AN ANALYSIS OF THE VALUE LINE TIMELINESS RATINGS IN A PERIOD OF ECONOMIC GROWTH AND MARKET GAINS

Nichole Castater, Barry University
Gayle Workman, Barry University
Bruce Payne, Barry University

ABSTRACT

The *Value Line* Investment Survey may be best known for the ranking of investment timeliness for each of the 1700 companies in its database. The company claims to have a proven track record with the timeliness ranking system since 1965. Thus, that ranking has been of interest to investors and market researchers for years. Previous studies that examined the fundamental financial characteristics of those firms identified as having the highest timeliness ratings have ignored the macroeconomic background and conditions in the financial markets at the time those high ratings were awarded. This study examines the fundamental financial characteristics of that group of firms that have been identified by *Value Line* as having the highest timeliness ratings in their database during the four years preceding this study. That time has been characterized, by economic growth, low unemployment, and record high equity markets. **JEL Classification**: C38, E22, and L25

INTRODUCTION

The *Value Line* timeliness screen ranks a stock's probable market performance one year in advance. All 1700 stocks in the *Value Line* database receive a timeliness ranking from number one, for companies ranked the highest for potential positive movement to number five, those companies ranked lowest for a timely investment. The ranking score is derived by *Value Line* via a proprietary computer program using as input the long-term price and earnings history, recent price and earnings momentum, and earnings surprises. The company claims to have a proven track record with the timeliness ranking system since 1965. Thus, that ranking has been of interest to investors and market researchers for years.

Previous studies that examined the fundamental financial characteristics of those firms identified as having the highest timeliness ratings have ignored the macroeconomic background and conditions in the financial markets at the time those high ratings were awarded (Swedroe, 2010 Lienweber, 1995). This study examines the

fundamental financial characteristics of that group of firms that have been identified by *Value Line* as having the highest timeliness ratings in their database during the four years preceding this study. That period has been characterized, by steady to high economic growth, record low unemployment, stable prices, and record high equity markets. Financial data collected during this period and managerial behavior regarding financial positions observed during this period are empirical evidence of the financial characteristics of firms and managerial behavior during such an economic environment. Thus, the period March 2017 to March 2019 provides a "workshop" for the study of *Value Line*'s timeliness rankings, and the financial characteristics of those firms ranked highest in a period of unusual economic growth.

Regardless of the consistent high level of interest and apparent advantages of using the *Value Line* timeliness ranking (VLTR) to evaluate investments and the intrinsic value of firms in a macroeconomic background of high economic growth, record low unemployment, and record high equity markets. There have been no studies that have determined, or established an association, between traditional measures of risk and return and *Value Line* timeliness ratings in that economic environment.

The purpose of this study is to establish a financial profile of those firms identified as having the highest *Value Line* timeliness ratings in a growing economic environment and to compare those firms with firms chosen at random, but from the same industries as the first group to determine whether the firms with the high timeliness ratings have a unique risk-return profile. If the study can be validated to exclude any bias, the model may identify firms that will attain high timeliness ratings in future periods of high economic growth. This would have implications for financial managers, investors, investment counselors, and academic researchers.

LITERATURE REVIEW

Empirical evidence over time indicates that the long-term performance of the *Value Line* ranking system has been outstanding. Their top-ranked stocks for timeliness outperformed the Dow Jones Wilshire 5000's total-return index by an average of 2.6 percentage points a year over nearly three decades (Hulbert, 2007). The widespread use of the timeliness ratings is, however, contrary to the logic contained in all forms of the Efficient Market Hypothesis (EMH). Thus, that extraordinary performance in an efficient market has led many to refer to it as the "*Value Line* Anomaly," or the "*Value Line* Enigma." Fischer Black, one of the fathers of the EMH, once stated that *Value Line's* results were the big exception to the EMH (Swedroe, 2010). The use of all *Value Line* data in investor decisions has grown steadily and continues to grow steadily in popularity since its inception in 1965 (Suredividend.com, 2019). Huang (2017) polled advisers, professional stockbrokers and bond specialists to find the best investing tools, newsletters, websites, and journals for potential investors. The study concluded that "*Value Line* is the most reliable source of stock investment research, with a history going back to 1931, and that historically, it has outperformed the competition when it comes to risk-adjusted performance." However, Lockwood, Zhang, and Le (2016) found that the *Value Line* effect is confined to U.S. stocks. They concluded that U.S. listed stocks significantly outperform their benchmarks long after *Value Line* Timeliness rank change announcements. In contrast, they found no evidence of a *Value Line* effect for recommendations made for foreign stocks that

list on U.S. exchanges, nor for those that list outside the U.S. Further, their study concluded that for days surrounding rank change announcements, trading volume is abnormally high for the U.S. listed stocks, but remains unchanged for the foreign stock sample (Lockwood, Zhang and Le 2016). The subject of risk is not often associated with timely ratings. Moreover, Waggle, Agrrawal, and Johnson (Spring 2004) found that "Investors selecting *Value Line's* timeliest stocks, tend to take on relatively high levels of market risk, as measured by beta. The authors concluded that individuals should focus on security betas rather than *Value Line* ranks when making investment decisions. They further concluded that *Value Line's* assignments of timeliest ranks appear biased toward higher-beta securities. Waggle, Agrrawal, and Johnson (Spring 2004).

Whereas previous studies ignore the macroeconomic background at the time company rankings are awarded, this study examines those rankings and companies receiving those ranking for the four years prior to this study That period has been characterized, by steady to high economic growth, record low unemployment, stable prices, and record high equity markets.

METHODOLOGY

The issues to be resolved are first, classification or prediction, and then evaluation of the accuracy of that classification. More specifically, can firms be assigned, based on selected financial variables, to one of two groups: (1) firms that were identified as having the highest ratings for timeliness in their database and simply referred to here as (FHTR) or, firms chosen at random (FCAR) from the same database and from the same industries as the FHTR group?

Multiple discriminant analysis (MDA) provides a procedure for assigning firms to predetermined groupings based on variables or attributes whose values may depend on the group to which the firm belongs, and canonical correlation ranks those variables in order of their weighted effects on the results of the analysis. If the purpose of the study were simply to establish a financial profile of each group of firms, simple ratios would be adequate. However, as early as 1968, in a seminal paper on the use of MDA in finance, Altman showed that sets of variables used in multivariate analysis were better descriptors of the firms and had more predictive power than individual variables used in univariate tests (Altman 1968). The use of MDA in the social sciences for the purpose of classification is well known. MDA is appropriate when the dependent variables are nominally or ordinally measured and the predictive variables are metrically measured. In addition to its use in the Altman study to predict corporate bankruptcy, other early studies used MDA to predict financially distressed property-liability insurance firms (Trieschmann and Pinches 1973), to determine firm value (Payne 2010), and the failure of small businesses (Edmister 1982). This study also employs nominally measured dependent variables and metrically measured predictive variables. The nominally measured dependent variables are the group of FHTR firms and the group of FCAR firms. The computer program used to perform the analysis is SPSS 25.0 Discriminant Analysis (SPSS Inc. 2019). Since the objective of the analysis is to determine the discriminating capabilities of the entire set of variables without regard to the impact of individual variables, all variables were entered into the model simultaneously. This method is appropriate since the purpose of the study was not to

identify the predictive power of any one variable, but instead the predictive power of the entire set of independent variables (Hair et al. 1992).

SELECTION OF SAMPLE AND INDEPENDENT VARIABLES

Since all empirical evidence over time indicates that the long-term performance of *Value Line*'s timeliness ranking system has been outstanding, and whereas the use of that *Value Line* data in investor decisions has grown steadily and continues to grow steadily in popularity since its inception in 1965 (Suredividend.com, 2019), it is used here as the subject of study.

All data used in the analysis were gathered from *Value Line Ratings and Reports*.[2] The first group of 100 firms was identified by *Value Line* as having the highest timeliness ratings in our sample. Again, they are *Value Line* database, but from the same industries as the first group. Thus, there are 200 companies in our sample.

In periods of economic growth, or economic decline all industries will not experience the same effects whether they are adverse or beneficial. It follows that for an unbiased study the effects of industry must be held constant. This was accomplished by matching the companies in the FHTR group with companies from the same industry in the FCAR group. For example, from the restaurant industry, Bob Evan's is in the FHTR group, and McDonald's is in the FCAR group. From the drugs industry, Forrest Labs is in the FHTR group and Pfizer is in the FCAR group. From the medical services industry, Tenet Healthcare is in the FHTR group and Aetna is in the FCAR group. From the internet industry, Amazon is in the FHTR group, and Yahoo is in the FCAR group. Granit Construction is in the FHTR group from the building materials industry, and Vulcan Materials is in the FCAR group. In this manner, each company identified by *Value Line* as having high timeliness ratings for was matched with a randomly chosen company, from the same industry. Thus, the matching method of randomly choosing, and matching companies from the same industries eliminates any bias due to differences in industry listings.

Previous studies using this, and other statistical methods have chosen explanatory variables by various methods and logical arguments. In this study, the group of explanatory variables chosen for analysis includes one measure of the size of the firm, one measure of return on investment, two measures of risk, one measure of financial strength and one measure of how the firm may be perceived by investors at the margin. It is the buying and selling of those investors that establish the market value of both equity and debt. An evaluation of those measures is needed to accomplish the purpose of this study. A basic tenet of this study is that all investors "trade-off" indicators of risk and return, and their perception of risk and return to establish the value of the firms. Following are the six explanatory variables:

X_1 - Sales is included as a measure of the size of the firm. Market capitalization is commonly used to measure the size of the firm, but in this case, sales is the better measure because it is more likely affected by strong economic growth. The literature is mixed on whether the size of the firm is a factor in establishing the timeliness of an investment. Thus, it is included in the set in an attempt to add clarity.

X_2 - Return to total capital is used as a measure of return on investment. It includes a

return to creditors as well as owners and recognizes that value is affected by the cost of debt. A measure of return to equity could be used, but it would ignore the cost of debt and the fact that debt as well as equity finances assets.

X_3 - There is in any company both financial risk (financial leverage) and operating risk (operating leverage). Sharpe's beta coefficients contain the effects of both operating and financial risk. It is customary in modern research to separate the two types of risk to identify and compare the sources of risk. The separation is accomplished by using Hamada's (1972) equation to "unlever" the published betas. "The unlevered beta resulting from Hamada's equation is used as a measure of operating or business risk that results from fixed operating costs, and the debt to total capital ratio is usually used as a measure of financial leverage (risk) (Van Horne 2001, Brigham and Daves 2006).

X_4 - Long Term Debt to Total Capital (DTC) is used here as a measure of financial risk (financial leverage). There are other ratios that measure financial risk very well, but the long-term debt to total capital ratio again recognizes that the firm is financed by creditors as well as owners.

X_5 - *Value Line* Financial Strength ratings include nine classifications. The classifications include balance sheet data, the level and direction of profits, cash flow, earned returns, cash, and stock price, all contribute to a company's relative position on the scale. The amount of cash on hand, net of debt, is an important consideration. Those receiving the top grade include familiar names such as Coca-Cola, Wal-Mart and McDonald's among others. The lowest grade is reserved for companies experiencing serious financial difficulty – even insolvency.

X_6 - The ratio of market price to earnings (P/E) has been used for years as a rough measure of how investors at the margin (those willing and able to buy) value a firm. More recently, the price-earnings growth ratio (PEG) has grown in popularity. Damodaran, (2002) writes that the PEG is a better measure of a company's potential future value, He further writes that many analysts have abandoned the P/E ratio, simply because they desire more information about a stock's potential. Thus, PEG is used here as an indicator of the market's perception of a company.

In sum, there are six explanatory variables in the multiple discriminant model. They are as follows:

X1 - A Measure of Size (Sales)
X2 – Return to Total Capital
X3 – Hamada's Unlevered Beta (Operating Risk)
X4 – Long Term Debt to Total Capital (Financial Risk)
X5 – *Value Line*'s Measure of Financial Strength
X6 – The Price Earnings Growth Multiple

The explanatory variable profile contains basic measures of common financial variables. They were chosen, as in any experimental design, because of their consistency with theory, adequacy in measurement, the extent to which they have been used in previous

studies, and their availability from a reputable source. Other explanatory variables such as the dividend payout ratio and free cash flows could have been added. However, their contributions to the accomplishment of the stated purpose of the study would have been negligible. When there are a large number of potential independent variables that can be used, the general approach is to use the fewest number of independent variables that account for a sufficiently large portion of the discrimination procedure (Zaiontz 2014). The more accepted practice is to use only the variables that logically contribute to the accomplishment of the study's purpose (Suozzo 2001). The construction of this study is consistent with both references.

The financial profiles simply consist of, as previously mentioned, one measure of the size of the firm, one measure of return on investment, two measures of risk, one measure of financial strength, and one indicator that may reflect how the market views the intrinsic value of the firm. If the two groups of firms have unique financial profiles of those measures, and the model can be validated without bias, it suggests that the profile for the highly ranked companies for investment timeliness may be used as a tool to forecast companies that will maintain high timeliness rankings in a growth economy in the future.

TESTS AND RESULTS

The discriminant function used has the form:

$$Z_j = V_1X_{1j}+V_2X_{2j}+.....+V_nX_{nj} \quad (1)$$

Where:

X_{ij} is the firm's value for the ith independent variable.
V_i is the discriminant coefficient for the firm's jith variable.
Z_j is the jth individual's discriminant score.

The function derived from the data in this study and substituted in equation 1 is:

$$Z_j = - 1.141 + .024X_1 - .206X_2 - 2.119\ X_3 - .285X_4 + .450X_5 + .013X \quad (2)$$

The classification of firms is relatively simple. The values of the six variables for each firm are substituted into equation (2). Thus, each firm in both groups receives a Z score. If a firm's Z score is less than a critical value, the firm is classified in group one (FCAR). Conversely, a firm's Z score that is greater than the critical value will place the firm in group two (FHTR). Since the two groups are heterogeneous, the expectation is that FHTR firms will fall into one group and the FCAR firms will fall into the other. Interpretation of the results of discriminant analysis is usually accomplished by addressing four basic questions:

1. Is there a significant difference between the mean vectors of explanatory variables for the two groups of firms?
2. How well did the discriminant function perform?

3. How well did the independent variables perform?
4. Will this function discriminate as well on any random sample as it did on the original sample?

To answer the first question, SPSS provides a Wilk's Lamda – Chi-Square transformation (Sharma 1996). The calculated value of Chi-Square in this study is 12.93. That exceeds the critical value of Chi-Square 12.59 at the five percent level of significance with 6 degrees of freedom. The null hypothesis that there is no significant difference between the financial profiles of the two groups is therefore rejected, and the first conclusion drawn from the analysis is that the two groups have significantly different financial characteristics. This result was, of course, expected since one group of firms experienced very high timeliness ratings and the other group was chosen randomly. The discriminant function thus has the power to separate the two groups. However, this does not mean that it will, in fact, separate them. The ultimate value of a discriminant model depends on the results obtained. That is what percentage of firms were classified correctly and is that percentage significant?

To answer the second question a test of proportions is needed. Of the 100 FHTR firms in the total sample, 64 percent were classified correctly. The results are shown in Table 1. It may appear obvious that 64 percent classified correctly is significant, but formal research requires the proof of a statistical test. To test whether a 64 percent correct classification rate is statistically significant, the Press's Q test is appropriate (Hair et al. 1992). Press's Q is a Chi-square random variable:

$$\text{Press's Q} = [N-(n \times k)]^2 / N(k-1) \qquad (3)$$

where:

N = Total sample size
n = Number of cases correctly classified
k = Number of groups

In this case:

$$\text{Press's Q} = [100 - (64 \times 2)]^2 / [100\,(2-1)] = -7.84 > \chi^2_{.05}\ 3.84 \text{ with one d. f.} \qquad (4)$$

Thus, the null hypothesis that the percentage classified correctly is not significantly different from what would be classified correctly by chance is rejected. The evidence suggests that the discriminant function performed very well in separating the two groups. Again, given the disparity of the two groups, and the sample size, it is not surprising that the function classified 64 percent correctly.

The arithmetic signs of the adjusted coefficients in Table 2 are important to answer question number three. Normally, a positive sign indicates that the greater a firm's value for the variable, the more likely it will be in group two, the FHTR group. On the other hand, a negative sign for an adjusted coefficient signifies that the greater a firm's value for that variable, the more likely it will be classified in group one, the FCAR group. Thus, according to Table 2, the greater the canonical coefficients of financial strength, size, the price-earnings growth ratio, and the debt to total capital ratio, the more likely the firm would have a high *Value Line* timeliness rating. Conversely, the greater the measures of

both financial and operating risk the more likely the firm would be a randomly chosen firm.

The relative contribution of each variable to the total discriminating power of the function is indicated by the discriminant loadings, referred to by SPSS as the pooled within-groups correlations between discriminating variables and canonical function coefficients, or more simply their structure matrix. Those structure correlations are indicated by canonical correlation coefficients that measure the simple correlation between each independent variable and the Z scores calculated by the discriminant function. The value of each canonical coefficient will lie between +1 and -1. Multicollinearity has little effect on the stability of canonical correlation coefficients, unlike the discriminant function coefficients where it can cause the measures to become unstable. (Sharma 1996). The closer the absolute value of the loading to 1, the stronger the relationship between the discriminating variable and the discriminant function These discriminant loadings are given in the output of the SPSS 25.0 program and shown here with their ranking in Table 2.

Table 2 reveals that the measure of financial strength made the greatest contribution to the overall discriminating function. That was followed respectively by the measure of operating risk, size, the price-earnings growth ratio, return to total capital and finally financial risk (leverage).

Some multicollinearity may exist between the predictive variables in the discriminant function since both size and financial leverage could be reflected in the results of the analysis. Hair, et al. (1992) wrote that this consideration becomes critical in stepwise analysis and may be the factor determining whether a variable should be entered into a model. However, when all variables are entered in the model simultaneously, the discriminatory power of the model is a function of the variables evaluated as a set and multicollinearity becomes less important. More importantly, the rankings of explanatory variables in this study were made by the canonical correlation coefficients shown in Table 2. As discussed, the previous paragraph, those coefficients are unaffected by multicollinearity (Sharma, 1996).

VALIDATION OF THE MODEL

Before any general conclusions can be drawn, a determination must be made on whether the model will yield valid results for any group of randomly drawn firms. The procedure used here for validation is referred to as the Lachenbruch or, more informally, the “jackknife” method. In this method, the discriminant function is fitted to repeatedly drawn samples of the original sample. The procedure estimates (k – 1) samples and eliminates one case at a time from the original sample of “k” cases (Hair et al. 1992). The expectation is that the proportion of firms classified correctly by the jackknife method would be less than that in the original sample due to the systematic bias associated with sampling errors. In this study, there was a difference of six firms between the original test and the validation test. The major issue is whether the proportion classified correctly by the validation test differs significantly from the 64 percent classified correctly in the original test. That is, is the difference in the two proportions classified correctly by the two tests due to bias, and if so is that bias significant? Of course, it may be obvious that a difference of only six cases will not be significant with a sample of two groups of one hundred firms in each group. However,

as in the aforementioned case of the Press's Q test of proportions, formal research requires the proof of a statistical test. The jackknife validation resulted in the correct classification of 58 percent of the firms. Since there are only two samples for analysis the binomial test is appropriate:

$$t = r - n\,p / [n\,p\,q]^{1/2} \quad (5)$$

Where:

t is the calculated t statistic
r is the number of cases classified correctly in the validation test.
n is the sample size.
p is the probability of a company being classified correctly in the original test.
q is the probability that a firm would be misclassified in the original test.

In this case: $58 - 100\,(.64) / [100\,(.64)\,(.36)]^{½} = -1.25$ is less than t_{05} 1.645. (6)

Therefore, the null hypothesis that there is no significant difference between the proportion of firms classified correctly in the original test and the proportion classified correctly in the validation test cannot be rejected. Thus, it can be concluded that while there may be some bias in the original analysis, it is not significant, and it is concluded that the procedure will classify new firms as well as it did in the original analysis.

In addition to the validation procedure, researchers usually address the question of the equality of matrices. This is especially important in studies such as this where there is a disparity in the size of the groups. However, there is no disparity in this study, both groups have 100 observations. One of the assumptions in using MDA is that the variance-covariance matrices of the two groups are equal. The SPSS program tests for equality of matrices using Box's M statistic. Box's M is a parametric test used to compare variation in multivariate samples. More specifically, it tests if two or more covariance matrices are equal (homogeneous).

In this study Box's M transformed to the more familiar F statistic of 316.097 resulted in a zero level of significance. Thus, the null hypothesis that the two matrices are equal cannot be rejected.

SUMMARY AND CONCLUSIONS

The *Value Line* Investment Survey ranking of investment timeliness for each of the 1700 companies in its database is well-known and has been a popular source of information for investors since 1965. Previous studies that examined the fundamental financial characteristics of those firms identified as having the highest timeliness ratings have ignored the macroeconomic background and conditions in the financial markets at the time those high ratings were awarded. The purpose of this study was to establish a financial profile of those firms identified as having the highest *Value Line* timeliness ratings in a unique economic environment characterized by high growth, stable prices, and low unemployment. Then to compare those firms with firms chosen at random, but from the same industries as the first group to determine whether the

firms with the high timeliness ratings have a unique risk-return financial profile.

In this study, the group of explanatory variables chosen for analysis includes one measure of the size of the firm, one measure of return on investment, two measures of risk, one measure of financial strength and one measure of how the firm may be perceived by investors at the margin. It is the buying and selling of those investors that establish the market value of both equity and debt.

A unique set of explanatory variables was found for those firms with high *Value Line* timeliness ratings, and since the model was validated without bias, it is suggested that the profile may be used to identify firms that will maintain those high ratings in future markets characterized by high economic growth.

The results of the statistical analysis indicated first that there was a significant difference in the financial profiles of the two groups of firms. Table 2 reveals that the measure of financial strength made the greatest contribution to the overall discriminating function. It is followed respectively by the measure of operating risk (leverage), the measure for the size of the firm, the price-earnings multiple, return to total capital, and finally debt to total capital (financial leverage).

The greater the values for financial strength, size, the price-earnings multiple and financial leverage (financial risk), the more likely the firm will have a high timeliness rating. Conversely, firms with high timeliness ratings have less operating leverage (operating risk), and surprisingly, lower returns to total capital.

Two of these results may have been expected, three had no apriori expectations and, one was simply a mild surprise. Explanations as to why the variables are associated with one group or the other are beyond the scope of this study. However, a few comments on the findings may be in order.

It was expected that size, growth and financial strength would be characteristics of timely investments. There were no apriori expectations regarding either financial or operating leverage. It was simply not known.

The study resulted in one mild surprise. It is logical to surmise that return to total capital would be a characteristic of companies regarded as timely investments. A relatively low level of return on invested capital is simply inconsistent with the idea of a timely investment. No explanation of this empirical result can be offered here, and it may indeed defy logic. However, that finding, as well as the other conclusions of the study, are rich in content for needed further research.

This study has resulted in a contribution toward the construction of a theory that describes the risk-return, financial strength and size characteristics of firms that were regarded by *Value Line* as the most timely investments in a period of very strong economic growth. It is further suggested that since the model was validated without bias, it may be used to predict firms that will again be ranked very high for timeliness of investment in a growth economy in the future. To make a more complete contribution to the theory, the aforementioned further research is needed.

REFERENCES

Altman, Edward I. 1968. "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy." *Journal of Finance.* 23 (4): (September): 589-609.

Brigham, Eugene, and Phillip R. Daves, "*Intermediate Financial Management." Boston, Cengage, 2018.*

Damodaran, Aswath. 2014. *Investment Valuation: Tools and Techniques for Determining the Value of any Asset:* New York: John Wiley and Sons. http://people.stern.nyu.edu/adamodar/New_Home_Page/data.html.

Edmister, Robert O. 1982. "An Empirical Test of Financial Ratio Analysis for Small Business Failure Prediction." *Journal of Financial and Quantitative Analysis* 7: 1477-1492.

Hair, Joseph F., Rolph E. Anderson, Ronald L. Tatham, and William C. Black. 1992. *Multivariate Data Analysis.* New York: Macmillian.

Hamada, Robert S. 1972. "The Effect of Firm's Capital Structure on the Systematic Risk of Common Stocks." *Journal of Finance.* (May): 435-452.

Huang, Nellie S. "Best Places to get Investment Advice." *Kiplinger Personal Finance*: January 2017. https://www.kiplinger.com/article/investing/html_

Hurlbert, Mark, 2007. "To the Very Patient May Go the Spoils." *New York Times*, February 4.

Payne, Bruce C. 2010. "An Analysis of the Financial Variables that Determine the Value of Firms Identified as Institutional Favorites in a Period of Economic Recession and Slow Recovery." *Advances in Investment Analysis and Portfolio Management.* 4: 27-47.

Jimmy Lockwood, Ying Zhang, Steven V. Le. "Investor response to online *Value Line* rank changes: Foreign versus local stocks." *Global Finance Journal* 30 (2016): 10–26.

Leinweber, David J. 1995. "Using Information From Trading in Trading Portfolio Management." *The Journal of Investing*, Summer, 4 (2) 40-50.

Reynolds, Ben. 2019. "Four Simple Tools to Invest Like Warren Buffet." Suredividend. https://www.suredividend.com/4-simple-tools-to-invest-like-warren-buffett/

Sharma, Subhash. 1996. *Applied Multivariate Techniques.* Hoboken, New Jersey: John Wiley.

Suozzo, Peter. 2001. *Global Equities Research.* Stern School of Business. http://pages.stern.nyu.edu/~ekerschn/pdfs/readingsemk/EMK%20NYU%20S07%20Global%20Tech%20Strategy%20Valuation%20Multiples%20Primer. pdf.

Swedroe, Lawrence. 2010. "The *Value Line* Enigma." https://www.cbsnews.com/news/the-value-line-enigma/

Treschmann, James S, and George E. Pinches. 1973. "A Multivariate Model for Predicting Financially Distressed Property-Liability Insurers." *Journal of Risk and Insurance.* 40 (3): September: 27-333.

Van Horne, James C. Financial Management and Policy, New York: *Prentice-Hall Publishing*, 2001.

Waggle, Doug, Agrrawal, Pankaj and Don Johnson, Journal of Investing, Vol. 10 (1), Spring 2001.

Zaiontz, Charles. 2014. "Real Statistics Using Excel. http://www.real-statistics.com/multiple-regression/testing-significance-extra-variables-regression-model/

TABLE 1
CLASSIFICATION RESULTS
Predicted Results

FHTR - FCAR Classification

Actual Results	FHTR	FCAR
FHTR	29	19
FCAR	17	35

TABLE 2
RELATIVE CONTRIBUTION OF THE VARIABLES

Discriminant Variables	Coefficient	Rank
Sales	0.343	3
Return to Total Capital	-0.180	5
Hamada's Unlevered Beta	-0.605	2
Long Term Debt to Total Capital	0.043	6
Value Line's Measure of Financial Strength	0.870	1
The Price Earnings Growth Multiple	0.272	4