A CANONICAL CORRELATION APPROACH TO INVESTIGATE THE DETERMINANTS OF INVESTMENT SAFETY

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ABSTRACT

In this study, we use a canonical correlation approach to investigate the constituencies of the concept of investment safety related to investments in common stocks. We identify a parsimonious set of financial indicators that, collectively, predict the safety level of a given firm in an investment context. The results from the canonical analysis show that there is a significant correlation between the multi-faceted concept of investment safety and a set of three financial measures – cash flow (measured by cash flow per share), earnings (measured by earning growth), and liquidity (measured by the current ratio). **JEL Classifications**: C38; E22; L25

INTRODUCTION

The equities markets have been experiencing increasing volatility since 2009 (Market Watch 2013; Murphy 2014). Such increases can be illustrated by discussing the VIX Index. The VIX Index Fund is a fund that measures the expectation of volatility on the S&P 500 market index over a one month period. The VIX is traded on the Chicago Board Options Exchange and is constructed using the implied volatilities of a number of puts and calls on the S&P 500 Index. When the VIX trades above 30, a large amount of volatility is said to exist in the market, and it is often called the "investor fear gauge." When the VIX trades below 20, these times are considered less stressful in the stock market.

Safe assets have been traditionally identified as fixed income assets that include US Treasuries, US Agency Debt and their Asset Backed Securities (ABS) and Mortgage Backed Securities (MBS) as well as municipal debt. These instruments are considered safest, on both a domestic and global scale, especially when issued by a government with a stable monetary policy. In addition, Many safe assets are also provided by the private sector and "shadow banking system." (Gorton and Ordoñez 2013) These assets include investment grade bonds, high-yield bonds, and private sector mortgage-backed securities. Although debt investments would be a natural alternative to stock investments during volatile times, and have traditionally been "safe assets," bond yields are at historically low levels and cannot provide a sufficient return for most investors.

The Federal Reserve's third quantitative easing initiative (QE3) focused on government purchases of its own treasuries and agency debt and crowded out private investors to seek safety in corporate bonds and private sector MBS (Gorton, Lewellen et al. 2012). In addition, the Fed's quantitative easing policies have caused record low yields along with record high prices for debt.

Martin Feldman, in an interview with Goldman Sachs, states that the Fed's policy is the primary cause of a "bond bubble" that may "pop" with the tapering of Fed funds (Nathan 2013). With the Fed deciding to "taper" QE3 from $85 billion to $75 billion per month in December 2013, and another reduction of QE3 to $65 billion in January 2014, the price of safe assets will decrease (Wearden 2013). In June 2013, Ben Bernanke's mere mention of tapering caused a worldwide decrease in equity markets (Hargreaves 2013). However, the moderate taperin announcement of just $10 billion in December 18, 2013 signaled a more moderate policy than originally predicted and global stock indices rose on December 19, 2013 (Wearden 2013).

Destabilizing political events in Europe and the United States have also affected global bond volatility. The European Debt Crisis in the PIGS (Portugal, Ireland, Greece, and Spain) has created doubt in European sovereign bond markets. The refusal of Congress to increase the debt ceiling in July 2011 and again in October 2013 resulted in the US losing its AAA credit rating in sovereign bond markets, as well as caused volatility and doubt in US sovereign bond markets. In order for investors to earn higher returns in bonds now requires investment in riskier investment grade or high-yield bonds. The risks associated with earning higher returns in bonds may not be appropriate for many investor profiles, especially for those who are approaching retirement. So this leaves investors searching for not just safe assets, but safe assets that yield higher than the risk-free rate of return.

When the reality of more volatile stock and bond markets collides with the rapidly aging populations in the US and other developed countries, the need to identify safe assets which earn appropriate returns becomes paramount. This situation highlights the importance of this study. Part of our objective is to create a means to better identify safe equity investments using easily accessible financial indicators. These financial indicators are closely correlated with the Value Line ranking system, whose highly-ranked stocks have exhibited positive abnormal returns.

VALUE LINE RANKINGS

Value Line has created rankings for its universe of 1,700 companies. The "Safety" rank is an overall measure of risk of the stocks analyzed by Value Line. It is derived from the "Stock Price Stability" the "Financial Strength" ratings of a company. Those stocks with a ranking of 1 are the "safest, most stable, and least risky investments" relative to the other stocks in the Value Line universe (2013). Those stocks with high "Safety" ratings are usually large, financially sound companies, which pay regular cash dividends, and can have less than average growth prospects.(2013) These "safe" stocks often provide two sources of income for the investor in the form of dividends and slow capital gains growth. In volatile markets, these stocks can become invaluable sources of stability and income for those investors with certain risk profiles. According to Value Line research, those stocks with high "Safety" rankings often fall less during times of market downturn, while still issuing dividends Value Line universe (2013).

The Value Line scores that measure "Stock Price Stability" and "Price Growth

Persistence" for the 1,700 stocks it follows are the basis of research in this paper. These measures can range from a low score of 5 to a high of 95, and are comparisons between the stock in question and the rest of the stocks in Value Line's universe (2013). "Stock Price Stability" is basically a measure of the stock's price volatility. It is "a relative ranking of the standard deviation of weekly percent changes in the price of [the stock] over the last five years."(Greene 2010) If there is not five years of data available, then there is no "Stock Price Stability" ranking for that stock. "Price Growth Persistence" is a "measurement of the historical tendency of a stock to show persistent growth over the past 10 years compared to the average stock." (Greene 2010) Again, if there is not 10 years of data available for the stock in question, then there is no "Price Growth Persistence" ranking for that stock.

The need for further research on the "Safety" rank and its components is the foundation for this research. We notice that Value Line uses market prices, growth rates, and standard deviations for "Price Growth Persistence" and "Stock Price Stability," respectively. These rankings are both good indicators of equity investment safety.(Waggle 2001) However, this research seeks to further investigate these rankings by using canonical correlation to create a financial profile to explain financial safety.

In addition, instead of using market prices, this research uses fundamental financial indicators, including cash flow, earnings, and liquidity and further identifies a financially safe equity investment. This expands on existing research by O'Hara, Lazdowski, et al. which finds that companies that exhibit "17 years of consistent growth in dividends, cash flow and earnings can outperform the market on a constant, long-term basis." The indicators used to measure dividends, cash flow, and earnings include dividends per share, and earnings per share (O'Hara, Lazdowski et al. 2000). These fundamental indicators are available to all investors and researchers, not just those who subscribe to Value Line, and for firms other than those contained in the 1,700-member Value Line universe.

OBJECTIVE

In an age of volatile markets, safe investments can help preserve principal and compound investments at a steady rate of return. Our objective in the current study is two-fold. First, we provide a discussion on the two different dimensions, price stability and growth persistence of a stock that define the concept of financial safety in the context of investment. Second, we then investigate the finer contents of the multi-dimensional concept of financial safety. Using the "stability" and "persistence" rankings as well as multiple financial measures from Value Line, we use a canonical correlation analysis approach as a tool to investigate the relationships between the concept of investment safety and its underlying predicting factors.

In the following sections, we first provide a discussion on the concept of investment safety, its underlying dimensions as conceptualized in this study, and a discussion on the set of financial indicators selected to be used as predicting variables for the concept. We then briefly discuss the analysis methodology and the canonical correlation analysis (CCA) technique before describing the data and their analysis. The results and their interpretation will be discussed before our conclusion and recommendations for future studies.

INVESTMENT SAFETY

Investment safety is not a single-dimension concept. Primarily, safe investments are investments that are subject to little or no risk of loss. These investments may or may not be guaranteed by a government or quasi-government agency. Secondarily, safe investments typically pay modest and continuous returns to investors. The capability to generate continuous stream of income should reflect in its stock price. As such, we posit in this study that the concept of investment safety should comprise of two underlying dimensions: The stock price stability and the persistence of growth in the value of common stocks.

The first dimension, price stability, of the safety construct is the Value Line rating for stock price stability. This measurement is based on the ranking of the standard deviation of weekly percent changes in the price of a stock over the past five years. The lack of price level volatility may be used as a measure of the absence of risk, or safety of investment. In a recessionary market, stocks with price stability allow investors' capital to stay in a safe haven. While the investment with price stability may still have some potential for growth, its investor does not run the risk of losing vast amounts of wealth.

The persistence of growth in the value of common stocks has long been of interest to investors, investment counselors, financial managers, and academicians. It seems to be a common belief that a firm that has grown rapidly for the past for several years is highly likely to repeat this performance in the future. Conversely, stocks that have done poorly over prolonged periods are shunned and trade at low multiples. In a trend of rising prices, the price of an investment is expected to grow at least as much as inflation in order to maintain its value over time. Indeed, the persistence rather than the magnitude of growth has become of primary importance to the selection of securities by both institutional investors and inside traders (Meisheri 2006, Damodaran 2002, and Payne 2004). The Value Line proprietary measure of price growth persistence rewards a firm for the consistency with which it outperforms the broader universe of equity offerings over an extended period of time. It is used here as a proxy measure of the second dimension, persistence of growth.

PREDICTING VARIABLES

Previous studies have chosen predictor (explanatory) variables by various methods and logical arguments. Despite the variation in the selection methods, the safety of an investment can be effectively reflected in three aspects: the firm's financial structure (the long term debt to total capital is a measure of financial risk), its potential of sustaining earnings, and the firm's liquidity. Accordingly, the group of predictor variables chosen in this study for analysis includes a measure of the overall finance risk, two measures of return or potential return to investors, and two measures of liquidity. Table 1 below summarizes the criterion variables and predictor variables used in the current study.

The first measure of return is return to total capital (ROTC). Return to total capital 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 is used to finance assets. This is consistent with the use of the debt to total capital ratio as a measure of financial leverage (financial risk). It is an understatement that growth, whether it be measured as positive changes in sales, share price, or the present value of invested dollars, in a period of economic recession

and financial market turmoil is unusual. Financial literature is replete with methods and theories on how to achieve growth, how to determine the optimum rate of growth, and even if an optimum growth rate exists (Miller and Modigliani 1961). On one hand, one can look at growth with a euphoric view that it would bring in new cash flows and incomes; hence, more safety. On the other hand, in situations where a company has to maintain growth by cutting prices may not be able to contribute as much in terms of income. In addition, growth usually requires extra funding for increases in the working capital. During a time when overall liquidity is sluggish, such demands for additional working capital can exert financial stresses on the company. In this paper, we posit there is no a priori expectation on how positive growth would affect the safety of a company. It is simply not known.

The current ratio, to a certain extent, can be used to indicate a given company's ability to pay its short-term liabilities (debt and payables) with its short-term assets (cash, inventory, receivables). The higher the current ratio, the more capable the company is of paying its obligations. Generally, a ratio under 1 suggests that the company is unable to pay off its obligations if they were to become due at that point. While a current ratio less than 1 shows a lack of liquidity, it does not necessarily mean that the company will go bankrupt; as there are many ways to access financing. Furthermore, a low current ratio can indicate a highly-efficient operating cycle or an uncanny ability to turn its product into cash (i.e. Wal-Mart). Companies that have trouble getting paid on their receivables or have long inventory turnover can run into liquidity problems while maintaining a high current ratio. The high current ratio can be the result of a high level of accounts receivable and inventory due to inefficient turnover. Because business operations differ in each industry, it is always more useful to compare companies within the same industry.

Cash-flow-per-share (CFPS) is considered another measure for liquidity. The capability of business to meet claims on a timely basis becomes difficult if the business is low on cash. Furthermore, lower operational cash flows may compel a company to cut back on planned profitable projects. Conversely, if there are adequate cash flows, the chance that the company has to forego earning opportunities due to projects being underfunded will be minimized. Thus, cash flow per share is included in the profile of explanatory variables. There is an a priori expectation that firms with higher levels of safety will have significantly greater cash flows per share that firms selected at random.

In summary, there are five explanatory variables in this canonical correlation model: ROTC, GROWTH, CURRATIO, DTC, and CFPS are compared against the concept of investment safety consisting of the aforesaid two variables. These five variables measure the firm's profitability (ROTC), financial risk (DTC), its ability for sustained growth (GROWTH), its liquidity (CURRATIO and CFPS). Thus, the study contains measures of both risk and return that determine the value of the firm. A basic tenet of this study is that investors at the margin evaluate the degree of risk in an investment and compare it to the investment's potential rate of return. In modern textbooks this is a fundamental principle referred to as the "risk-return tradeoff." (Brigham and Daves, 2012) Investors at the margin "trade off" proxies for risk and return in buying and selling securities to establish demand and thus, price or market value. Safety is simply one side of that tradeoff indicating a lack of risk, and when investors become more risk adverse, as in a recent period of recession and slow recovery, they must have a greater potential return to assume marginal risks.

DATA ANALYSIS

The objective for the data analysis in the current study is to obtain insights into the interrelationships between the two investment safety dimensions and the collection of predicting variables. In the current study, we have two metric scales, STAB and PERSIS, as the criterion variables and a set of five metric predictors as the independent variables. Ordinary regression analysis or stepwise regression analysis handles only a single criterion variable; therefore, these statistical techniques do not provide an accommodation for the multiple criterion variables in our study. As such, we use the canonical correlation analysis method to analyze the data we collected for this study.

Canonical Correlation Analysis

Canonical correlation analysis (CCA) is a multivariate statistical model aimed at studying the interrelationships among sets of multiple dependent variables and multiple independent variables. It is generally accepted to be the most appropriate and powerful multivariate approach (Hair et. al 1998). CCA develops a number of orthogonal canonical functions that maximize the correlation between the linear composites, also known as canonical variates, which are sets of dependent and independent variables. Each canonical function is actually based on the correlation between two canonical variates, one variate for the dependent variables and another for the independent variables. Those variates are derived to maximize the correlation between them. In addition, CCA generates a number of canonical functions (pairs of canonical variates). The number of functions generated each time is equal to the number of variables in the smaller set of variables.

The CCA model

In the current study, our objective is to evaluate the strength of the associations between the canonical variates which include the five metric scales: ROTC, GROWTH, CURRATIO, DTC, and CFPS and the concept of investment safety. The set of dependent variables includes the two underlying dimensions of STAB and PERSIS. The five independent variables resulted in a 40-to-1 ratio of observations to variables, exceeding the guideline of 10 observations per variable. The CCA in our study was restricted to deriving two canonical functions as the dependent variable set contained only two variables, STAB and PERSIS. To determine if both canonical functions should be included in the interpretation stage, we focused on the level of statistical significance, the practical significance of the canonical correlation, and the redundancy indices for each variate.

The first statistical significance test is for the canonical correlations of each of the two canonical functions. Both of the two canonical functions were tested to be statistically significant at the 0.01 level (see Table 2). In addition to tests of each canonical function separately, multivariate tests of both functions simultaneously are also performed. The test statistics employed are Pillai's criterion, Hotelling's trace, Wilks' lambda, and Roy's largest root. Table 2 also details the multivariate test statistics, which all indicate that the canonical functions, taken collectively, are statistically significant at the 0.01 level.

In terms of the magnitude of the canonical relationships, the practical significance of the canonical functions as represented by the size of the canonical correlations cannot be said to be strong. The canonical correlation coefficients that indicate the variates' linear relationship are 0.3497 and 0.2661 for Function 1 and Function 2, respectively. In

other words, the proportions of variances in the respective criterion variates that can be explained by the canonical functions are respectively 12.23% and 7.1%. Nonetheless, when we consider that the set of predictor variables selected for this study are relatively small in number and constitute only a small subset of all key financial indicators, having the canonical correlations to be in such a size is not unexpected.

Redundancy analysis

The squared canonical correlations provide an estimate of the shared variance between the canonical variates rather than that from the sets of dependent and independent variables (Alpert and Peterson 1972). The interpretation of the canonical correlations can be misleading. This is particularly true when the roots are considerably larger than previously reported bivariate and multiple correlation coefficients. The researcher may be tempted to assume that the canonical analysis has uncovered substantial relationships of conceptual and practical significance (Hair et. al 1998). To overcome this issue, Steward and Love (1968) proposed the calculation of the redundancy index as a summary measure of the ability of a set of independent variables (taken as a set) to explain variation in the dependent variables (taken one at a time).

In the earlier statistical significance tests, although both of the functions are statistically significant, we focus on interpreting the first function as the squared correlation for the second function is relatively insignificant. In Table 3 we summarize the computation of the redundancy indices for the predictor and criterion variates in the first function.

The redundancy index for the criterion variables is 0.0785. That is, approximately 8% of the variances in the criterion variables can be explained by the predictor variate. As there have not been any generally accepted guidelines to judge what level, above which, a redundancy index is supposed to be acceptable, one needs to make his judgment in accordance to the context of the study. In the current study, as the input and output scales we use are only small subsets of the whole repertoire of indicators, it is not particularly unexpected that the redundancy indices are not much higher (0.08 and 0.03 respectively).

Interpretation of the canonical variates

The CCA results are summarized in the Canonical Structure Matrix (Table 4). The canonical structure matrix reveals the correlations between each variable and its own variate in the canonical functions. It can be said that these correlations are like the factor loadings of the variables on each discriminant function and can be interpreted as they are standardized. It allows the comparison of the variables in terms of their correlations and how closely a variable is related to each function. Generally, any variable with a correlation of 0.3 or more is considered to be significant.

Recall the results of the significance tests in the earlier paragraphs, our interpretation focuses only on the first canonical function and not the second one. Adopting the traditional 0.3 as the cutoff point, three predictor variables; GROWTH (0.5939), CURRATIO (-0.5226), and CFPS (0.7355); are significant contributors to the composite independent variate. Both of the variables in the criterion variate have significant contributions at 0.7806 and 0.8215 for STAB and PERSIS, respectively. Based on their loading values, we can rank the importance of the independent variables in the following orders: CFPS, GROWTH and CURRATIO. That is to say that CFPS, the variable indicating cash flow, contributes most highly in explaining the variances in the dependent variate in the canonical function.

In terms of the dependent variables, it appears that the variances in the stock value growth consistence variable (PERSIS) are slightly more ready to be explained by the independent variate than the stock price stability variable (STAB).

The positive signs of CFPS and GROWTH indicate that the higher the loading are on these variables the higher the levels of STAB and PERSIS. However, the negative loading on CURRATIO, while maximized for correlation with the dependent variate, renders the interpretation to be a complicated task. Figure 1 graphically depicts the relationships between the independent and dependent variables and their variates.

DISCUSSION

Our independent variate is composed of stock price growth consistency PERSIS and stock price stability STAB, with most explanatory power expressed through the PERSIS component. This represents the fact that our canonical correlation model is a better suited to those stocks that have a consistent growth rate over at least the last ten years. Since stock price growth is a desirable trait for any long term investment strategy, these firms would generate returns that are at least approximating the inflation rate, if not higher. These returns would then grow investment funds over the long term to insure future financial goals were met. This is a prime component of what we have explained as safety in equity assets.

Consistent with an emphasis on price growth consistency, the highest positive loading components of our dependent variate are cash flow per share (CFPS) and earnings growth (GROWTH). This indicates that those firms with the highest cash flow per share and the highest earnings growth are those that will have the most consistent stock price growth over time. This stands to reason due to the fact that firms with higher CFPS and GROWTH will generate more internal equity, and will be less dependent on outside sources of financing during tough economic times. With higher amounts of internal equity, these firms can take advantage of growth opportunities during times when outside financing may be scarcer.

The highest negative loading component of our dependent variate is the current ratio, CURRATIO, one of the primary measures of liquidity. The negative sign suggests that the relationship between CURRATIO and the predictor variate is inverse. This is a counterintuitive result. To obtain plausible explanations for such an unexpected result, we performed several procedures.

The first procedure was a sensitivity analysis to test how the liquidity variable, CURRATIO, and the financial structure variable, DTC, individually contribute to the predictor variate. The underlying question we had was: Would the inclusion of DTC, which already includes the constituencies of CURRATIO, be a disturbing factor to have caused the unexpected sign of CURRATIO? In the sensitivity analysis, the CCA model was run again twice, one without CURRATIO and another without DTC, to verify whether the canonical loadings would change significantly when the model changes. Compared to the full model (contains all five predictor variables), neither of the revised models resulted in any significant change in the canonical correlation coefficient. In the model that CURRATIO was left off, the variation in the distribution of the loadings mainly occurred to the variable GROWTH (increased from 0.5939 to 0.7314). As the loadings were more evenly distributed between the growth and cash flow variables, the criterion variate was leaning more towards the variable PERSIS.

In the other revised model in which DTC was left off it instead of CURRATIO, the

loading distributions remained almost unchanged in both of the predictor and criterion variate. The second revised model suggests the financial structure, represented by DTC, does not have much correlation with the safety construct we defined earlier in this paper. However, our sensitivity analysis of the components in the model does not seem to have offered too much of an explanation to the opposite sign of the variable CURRATIO in the CCA model.

Another possibility for the negative loading of CURRATIO may be attributed to the inherent contradictory nature between STAB and PERSIS. The variable STAB is the measurement of how stable the stock prices of a given company has been: A stock with its price unchanged over time will rank higher than one that appreciates gradually. On the other hand, the variable PERSIS rates more highly the stocks of those companies whose values grow over time. To verify this assertion, we conducted another sensitivity analysis on the alternate canonical correlation analysis function. In CCA, usually the first function, which has the highest canonical correlation, is chosen for interpretation. So did us in this current paper. However we also looked into an alternate combination of the variables in the second CCA function with a view to uncover additional insights into the relationships between the predictor and criterion variables.

Table 6 summarizes our analysis of swapping the variables of CURRATIO and DTC in and out of the CCA model. In the model where all the five predictor variables were present, the predictors GROWTH and CURRATIO have loadings that are higher than 0.3, and with a positive sign, which are in the same direction as the criterion variable PERSIS. The positive sign of the two predictor variables and the criterion variable shows that the relationship between them is a direct one. Another predictor variable that has a loading greater than 0.3 is DTC, that has a negative direction, the same as that of STAB. This loading distribution provides us with some initial evidence to show that the two dimensions underlying the investment safety construct, stability in stock price (STAB) and persistence of growth (PERSIS), are orthogonal and predicted by different sets of predictors. In that, growth and liquidity seem to support a company's stock price sustaining a steady growth; while the long term debt to capital ratio is directly related to the stability of stock price of a company.

When the liquidity variable was removed from the model, the loading on the cash flow variable became much more significant to replace the role of CURRATIO in supporting STAB. As DTC was swapped with CURRATIO, the shift in the loading distributions further strengthened the pattern that GROWTH and CURRATIO tend to be directly and significantly connected with the dimension of stock price growth persistence.

Yet, another possible explanation as we discussed earlier in this paper is that a small current ratio might be a primary indicator of efficiencies in receivable collections and inventory management. Warren Buffet states in his investment philosophy that companies with a current ratio less than one over a long period of time are usually companies that have what is called a "sustainable competitive advantage," (Livy 2013) These companies can convert inventory to revenues so quickly that this economic power far outweighs any lack of liquidity over time. The negative loading on CURRATIO substantiates this philosophy by showing that investors are investing in companies with sustainable competitive advantages.

It is noteworthy that the correlation between the two canonical variates in the primary canonical correlation function is relatively low. One direction for further research is that the low correlation could have been caused by the incompatible scales of the variables used in the study. Among the five predictors and two criterion variables used in the CCA

model, three (STAB, PERSIS, and GROWTH) of the seven variables measure each an aspect of a company across a time span; while the remaining four variables are relatively 'snapshot' indicators measuring a company at a specific point in time. Note that both of the dimensions in the criterion variate are measured by variable covering a time span and only one of the five predictor variables measures a time interval. Some important information relevant to earlier periods might therefore be missing. This could be a major issue that explains the low canonical correlation.

The data analysis procedure, canonical correlation analysis, seeks to maximize the correlation between the linear combination of the criterion variate and its predictor variate. However, such combination may not always make much theoretical sense. In addition, nonlinearity can also pose the same problem as it does in simple correlation i.e. if there is a nonlinear relationship between the sets of variables, the CCA technique is not designed to detect that. While CCA is an appropriate data analysis procedure that facilitates the description of the relationship between the set of predictor variables with the construct of investment safety, it is very sensitive to the data involved, i.e. adding or leaving out influential cases and/or individual variables of the analysis can change the outcome dramatically.

CONCLUSION

In summary, the results of this analysis indicate that when investors are primarily concerned with safety, consideration should be given to consistent growth, followed by low variance in stock price. The three financial variables to consider should be earnings growth, cash flow per share, and the current ratio. Over the long term, consistent earnings growth and positive cash flow per share contribute to a safe equity investment.

Conversely, over the same long time horizon, firms with current ratios consistently less than 1 show an operational efficiency and earnings power that also contribute to the stock's safety. Further analyses suggest the somewhat unexpected sign of loading on the liquidity proxy, CURRATIO, is likely due to the opposing natures of the two dimensions, capital growth and stability of investment value, which underlie the construct of investment safety. Of course it may be argued that such phenomena are not inconsistent with the aforementioned Buffet philosophy of sustainable competitive advantage.

Although these results are promising, the explanatory power of this canonical correlation analysis in its current form is relatively low. Future studies could involve different financial variables, as well as more strategic and operational variables. These could further enhance this model and method of analysis. Interestingly enough, the low explanatory power of the model, but high correlation of components within the independent and dependent variates show that there are a few but very key financial characteristics that must be addressed in order for a stock to be considered safe. However, the lack of explanatory power of the overall model points to more as of yet undefined characteristics that must be analyzed to make the model more robust. These undefined characteristics could range from management styles to operational efficiencies to innovation at the most basic level.

This study has resulted in a contribution to the construction of a theory. Further research in this area may be rich in potential contributions for constructing a complete theory of the safety of invested capital. Such a theory would be invaluable to investors, investment managers, companies, and academicians.

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TABLE 1

PREDICTOR AND CRITERION VARIABLES

Criterion Variables

STAB	Stock Price Stability
PERSIS	Persistence of Growth in Value of Common Stocks

Predictor Variables

ROTC	Return to Total Capital
GROWTH	The Five Year Growth Rate in Earnings
CURRATIO	Current Ratio
DTC	Long Term Debt to Total Capital Ratio (Financial Risk)
CFPS	Cash Flow Per Share

TABLE 2

MEASURES OF OVERALL MODEL FIT AND

MULTIVARIATE TEST OF SIGNIFICANCE

Can. Function	F	Canon. Corr.	Sq. Corr	p
1	4.14	0.35	0.12	0.000
2	3.70	0.27	0.07	0.006

Test Name	Value	Approx. F	Sig. of F
Pillais	0.1931	4.15	0.000
Hotellings	0.2155	4.14	0.000
Wilks	0.8156	4.14	0.000
Roys	0.1223		

TABLE 3

CALCULATION OF THE REDUNDANCY INDICES FOR THE PRIMARY CANONICAL FUNCTION

Predictor Variable	Canonical Loading	Sq. Can. Loading	Avg. Sq. Loading	Sq. Can. Corr.	Redundancy Index
ROTC	-0.0545	0.0030			
GROWTH	0.5939	0.3528			
CURRATIO	-0.5226	0.2731			
DTC	0.0369	0.0014			
CFPS	0.7355	0.5409			
Predictor Variate		1.1711	**0.2342**	**0.1223**	**0.0286**
Criterion Variable					
STAB	0.7806	0.6093			
PERSIS	0.8215	0.6749			
Criterion Variate		1.2842	**0.6421**	**0.1223**	**0.0785**

TABLE 4

CANONICAL STRUCTURE MATRIX (CANONICAL LOADING)

Predictor Variable	Canonical Functions	
	1	2
ROTC	-0.0545	-0.1416
GROWTH	0.5939	-0.5770
CURRATIO	-0.5226	-0.7181
DTC	0.0369	0.3773
CFPS	0.7355	0.0788
Criterion Variable		
STAB	0.7806	0.6251
PERSIS	0.8215	-0.5702

TABLE 5: SENSITIVITY ANALYSIS FOR THE PRIMARY

CANONICAL CORRELATION FUNCTION

Predictor Variable	Canonical Loading	Canonical Loading	Canonical Loading
ROTC	-0.0545	-0.0189	-0.0572
GROWTH	0.5939	0.7314	0.5839
CURRATIO	-0.5226		-0.5366
DTC	0.0369	-0.0571	
CFPS	0.7355	0.7089	0.7378
Criterion Variable			
STAB	0.7806	0.5459	0.7956
PERSIS	0.8215	0.9587	0.8074
Canonical Correlation	0.3497	0.3353	0.3491

TABLE 6: SENSITIVITY ANALYSIS FOR THE ALTERNATE CANNONICAL

CORRELATION ANALYSIS FUNCTION

Predictor Variable	Canonical Loading	Canonical Loading	Canonical Loading
ROTC	0.1416	-0.2545	0.1446
GROWTH	0.577	-0.4929	0.6163
CURRATIO	0.7181		0.7251
DTC	-0.3773	0.6057	
CFPS	-0.0788	0.6116	-0.057
Criterion Variable			
STAB	-0.6251	0.8379	-0.6058
PERSIS	0.5702	-0.2846	0.5901
Canonical Correlation	0.2661	0.1641	0.2572

FIGURE 1

CANONICAL CORRELATION MODEL FOR INVESTMENT SAFETY AND ITS FINANCIAL INDICATORS