting profit. Furthermore, companies that are currently generating economic profits will probably not be able to do so forever as new competitor firms, drawn by the positive economic profits, destroy value. Therefore, a decay rate is estimated to determine when economic profits go to zero. Once the economic profit is zero, the firm is no longer creating value and this is the point where the discounting ends.

MSN Money StockScouter

moneycentral.msn.com/investor

In conjunction with Camelback Research Alliance, MSN Money offers the StockScouter ratings system to help investors assess a stock's potential for outperforming the overall market. Stocks are given a rating of one through 10, with one being the poorest and 10 being the best, based on the fundamental and technical qualities

Table 1.
Valuation Methodology

Morningstar Fair Value

www.morningstar.com

Cost: Premium membership required; \$11.95/mo.; \$109/yr.; \$189/2 yrs.

Database: Analyst reports available for 1,000 stocks

Methodology: Modified discounted cash flow model driven primarily by revenue growth, profitability, and asset efficiency.

Assumptions/Conditions: Proprietary model does not allow for any user intervention. The model looks at economic profits (earnings minus a capital charge). Also assumes that companies that are earning positive economic profits will see this profit go to zero in the future as new firms, drawn by this economic profit, enter the market and “destroy” the value. Assumptions regarding this “decay rate” are made based on company- and economy-specific factors.

MSN Money StockScouter

moneycentral.msn.com/investor

Cost: Free

Database: U.S. stocks trading on the three major exchanges for at least the last six months (6,200+ stocks)

Methodology: Model that assigns a one to 10 rating based on four factors—fundamentals, ownership, valuation, and technicals. Also considers current market preferences for sector, market cap, and investment style.

Assumptions/Conditions: Proprietary model does not allow for any user intervention.

Quicken.com Stock Evaluator

www.quicken.com/investments

Cost: Free

Database: All traded stocks

Methodology: Discounted earnings method based on latest annual earnings, earnings growth rate, and discount rate.

Assumptions/Conditions: Default values provided for latest earnings, growth rate, and discount rate. Users can specify growth and discount rates.

S&P Fair Value Rankings at Business Week Online

www.businessweek.com

Cost: Free

Methodology: Based on fundamental data such as earnings growth potential, price-book ratio, return on equity, and dividend yield relative to the S&P 500 index.

Assumptions/Conditions: Site does not provide detailed information regarding the methodology. Users cannot alter underlying assumptions or parameters.

StockWorm Valuation

www.stockworm.com

Cost: Free

Database: 8,000+ stocks

Methodology: Average of the results of five different valuation models—derived dividend discount, levered beta, risk proxy, PEG value, and forward PE.

Assumptions/Conditions: Proprietary model does not allow for any user intervention.

The valuation time frame for these models is 10 years; the current 30-year T-bond rate is the risk-free rate; the three-year growth rate in earnings is used for the PEG value model.

ValuEngine.com Fair Value Assessment

www.valuengine.com

Cost: Valuation summary free to registered users; \$19.95/mo. for detailed analysis

Database: 5,000+ stocks

Methodology: Model using trailing 12-month EPS, analyst consensus estimate of future 12-month EPS, and 30-year Treasury yield. Also makes use of other firm-specific and interest-rate parameters.

Assumptions/Conditions: Registered users cannot alter underlying variables or assumptions. Subscribers can change trailing 12-month EPS, analyst consensus estimate, and 30-year bond yield to see impact on model price.

ValuePro.net Online Valuation

www.valuepro.net

Cost: Free

Database: 5,000+ stocks

Methodology: Discounted cash flow model that makes use of 20 variables to arrive at forecasted expected cash flows that are discounted using weighted average cost of capital (WACC).

Assumptions/Conditions: Default values provided for bond spread to Treasury, preferred stock yield, equity risk premium, 10-year Treasury return, and excess return period. All variables can be modified by user.

of the stock. This system also takes into account the risk/reward relationship—stocks with high expected future return and high volatility of return will see their ratings reduced as compared to a stock with high expected return and low volatility.

StockScouter ratings are derived us-

ing four key “factors”—fundamentals, ownership, valuation, and technicals—and each of these factors is assigned a grade from A to F. The factors are made up of sub-factors that do not receive their own grade, but do impact the grade of the factor as a whole. The StockScouter details page at the

Web site shows the grade for each factor as well as a positive, negative, or neutral rating for the respective sub-factors.

The fundamentals factor assesses a company’s past earnings growth, estimated future earnings growth, and its ability to exceed consensus estimates.

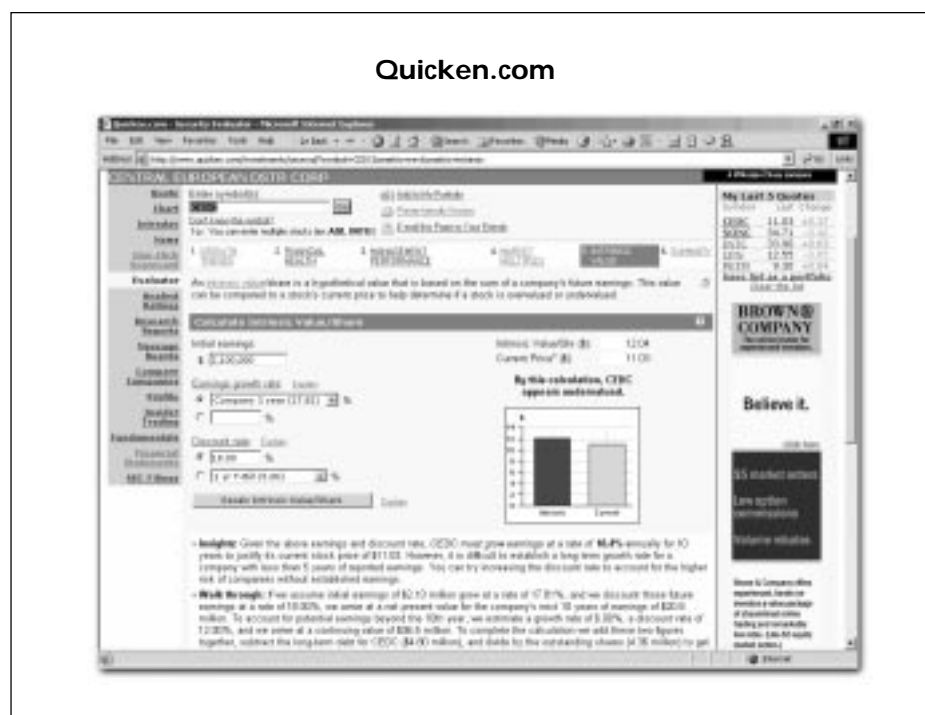
Companies receiving high grades for this factor generally grow reasonably fast, beat analyst earnings estimates, and are expected by analysts to grow earnings in the future.

The ownership factor examines whether a stock is under accumulation (being bought) by company insiders—executives and board members. Highly rated stocks are being accumulated by high-ranking executives or board members in large quantities.

For the valuation factor, the StockScouter assesses whether a stock's price is high or low relative to current sales, earnings, and estimated earnings growth. Backtesting of this factor has shown that large companies should be more expensive than their peers in order to receive a high rating, while small companies must be relatively cheap in order to receive a high grade.

Lastly, the technical factor examines whether the current trend in price is positive or negative. Stocks with prices rising at an accelerating rate over the near- and short-term receive higher grades. In addition, stocks with low prices relative to their 10-week trends can receive high grades if it is believed they will rebound.

Further consideration is made by the StockScouter model for "market preferences." These preferences tend to affect stock prices over one- to two-month periods and consist of sector, market cap, and style. The sector preferences take into account those sectors currently being favored by investors;



the market-cap preference favors those market-cap groups—small, mid, and large—that are currently preferred by the market; the style preference focuses on which style—growth or value based on the price-sales ratio—is currently preferred by investors.

The StockScouter model is proprietary in nature and, therefore, users cannot change the underlying assumptions to alter the outcome.

Quicken.com Stock Evaluator www.quicken.com/investments

The Quicken.com site features a valuation tool entitled the Stock Evaluator, which allows users to examine com-

pany factors such as growth trends, financial health, management performance, market multiples, and intrinsic value, either individually or across multiple companies.

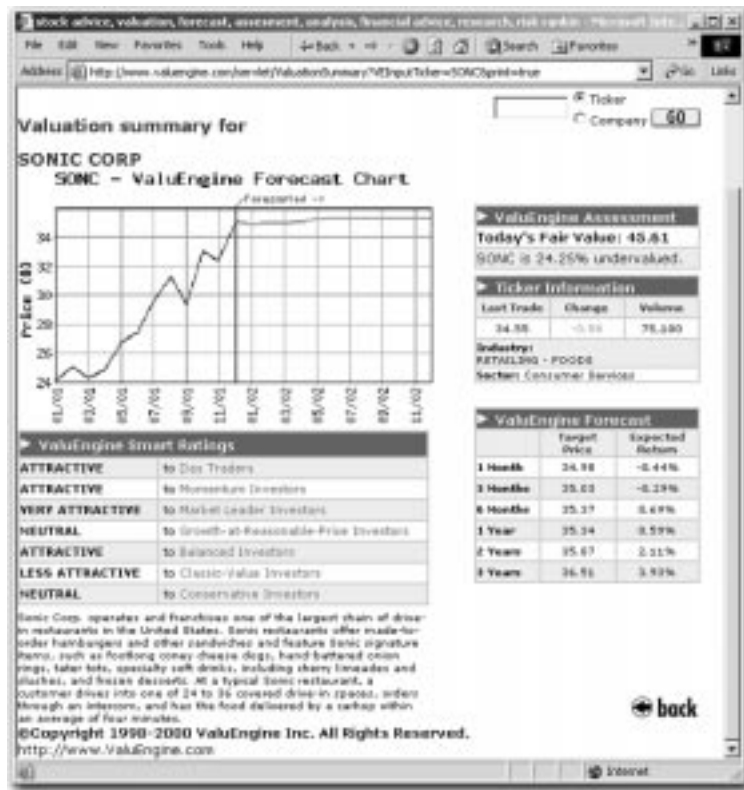
The growth trends, financial health, management performance, and market multiples sections examine the trends in various data elements over the last 10 years (when data is available). The trends are displayed in both graphical and tabular formats and comparisons are made between the company, industry, sector, and S&P 500.

Growth trend analysis focuses on sales, net income, and cash flow trends.

Table 2.
Sample Stock Valuations as of 12/19/01

Service	Price	Morningstar Fair Value	MSN Money StockScouter	Quicken.com Stock Evaluator	S&P Fair Value Rankings at Business Week Online	StockWorm Valuation	ValuEngine.com Fair Value Assessment	ValuePro.net Online Valuation
Valuations/ Ratings		Morningstar Fair Value	Stock Rating (10-point scale)	Intrinsic Value (\$/Shr)	S&P Fair Value	Average Valuation (\$/Shr)	Fair Price (\$/Shr)	Intrinsic Value (\$/Shr)
Calpine Corp. (CPN)	\$14.69	NA	4	\$79.04	\$32.00	\$29.51	\$51.68	\$0.00
Central European Distrib. (CEDC)	\$12.00	NA	5	\$12.04	NA	NA	\$10.12	\$0.17
Intel Corp. (INTC)	\$33.05	\$28.00	8	\$15.02	\$25.70	\$20.00	\$27.25	\$21.42
Sonic Corp. (SONC)	\$35.66	NA	7	\$49.12	\$44.90	\$38.59	\$45.61	\$57.62

ValuEngine.com



company. For the first 10 years, the evaluator uses a basic discount rate of 15%, which is derived by assuming a 6% bond rate and a 9% risk premium, after which it uses a lower discount rate of 12%. For companies that have been in existence for less than 10 years, a sliding scale is used to determine the risk adjustment, with a higher risk premium added to younger companies. You can also enter in your own discount rate or select from the one-year T-bill rate, 30-year long bond rate, or the long-term return on the S&P.

S&P Fair Value Rankings at Business Week Online

www.businessweek.com

Visitors to the Business Week Online Web site will find S&P Fair Value and Fair Value Rankings for most companies. A company's fair value is calculated on a weekly basis and is that value at which S&P believes the stock should be trading based on its earnings growth potential, price-book value, return on equity, and dividend yield relative to the S&P 500 index.

Each stock is then given a rating from Tier 1 to Tier 5. Stocks in Tier 5 are considered the most undervalued, with a fair value considerably greater than the current price. Tier 4 stocks are considered moderately undervalued and Tier 3 consists of stocks whose fair value closely approximates its current value. Tier 2 stocks are considered moderately overvalued and Tier 1 stocks have a current price that far exceeds its fair value.

Connotations are also made for momentum using the timing index. Stocks with a "+" next to their fair value ranking have a price trend that is strengthening, while a "-" denotes a weakening price trend.

Finally, stocks are divided into tiers—A through E—based on their potential for an earnings surprise. Tier A stocks are most likely to have future positive earnings surprises, Tier B stocks are second-most likely to have positive earnings surprises, and Tier C stocks are likely to have reported earnings in line with analyst estimates. Tier D stocks are those that are sec-

Comparisons are made based on one-, three-, five-, and 10-year growth rates in these data elements. For financial health, the evaluator presents historical total debt-to-equity and long-term debt-to-equity trends and provides comparisons using trailing 12-month debt-to-equity. Attempting to determine how successfully management is converting shareholder's equity, assets, and invested capital into earnings, the management performance examines trends in return on equity, return on assets, and return on invested capital. Lastly, the focus of the market multiples analysis is on the price-earnings ratio and price-sales ratio. Comparisons are made based upon the trailing 12-month price-earnings ratio and the price-earnings to growth (PEG) ratio.

At the intrinsic value area, you are given an intrinsic value per share based on multiple assumptions that are provided by the evaluator or that can be specified by the user. The underlying

assumption is that the value of a company is based on the company's future earnings; as such, the intrinsic value is the sum of the company's future earnings, minus any long-term debt, divided by the number of shares outstanding.

The main components used to derive the intrinsic value are initial earnings, earnings growth rate, and a discount rate. In order to arrive at an intrinsic value, the company must have had positive earnings for the last fiscal year. For the earnings growth rate, there is a pulldown menu containing a variety of choices, including the average estimated five-year growth rate (which is the default value for companies that have it available), and one-, three-, five-, and 10-year historical growth rates for the company, industry, and S&P 500. You also have the ability to enter in your own earnings growth rate. Finally, for the discount rate, the default rate assigned by the evaluator is based on the age of the

ond-most likely to have negative earnings surprises, while Tier E stocks have the highest likelihood of having negative earnings surprises.

StockWorm Valuation

www.stockworm.com

The StockWorm Web site offers five different models and averages the results to arrive at “fair” stock price. None of these models allow users to modify the underlying parameters.

The first is the basic EBO (Edwards-Bell-Ohlson) model, which is a version of the discount dividend model. For this model, the current three-year T-bond rate is the default risk-free rate and the risk of a stock is defined as beta. The EBO models are complex and beyond the scope of our discussion here; however, a summary paper on these techniques is found on the StockWorm Web site.

The second model is the levered beta EBO model, which is identical to the basic EBO model except that the beta is adjusted for the level of debt carried by the company—the higher the debt, the higher the risk (beta).

The risk proxy EBO model substitutes risk “proxies” for beta. These proxies include market capitalization (small-cap stocks are considered higher-risk), number of analyst covering a stock (more analysts, less risk), and variation in earnings estimates (more variation, more risk).

The PEG value model assumes that fairly valued stocks have a price-earnings (PE) ratio that is equal to the growth rate, therefore the price-earnings to growth rate (PEG) ratio is one. Overpriced stocks have PEG ratios of greater than one (price-earnings ratio greater than the growth rate) and underpriced stocks have PEG ratios of less than one (price-earnings ratio less than growth rate). In this case, the growth rate used is the three-year earnings growth rate. This model does not work for companies with negative growth rates.

The final model is the forward PE value and is based on the belief that the future value of a stock can be calculated by comparing the current

ValuePro.net

ValuePro.net Online Valuation

VP Home Cash Flows Download Baseline Data

Online Valuation for INTC - 12 / 17 / 2001

Intrinsic Stock Value

Excess Return Period (yrs)	<input type="text" value="10"/>	Depreciation Rate (% of Rev)	<input type="text" value="9.63"/>
Revenues (\$mil)	<input type="text" value="28258.0"/>	Investment Rate (% of Rev)	<input type="text" value="19.79"/>
Growth Rate (%)	<input type="text" value="7.00"/>	Working Capital (% of Rev)	<input type="text" value="11.81"/>
Net Oper. Profit Margin (%)	<input type="text" value="45.29"/>	Short-Term Assets (\$mil)	<input type="text" value="20000"/>
Tax Rate (%)	<input type="text" value="30.153"/>	Short-Term Liab. (\$mil)	<input type="text" value="6063"/>
Stock Price (\$)	<input type="text" value="32.9700"/>	Equity Risk Premium (%)	<input type="text" value="3"/>
Shares Outstanding (mil)	<input type="text" value="6712.0"/>	Company Beta	<input type="text" value="1.365"/>
10-Yr Treasury Yield (%)	<input type="text" value="5"/>	Value Debt Out. (\$mil)	<input type="text" value="972"/>
Bond Spread Treasury (%)	<input type="text" value="1.5"/>	Value Pref. Stock Out. (\$mil)	<input type="text" value="0"/>
Preferred Stock Yield (%)	<input type="text" value="7.5"/>	Company WACC (%)	<input type="text" value="9.08"/>

price-earnings ratio with the future price-earnings ratio. This model does not work for stocks with negative current or future earnings.

Beyond the stock values derived from each of these models, the site also compares the company values for each of these models and the median values for the market and the respective industry.

ValuEngine.com Fair Value Assessment

www.valuengine.com

The ValuEngine valuation model was developed by Yale University professor Zhiwu Chen and utilizes a proprietary discounted earnings methodology. As a proprietary model, little information is disclosed regarding the

process by which the fair value is derived. However, the stock valuation model is based primarily on three fundamental variables—trailing 12-month earnings per share, consensus forecasted earnings per share for the next 12 months, and the current 30-year Treasury yield, all of which are updated throughout the day. The model also makes use of seven firm-specific parameters—long-term earnings growth, historical earnings stability, nature of the company’s business cycle, volatility of analyst estimated earnings growth, sensitivity to macroeconomic risk factors, and three interest rate parameters.

What makes this valuation model unique is that it also takes into account the way in which the market

has historically valued the stock. In other words, a stock that may be “over-valued” using traditional methods such as price-earnings ratio and price-book ratio, may be considered under-valued by this model because of the typical historical valuation by the market, and vice versa.

Registered users of the site have access to valuation summaries that are updated in real-time. These summaries show Smart Ratings that illustrate the relative attractiveness of a company, depending on the type of investor, including day traders, momentum investors, growth-at-a-reasonable-price investors, and conservative investors. There is also a graph depicting the forecasted value of the stock over time. Lastly, there is the current fair or model price of the stock according to the ValuEngine Stock Valuation Model.

Subscribers to ValuEngine.com have access to detailed stock valuation analysis. These reports contain 10 valuation variables and their respective rankings, an outlook for the stock over various time periods and the odds of these outcomes, and a list of stocks whose price movements are similar to the stock being analyzed. Finally, there is a “what-if” table where users can alter the three primary variables of the model to see how changes in these variables will affect the model price.

ValuePro.net Online Valuation www.valuepro.net

The ValuePro.net Online Valuation module uses a discounted cash flow

approach to arrive at a company’s intrinsic value. The assumption is that the value of any asset is equal to the expected cash flows of the asset, discounted for timing and risk. For stocks, cash flows come from dividends, sale or merger of the company, repurchase of stock, or sale of stock at market prices.

The discount cash flow model used by the site employs a four-step process. It begins by forecasting the expected cash flows of the company based on assumptions regarding the revenue growth rate, net operating profit margin, income tax rate, fixed investment requirement, and incremental working capital requirement. Next is the estimation of the discount rate, in this case the company’s weighted average cost of capital (WACC). The discount rate is then used to discount expected cash flows during the excess return period to arrive at the company’s cash flow from operations. The discount rate is also used to calculate the company’s residual value, to which the value of short-term assets is added to get the corporate value. From this, the values of the company’s liabilities are subtracted and the resulting value is divided by the number of shares outstanding to get the intrinsic value per share.

The ValuePro model, which is described in the “Streetsmart Guide to Valuing a Stock,” relies on 20 data inputs, including balance sheet, income statement, and statement of cash flow elements. All of the inputs are provided by the service, taken from

SEC EDGAR data and other sources, but can also be modified by the user. Among these variables are certain default values that are the same for each company, unless changed by the user. They include the corporate versus Treasury bond yield spread (1.5%), preferred stock yield (7.5%), a default beta value of 1.0 if no value is available, equity risk premium of 3.0%, 10-year Treasury rate of 5.0%, and excess return period of 10 years.

Conclusion

As each of these sites is quick to point out, none of the ratings or valuations should serve as the sole basis for buying a stock. Like many other forms of investment analysis, they are only a piece of the larger puzzle.

There are a number of sound ways to approach the valuation process, but the most critical consideration revolves around estimates used as inputs for the models. Great value can be gained from examining the model assumptions and assessing their likelihood. Fair or intrinsic value represents the best guess at what a stock should trade at, but there is no assurance that the stock price will ever reach the fair value. Stocks often trade far from their fair value, especially in the short run. However, a well-reasoned valuation estimate should provide an indication of the direction a stock price should be pulled in the long-run.

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