

SEEKING ALPHA WITH MULTI-FACTORS INVESTMENT MODEL

Steven V. Le, Department of Finance, California State University, Long Beach, 1250 Bellflower Blvd., Long Beach, CA 90840-8505, 562-985-4569, steven.le@csulb.edu

ABSTRACT

The objective of this study is to utilize the Multi-Factors valuation model and the Jensen's Alpha approach to determine the undervalued stocks with positive Alpha. This statistical analysis, based on monthly financial data of 1,810 Value Line companies (98 industries), reveals that excess returns (Alpha) can be achieved from applying Multi-Factors investment model.

Keywords: Investment, Finance

I. INTRODUCTION

A multi-factor model is a financial model that employs multiple factors in its calculations to explain market phenomena and/or equilibrium asset prices. A multi-factor model can be used to determine the intrinsic value of either an individual security or a portfolio of securities. It does so by comparing two or more factors to analyze relationships between variables and stock prices. Multi-factor models also help explain the weight of the different factors used in the models, indicating which factor has more of an impact on the price of an asset. Nobel Laureate Eugene Fama and researcher Kenneth French, former professors at the University of Chicago Booth School of Business, attempted to better measure market returns. One widely used multi-factor model is the Fama-French three-factor model (the size of firms, book-to-market values, and excess returns on the market).

Jensen's alpha takes into consideration the capital asset pricing model (CAPM) market theory and includes a risk-adjusted component in its calculation. Beta (or the beta coefficient) is used in the CAPM, which calculates the expected return of an asset based on its own particular beta and the expected market returns. Alpha is commonly used to rank active mutual funds as well as all other types of investments. The concept of alpha became more popular with the advent of smart beta index funds tied to indexes like the Standard & Poor's 500 index and the "Wilshire 5000 Total Market Index. These funds attempt to enhance the performance of a portfolio that tracks a targeted subset of the market.

The objective of this study is to utilize the Multi-Factors valuation model and the Jensen's Alpha approach to determine the undervalued stocks with positive Alpha. The remaining sections of this paper are organized as follows. Section II presents the statistical model, methodology and data. Section III discusses the empirical results. The conclusions are in Section IV.

II. METHODOLOGY AND DATA

Multi-Factors Valuation Model

The statistical model constructed for this study is based on the generally accepted theory of common stock valuation. This approach is based on the principle that rational investors evaluate the expected returns and risks of securities in the financial market and set a price for a particular security which adequately

compensates investors for the risks. The Discounted Cash Flow valuation approach is based on the proposition that the maximum price that a rational investor will pay for a security is an amount equal to the present value of the expected dividends plus its resale price, including capital gains. Therefore, the present market price of a stock is given by the formula:

$$P_0 = \frac{D_1}{(1+K)^1} + \frac{D_2}{(1+K)^2} + \dots + \frac{D_t}{(1+K)^t} + \frac{P_t}{(1+K)^t} \quad (1)$$

Equation (1) was simplified by Gordon (1962) as follows:

$$P_0 = \frac{D_1}{K-g} \quad (2)$$

Where g is the expected dividend growth rate.

Equation (2) can be expressed as follows:

$$\frac{P_0}{B_0} = \frac{D_1/B_0}{K-g} = f(D_1/B_0, K, g) \quad (3)$$

Where P_0 / B_0 = market price-to-book ratio
 B_0 = book value
 D_1 / B_0 = book yield
 K = $R_f + \text{risk}$
 R_f = Risk-free rate

Equation (3) attempts to quantify the impact and the relationship between stock prices and several economic, financial and risk factors associated with each company. The ratio of market price and book values of security i can be written as a function of several explanatory variables and can be expressed as follows:

$$P_i/B_i = f(RF, \text{book yield}, g, \text{risk}) \quad (4)$$

There are four types of variables which were hypothesized to affect the market price-to-book ratio of companies:

- (1) Economic Variables: Interest rates and inflation should influence market price-to-book ratio.
- (2) Dividend Policy: High book yield, retention ratio, and expected earnings growth rate should have a positive effect on market price-to-book ratio.
- (3) Risk Factors: CBOE Volatility Index (VIX), %Cash to Net Asset Value, high beta, and low Value Line Safety Rank should have a negative impact on market price-to-book ratio.
- (4) Financial Factors: High return on equity, high percent of cash to total asset, good Value Line Timeliness Rank, % Return on Total Asset, and high annual return should have a positive impact upon market price-to-book ratio.

In specifying (4), our intent is to construct a statistical model to quantify the changes in the market price-to-book ratio and to examine other economic and financial factors in the valuation of stock prices.

This empirical study is based on monthly Value Line financial and economic data from January 2015 through October 2021 of approximately 2,000 companies (98 industries). The monthly data was obtained from Value Line and Federal Reserve Statistical Release. The dependent and independent variables were defined as follows:

- **Market/book ratio (P_0/B_0):** The month-end market price divided by book value per share.
- **Dividend Declared/Book Value (BYD):** Indicated declared dividend divided by book value per share.
- **Risk-free rate (I):** The interest rate of the 10-year U. S. Treasury Bonds.
- **CBOE Volatility Index (VIX):** The Index calculated by the Chicago Board Options Exchange
- **Timeliness Rank (TR)** measures probable price performance during the next 6 to 12 months, relative to all other Value Line stocks. These equities represent 94% of the trading volume on all U.S. stock exchanges. The rank of a stock's probable relative market performance in the year ahead. It is derived by a computer program using as input the long-term price and earnings history, recent price and earnings momentum, and earnings surprise. All data are known and actual. Stocks ranked 1 (Highest) and 2 (Above Average) are likely to outpace the year-ahead market. Those ranked 4 (Below Average) and 5 (Lowest) are not expected to outperform most stocks over the next 12 months.
- **Safety Rank (SR):** A measurement of potential risk associated with individual common stocks. The Safety Rank is computed by averaging two other Value Line indexes – the Price Stability Index and the financial strength Rating. Safety Ranks range from 1 (Highest) to 5 (Lowest).
- **Beta (B):** A relative measure of the historical sensitivity of the stock's price to overall fluctuations in the New York Stock Exchange Composite Index. The Betas are adjusted for their long-term tendency to converge toward 1.00. Additionally, Value Line shows betas computed based on monthly total returns for the trailing three year, five-year and 10-year periods.
- **Relative P/E Ratio (RPE):** A stock price-earnings ratio divided by the price-earnings ratio for a market measure.
- **% Retained to Common Equity (RR):** Net profit less all common and preferred dividends divided by common equity including intangible assets, expressed as a percentage.
- **Estimated Return on Shareholders Equity (ROE):** Indicator of profitability. Determined by dividing net income for the past 12 months by common stockholder equity (adjusted for stock splits). Result is shown as a percentage.
- **% Return on Total Asset (Latest Quarter) (RTA):** Percent of net profit to total assets
- **Total Return 1-Year (TT):** The capital gain or loss for the stock price plus the sum of dividends reinvested at year-end for the past year, expressed as a percentage.

- **Relative Strength 3 Months (RS):** The stock's price over time divided by the Value Line Composite Average over the same time span. Arising relative strength line means the stock has been outperforming the market; a declining line means just the opposite.
- **% Cash to Total Asset (CA)**
- **Projected 3-5 Year Relative P/E (PPE)**
- **Projected Earning Per Share Growth Rate (PEG):** The estimated growth rate in earnings expressed as a percentage.
- **% Book Value Growth 1 Year (BG)**

Utilizing a cross sectional time series data, this model may be expressed as follows:

$$P_{it}/B_{it} = a + b_1TR_{it} + b_2SR_{it} + b_3B_{it} + b_4RPE_{it} + b_5RR_{it} + b_6ROE_{it} + b_7BG_{it} + b_8TT_{it} + b_9RS_{it} + b_{10}RTA_{it} + b_{11}PPE_{it} + b_{12}PEG_{it} + b_{13}CA_{it} + b_{14}BYD_{it} + b_{15}I_{it} + b_{17}VIX_{it} e_{it} \quad (5)$$

Where:

i	=	company i
t	=	time t
a	=	the intercept
b	=	regression coefficient
e _{it}	=	the random error

Jensen's Alpha

The CAPM return is supposed to be 'risk adjusted', which means it takes account of the relative riskiness of the asset. Riskier assets should have higher expected returns than less risky assets. If an asset's return is even higher than the risk adjusted return, that asset is said to have "positive alpha" or "abnormal returns". Investors are constantly seeking investments that have higher alpha.

$$\text{Jensen's Alpha} = R(i) - (R(f) + B*(R(m) - R(f))) \quad (6)$$

where:

R(i) = the expected or realized return of an investment (or portfolio)

R(m) = the realized return of the appropriate market index

R(f) = the risk-free rate of return for the time period

B = the beta of the investment (or portfolio) with respect to the chosen market index

III. EMPIRICAL RESULT

As shown in Table 1, a cross-sectional regression estimate of expression (4) and (5) yield the following result:

$$P/B = -2.906 - 0.023 VIX - 0.122 TR - 0.203 SR - 0.190 B + 1.284 RPE + 0.153 RR + \quad (7)$$

$$(-14.854) \quad (-11.356) \quad (-13.639) \quad (-4.218) \quad (57.200) \quad (135.624)$$

$$0.090ROE + 0.006 BG + 0.011 TT + 0.001 RS + 1.774 PPE + 0.046 PEG +$$

$$(64.530) \quad (15.311) \quad (42.685) \quad (1.580) \quad (65.661) \quad (36.625)$$

$$0.002 CA + 16.153 BYD - 0.0172 I + 0.094 RTA + e_{it}$$

$$(3.049) \quad (99.343) \quad (-9.752) \quad (18.073)$$

(t-statistics in parentheses below the coefficients) (R2 = 0.712)

Durbin-Watson *test* was utilized to test the hypothesis of no autoregression. As shown in Table 1 the Durbin-Watson statistic indicates that there is no autoregression and we can retain the statistical estimates without concerning a bias of the estimated standard error. The low correlation coefficients of the correlation matrix indicate little multicollinearity between the independent variables. The statistical results are shown in Table 1. 543 stocks were identified as “undervalued”, and 431 stocks were both undervalued with positive Jensen’s Alpha. The top 20 companies are shown in Table 2. In addition, the statistical results indicated that investors respond positively to the stocks with high dividend and quality earnings, which is reflected in the book yield and return on equity variables. The results also suggest that expected growth in earnings or capital appreciation is an investment objective of stockholders. This is consistent with the discounted cash flow approach in the valuation theory of common stock.

TABLE 1
Statistical Results
Dependent Variable: P/B: Market Price/Book Value

Independent Variables	B	Standard Error	t
VIX: Volatility Index	-0.023	0.002	-14.854
TR: Timeliness Rank	-0.122	0.011	-11.356
SR: Safety Rank	-0.203	0.015	-13.639
B: Beta	-0.190	0.045	-4.218
RPE: Relative P/E Ratio	1.284	0.022	57.200
RR: % Retained to Common Equity	0.153	0.001	135.624
ROE: Est Return on Shareholders Equity	0.090	0.001	64.530
BG: % Book Value Growth 1-Year	0.006	0.000	15.311
TT: Total Return 1-Year	0.011	0.000	42.865
RS: Relative Strength 3Months	0.001	0.000	1.580
PPE: Proj 3-5 Yr Relative P/E	1.774	0.027	65.661
PEG: Proj EPS Growth Rate	0.046	0.001	36.625

CA: % Cash to Total Asset	0.002	0.001	3.049
BYD: Dividend Declared/Book Value	16.153	0.163	99.343
I: 10-Year Treasury	-0.172	0.018	-9.752
RTA: % Return on Total Asset	0.094	0.005	18.073
(CONSTANT)	-2.906	0.085	-34.152
R Square	0.712		
Adjusted R Square	0.712		
Durbin-Watson Statistic	1.956		

TABLE 2

Company Name	% Jensen's alpha	% Undervalue
Voya Financial	62.77	146.37
Advanced Drainage	61.87	21.99
Olin Corp.	61.74	8.16
BioMarin Pharmac.	58.05	89.45
Marathon Oil Corp.	56.81	10.65
SiriusPoint Ltd.	50.99	82.26
Antero Resources	47.99	694.82
ATN International	40.44	793.92
Element Solutions	40.13	73.89
IDT Corp.	39.67	3.70
Sanderson Farms	39.10	11.24
Lumber Liquidators	38.19	100.11
Cal-Maine Foods	37.75	297.42
Primo Water Corp.	37.41	190.37
Ford Motor	36.12	41.26
Fiesta Restaurant	35.67	92.66
Alcoa Corp.	35.01	119.92
Fresh Del Monte Prod.	34.86	10.58
Capri Holdings Ltd.	34.26	10.08
ArcelorMittal	32.85	5.14
AVERAGE (20 Companies)	44.08	140.20
AVERAGE (431 Companies)	8.63	45.76

IV. CONCLUSIONS

This study utilized the Multi-Factors valuation model and the Jensen's Alpha approach to determine the undervalued stocks with positive Alpha. The empirical results led to the following conclusions:

- Investors can successfully identify the most attractive stocks for investment by utilizing Multi-Factors Valuation Model and Jensen's Alpha approach.
- The empirical analysis of Section III demonstrated that the contemporaneous increases in the Chicago Board Options Exchange (CBOE) Volatility Index (VIX) and Beta have a negative impact on the valuation of common stocks.
- The empirical evidence suggests that Value Line Timeliness and Safety ranks are important for stock selection.
- The empirical evidence also suggests that high projected earnings growth, return on equity, quality earnings and good balance sheet would have a positive impact upon the value of common stocks.

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