The Association Between A Market Determined Measure of Risk and Alternative Measures of Risk

by

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SECTION 1. INTRODUCTION

Many studies have investigated beta from the market model of portfolio theory. Although many studies agree that beta may be a useful measure of risk, relatively little work has been done comparing beta to measures of risk traditionally thought to be economically important and to specific corporate decisions.

In this paper we look at the association between betas for common and non-convertible preferred stocks and several traditional accounting measures of risk which have been said to measure various aspects of firms's asset structure and its capital structure.[1] We find that selected non-accounting corporate decisions appear to be associated with the market risk levels of firm's common and preferred stocks at least as strongly as accounting variables.

Section II discusses beta and the market model briefly. In Section III we discuss the traditional measures of risk and the corporate decisions to be used in the study. After describing our samples of preferred stocks and common stocks in Section IV, we present the empirical results obtained in our study in Section V.

SECTION II. BETA AND THE MARKET MODEL

The market model states that the return on an asset i in period t, $\tilde{R}_{it}$,[2] is linearly related to the return on the market

portfolio $\tilde{R}_{mt}$ by

$$(1) \quad \tilde{R}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \tilde{\epsilon}_{it}$$

where $\tilde{\epsilon}_{it}$ represents the factors unique to asset i. The $\tilde{\epsilon}_{it}$ are assumed to be independently distributed across assets and have an expected value of zero. α_i and β_i are parameters appropriate to asset i.

Several studies have indicated that β_i, the beta coefficient, may be a useful measure of asset risk.[3] Beta has been described as a measure of a security's volatility or systematic risk relative to that of the typical market asset. Beta is based on and summarizes the information that is available to the market concerning the security and which indicates the risks associated with the security. However, there remain many alternative approaches to the measure of risk.

SECTION III. TWO ALTERNATIVE APPROACHES TO THE MEASUREMENT OF RISK

A. Accounting Variables

Alternative approaches to the measurement of risk involve different methods of summarizing information available to the market. One popular alternative to the market approach to measuring risk includes the analysis of corporate accounting data. In this case accounting data are considered to be essentially a summary of corporate events and decisions. In this manner the data are felt to summarize, in some form, information basic to the measurement of the risk associated with

the firm and with the securities supporting the firm. The accounting data are different from beta in that accounting data are presumed to measure the total risk of the firm rather than the systematic risk measured by betas and associated with the firm in a portfolio atmpsphere. However, regardless of this difference in concept both beta and the accounting data should contain information about the firm's systematic risk and there should be an association between beta and the accounting data.

Like other studies using accounting data, this study is faced with the problem of selection of the appropriate accounting data and financial ratios. These approaches include selection of data and ratios mentioned frequently in the literature, used with previous success or associated with each of various general classes of accounting ratios.[4] The combination of several of these selection procedures often leads to the examination of several alternative ratios from each of the many generally accepted classes of ratios. Each ratio in any given class investigates aspects of the firm similar to those investigated by other ratios in the class. Such ratios are often highly correlated and selection of a specific ratio as the most useful of a class of ratios is often based on relatively minor differences in the ratios and is possibly dependent on the specific empirical sample.

In this paper we assume that the correlation within each class of accounting ratios is high and select one ratio from each of the several generally accepted classes of ratios. We use market values for preferreds and bonds where possible and for common equity.[5] As a measure of profitability we choose the available for common/ common equity ratio (AC/E). Leverage is measured by the debt/ common equity (D/E) and the preferred/common equity (P/E) ratios.[6] Liquidity

is measured by the current ratio (CB). The sales/common equity (S/E) and the cash flow/debt plus preferred [CB/(D + P)] ratios represent efficiency and coverage from operations ratios respectively. In addition, common equity is used as a measure of firm size.

Recent studies using accounting data in association with beta have had mixed results.[7] There are many possible accounting oriented reasons for any weaknesses in this association. In particular, currently used accounting systems are not normative and often generate deliberately biased results whereas the market place is not encumbered by accounting-type controls and is felt to generate prices based on unbiased valuations of new information. For example, accounting data which is deliberately "conservative" is deliberately mis-stating the company's current position.

The standardization and formalization of accounting might be more useful (although perhaps too restrictive), if there were fewer available alternative and competing methods of accounting for events. The wide variety of possible accounting approaches means that within and across firms and industries several alternative ways are used to describe new information. For example, the accounting analysis of a firm may suffer because the summary accounting data which is available to the

public for any company often includes, in ways not necessarily clear to the public, several different approaches to the measurement of corporate events. Comparison between firms within any given industry is burdened by the same problem.

Many samples comparing accounting data to beta include data from companies in each of several industries. This adds additional problems. As the heterogeneity of the sample increases, the meaning of the accounting numbers becomes increasingly nebulous. In particular, the information contained in a given accounting number and the importance of that number differs across industries. As a result, any association between raw accounting statistics and beta could be suspect.

Even if raw accounting data are such that the miscellaneous problems cancel themselves out,there are additional problems to consider, For example, studies employing accounting variables generally assume a linear relation between the independent accounting variable and the dependent variable. Although linear relations are simple mathematically and are often used when there is no a priori reason to assume any other specific type of association, it is quite possible that linear relationships do not hold in the measurement of association between beta and our accounting variables.[8]

The problems mentioned here are merely meant to be representative of those which may affect adversely or may obscure any association between accounting data and beta. Perhaps a

more productive approach in finding an association between beta and other measures of risk lies in using corporate information in different ways.

B. Decision Variables

While accounting data is considered to be a major summary of information about the risk of a firm's assets and about the effects of management's decisions, it is not the sole source of information. One alternative source of information includes a more direct investigation of specific management decisions and the results of these decisions. Presumably, a firm's decisions and the results due to the decisions reflect and indicate the risks associated with the firm. If the market considers the firm's decisions and actions in its analysis of a security's risk level, then the betas for the firm's securities should be directly related to the risk associated with the firm's decisions.

The decision variables included in our study are based on specific events or on results that are due to a series of corporate events. The variables used here represent a small proportion of the variables that might be called decision variables. Dummy variables are used to associate each chosen event with the securities of each company.

One decision which may contain information for investors and which is measurable in a simple, discrete manner is the firm's decision to change its dividend policy on its preferred stock by

beginning or ending an arrearage.[9] A second decision which may contain information and is measurable in a discrete sense is the firm's decision to reduce its regular common dividend payment to zero.[10] These descriptions of events are chosen (they will be changed slightly later) rather than dividend changes in excess of some arbitrary level for simplicity. In addition, it is felt that the described dividend changes may be more clearly associated with firms with high levels of systematic risk than other possible dividend decision variables that could have been chosen.[11]

There is also one measure of the firm's performance due to a series of management decisions. This variable,which is called a coverage dummy variable, measures the firm's ability to cover their interest and preferred dividend obligations during every year of the sample period. If the firm fails to cover its preferred dividend from operations at any time during the sample period, then the firm,reflecting the results of a series of managements decisions, is assumed to have some difficulty in meeting all its objectives from operations. In addition, a measure of the firm's diversification within its industry is included. This decision variable will be described fully when we describe the data used in the study.

The measurement problems associated with the decision variables are different from those for the accounting variables.

Whereas accounting variables suffer from measurement error, the decision variables suffer primarily from specification errors. In order to generate the dummy variables representing management's decisions, it is necessary to make specific decisions as to when to include each dummy variable. The decisions as to when to include dummy variables are arbitrary in that other possible selection criteria could be used. However, after it has been determined as to when to use a dummy variable to represent a decision by management, then there is is often no measurement error associated with the dummy variable because several decisions such as the decision to reduce dividends to zero are easily observable.

Decision variables that are based on accounting data suffer from both measurement and specification problems. For example, in addition to the problems associated with determining the point at which the coverage ratio should be associated with a dummy variable, the coverage ratio has some measurement error. Even though use of specific rules for generation of the decision variables make the decision variables appear to have less error than the accounting variables, it is questionable that this is the case if we consider both specification and measurement error.

These variables are not meant to represent a full spectrum of possible decision variables. Many other decisions which may provide information for investors, but which will not be included in this study, such as a change in management, might be more easily measured by a decision variable technique than by current

accounting technique. If corporate decisions that are poorly measured by accounting dataare important to the market, then one might argue that extensions of the decision variable approach and combinations of decision and accounting variables will yield more useful associations with beta than does the accounting approach alone.

Moreover, as a rationale, the comparison of the association between beta and accounting data to the association between beta and decision variables can be based on the instrumental variable approach. It may be that beta is based on some set of observable, instrumental variables. In this case the analysis that follows could be considered to be a comparison of alternative instrumental variable systems.[12a]

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SECTION IV. THE SAMPLE

In this study, we used 98 common and non-convertible preferred stocks which traded on the New York Stock Exchange from March, 1956 to March, 1966. The 98 preferreds either traded relatively actively on the exchange or were used in Moody's preferred stock indexes at some dime during this period.[13] Our common stock sample included only the common stocks of these companies. These securities also had to be traded on the exchange.[14]

This may lead to samples including abnormal numbers of securities representing particular industries. For example, many railroads issue large amounts of preferred stock. In addtion, Moody's has five indexes for industrial preferreds, but only two indexes for utility preferreds. This leads one to suspect that utilities are under-represented in the preferred stock sample. However, since every company represented in the common stock sample must have issued preferred stocks, and since relatively few industrial companies issue preferred stocks, it is likely that utility common stocks may be overrepresented

cludes only manufacturing and retailing firms; the second includes these firms and utilities and the third includes all these firms and transportation firms.

For each security in the sample we estimate beta and obtain the appropriate data to develop the accounting ratios and decision variables. The estimate of beta for each security is based on a regression of the 120 monthly wealth relatives from March, 1956 to March, 1966 on the comparable observations of a market index.[15]

The accounting data come from Standard and Poor's annual Compustat tapes. Supplementary accounting data are obtained from Moody's manuals. Each accounting number used in the numberator or denominator of the ratios is an average of the accounting data available for the most recent two fiscal years as of April, 1966. This is usually fiscal 1964 and 1965. Market values, based on calendar years 1964 and 1965, are used to value any equity and debt securities for which prices were available.[16] Book values are used for privately issued debt and preferreds where market values are not available.[17]

Data for two fiscal years is used for many reasons. Any extreme observations that might be associated with one of the fiscal years would tend to be averaged away. If more than two fiscal years of data are used then accounting problems such as consistency are more likely to occur. In addition, there is some question as to the usefulness of 'old' accounting data for our study. As long as a firm maintains its normal operations the ratios based on the old data are likely to vary only slightly

from the data used in the study and may not provide much additional information for our study.[18]

Each decision variable, except the diversification variable, is a dummy variable based on the period from March, 1956, to March, 1966.[19] We took advantage of the fact that each firm in the sample had a preferred stock and redefined our "zero dividend" variable slightly. A dummy variable is associated with those companies that, while decreasing their common stock dividends to zero, kept paying regular preferred stock dividends.[20] In the case of the arrearage variable a dummy variable is associated with each firm that either paid off an existing arrearage in full or began to accumulate an arrearage.[21] A dummy variable is also associated with each firm that did not cover its preferred dividend every year during the sample period.

The diversification variable is generated through a comparison of a firm's SIC codes and its Compustat industry number in 1966. Whereas the SIC codes often indicate that the same firms are in several different aspects of some general industries, Compustat uses only one industrial code per firm. This code could be considered a summary of the SIC codes. In particular, if a firm is broadly diversified within an industry its Compustat number is rounded to its general two digit SIC code.[22] Whenever this is the case, the firm is assumed to have a diversified portfolio of earning assets within the industry and received a dummy variable.[23]

One could argue that the use of only two years of accounting data for the accounting variables at the same time that ten years of data is used to generate some decision variables would bias the results in favor of the decision variables. However, in the case of some accounting ratios, the effects of important events often linger for several periods and may be included to some extent in the data used for the study even though the event occured before 1964. Moreover, in a sense, the study is biased in favor of the accounting data because we have made a definite attempt to represent many different types of accounting data while we have not made any such attempt in the case of the decision variables.

In addition, five industries with at least seven observations each are represented by dummy variables. These industries are shown in Table 1. This approach places all the firms in less well represented industries into a sixth industry.

Lastly, we decided to look solely at individual observations, rather than at portfolios of securities. Although some studies comparing accounting statistics and beta have obtained stronger correlations when they used portfolios rather than single firms in their study thereby washing out the individual aspects of each firm, it is felt that as long as accounting data is presented in its present form a basic compairson between beta and traditional measures of risk can be done at the individual observation level.[24]

SECTION V. RESULTS

In this section we discuss the results of a regression analysis comparing the association of beta and the chosen accounting data with that between beta and chosen decision variables. A stepwise regression with beta as the dependent variable is used in order to observe the impact of the statistically most important independent variables in our study and to keep the other, apparently less important, variables from cluttering up the study.

A. Common Stock Results.

In Table 2, Section A, we show the results of regressing beta for the common stocks in the sample on our chosen accounting variables for samples of 71 manufacturing and retailing firms, 90 firms including utilities and 98 firms including transportation firms. In each case all of the accounting variables mentioned earlier could have been included in the regression if they meet some minimum requirements to enter the regression.[25] Note that the market value of the firm's equity (our size variable), although eligible for the regressions, at no time aids the association. It appears that size is not related to the risk observed in the market place.[26] Moreover, choice of the most useful variable and the sign of the current ratio appear dependent on the sample. In fact,

the relevant variables appear to be a function of the sample. Some of the several possible reasons for these inconsistencies were discussed earlier with respect to the problems associated with accounting data. It appears that accounting variables, alone and in their present form, may not have a strong association with beta in the case of common stocks.

In the regressions in Table 2, Section B, industry dummy variables are included. The results appear stronger and more consistent. In particular, increased leverage and decreased liquidity are both associated with relative high betas.

We also regressed beta on the decision variables described above. The results, which are in Section A of Table 3, appear at least as strong and more consistent than those obtained from the accounting variables. In particular, it appears that the arrearage and zero dividend variables are most important. The diversification variable appears to have no significant association with beta. One possible explanation is that the SIC codes do describe general risk classes. This suggests that firms that have diversified within some given two digit SIC code do not exhibit levels of risk systematically different from other firms within the general industry. [27]

Table 3, Section B shows that inclusion of industry variables improves the observed associations. However, note that

in this case, addition of the industry variables does not materially influence the apparent importance of the decision variables already included in the regression analysis.

It is also interesting to remember that, although the accounting ratios that formed the basis of Table 2 presumably represent a broad spectrum of areas effecting the firm and the decision variables represent a small subset of management decisions, the decision variables form as least as well as the accounting variables. In fact,the decision variables may have marginally stronger and more consistant association with beta than do the accounting variables.[28]

B. Preferred Stock Results

One possible explanation of the relatively poor association between beta and the several accounting variables discussed above is the absence of an adequate measure of the firm's growth rate. This problem can be investigated by using preferred stock samples that parallel the common stock samples used above. Since preferred stocks do not share in earnings growth such a sample effectively has a growth rate of expected returns standardized at zero.[29]

The results obtained by comparing betas for each company's preferred stock with the accounting and decision variables are presented in Tables 4 and 5.[30] As in the case of common stocks, the association between the accounting variables and

and beta, in Table 4 Section A, appears dependent on the sample. Note that the available for common/common equity ratio has replaced the current ratio as an explanatory variable in the regression. Use of a preferred stock sample did improve the association between beta and the accounting variables as the typical R^2 doubled and both the sign and strength of the regression coefficients that came into each of the three regressions were fairly consistent.

Addition of industry variables, in Section B of Table 4, makes the associations stronger and somewhat more consistent. While it appears that the cash flow/(debt & preferred) ratio now has a more consistent relationship with beta, this does not occur for the leverage ratios. In addition, the industry dummies do not enter the regressions consistently.

Sections A and B of Table 5 suggests that there is some change in the relationship between beta and decision variables in the case of preferred stocks from that for common stocks. Although the arrearage and zero dividend variables appear important for both preferred and common stocks, the industry variables with the exception of that for the transportation industry disappear completely. This last result suggests that preferred share holders and common share holders may look at a firm's asset structure differently. Whereas common shareholders appear concerned about the industry in which the firm operates, preferred shareholders may be concerned with the firm's operations only insofar as it is generally expected to gen-

erate some minimum return necessary to maintain, over the long term, a safe dividend flow. It should also be noted that the association between beta and the decision variables is again at least as strong as that obtained through the association of beta and the accounting variables.[31]

These results also suggest one possible sweeping generalization about preferred stocks with respect to their relationship with the decision variables. It is possible that in generally viable industries (one can question the viability of the transportation industry, given its current condition) preferred stocks have essentially the same systematic risk relative to the market place unless there has been some major corporate decision such as decreasing the common stock dividend to zero thereby hinting that the preferred stock dividend may go into arrears. In this case beta would have some other value.

C. Use of Accounting and Decision Variables

The strongest association between beta and traditional measures of risk may include some combination of accounting and decisions variables. If we look at the association between beta and both sets of independent variables, in Table 6, then we find that use of both measures of risk explains from 9% to 29% of the variance left unexplained after inclusion of the decision variables (including the industry dummies). These results suggest that the accounting and decision variables generally are associated with similar aspects of beta. However, it appears that the associations with

beta do not overlap completely and that addition of one set of independent variables to the other set of independent variables could increase our chance to observe a useful association between traditional measures of risk and beta. Alternatively, perhaps the use of decision variables covering additional areas of management may show that decision variables, in general, are more strongly associated with beta than are accounting variables.

SECTION VI. CONCLUSION

It appears that measuring schemes not based solely on accounting may provide satisfactory alternative associations with beta. The comparible coefficients of determination indicate that, even in this limited case, the average measurement of error is no worse in the decision variables case than in the accounting variables case. Future studies expanding the set of management decisions considered in the analysis or including both accounting and decision variables as well as satisfactory growth variables may lead to stronger associations with betas for individual securities and in portfolios of securities and ultimately to an ability to predict beta from fundamental economic data.

It is also worth noting that some variables appeared to be associated with beta for both classes and all samples of securities while other variables seemed more strongly associated with only one class or some samples of securities. Perhaps reformulations of the accounting and decision variables and examination of higher order relationships and discontinous

relationships between the data and beta will aid in exploring this problem.

Beaver Kettler and Scholes [1] mention that it could be that "neither the accounting data nor the market price based risk measure reflect the 'true' underlying risk, but that investors, falsely perceiving accounting data to have utility, make decisions such that the accounting data are compounded in the market prices." However, they add that there is some indirect evidence indicating market efficiency in that information is generally accepted quickly in an unbiased fashion.

A question that is added by these results is whether or not decision variables measure risk in a manner superior to accounting approaches to measuring risk. Perhaps, accounting variables are merely proxy variables for measuring the decisions of the firm and are merely summaries of other variables more fundamentally related to the decisions of the firm. In this case perhaps it would be more efficient to look beyond the accounting proxy variables in the search for an increased understanding of the elements of systematic risk or to reformulate the accounting variables in this search.

Footnotes

*Assistant Professor University of Pennsylvania. I appreciate helpful discussions with Irwin Friend, James Morris, R. Richardson Pettit and Randolph Westerfield. I retain all responsibility for any errors.

[1] In this paper preferred stocks refers solely to non-convertible preferred stocks.

[2] The tilde (~) represents a random variable.

[3] See Fama (5) and Jensen (9) for reviews of much of the work in this area. In addition Blume (4) has a summary of two alternative justifications for using beta as a measure of risk.

[4] The division of accounting ratios into classes appears to depend on the author. However, the ratios are generally divided up into measures of profitability, leverage, liquidity, efficiency and coverage of obligations from operations.

[5] Whenever we could find sufficient data we use market values. This is discussed further when we discuss the data included in the study.

[6] We used more than one ratio only in this area. This class of ratios was expanded because it is controversial and because market data for preferred stocks was available.

[7] See Beaver, Kettler and Scholes (1), Bildersee (2) Gonedes (8) and Pettit and Westerfield (11) for examples of studies comparing beta with accounting measures of risk.

[8] One often hears arguments from various sources suggesting that only if some ratio is greater than some number, then the particular aspect of the firm represented by the ratio is in good condition. Such an argument suggests that non-linear associations between accounting variables and beta may be more likely to hold than are linear associations. It should be pointed out that, in the case of perfect markets, a linear relation between beta and the leverage ratios can be derived.

[9] No firm maintained an arrearage continuously throughout the sample period.

[10] One possible problem with these decision variables is that the information contained in the dividend decisions described in the text may be so extreme that the company's beta may change with the event. See Bildersee (2). An alternative problem is that there may be abnormal returns associated with the events. For example, see Fama, Fisher, Jensen and Roll (6) and Pettit (10).

[11] If we desire a dummy variable suggesting that the firm's dividend policy has some non zero probability of going to zero during the sample period then it might be more useful to use a dummy variable for all firms which decrease their dividend by more than some percent.

[12] One often hears corporate arguments supporting diversification as something the firm can do, but investors can not do. Yet many academics argue that individuals can diversify adequately by themselves and do not need the firms's efforts at diversification since, as the investor's assets increase, the importance of the peculiarities associated with any one asset becomes arbitrarily small.

[12a] See Beaver, Kettler and Scholes [1] for a full discussion of the instrumental variable approach to this type of problem.

[13] In order to ensure the presence of many trades or relatively narrow bid-ask spreads the sample of securities in this study, but not in Moody's indexes some time during the period, was limited to those stocks which had more than 4,000 shares traded from January, 1966 to March, 1966. See Bildersee (2) for a fuller explanation. In addition, Bildersee (3) shows that the betas obtained from using the market model for preferred stocks leads to results consistent with expectations.

[14] The market price and dividend data for common stocks used were obtained from a data file created by the Center for Research in Security Prices at the University of Chicago.

[15] The used the Fisher Link Relative index to represent the market portfolio. See Fisher (7).

[16] The market value of a security issue for a given calendar year is determined by multiplying the average of the security's high and low prices by the average number of shares outstanding during the calendar year according to the appropriate Moody's manual. This approach was chosen arbitrarily from several possible approaches. The alternative approaches are correlated highly with the chosen approach.

[17] Convertible securities could be awkward to handle in this case. However, there were very few convertible securities associated with the firms in the sample and their affects on the ratios appeared immaterial.

[18] If the type or quality of operations of a firm changes during the period, then a more complicated model would benefit the study.

[19] The decision to concentrate on corporate decisions made during the 1956-1966 period is arbitrary. It was made so that the time span used to calculate betas and to observe decisions was the same. It is quite likely that some decisions made before 1956 affected the risk level of the firm during the period and that beta might depend on expectations about decisions to be made after that period.

[20] The redefinition enables us to avoid a timing problem with respect to the arrearage and zero dividend variables. Every firm that has ever had a regular common stock dividend and then has suffered an arrearage has also cut off its common stock dividend. If this was done between 1956 and 1966, then these two variables would, by their original definition, be highly correlated. (In addition, if the common stock dividends fell to zero before 1956 and then the firm suffered an arrearage between 1956 and 1966, the dummy variables approach based only on decistions from 1956 to 1966 would indicate that the firm had suffered arrearage but had not set its common stock dividend to zero.)

[21] If the preferred stock in question is a non-cumulative preferred, then a dummy variable is associated with the firm if it does not pay a preferred dividend.

[22] The vast majority of the utilities on this study are electric utilities and the vast majority of the transportation companies in this study are railroads. Since this approach suggests that none of these firms are diversified, the results of major interest for this variable are obtained in the

manufacturing and retailing sample.

[23] This measure is, at best, preliminary because many firms have assets covering several industries and because some industries are defined more broadly than others.

[24] See Beaver, Kettler and Scholes (1) and Pettit and Westerfield (11) for examples of using portfolios of securities when using accounting data.

[25] Variables were accepted in the study if they had T-values over 1.00 and were deleted if then had T-values under 0.50. Only one variable was accepted under these contraints and then remained in the regression during additional iterations despite suffering a decreased T-value.

[26] The approach used here filters out the very small (non-NYSE) firms. Hence, it is still possible that there is some relation between size and the risk of the firm's securities.

[27] This possibility has been disputed in several places. See, for example, Wippern (12).

[28] If we compare the adjusted R^2's between comparable regressions in tables 2 and 3, the decision variables outperform the accounting variables in 4 of the 6 cases.

[29] The growth of earnings or lack thereof may contribute signifiicantly to the degree of certainty that investors associate with the preferred dividend stream. Then growth may effect preferred stock values indirectly.

[30] There are often multiple preferred stocks issued by a company. However, use of more than one preferred from any one firm would effectively have generated a regression in which accounting statistics of firms with multiple preferreds would be weighted heavily. In cases where more than one preferred was available for a company the beta used in this study was an average beta weighting each preferred equally.

[31] If we compare the adjusted R^2's for comparable regressions,the association between beta and the decision variables is greater than that between beta and accounting variables in 5 of the 6 cases.

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Table 1

Industry Breakdown in Sample

Industry	Firms
Chemical	7
Food	13
Retailing	7
Transportation	8
Utility	19
Other	44
	98

Table 2

The Association Between Betas for Common Stocks and

Accounting Measures of Risk

A. Accounting Variables[1]

	Const.	D/E	P/E	S/E	CA/CL	CF/(D+P)	Adj. R^2
Coefficient	1.013	0.355		0.017	-0.065		.180
T-Value		2.417		1.504	1.529		
N = 71							
Coefficient	0.611			0.042	0.069		.220
T-Values				4.292	2.476		
N = 90							
Coefficient	0.499	0.259	0.318	0.036	0.074	0.010	.241
T-Value		2.787	1.458	3.164	2.206	1.011	
N = 98							

B. Accounting Variables (Including Industry Variables)[1]

	Const.	D/E	S/E	CA/CL	Food	Retail	Utility	Adj. R^2
Coefficient	1.065	0.363	0.030	-0.072	-0.220	-0.331	----	.292
T-Value		2.558	2.735	1.818	2.563	3.122		
N = 71								
Coefficient	1.067	0.301	0.032	-0.069	-0.227	-0.322	-0.656	.481
T-Value		2.583	3.219	1.963	2.927	3.355	6.127	
N = 90								
Coefficient	1.066	0.257	0.032	-0.066	-0.227	-0.311	-0.631	.528
T-Value		3.843	3.177	1.995	2.757	3.096	7.181	
N = 98								

[1]The Available for Common/Common Equity ratio, the equity variable and the chemical and transportation industry variables do not appear in any regression.

Table 3

The Association Between Betas for Common Stocks and

Decision Variable Measures of Risk

A. Decision Variables[1]

	Const.	Arrearage	Coverage Dummy Var.	Zero Dividend	Adj. R^2
Coefficient	0.885	0.327	0.091	0.302	.214
T-Value		2.066	0.661	1.905	
N = 71					
Coefficient[2]	0.801	0.373	0.138	0.348	.244
T-Value		2.270	0.957	2.115	
N = 90					
Coefficient	0.814	0.478	0.144	0.429	.323
T-Value		3.138	1.125	2.984	
N = 98					

B. Decision Variables (Including Industry Variables)[1]

	Const.	Arrearage	Coverage Dummy Var.	Zero Dividend	Food	Retail	Trans.	Utility	Adj. R^2
Coefficient	0.927	0.333	0.097	0.307	-0.156	-0.150	---	---	.260
T-Value		2.144	0.716	1.933	1.933	1.438			
N = 71									
Coefficient[2]	0.927	0.333	0.097	0.307	-0.156	-0.150	---	-0.383	.467
T-Value		2.385	0.797	2.201	2.149	1.599		6.043	
N = 90									
Coefficient	0.917	0.405	0.085	0.378	-0.160	-0.149	0.242	-0.374	.546
T-Value		3.185	0.801	3.156	2.122	1.524	2.589	5.663	
N = 98									

[1] The diversification and chemical industry variables did not appear in any regression.

[2] No utility stock in the sample suffered arrearage, coverage or zero dividend problems as described in the text.

Table 4

The Association Between Betas for Preferred Stocks and Accounting Measures of Risk

A. Accounting Variables[1]

	Const.	D/E	P/E	S/E	AC/E	CF/(D+P)	Adj. R^2
Coefficient	0.137		0.185	0.017	-0.780	-0.008	.497
T-Value			1.367	3.703	3.193	2.322	
N = 71							
Coefficient	0.133			0.022	-0.783	-0.008	.474
T-Value				6.315	3.650	2.590	
N = 90							
Coefficient	0.069	0.227	0.233	0.017	-1.003		.470
T-Value		4.932	1.890	2.688	2.673		
N = 98							

B. Accounting Variables (Including Industry Variables)[1]

	Const.	D/E	P/E	AC/E	S/E	CF/(D+P)	Chem	Food	Retail	Trans.	Utility	Adj. R^2
Coefficient	0.154		0.173	-0.712	0.022	-0.009	-0.040			---	----	.557
T-Value			1.306	3.103	4.874	2.822	1.029					
N = 71												
Coefficient	0.159	0.049		-0.772	0.023	-0.009		-0.069	-0.137	---	0.084	.552
T-Value		1.020		3.771	5.903	2.968		2.220	3.615		2.680	
N = 90												
Coefficient	0.150	0.187		-1.201	0.016	-0.007			-0.125	0.304	-0.134	.644
T-Value		4.282		3.973	2.884	1.471			2.198	4.619	3.021	
N = 98												

[1] The Current ratio and the equity variable did not appear in any regression.

Table 5

The Association Between Betas for Preferred Stocks and Decision Variable Measures of Risk

A. Decision Variables[1]

	Const.	Arrearage	Coverage Dummy Var.	Zero Dividend	Adj R^2
Coefficient	0.085	0.311	0.057	0.134	.565
T-Value		5.467	1.138	2.358	
N = 71					
Coefficient	0.082	0.313	0.058	0.136	.561
T-Value		5.974	1.272	2.593	
N - 90					
Coefficient	0.097	0.400	0.165	0.113	.451
T-Value		4.440	2.175	1.330	
N = 98					

B. Decision Variables (Including Industry Variables)[1]

	Const.	Arrearage	Coverage Dummy Var.	Zero Dividend	Trans.	Adj. R^2
Coefficient	0.085	0.311	0.057	0.134	---	.565
T-Value		5.467	1.138	2.358		
N - 71						
Coefficient	0.082	0.313	0.058	0.136	---	.561
T-Value		5.974	1.272	2.593		
N = 90						
Coefficient	0.072	0.343	0.135	0.098	0.427	.702
T-Value		5.128	2.414	1.551	8.870	
N = 98						

[1] The diversification variable and the chemical, food, retail and utility industry variables did not appear in any regression.

Table 6

The Association Between Beta and Accounting and Decision Variables

A. Common Stocks[1]

	Const.	D/E	S/E	CA/CL	Arrearage	Diversification	Zero Dividend	Food	Retail	Utility	Adj. R^2
Coefficient	1.103	0.254	0.021	-0.074	0.171	-0.088	0.279	-0.220	-0.315		.366
T-Value		1.786	1.637	1.901	1.285	1.247	2.601	2.664	2.928		
N = 71											
Coefficient	1.098	0.209	0.022	-0.070	0.180	-0.086	0.288	-0.224	-0.307	-0.627	.539
T-Value		1.817	1.897	2.044	1.507	1.353	2.998	3.015	3.171	5.656	
N = 90											
Coefficient	1.088	0.175	0.015	-0.066	0.310	-0.080	0.324	-0.208	-0.268	-0.598	.604
T-Value		2.717	1.337	2.147	2.981	1.264	3.479	2.717	2.770	2.034	
N = 98											

B. Preferred Stocks[2]

	Const.	D/E	P/E	S/E	AC/E	CF/(D+P)	Arrearage	Diversification	Coverage Dummy Var.	Zero Dividend	Food	Retail	Transport-ation	Utility	Adj. R^2
Coefficient	0.119		0.150	0.015	-0.486	-0.008	0.149			0.165	-0.062	-0.096			.690
T-Value			1.301	3.589	2.102	2.702	2.702			4.688	2.177	2.732			
N = 71															
Coefficient	0.146			0.016	-0.583	0.009	-0.157	-0.025		0.161	-0.055	-0.108		-0.048	.673
T-Value				4.219	2.516	3.439	3.046	1.095		4.885	2.125	3.212		1.944	
N = 90															
Coefficient	0.097	0.128				-0.005	0.319		0.101	0.070		-0.060	0.311	-0.072	.730
T-Value		3.151				1.203	4.963		1.861	1.152		1.208	5.448	1.911	
N = 98															

[1] The preferred/common equity and available for common/common equity ratios and the equity variable did not appear in any regression. In addition, the coverage variable and the chemical and transportation industry variables did not appear in any regression.

[2] The Available for common/common equity ratio and the equity variable did not appear in any regression. In addition, the chemical industry variable did not appear in any regression.