
VALUE WIZARD INSIGHTER - November 2000

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1. Value Wizard Pro

Recent visitors to the *Value Wizard Investment Models* website have had an opportunity to preview the *Value Wizard Pro Investment Valuation* web application that is currently under development. The new features are Model Chooser, Input Analyzer and Quality Grader components.

Model Chooser provides an online interactive interview based on a series of selection criteria to assist users in identifying the most appropriate investment model that has the best-fitting growth pattern. The available models include General DCF, Annuity Value and the eight basic Value Wizard models: Value S-Curve, Value 1-Stage, Value Goal 1-Stage, Value Range 1-Stage, Return 1-Stage, Value 2-Stage, Value Range 2-Stage and Return 2-Stage.

Input Analyzer is an online interactive integrated suite of input analysis modules that provide economic reality testing and deeper investigation of the input assumptions for possible adjustment where warranted. There is an analysis module for each of the five major inputs to the investment models: Cash Flow, Growth Rate, Discount Rate, Price Ratio and Total Shares. In addition, a Quality Appraisal module includes the ***Quality Grader*** which provides configurable investment quality grading that can be used as input to the Discount Rate module.

Cash Flow provides several types of adjustment including a user-defined item. The key finding is Adjusted Cash Flow.

Growth Rate provides log-linear, linear and symbolic analysis of historical growth of Earnings per Share and a user-defined factor. It includes four graphs: six years of EPS, six years of Factor, five years of EPS growth and five years of Factor growth. The key findings are the historical growth rate of Factor and the rate of change in the growth rate of Factor.

Discount Rate provides a quality-adjusted discount rate and an estimate of the cost of capital for comparison. It includes a graph of the range of discount rate adjustments based on quality. The key finding is the Quality-Adjusted Rate.

Price Ratio provides company and relative price ratios for dividends and a user-defined factor. The relative price ratios include company-to-peers, company-to-industry and company-to-market. The key finding is the company-to-market relative dividend-to-price ratio.

Total Shares provides quarterly and year-to-year dilution. It includes a graph of quarterly percentage dilution and a graph of quarterly cumulative percentage dilution. The key finding is the percentage dilution in total shares outstanding in the latest fiscal year.

Quality Appraisal provides per share and percent appraisal of summary financial statement items, and *Quality Grader* calculates investment quality according to three standard measures and a configurable user-defined measure. The key findings are the Appraisal per Share and the Quality Grade.

Full-time individual investors, companies and organizations may be interested in licensing the *Value Wizard Pro* web-based application with the Automatic Data Gathering feature or with Localization to a non-English language. If interested, please contact license@numeraire.com for more information.

1. Evolution of Analysis

The word evolution is used in many ways. When the word evolution was used during the eighteenth century, it meant the stages through which a living being passes in the course of its development. It gives an account of a single life span and remains within the context of individual development. The term for this in biology is ontogeny. But evolutionary theory challenged the single life span as a sufficient model for understanding experience. In the 1830s the word evolution was used for the first time to describe the development of the species rather than of the individual. For this the biological term is phylogeny.

Tree of Life at <http://phylogeny.arizona.edu/tree/phylogeny.html>

is based on biochemistry or phylogenetic molecular evolution. This new method is flawed from the neo-Darwinian perspective. The problem is that different trees result when different genes are used to draw the tree. This suggests that the branches of the tree of life intersect in networks instead of fanning out in separate lines like ordinary trees. Another theory, cosmic ancestry, holds that random mutation or variation and natural selection alone cannot enable life to evolve to higher levels of organization. Without new genes added to the gene pool, evolution would go only downhill. <http://www.panspermia.org/tree.htm>.

Yoga at http://www.innerself.com/Creating_Realities/are_we_evolved.htm

presents the concept of karma and six stages of the evolution of consciousness. A simpler human evolutionary framework includes the three stages of body, mind and spirit: I am One, We are One, and All are One. Donald Merlin in *Origins Of The Modern Mind: Three Stages In The Evolution Of Culture And Cognition*, 1993, Harvard University Press, traces the evolution of human culture and cognition from primitive apes to artificial intelligence and presents a theory of how the human mind evolved from its presymbolic form.

The evolution of the investment analysis has followed several stages. It can be depicted as a family tree beginning at *Homo sapiens sapiens* (*Homo s.s.*) as the common branch. The stylized branches are presented in systematical rather than chronological order.

STAGE 1: *Homo s.s. heuristicus*: Pre-analysis.

Intuition and heuristics. Either no theory or the Greater Fool Theory.

STAGE 2: *Homo s.s. graphicus*: Market analysis.

Market timing. Price charts and mechanical trading rules. Advanced price charting with moving averages, head and shoulders patterns and other indicators.

STAGE 3: *Homo s.s. quotienticus*: Hybrid market/security analysis.

Price ratios. Includes dividend/price (e.g. Dogs of the Dow), price/earnings, price/earnings growth, price/cash flow, price/sales and price/book value.

STAGE 4: *Homo s.s. statisticus*: Hybrid market/security analysis.

Pricing models. Monocausal univariate capital asset pricing model (CAPM) with the market beta factor as sole explanation of risk, other univariate and multivariate inferential econometric factor models, arbitrage pricing model (APT), and option pricing theory.

STAGE 5: *Homo s.s. relativisticus*: Security analysis and hybrid market/security analysis.

Valuation models and pricing models. Appraisals based on comparative financial statements and comparable transactions.

STAGE 6: *Homo s.s. intrinsicus*: Investment analysis.

Valuation models. Includes dividend discount model (DDM) and other discounted cash flow (DCF) models, single-stage or multiple-stage models with finite horizons and normative terminal values, and models with infinite horizon.

In some individual analysts, all six analysis stages can be observed in different circumstances. The six corresponding stylized types of investment analyst may be difficult to identify due to protective coloration and other survival strategies.

Stage 1: The primordial persona relies on instincts and common sense rules of thumb to serve as an antidote to the speculative theories of mad scholars.

Stage 2: The latent chartist persona finds confirmation in price charts through the patterns he projects into them, and interprets this divinatory power as a talent for graphical literacy or graphicity.

Stage 3: The filter feeder persona interprets superficial price quotients, designed for screening and ranking, as pricing ratios for valuation.

Stage 4: The statistician persona, an overzealous exponent of the inductive method, applies the spurious artifacts of mathematical models as substitutes for judgment.

Stage 5: The appraiser persona takes convenient samples for the most comparable securities and transactions as benchmarks for relative pricing.

Stage 6: The evaluator persona makes forward looking assumptions that provide wide leeway in justifying the conclusions.

As can be observed, each stage has its limitations and its potential for misuse. Valuation models by definition are independent of even the existence of a public stock market. Any investment model that contains market-generated data is a pricing model but not a valuation model. There are no market variables in a valuation model except for the inclusion of normative, as opposed to positive, benchmarks of terminal selling price when assuming a finite investment horizon. Hybrid models therefore are pricing models that are mislabeled if called value models or valuation models. Such mislabeling may be an unwitting mistake made in good faith, or it may be camouflage to attract a different audience and clientele. *Caveat emptor!*

3. Depth of Analysis

Abraham Lincoln was highly intelligent with a self-deprecating sense of humor. Once after making a speech when taking questions from the audience, he was asked by a heckler, "How long should a person's legs be?". The extremely long-legged Lincoln answered, "Long enough to reach the ground." This brings to mind a similar question, "How deep should investment analysis be?", and the similar answer is, "Deep enough to reach the right decision." If the expected result of more digging is to merely reinforce the prior decision, there is no practical reason to dig deeper.

Now that we have evaluated the same stock on several occasions over the past year in this newsletter, this principle can be illustrated with concrete examples. When Yahoo! Inc. was chosen in October 1999 to demonstrate the use of the *Value Wizard Investment Models*, it was not a candidate for in-depth research and analysis for long-term value investing because of its readily ascertainable highly unrealistic overpricing.

On 18 October 2000, Yahoo common stock share price fell to 42 1/16, a new 52-week low. A look at the YHOO stock price chart for the past 12 months shows a steady decline from a 52-week high of \$250 to about \$55 per share at the end of October 2000. The series of estimates of intrinsic value of YHOO stock using the Value 1-Stage model are presented below in chronological order with key assumptions about growth and dilution. The decision is for an investor who does not currently own YHOO stock.

October 1999 Evaluation

Article: October 1999 *Insighter* "Evaluation of Yahoo! Common Stock".

Model: Value 1-Stage.

Assumptions: Highly optimistic growth in FCFE of 20% per year for 20 years, and current shares outstanding with no additional share dilution.

Data: FY 1998 Form 10-K.

Conclusions: Intrinsic value = **\$95** per share, and safety margin = **negative \$45** per share.

Decision: Overpriced at \$150 market price, so pass.

Comment: If YHOO is so far overpriced with these highly generous assumptions, then more realistic assumptions would not change the decision.

April 2000 Evaluation

Article: April 2000 *Insighter* "Yahoo Fiscal Year 1999".

Model: Value 1-Stage.

Assumptions: Highly optimistic growth in FCFE of 20% per year for 20 years, and current shares outstanding with no additional share dilution.

Data: FY 1999 Form 10-K.

Conclusions: Intrinsic value = **\$95** per share, and safety margin = **negative \$75** per share.

Decision: Overpriced at \$170 market price, so pass.

Comment: If YHOO is so far overpriced with these highly generous assumptions, then more realistic assumptions would not change the decision.

August 2000 Evaluation

Article: August 2000 *Insighter* "Shares Outstanding-Continued" (see excerpt below).

Model: Value 1-Stage.

Assumptions: Highly optimistic growth in FCFE of 20% per year for 20 years, and full share dilution.

Data: FY 1999 Form 10-K.

Conclusions: Intrinsic value = **\$72** per share, and safety margin = **negative \$53** per share.

Decision: Overpriced at \$125 market price, so pass.

Comment: If YHOO is so far overpriced with these highly generous assumptions, then more realistic assumptions would not change the decision.

Excerpt from article: "Our example of YHOO common stock with an estimated intrinsic value of \$95 per share based on 1999 Form 10-K data assumed a hypothetical degree of dilution at 596.790 million shares. Increasing the total shares outstanding to 782.327 million shares would result in a decrease in estimated value per share of about 23.7% $[(782.327-596.790)/782.327 = (185.537/782.327)]$, to an intrinsic value of about \$72 per share $[\$95*(596.790/782.327)]$. This revised value puts YHOO common stock even farther from striking distance of any positive safety margin at prevailing market prices."

November 2000 Evaluation

Article: (the present article).

Model: Value 1-Stage.

Assumptions: Less highly optimistic growth in FCFE of 15% per year for 20 years, and full share dilution.

Data: FY 1999 Form 10-K.

Conclusions: Intrinsic value = **\$35** per share, and safety margin = **negative \$20** per share.

Decision: Overpriced at \$55 market price, so pass.

Comment: At its lowest trading price of about \$42 on 18 October 2000, the safety margin is negative \$7 per share or negative 20% of intrinsic value.

Comments and Analysis: The following estimated values are based on the following assumptions using Yahoo's FY 1999 Form 10-K data:

- (1) fully diluted total outstanding shares = US \$782.327 million,
- (2) base-year free cash flow to common equity = US \$265.884 million,
- (3) ending Price-to-FCFE ratio = 10 times,
- (4) discount rate = 6% per annum,
- (5) growth rate as stipulated, and
- (6) growth duration as stipulated.

The **Model Chooser** indicated that the Value Goal 1-Stage model was most appropriate for this particular evaluation due to the expected highly speculative growth pattern for Yahoo! Inc. The Value 1-Stage estimate provides a comparison with earlier estimates. Also shown are estimates using the other Value Wizard Investment Models for testing the robustness of the assumptions.

Value 1-Stage model:

Growth = 15% per year for 20 years

Intrinsic value = US **\$35.26**.

Value Goal 1-Stage model:

Growth = 15% per year for 20 years

Intrinsic value = US **\$35.26**

Target market price = US \$55.00

Safety margin = none

Years forecast = 25

Growth rate = 18.10% per year
Discount rate = 3.22% per year
Price/FCFE ratio = 21
Base FCFE = US \$416 million.

Value Range 1-Stage model:

Distribution type = normal
Distribution STD = 0.25
Growth = 15% per year for 20 years
Mean or Most Likely Scenario = US **\$41.61**
10th Percentile Pessimistic Scenario = US **\$18.67**
90th Percentile Optimistic Scenario = US **\$71.32**.

Value 2-Stage model (rapid growth):

1st-stage growth = 20% per year for 5 years
2nd-stage growth = 15% per year for 10 years
Intrinsic value = US **\$26.95**.

Value 2-Stage model (explosive growth):

1st-stage growth = 50% per year for 5 years
2nd-stage growth = 15% per year for 10 years
Intrinsic value = US **\$80.01**.

SUMMARY: The current evaluations of YHOO common stock provide a narrower range of estimated intrinsic values than in earlier evaluations.

Value Goal 1-Stage model estimate of intrinsic value is \$35. How likely is growth at 15% per year to last for 21 years? How likely is growth for 20 years to be 18.10% per year? How likely is the discount rate to be 3.22% per year for 20 years? How likely is the ending Price/FCFE ratio to be 21 times? How likely is the base period FCFE to be \$416 rather than \$266 when adjusted to the long-term cash-generating capacity of the company? None of the input values implied by the target market price appear to be reasonable. Therefore, a market price as high as the target of \$55 is not justifiable.

The Value Range 1-Stage model estimated the 10%-90% range of intrinsic value to be \$19 to \$71 with an average of \$42. Therefore, subject to the limitations and assumptions of the model, there is a 10 percent chance of the intrinsic value of YHOO being either lower than \$19, and a 10 percent chance of the intrinsic value of YHOO being higher than \$71. This provides upper and lower bounds and an average intrinsic value which happens to coincide with the 52-week low market price on 18 October 2000.

The Value 2-Stage model estimated intrinsic value is \$27 for rapid growth and \$80 for explosive growth. How long can explosive company growth last?

Overall, the central tendency of these evaluations is the \$35 estimated by the Value 1-Stage model with no safety margin. If an investor has a *minimum* 20% safety margin for a stock of this kind in this situation, then the *maximum* buying price is \$28 (\$35 times 80%).

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