Book-to-Market Equity, Size, and the Segmentation of the Stock and Bond Markets*

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Abstract

Recent studies have shown that the book-to-market ratio of equity and size have explanatory power for the cross section of stock returns. We find that book-to-market equity and size effects also exist in the cross section of bond returns. This reduces concerns that these effects are spurious and suggests that book-to-market and size are correlated with risks that are priced in both stocks and bonds. While book-to-market has the dominant effect in stock returns, size has the dominant effect in bond returns. Credit ratings subsume the size effect in bond returns suggesting that the size effect may reflect the pricing of a distress risk. Evidence is found that book-to-market and size each measure at least two risks (one is related to credit risk). These underlying risks, however, are not priced in both stocks and bonds suggesting that these markets are segmented. One risk is priced in stocks and is correlated more with book-to-market, and the other risk is priced in bonds and is correlated more with size. Further evidence of the segmentation of the stock and bond markets is found in the subperiod results for the book-to-market and size effects.

1. Introduction

Studies show common variation in the time-series of returns to portfolios of stocks and corporate bonds (Keim and Stambaugh (1986), Fama and French (1989, 1993), Ferson and Harvey (1991), Campbell (1996)). There is also evidence that individual stock and bond returns of a firm are positively correlated (Kwan (1996)). These results suggest that the pricings of stocks and bonds are based on some common subset of risks. This study extends this literature by examining the commonalities in the *cross-sectional* variations of stock and bond returns. Given that book-to-market equity and size are determinants of the cross section of stock returns (Fama and French (1992)), we investigate the roles of book-to-market equity (BE/ME) and size in explaining the cross section of bond returns.

Using monthly bid quotes data from Lehman Brothers for 1974 through 1994, we find that both BE/ME and size are priced in the cross section of corporate bond returns. This is consistent with each of these variables containing information about the valuation of both a firm's stocks and bonds.[1] The finding here of BE/ME and size effects in the returns of another asset class (bonds) compliments the pre-Compustat and foreign stock-return evidence of these effects and reduces concerns that these phenomena are spurious.[2]

We find that the size effect subsumes the BE/ME effect in bond returns. Yet in the stock returns of the *same* sample of firms, no size effect is detected, but a strong BE/ME effect is. The lack of a size effect in the stock returns is primarily due to the sample being mainly large firms.

[1] Kwan (1996) concludes that the positive time-series correlation between stock and bond returns is due to the preponderance of information in the marketplace being about the mean value of the firms' assets and not the variance. However, Chen (2000) shows that this is not necessarily true. He shows that leverage can result in expected stock and bond returns being positively correlated while the expected return on the assets remains constant. Hecht (2000) also notes the potential of leverage alone to drive variation in expected returns.

[2] Lo and MacKinlay (1990), Black (1993), Kothari, Shanken, and Sloan (1995), and Shumway and Warther (1999) raise concerns about spurious findings resulting from data snooping and data biases. Chan, Hamao, and Lakonishok (1991), Davis (1994), Barber and Lyon (1997), Fama and French (1998), Hawawini and Keim (1998) provide evidence of BE/ME and SIZE effects using alternative stock-return databases.

Nevertheless, a strong size effect is found in the bond returns. The results indicate that the size effect is predominant in bond returns while the BE/ME effect is predominant in stock returns. Fama and French (1992) and Knez and Ready (1997) also find that the BE/ME effect is stronger in stock returns than the size effect is. We also show that the size effect in bond returns is not exclusive to January. It is well known that the size effect in stock returns is a January phenomenon (Keim (1983), Fama and French (1992)). The finding of a non-January size effect in bond returns is further evidence of the strong role of size in bond pricing.

Why then is size more important to bond pricing and BE/ME more important to stock pricing? Chan and Chen (1991) argue that size captures distress risk, while Fama and French (1992, 1993, 1995, 1996) argue instead that BE/ME captures distress risk. Evidence linking either BE/ME or size to distress risk, however, is mixed. Fama and French (1995) show that the earnings of high BE/ME firms are low for several years before and after portfolio formation suggesting that these firms are relatively distressed. However, He and Ng (1994) and Shumway (1996) find that size is a better proxy for distress risk than BE/ME is. He and Ng (1994) use each stock's estimated sensitivity to a portfolio measuring the excess returns of firms previously cutting dividends by more than fifty percent as their proxy for a distress risk while Shumway (1996) uses an estimate of the probability of a firm's delisting for distress reasons as his proxy. Dichev (1998) concludes that neither the BE/ME nor the size effect can be explained by the probability of bankruptcy.

This study may shed light on which variable, size or BE/ME, is a better candidate for measuring distress risk. If a distress premium does exist in asset returns, it seems likely that distress risk would be a relatively larger component of bond pricing than of stock pricing since corporate bonds are priced according to default risk. The finding that a strong size effect exists in bond returns and more importantly that this size effect is captured by credit ratings suggests that size is more closely related to a potential distress risk than BE/ME is.

We also show that size and BE/ME are each proxies for more than just a single risk. We decompose size and BE/ME into their credit risk and non-credit risk components. The credit-risk components of each variable are priced in bond returns but not in stock returns. The non-credit-risk components of each variable are priced in stock returns but not in bond returns. For the risks examined here, the stock and bond markets appear segmented. Collin-Dufresne, Goldstein, and Martin (2000) find a common systematic factor in corporate credit spread changes that is unrelated to macroeconomic and stock-market variables. Gebhardt (2000), Hecht (2000), and Nayak (1999) find that the momentum effect of Jegadeesh and Titman (1993) is a stock-return phenomenon. These results also suggest that the bond and stock markets are segmented.

We conclude that there are a minimum of two risks (one is related to credit risk) that are captured by *both* BE/ME and size. Size is correlated greater with the risk that is important to bond pricing, and BE/ME is correlated greater with the risk that is important to stock pricing.[3] The results summarized above suggest that size and BE/ME effects are in both stock and bond returns because these measures are each correlated with risks that are priced in both markets. The results do not show, however, that the underlying risks themselves (decomposed here into credit and non-credit risk) are each priced in both stocks and bonds. In other words, size and BE/ME effects extend across both markets because the variables themselves do, not because the underlying risks do. Fama and French (1993) and Elton, Gruber, Agrawal, and Mann (2001) find that HML and SMB portfolios (BE/ME and size premia respectively) explain time-series variation in bond returns. The authors interpret their results as evidence of common risks across the stock and bond markets. The results in this study suggest that this is not true. If there are common risks that are priced in both the stock and bond markets, size and BE/ME do not seem to be the vehicles through which to identify them.

[3] Berk (1995) notes that size and BE/ME should both be correlated with any and all priced risks in the stock market, since these variables include the market price of equity which is inversely related to risk.

Attributing the BE/ME and size effects to underlying risks has its detractors. Lakonishok, Shleifer, and Vishny (1994) and LaPorta (1996) suggest that BE/ME captures investors' mispricings of stocks. The results for BE/ME effects in bond returns provide interesting implications for the mispricing interpretation of the value phenomenon. BE/ME explains the stock returns to the firms issuing public bonds in the 1974 to 1984 subperiod only and explains the bond returns only in the 1985 to 1994 subperiod. If the BE/ME effect is related at least in part to mispricing, the results indicate that investors do not misprice both the stocks and bonds of a firm simultaneously. Therefore, the mispricing interpretation of the BE/ME effect also leads to the conclusion that the stock and bond markets are segmented. Given that stocks and bonds are both claims to the underlying assets of the firm, the finding of segmentation is striking and warrants attention in future research.

The remainder of this paper proceeds as follows: Section 2 describes the data and the research methodology, Section 3 presents the results, and Section 4 concludes the study.

2. Data and Methodology

A. Bond Database

There are primarily two sources of bond price data: actual transaction prices from exchanges (e.g. NYSE, AMEX) and bid prices from over-the-counter institutional bond dealers. Since exchange transactions represent only a small fraction of the corporate bond market (Nunn, Hill, and Schneeweis (1986), Warga (1991)), bond studies typically use bid-price data obtained from individual bond dealers. Warga (1991) provides evidence that dealer data are not systematically different from actual transaction data by comparing month-end bid prices from Lehman Brothers for investment-grade bonds to transaction prices for these bonds from the NYSE. He finds that the deviations are random and insignificant. Furthermore, Shane (1994) shows that the returns for low-grade bonds calculated using dealer bid prices (from Drexel Burnham Lambert and Salomon Brothers) have a correlation of 0.99 with the returns to the same bonds calculated with transaction-price data.

The data for this paper consist of month-end bid prices from Lehman Brothers for individual corporate bonds from May 1974 to December 1994 (August and September 1975, December 1984, and January 1985 are unavailable) archived at the Fixed Income Research Program at the University of Houston.[4] Since infrequent trading is a concern with bond data, Warga (1991) argues that month-end data, as opposed to shorter frequencies, are the most reliable since investment firms typically perform month-end checks on bid quotes.

Since the bonds traded at Lehman are primarily those used in the construction of their various bond indices, the majority of the data on speculative-grade bonds until 1992 consists of “fallen angels” - bonds issued at investment grade and subsequently downgraded to junk. Beginning in 1992, the Lehman indices also included bonds *issued* at junk grades.

Until 1992, the majority of the bid-price data consists of matrix prices, which are reference prices for infrequently traded bonds determined by an algorithm that generates a fixed yield spread over a benchmark, which can be a Treasury or a similar but more frequently traded corporate bond. Since matrix prices incorporate only the general characteristics of the bond into the quote, and not firm-specific information, only trader bid prices are used in this study (see Nunn, Hill, and Schneeweis, 1986 or Warga and Welch, 1993). Finally, bonds with less than one year to maturity are excluded since the risk characteristics of these bonds change nontrivially over the monthly horizon used here (Ilmanen, McGuire, and Warga 1994).[5]

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[4] The Fixed Income Research Program provides data beginning in January 1973. However, after employing the filters to be described shortly, the months January 1973 to April 1974 have less than six observations per month and are excluded.

[5] Including bonds with less than one year to maturity does not alter the results.

The final data set used in this paper includes information on 3,279 bond issues of 753 industrial and utility firms over the period May 1974 through December 1994. The average number of monthly observations for each bond issue is 47.

B. Monthly Regressions

Adapting the methodology of Fama and French (1992) to the cross section of corporate bond returns, we regress monthly bond returns from July of year *t* to June of year *t*+1 on book-to-market, size, and control variables from a prior period. Specifically, book-to-market (BE/ME) is formed by dividing the book value of a firm's common equity at fiscal year *t*-1 by the market value of common equity at fiscal year *t*-1, both obtained from Compustat. SIZE is the market value of the firm's equity in June of year *t* from CRSP.

Since corporate bonds are priced in part according to default risk, we employ two traditional measures of default risk from the bond literature: leverage and credit ratings.[6] Leverage (LEV) is the Compustat book value of the firm's debt divided by the Compustat book value of its total assets at fiscal year *t-1*. The ratings dummy variable A is equal to one if the bond has a beginning-of-the-month Moody's rating of A or lower, and zero otherwise.[7] Baa, Ba, B, and Caa dummies are defined similarly. These dummies are constructed to capture the marginal effects in returns of moving from one credit-quality level to the next.

We also control for cross-sectional variations in interest rate risk, callability, and sinking funds. Modified duration (DUR) is calculated at the beginning of each month and is used to explain the bond return in that month. Ilmanen (1992) and Ilmanen, McGuire, and Warga (1994) show that DUR captures cross-sectional variation in bond returns. Dummy variables indicating callability and

[6] See Fisher (1959), Ogden (1987a, 1987b), and Jones, Mason, and Rosenfeld (1984).

[7] There is not a sufficient number of Aaa bonds in some months to use them as the benchmark case for the dummy variables.

sinking funds are employed since these features affect a bond's expected cash flows and consequently its sensitivity to changes in interest rates. CALL is a dummy variable set equal to one if the bond is callable, and zero otherwise. SINK is a dummy variable set to one if a particular issue has a sinking fund provision and zero otherwise.

Regressions of the monthly returns to individual bonds on ln(BE/ME), ln(SIZE), and the control variables are estimated each month from May 1974 to December 1994. The coefficients for each variable are averaged across all months, and the t-statistics for testing whether each variable is priced in the cross section of bond returns is the average coefficient divided by its time-series standard error (Fama and MacBeth (1973)).

3. Results

A. *Summary Statistics*

Table 1 provides summary statistics for the bond data from May 1974 to December 1994 (155,481 bond-months). We see that the sample is comprised mostly of investment-grade bonds, defined as Moody's Baa and above (86% of the bond-months). As expected, bond returns are decreasing in ratings with Caa bonds earning 1.69% per month on average and Aaa earning 0.63% per month on average. Ratings are decreasing in BE/ME and increasing in SIZE, suggesting that BE/ME and SIZE are related to default risk.[8] Note also that this is a predominantly large-firm data set, as is expected for firms issuing publicly-traded debt.

Table 1 also shows that ratings are generally decreasing in LEV and that higher credit ratings are associated with longer DUR.[9] The positive relation between ratings and duration is potentially due to a combination of shorter maturities and higher coupon rates for low-grade bonds. As a

[8] Ogden (1987a), among others, shows that size is an important determinant of credit ratings.

[9] This is consistent with the finding of Ogden (1987b) that interest rate risk (estimated as a bond beta) is positively related to credit ratings.

consequence of this relation, DUR appears to be negatively related to returns in a simple univariate analysis.

B. *The Cross Section of Equity Returns*

To provide an appropriate benchmark for our investigation of the BE/ME and size effects in corporate bond returns, the equity returns to the firms whose bonds appear in the data set are examined first. In particular, we are interested in examining whether or not *this* equity sample displays BE/ME and size effects. Table 2 reports the average monthly returns to stock portfolios formed by sorting firms each month into quintiles based on BE/ME and SIZE separately.[10] As in Fama and French (1992), BE/ME captures substantial dispersion in stock returns. The lowest BE/ME quintile averages a monthly return of 0.92%, and the highest quintile averages 1.65%. Furthermore, returns are monotonically increasing in BE/ME. An examination of the average SIZE of the firms in each BE/ME quintile indicates that BE/ME and SIZE are correlated. The correlation between ln(BE/ME) and ln(SIZE), which are the specifications employed in the regressions, is –0.32.[11]

Table 2 however does not reveal a size effect in the returns to the SIZE portfolios; the portfolio returns are clearly not decreasing in SIZE. In fact, the third quintile averages the highest monthly return (1.46%). The lack of evidence of a size effect in this data may be attributed to the time period examined and/or to the specific sample employed. We address these issues after discussing the regression results.

Panel A of Table 3 presents the results from the monthly regressions of stock returns on ln(BE/ME) and ln(SIZE) for the May 1974 to December 1994 period. These regressions echo the results in Table 2. The average monthly premium for ln(BE/ME) is 0.36% with a t-statistic of 2.45

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[10] Fama and French (1992) sort into deciles; stocks are sorted into quintiles here because of the smaller number of stocks available.

[11] Fama and French (1992) find that ln(BE/ME) and ln(SIZE) have a correlation of –0.26 in their data set.

when ln(BE/ME) is the sole explanatory variable and 0.29% with a t-statistic of 1.94 when the regressions are estimated with both ln(BE/ME) and ln(SIZE) in the model. Ln(SIZE) is not a significant component of the cross section of these stock returns.

To investigate whether the lack of a size effect in the stock-return data is a result of the time period analyzed, monthly regressions are estimated (not reported) for *all* firms over the May 1974 through December 1994 period whose stocks are listed on the CRSP tapes and whose accounting data are available on the Compustat tapes. A size effect is detected in the stock returns for the CRSP-Compustat sample (ln(SIZE) premium = -0.13, t-statistic = -2.08). Therefore, the failure to detect a size effect in the stock returns of this paper's data set appears to be specific to this sample. Note in Panel B of Table 2 that the average size of the firms in the smallest size quintile is $184 million. This places the smallest quintile in this sample between the average sizes of the fifth and sixth decile of Fama and French (1992). Hence, the lack of a size effect in the equity returns of this paper's data set seems to be a consequence of its being a sample of relatively large firms. Consistent with this conjecture, Knez and Ready (1997) find that the size effect in equities is driven by the extreme positive returns of a very few small firms.[12]

The lack of a size effect in this sample of stock returns is not a weakness of the study; it serves only as a benchmark. This study considers whether BE/ME and size effects are consistent across the stocks and bond markets of these firms. If we were to discover a size effect in the bond returns of these same firms, then we would have quite an interesting contrast. Such a finding would suggest that bond pricing is more sensitive to size and that the stock and bond markets are segmented for these firms.

Panels B and C of Table 3 provide subperiod results for the 1974 to 1984 and 1985 to 1994 subperiods respectively. A BE/ME effect is present only in the first subperiod with an estimated

[12] They find however that BE/ME is a robust explanatory variable for the cross section of stock returns.

monthly premium of 0.68% and a t-statistic of 2.90 when ln(BE/ME) is used alone and 0.51% with a t-statistic of 2.04 when ln(SIZE) is included in the regressions. There is evidence of a size effect in the first subperiod, with an estimated monthly premium of –0.22% (t-statistic = -2.26); however, ln(SIZE) loses its significance when ln(BE/ME) is included in the regressions.

The premia for both ln(BE/ME) and ln(SIZE) in stock returns significantly diminish after 1984. Neither ln(BE/ME) nor ln(SIZE) are significantly related to the cross section of stock returns in the second subperiod. [13] The t-statistic for testing whether the average monthly ln(BE/ME) slope changes after 1984 is 2.30, and the t-statistic for a change in the ln(SIZE) slope is –2.65. [14] Note that the coefficient on ln(SIZE) is positive on average after 1984 (0.11%) with a t-statistic of 1.61. These are noteworthy observations since the next sections find that the BE/ME and size premia in bond returns display different behavior across these subperiods.

Overall, a BE/ME effect is found in the stock returns of the firms in the bond data sample, while a size effect is not. Furthermore, the reward to BE/ME comes entirely from the first half of the sample period (1974-1984). The next sections examine the roles of BE/ME and size in the cross section of corporate bond returns and compare the bond results to the stock results.

C. *The Cross Section of Corporate Bond Returns*

The average monthly returns to bond portfolios formed by sorting the available bonds each month into quintiles based on BE/ME and quintiles based on SIZE are presented in Panels A and B of Table 4, respectively. While there is relatively little variation in the returns to the lowest four BE/ME quintiles (all between 0.85% and 0.90% per month and not monotonically increasing), the highest

[13] For *all* firms with data on both CRSP and Compustat, there are BE/ME and size effects in stock returns during the May 1974 to November 1984 subperiod; and only a marginal BE/ME effect (p-value of 10%) in the February 1985 to December 1994 subperiod.

[14] The estimated premia for ln(BE/ME) and ln(SIZE) diminish after 1984 for the entire CRSP-Compustat sample as well.

BE/ME quintile averages 1.06% per month. This contrasts with the BE/ME results for stock returns in Table 2 where BE/ME does a good job of explaining the entire cross section of stock returns. While there is evidence of a book-to-market effect in bond returns in Table 4, this effect is driven solely by the highest BE/ME quintile.

Similarly for SIZE, the dispersion between the returns to the second quintile (0.90%) and the returns to the highest quintile (0.82%) is only 0.08%. The bond portfolio returns are however monotonically decreasing in SIZE. Furthermore, the average monthly return to the lowest SIZE portfolio is 1.21%. Table 4 therefore provides evidence of a size effect in bond returns that is predominantly driven by the lowest SIZE quintile. Recall that no size effect is detected in the stock returns (Tables 2 and 3).

Panel C of Table 4 shows some evidence of a BE/ME effect controlling for SIZE. The bonds in this case are sorted two-ways: first into trintiles based on SIZE, and then these three portfolios are further sorted into trintiles based on BE/ME. The mean monthly returns to these portfolios show a strong BE/ME effect in the smallest firms (with a spread of 0.19%), a weak BE/ME effect in the middle-sized firms (with a spread of 0.08%), and no BE/ME effect across the bonds of the largest firms (with a spread of 0.03%).

The results of the May 1974 to December 1994 monthly cross-sectional regressions of bond returns on ln(BE/ME), ln(SIZE), and the control variables are presented in Table 5. Ln(BE/ME) has explanatory power when used alone in the regressions. The estimated monthly premium for ln(BE/ME) is 0.11% with a t-statistic of 2.47. When used with ln(SIZE) however, ln(BE/ME) is no longer significant in the cross section of bond returns. Whether or not ln(SIZE) is used alone or with ln(BE/ME), ln(SIZE) has an average monthly coefficient of –0.10% and a t-statistic near 3.00. This contrasts with the results of Table 3 which show that the BE/ME effect is stronger than the size effect in the cross section of stock returns (see also Fama and French (1992) and Knez and Ready (1997)).

In the cross section of corporate bond returns, SIZE is the predominant effect. We explore the implications of this finding in the next section.

The existence of SIZE and BE/ME effects in the cross section of bond returns, as well as in stock returns, suggests that there are commonalities in the pricing of stocks and bonds. In addition, the correlation between monthly stock and bond ln(BE/ME) premia is 0.24, and the correlation between monthly stock and bond ln(SIZE) premia is 0.34. The estimated reward for ln(SIZE) is not significantly different across the bond and stock markets (-0.10% and -0.07% respectively, with a t-statistic = 0.43). The bond and stock results seem to diverge a bit though when considering that the ln(BE/ME) premium (0.11%) in the bond market is less than one-third of the ln(BE/ME) premium found in the stock market (0.36%, Table 3), and it is significantly less at the ten-percent level (t-statistic = 1.64).

The evidence of different premia for BE/ME across the two markets should not be all that troubling however. Suppose that BE/ME and SIZE represent respective stock sensitivities to two separate priced risks (as suggested by Fama and French, 1992, 1993, 1996) and that the stock and bond markets are integrated. The sensitivities of a firm's stock and bonds to these two risks will rarely be the same. Employing BE/ME and SIZE in the bond-return regressions assumes that the stock and bond sensitivities are the same, and therefore induces errors-in-variables.[15,16,17] The estimated premia

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[15] Since we are employing monthly cross-sectional regressions, all that is required to avoid the bias is that the sensitivity of a firm's stock differ from the sensitivity of its bonds by a scalar multiple. This seems highly unlikely.

[16] Estimating the sensitivities of each bond to the Fama and French (1993) HML and SMB factor-mimicking portfolios is problematic due to the nonstationarity of individual bonds. In an attempt to mitigate this problem, the loadings on size-duration (3-by-3) portfolios were estimated with rolling lagged 60-month windows (with at least 24 months available). These portfolio loadings were used in the monthly regressions as proxies for the loadings on the individual bonds. Not only are the HML and SMB loadings not priced in bond returns; the loadings do not alter the pricing results for BE/ME and SIZE. These results are consistent with the findings of Daniel and Titman (1997) that BE/ME and SIZE outperform the HML and SMB loadings in the cross section of stock returns. The loadings on HML and SMB were also estimated for each individual bond using rolling windows. The results do not change. I thank Eugene Fama for providing the data for the three-factor model.

will be biased (perhaps downwards). Even if BE/ME and SIZE effects are driven by mispricings, it seems likely that the pricing errors, and therefore the arbitrage profits, would be larger in the stock market than in the bond market given the higher uncertainty in the inputs to stock pricing (infinite horizon and residual cash flows) and given the larger cross-sectional variance of stock returns.

The cross-sectional results for bond returns over the 1974-1994 period indicate that BE/ME and SIZE effects are common to both stock and bond returns. Examining variables that are customarily used to explain the cross section of bond returns may provide some insight into the underlying natures of the BE/ME and SIZE effects. Table 5 shows that, as expected, both LEV and credit ratings are determinants of cross-sectional bond returns. LEV averages a monthly coefficient of 0.09% with a t-statistic of 2.18 when it is the only independent variable. And, although only the A and Caa dummies are significant (0.05% monthly marginal premium with a t-statistic of 2.01 and 0.23% monthly marginal premium with a t-statistic of 1.82 respectively), all the coefficients on the ratings dummies are positive indicating a higher average return upon moving from one ratings category to the next.

As for the remaining control variables, DUR is also significant in the bond-return cross section. DUR averages –0.05% with a t-statistic of –1.93. We find DUR to be priced negatively, as opposed to Gultekin and Rogalski (1984) and Ilmanen (1992) who find no statistical relation between DUR and bond returns. This result is not further explored here. Note only that the positive relationship between DUR and credit ratings (Table 1) and/or positive (on average) interest rate changes during the sample period may be resulting in the finding of a negative premium for DUR.[18]

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[17] Increasing leverage will theoretically increase a firm's equity beta. So cross-sectional differences in leverage may lead to cross-sectional differences in the equity loadings' abilities to proxy for the debt loadings. Unlevered BE/ME and SIZE are estimated by multiplying ln(BE/ME) and ln(SIZE) by (1-LEV), respectively. The results do not qualitatively change when using the leverage-adjusted measures in the regressions. I thank Jennifer Conrad for this suggestion.

[18] Three other measures of a bond's interest rate risk were used in the monthly cross-sectional regressions. Neither term-to-maturity nor two versions of a bond beta are found to be significant explanatory variables. A

We see also in Table 5 that neither CALL nor SINK displays any cross-sectional explanatory power when each is used in isolation.

Finally, in the full model of the cross section of bond returns, which employs ln(BE/ME), ln(SIZE), and all the other variables, DUR and CALL are both significant at the ten-percent level; the average coefficients for DUR and CALL are –0.05% and 0.09% respectively. SINK has an average monthly premium of 0.13% with a t-statistic of 3.11. CALL and SINK are found only to have explanatory power when holding the other variables constant. The Caa ratings dummy also has an average monthly coefficient of 0.26% and a t-statistic of 2.01.

In the full model, there is neither a BE/ME nor a size effect. Ln(SIZE) loses its significance in the full model since it is correlated with credit ratings (Table 1). Even when the ratings dummies are employed along with only ln(BE/ME) and ln(SIZE), ln(SIZE) loses its significance (-0.03% with a t-statistic of 1.20). In sum, the size effect subsumes the BE/ME effect in the cross section of corporate bond returns, and the role of size in the bond-return cross section is eliminated when credit quality is incorporated into the regression analysis. These results, along with Tables 2, 3, and 4, indicate that, while BE/ME is the predominant of the two variables in explaining stock returns, size is the predominant variable in capturing bond returns.

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pre-ranking bond beta was estimated monthly by regressing an individual bond's past five years of monthly returns in excess of the one-month Treasury return on the contemporaneous monthly returns to the Lehman Brother's Treasury index in excess of the one-month Treasury return (at least 24 out of the prior 60 months must be available). A post-ranking bond beta was estimated as the full-period beta of the corresponding size-beta (5-by-5) portfolio that the bond is allocated to each month.

D. *Why is the SIZE effect stronger in bond returns and the BE/ME effect stronger in stock returns?*

Beyond documenting that BE/ME and SIZE effects exist in another asset class, the results presented here may also shed light on what the underlying risks are that investors are hedging to produce the BE/ME and SIZE effects. The previous results indicate that one risk is more important to bond pricing while another is more important to stock pricing. Therefore, considering what risks bonds might be more sensitive than stocks to, and vice versa, may lead to an understanding of the risks driving these effects.[19]

For example, Fama and French (1992,1993,1995,1996) suggest that BE/ME measures distress risk. Chan and Chen (1991) on the other hand argue that size measures distress risk. The results here suggest that size may be the more appropriate candidate for measuring sensitivity to a distress factor. Elton, Gruber, Agrawal, and Mann (2001) show that a risk premium exists in corporate bonds and that this premium is largely explained by the Fama and French three-factor model (1993, 1996). They also show that this risk premium in bonds is decreasing in credit ratings. Hence credit ratings can be used as proxies for macroeconomic risk as well as for proxies of default expectations. Assuming that a distress-risk premium exists in bonds and stocks, and given that bonds are priced according to default risk, it is reasonable that a distress-risk premium is a larger component of bond pricing than of stock pricing. The finding that size is more important in bond pricing, and particularly that the size effect is subsumed by credit ratings, suggests that size is more closely related to distress risk.

Other studies have investigated whether size or BE/ME might measure distress risk. He and Ng (1994) and Shumway (1996) find that size is a better proxy for distress risk than BE/ME is. He and Ng (1994) show that the loading on the Chan and Chen (1991) distress factor (based on the

[19] Jagannathan and Wang (1996), Lewellen (1999), Lettau and Ludvigson (2001), and Liew and Vassalou (2000) present evidence that BE/ME and size effects are related to time variation in expected returns. Ferson and Harvey (1999), however, find that the Fama and French three-factor model itself does not work well as a conditional model of expected returns. These studies do not distinguish the potential time-varying risks that BE/ME is related to from the potential risks that size is related to.

returns of firms who cut dividends by at least 50%) can explain the size effect, but it only reduces the BE/ME effect in stock returns. Shumway (1996) shows that the probability of a stock delisting is related to size but not to BE/ME. Dichev (1998) provides the only evidence against size as a distress risk measure. Dichev finds that the probability of bankruptcy cannot explain either the size or the BE/ME effect.

The literature on credit market conditions and their differing effects on small versus large firms provides theoretical support for the size effect's relation to distress risk (Bernanke and Gertler (1989), Gertler and Gilchrist (1994), and Kiyotaki and Moore (1997), Cooley and Quadrini (1997)). These studies conclude that smaller firms are more adversely affected by tighter credit market conditions. In other words, smaller firms have greater distress risk. Perez-Quiros and Timmermann (2000) provide evidence that the returns of smaller firms display more sensitivity to changes in the state of the economy (recession versus expansion).

The following sections examine the robustness of the BE/ME and size effects in bond returns across subperiods and the January seasonalities in both of these effects. These analyses provide further evidence that the size effect is stronger in bond returns while the book-to-market effect is stronger in stock returns.

E. *Subperiod Analyses of the Cross Section of Corporate Bond Returns*

This section examines the cross section of bond returns in the two subperiods 1974 to 1984 and 1985 to 1994 and compares the results to those for stock returns (Table 3). Table 6 presents the monthly regressions for the first subperiod. Only a marginal size effect is detected. The average monthly ln(SIZE) premium is –0.07%, and it is significant at the ten-percent level (t-statistic = -1.71). The coefficient on ln(BE/ME) changes little from the 0.11% in the overall sample to 0.09% in the first subperiod; the t-statistic, however, in the first period is not significant at conventional levels (1.49).

The monthly regressions for the second subperiod are given in Table 7 and reveal strong BE/ME and size effects. The estimated monthly ln(BE/ME) premium is 0.12% with a t-statistic of 2.01. The estimated monthly ln(SIZE) premium is –0.12%, with a t-statistic of –2.52. Both ln(BE/ME) and ln(SIZE) remain significant when used together to explain bond returns in this later subperiod: ln(BE/ME) has an average coefficient of 0.10% and is significant at the ten-percent level (t-statistic = 1.73) and ln(SIZE) averages -0.12% per month and is significant at the one-percent level (t-statistic = -2.53). Note that the BE/ME effect in the later subperiod is largely unrelated to SIZE and to credit ratings, while the SIZE effect is again correlated with credit ratings.

Although the BE/ME and size effects in bond returns are stronger in the later subperiod, the hypotheses that the coefficients for ln(BE/ME) and ln(SIZE) do not change from the first to the second subperiod cannot be rejected (t-statistic of –0.35 for ln(BE/ME) and 0.74 for ln(SIZE)). For stock returns, however, recall that the hypotheses of no change in the coefficients of ln(BE/ME) and ln(SIZE) between the two subperiods can be rejected. Hence, while the compensations for ln(BE/ME) and ln(SIZE) diminish significantly in the stock market over the sample period, the compensations in the bond market do not decline; the point estimates of the BE/ME and size effects actually increase in the second subperiod for the bond market. These differences in the BE/ME and SIZE effects across the bond and stock markets are a result of two potential alternatives. One, the differences are a consequence of segmentation between the stock and bond markets. Or two, BE/ME and SIZE are each capturing more than just a single risk that is priced in both bonds and stocks. We will entertain both of these possibilities in the remaining sections.

The subperiod results also have similar implications for the argument that the BE/ME effect results from mispricings. The BE/ME effect in the stock returns is only detected in the first subperiod; the BE/ME effect in the bond returns is detected only in the second subperiod. If the BE/ME effect is in part due to mispricings and subsequent corrections, then the evidence indicates that investors do not misprice all securities of a firm simultaneously. Therefore, the mispricing interpretation of the BE/ME effect also suggests that the stock and bond markets are segmented. Additionally, the subperiod results further support the notion that size is more important in bond pricing than in stock pricing. The SIZE effect in bond returns is evident in both subperiods, but it is only evident in stock returns in the first subperiod, and then only univariately (BE/ME drives SIZE out).

F. *Credit Ratings in the Cross Section of Equity Returns*

Since distress risk is often considered to be priced in stocks, we examine the ability of the credit-ratings dummies to explain the cross section of stock returns. Table 8 shows that the ratings dummies are completely unrelated to stock returns. Clearly, the ratings dummies do not demonstrate the cross-sectional effects in stock returns that they achieve in bond returns. Perhaps this is because a distress-risk premium is not as large a component of stock pricing.

Should we be surprised that the ratings work poorly in explaining stock returns since there is no SIZE effect in this sample of stock returns (Table 3)? We know that the SIZE effect in bond returns is related to credit ratings. The poor performance of the credit ratings in the stock returns, however, is not solely a consequence of there being no SIZE effect. Table 3 shows that there is a SIZE effect in the 1974 to 1984 subperiod. Credit ratings remain poor determinants of the cross-section of stock returns during this period as well. This suggests the same two alternatives previously mentioned: the stock and bond markets are segmented or SIZE captures more than just a distress risk. After examining the January seasonalities of the BE/ME and SIZE effects in bond returns, we will consider further the notion that SIZE measures multiple risks.

G. *January effects*

January effects in both stock and bond returns have been well documented (Keim, 1983, Keim and Stambaugh, 1986). The integral relation between the size effect and the January effect in stock returns (Keim, 1983, Fama and French, 1992) has also been established. Unlike the size effect, the BE/ME effect in stock returns is only amplified in January; Fama and French (1992) find that the BE/ME effect exists for the rest of the year as well. Consistent with previous studies, Table 9 indicates that this sample of stock returns has strong BE/ME (2.55%, t-statistic=3.85) and SIZE (-0.93%, t-statistic=-3.58) effects in January when employed separately or together (ln(BE/ME): 1.90%, t-statistic=2.67, ln(SIZE): -0.66%, t-statistic=-2.36). It is also interesting to note that credit ratings display an ability to capture part of the cross section of stock returns in January (yet not in the overall year as we see in Table 8). Furthermore, the January size effect is correlated with the credit-ratings effect, as evidenced by the lack of a SIZE effect when credit ratings are included (ln(BE/ME) is unaffected). This finding reinforces our interpretation that SIZE is related to distress risk, and it suggests that a (small) distress premium does exist in stock returns. Table 10 shows no evidence of a BE/ME or a SIZE effect in stock returns in non-January.[20]

Table 11 shows that there are BE/ME (0.63%, t-statistic= 2.44) and SIZE effects (-0.49%, t-statistic= -2.92) in bond returns in January; however, as before, the SIZE effect subsumes the BE/ME effect, and credit ratings capture the size effect. Table 12 shows that there is a SIZE effect in non-January (-0.06%, t-statistic= 2.05), which is again captured by credit ratings. In unreported results, we find evidence of an investment-grade January effect (A and Baa dummy variables are significant) similar to that found in stock returns in Table 9. The finding of a *cross-sectional* January effect in investment-grade bond returns but not in low-grade bond returns is interesting and contributes to the January-effect literature. There is no *time-series* January effect in investment-grade bond returns; a *time-series* January effect is only in low-grade bond returns (Maxwell (1998)). The lack of a cross-sectional January effect that extends to the low-grade bonds seems somewhat at odds with the risk-based interpretations of the January effect.

In sum, there is a SIZE effect in bond returns year-round, but only in stock returns in January. There is a BE/ME effect in bond returns only in January. This further indicates that SIZE is more important than BE/ME in bond pricing. These findings also suggest that the January effects detected in both of these markets are, at least in part, a consequence of risk.

H. *Is there information in SIZE and BE/ME beyond credit risk?*

The consistent finding across the prior analyses is that the size effect is captured by credit ratings. We see, however, that a SIZE effect is detected in stock returns over the 1974 to 1984 subperiod, yet credit ratings do not capture any cross-sectional variation in stock returns over this period. We also see no size effect in stock returns over the 1985 to 1994 subperiod, yet we see a strong size effect in bond returns over this same period. These findings suggest that SIZE may represent more than a single (distress) risk. BE/ME also seems to capture more than just one risk. The BE/ME effect in stock returns is strong while there is little power for credit ratings to explain stock returns. The BE/ME effect in bond returns though is subsumed by SIZE (and by credit ratings). In this section, we investigate whether SIZE and BE/ME have any information in bond returns beyond what is contained in credit ratings. We also examine whether SIZE has any non-credit-risk information for stock returns.

We construct the variable NC_SIZE which is the component of SIZE that is orthogonal to the credit ratings. NC_SIZE is defined as the residual from the regression of ln(SIZE) on the five credit-rating dummy variables. CR_SIZE is the component of SIZE that is related to credit risk and is

[20] The full CRSP/Compustat stock sample differs in that it has a BE/ME effect in non-January over the May

defined as the predicted value of ln(SIZE) from the regression of ln(SIZE) on the five credit-rating dummy variables. NC_BE/ME and CR_BE/ME are constructed similarly. Panel A of Table 13 shows that NC_SIZE and NC_BE/ME are not determinants of bond returns. Therefore, the SIZE and BE/ME effect in bond returns seem solely a consequence of the relation between each of these measures and credit risk. The credit-risk components of both SIZE and BE/ME are priced in bond returns. Panel B of Table 13 shows that there are NC_SIZE effects and NC_BE/ME effects in the stock returns, but CR_SIZE and CR_BE/ME do not capture cross-sectional variation in stock returns.

These findings provide strong evidence that SIZE and BE/ME each capture more than one priced risk and that the stock and bond markets are segmented. The credit-risk components of both SIZE and BE/ME are priced only in the bond market while their non-credit risk components are priced only in the stock market. It is a bit unexpected that we do not find stronger evidence of the non-credit-risk component of BE/ME being priced in stocks (0.27%, t-statistic = 1.83). Fama and French (1993) and Elton, Gruber, Agrawal, and Mann (2001) show that size and BE/ME premia (SMB and HML portfolios respectively) explain time series variation in bond returns. At first glance, this may be interpreted as evidence that the stock and bond markets have common priced risks. The results here, however, indicate another explanation. The cross-sectional SIZE and BE/ME effects and the time-series SMB and HML effects are in both stock and bond returns because SIZE and BE/ME are correlated with risks that are priced in both markets, not because the risks themselves are priced in both markets. SIZE and BE/ME extend across the two markets but their underlying risks do not. In sum, SIZE and BE/ME are each correlated with a minimum of two risks, one risk is priced in bonds and is more closely related to size and another risk is priced in stocks and is more closely related to BE/ME.

1974 to December 1994 period.

4. Conclusion

We find that BE/ME and size effects also exist in the cross section of corporate bond returns. First, this reduces the concerns that these effects are spurious. Second, examining the roles of BE/ME and size in bond returns gives us an opportunity to learn more about the information contained in these measures. We find that the size effect is stronger than the BE/ME effect in bond returns and that credit risk generates the size effect in bond returns. We find that the weaker BE/ME effect in bond returns is also related to credit risk, but we conclude that size is a better measure of distress risk than BE/ME is.

While the size effect is stronger in bond returns, the BE/ME effect is stronger in stock returns. The reason for this seems to be that both size and BE/ME are each correlated with more than one risk. We find that size and BE/ME both have credit-risk components that are priced in bonds and non-credit-risk components that are priced in stocks. Size better measures the credit-risk component, and BE/ME better measures the non-credit-risk component. These findings improve our understanding of the sources of the size and BE/ME effects.

Finding size and BE/ME effects in bond returns suggests that the stock and bond markets price a common set of risks. We find evidence, however, that this is not the case. The credit risk underlying the size and BE/ME effects is not priced in the stock market and the non-credit risk underlying these effects is not priced in the bond market. We certainly cannot conclude that no risks are common to both markets, but the results here suggest that the stock and bond markets are segmented, an issue that deserves further attention.

References

Barber, Brad M. and John D. Lyon (1997), "Firm Size, Book-to-Market Ratio, and Security Returns: A Holdout Sample of Financial Firms," *Journal of Finance* 52, 875-883.

Berk, Jonathan B. (1995), “A Critique of Size-Related Anomalies,” *Review of Financial Studies* 8, 275-286.

Bernanke, Ben and Mark Gertler (1989), “Agency Costs, Net Worth, and Business Fluctuations, *American Economic Review* 79, 14-31.

Black, Fischer (1993), "Beta and Return," *Journal of Portfolio Management* 20, 8-11.

Boardman, Calvin and Richard McEnally (1981), "Factors Affecting Seasoned Corporate Bond Prices," *Journal of Financial and Quantitative Analysis* 16, 207-226.

Campbell, John Y. (1996), "Understanding Risk and Return," *Journal of Political Economy* 104, 298-345.

Chan, Louis K. C., Yasushi Hamao, and Josef Lakonishok (1991), “Fundamentals and Stock Returns in Japan,” *Journal of Finance* 46, 1467-1484.

Chan, K.C. and Nai-fu Chen (1991), “Structural and Return Characteristics of Small and Large Firms,” *Journal of Finance* 46, 1467-1484.

Chen, Long (2000), “Market Risk and Credit Risk in a General Equilibrium Model,” manuscript, University of Toronto.

Collin-Dufresne, Pierre, Robert A. Goldstein, and J. Spencer Martin (2000), “The Determinants of Credit Spread Changes,” forthcoming *Journal of Finance*.

Cooley, Thomas and Vincenzo Quadrini (1997), “Monetary Policy and the Financial Decisions of Firms,” manuscript, University of Rochester.

Daniel, Kent and Sheridan Titman (1997), “Evidence on the Characteristics of Cross Sectional Variation in Stock Returns,” *Journal of Finance* 52, 1-33.

Dichev, Ilia D. (1998), “Is the Risk of Bankruptcy a Systematic Risk?” *Journal of Finance* 53, 1131-1147.

Elton, Edwin J., Martin J. Gruber, Deepak Agrawal, and Christopher Mann, 2001, “Explaining the Rate Spread on Corporate Bonds,” *Journal of Finance* 56, 247-277.

Fama, Eugene F., and Kenneth R. French (1989), "Business Conditions and Expected Returns on Stocks and Bonds," *Journal of Financial Economics* 25, 23-49.

Fama, Eugene F., and Kenneth R. French (1992), “The Cross Section of Expected Stock Returns,” *Journal of Finance* 47, 427-465.

Fama, Eugene F., and Kenneth R. French (1993), "Common Risk Factors in the Returns on Stocks and Bonds," *Journal of Financial Economics* 33, 3-56.

Fama, Eugene F., and Kenneth R. French (1995), "Size and Book-to-Market Factors in Earnings and Returns," *Journal of Finance* 50, 131-155.

Fama, Eugene F., and Kenneth R. French (1996), "Multifactor Explanations of Asset Pricing Anomalies," *Journal of Finance* 51, 55-84.

Fama, Eugene F., and Kenneth R. French (1998), "Value Versus Growth: The International Evidence," *Journal of Finance* 53, 1975-1999.

Fama, Eugene F. and James MacBeth (1973), "Risk, Return, and Equilibrium: Empirical Tests," *Journal of Political Economy* 81, 607-636.

Ferson, Wayne E. and Campbell R. Harvey (1991), "The Variation in Economic Risk Premiums," *Journal of Political Economy* 99, 385-415.

Ferson, Wayne E. and Campbell R. Harvey (1999), "Conditioning Variables and the Cross Section of Stock Returns," *Journal of Finance* 54, 1325-1360.

Fisher, Lawrence (1959), "Determinants of Risk Premiums on Corporate Bonds," *Journal of Political Economy* 69, 217-237.

Gebhardt, William R. (2000), "Stock and Bond Market Interaction: Does Momentum Spillover?" manuscript, Cornell University.

Gertler, Mark and Simon Gilchrist (1994), "Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firms," 109, *Quarterly Journal of Economics* 309-340.

Gultekin, N. Bulent and Richard J. Rogalski (1984), "Alternative Duration Specifications and the Measurement of Basis Risk: Empirical Tests," *Journal of Business* 57, 241-264.

Hawawini, Gabriel and Donald B. Keim (1998), "The Cross Section of Common Stock Returns: A Review of the Evidence and Some New Findings," manuscript, University of Pennsylvania.

He, Jia and Lilian K. Ng (1994), "Economic Forces, Fundamental Variables, and Equity Returns," *Journal of Business* 67, 599-609.

Hecht, Peter (2000), "The Cross Section of Expected Firm (Not Equity) Returns," manuscript, University of Chicago.

Hicks, John R. (1946), *Value and Capital*, Second ed. (Oxford: Clarendon Press).

Ilmanen, Antti (1992), "How Well Does Duration Measure Interest rate Risk?" *Journal of Fixed Income*, March, 43-51.

Ilmanen, Antti, Donald McGuire, and Arthur Warga (1994), “The Value of Duration as a Risk Measure for Corporate Debt,” *Journal of Fixed Income*, June, 70-76.

Jagannathan, Ravi and Zhenyu Wang (1996), “The Conditional CAPM and the Cross Section of Expected Returns,” *Journal of Finance* 51, 3-53.

Jegadeesh, N. and S. Titman (1993), "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," *Journal of Finance* 48, 65-91.

Jones, E. Philip, Scott P. Mason, and Eric Rosenfeld (1984), “Contingent Claims Analysis of Corporate Capital Structures: An Empirical Investigation,” *Journal of Finance*, 39, 611-625.

Keim, Donald B. and Robert F. Stambaugh (1986), “Predicting Returns in the Stock and Bond Markets,” *Journal of Financial Economics*, 17, 357-390.

Kiyotaki, Nobuhiro and John Moore (1997), “Credit Cycles,” *Journal of Political Economy* 105, 211-248.

Knez, Peter J. and Mark J. Ready (1997), “On the Robustness of Size and Book-to-Market in Cross-Sectional Regressions,” *Journal of Finance* 52, 1355-1382.

Kothari, S. P., Jay Shanken, and Richard Sloan (1995), “Another Look at the Cross Section of Expected Returns,” *Journal of Finance* 50, 185-224.

Kwan, Simon H. (1996), “Firm-Specific Information and the Correlation Between Individual Stocks and Bonds,” *Journal of Financial Economics* 40, 63-80.

Lakonishok, Josef, Andrei Shleifer, and Robert W. Vishny (1994), “Contrarian Investment, Extrapolation, and Risk,” *Journal of Finance* 49, 1541-1578.

La Porta, Rafael (1996), “Expectations and the Cross-Section of Stock Returns,” *Journal of Finance* 51, 1715-1742.

Lettau, Martin and Sydney Ludvigson (2001), "Resurrecting the (C)CAPM: A Cross-Sectional Test When Risk Premia are Time-Varying," forthcoming *Journal of Political Economy*.

Lewellen, Jonathan, "The Time-Series Relations Among Expected Return, Risk, and Book-to-Market," *Journal of Financial Economics* 54, 5-43.

Liew, Jimmy and Maria Vassalou, "Can Book-to-Market, Size, and Momentum be Risk Fcators that Predict Economic Growth?" *Journal of Financial Economics* 57, 221-245.

Longstaff, Francis A. and Eduardo Schwartz (1995), “A Simple Approach to Valuing Risky Fixed and Floating Rate Debt,” *Journal of Finance*, 50, 789-819.

Macaulay, F. R. (1938), *Some Theoretical Problems Suggested by the Movements of Interest Rates, Bond Yields, and Stock Prices in the U.S. Since1856*, (New York: National Bureau of Economic Research).

Maxwell, William F. (1998), "The January Effect in the Corporate Bond Market: A Systematic Examination," *Financial Management* 27, 18-30.

Merton, Robert C. (1974), “On the Pricing of Corporate Debt: The Risk Structure of Interest Rates,” *Journal of Finance*, 29, 449-470.

Nayak, S. (1999), "A Study of the Performance Smile in Corporate Bond Returns Based on Past Winners and Losers," manuscript, Yale University.

Nunn, Kenneth P. Jr., Joanne Hill, and Thomas Schneeweis (1986), “Corporate Bond Price Data Sources and Return/Risk Measurement,” *Journal of Financial and Quantitative Analysis*, 21, 197-208.

Ogden, Joseph P. (1987a), “Determinants of the Ratings and Yields on Corporate Bonds: Tests of the Contingent Claims Model,” *Journal of Financial Research* 10, 329-339.

Ogden, Joseph P. (1987b), “Determinants of the Relative Interest Rate Sensitivities of Corporate Bonds,” *Financial Management*, Spring , 22-30.

Perez-Quiros, Gabriel and Allan Timmermann (2000), “Firm Size and Cyclical Variations in Stock Returns,” *Journal of Finance* 55, 1229-1262.

Shane, Hilary (1994), “Comovements of Low-Grade Debt and Equity Returns of Highly Leveraged Firms,” *Journal of Fixed Income* , March 1994, 79-89.

Shumway, Tyler (1996), “Size, Overreaction, and Book-to-Market Effects as Default Premia,” working paper, University of Michigan.

Shumway, Tyler and Vincent A. Warther, (1999), “The Delisting Bias in CRSP’s Nasdaq Data and Its Implications for the Size Effect,” *Journal of Finance* 54, 2361-2379.

Warga, Arthur (1991), “Corporate Bond Discrepancies in the Dealer and Exchange Markets,” *Journal of Fixed Income*, December 1991, 7-16.

Warga, Arthur and Ivo Welch (1993), Bondholder Losses in Leveraged Buyouts,” *Review of Financial Studies*, 6, 959-982.

Table 1

Descriptive Statistics

Means and standard deviations (in parentheses) of monthly returns to corporate bonds from May 1974 through December 1994 are reported below according to the Moody's rating of the bond (155,481 bond-months; August and September 1975, December 1984, and January 1985 are unavailable). Means and standard deviations are also provided for the issuing firms' book-to-market ratio, size, leverage, and the modified duration of the bonds.

The book-to-market ratio (BE/ME) is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June year *t*. Leverage (LEV) is the book value of long-term debt divided by the book value of total assets, both measured at fiscal year-end *t-1*. Duration (DUR) is beginning-of-the-month modified duration. BE/ME, SIZE, and LEV are associated with the monthly returns in July of year *t* through June of year *t+1*.

Moody's Rating	Monthly Return	BE/ME	SIZE (thousands)	LEV	DUR
Aaa	0.631	0.714	16,132,670	0.149	7.131
(N=7,172)	(3.23)	(0.36)	(19,835,134)	(0.09)	(2.60)
Aa	0.792	0.766	7,211,548	0.238	6.851
(N=30,508)	(2.86)	(0.35)	(10,265,073)	(0.10)	(2.44)
A	0.810	0.817	5,434,665	0.273	6.611
(N=66,916)	(2.77)	(0.42)	(8,100,691)	(0.10)	(2.52)
Baa	0.814	0.940	2,545,579	0.330	6.260
(N=29,387)	(2.63)	(0.52)	(2,787,455)	(0.10)	(2.36)
Ba	1.014	0.961	1,326,354	0.350	5.597
(N=9,177)	(5.10)	(0.78)	(1,991,197)	(0.13)	(1.77)
B	1.698	1.096	441,229	0.420	5.130
(N=12,064)	(17.98)	(0.98)	(850,662)	(0.15)	(1.37)
Caa	1.690	2.282	96,291	0.403	3.776
(N=254)	(4.84)	(1.86)	(118,705)	(0.13)	(1.59)
Ca	23.052	0.632	119,738	0.398	4.049
(N=3)	(8.04)	(0.39)	(174,971)	(0.293)	(1.04)

Table 2

Average Monthly Stock Returns to Portfolios
Formed by Sorting on BE/ME and SIZE
May 1974 – December 1994

Each month all firms with bonds in the dataset are sorted into quintiles based on BE/ME and SIZE separately. Panel A and Panel B report the mean monthly equally-weighted returns to the BE/ME and SIZE portfolios respectively for the May 1974 to December 1994 period (244 months; August and September 1975, December 1984, and January 1985 are unavailable). Average BE/ME and SIZE are the mean of the monthly averages of the respective variables for each portfolio.

BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. BE/ME, SIZE, and LEV are associated with the monthly returns in July of year *t* through June of year *t+1*.

	1 (low)	2	3	4	5 (high)
A. Sorting on BE/ME					
Avg. Return	0.918	1.207	1.253	1.441	1.646
Avg. BE/ME	0.35	0.62	0.84	1.06	1.80
Avg. SIZE (millions)	5,229	3,777	2,734	2,253	1,480
B. Sorting on SIZE					
Avg. Return	1.335	1.381	1.464	1.272	1.010
Avg. BE/ME	1.28	0.99	0.95	0.78	0.65
Avg. SIZE (millions)	184	661	1,369	2,704	10,567

Table 3

Cross-Sectional Regression Estimates of Monthly Stock Returns
May 1974 – December 1994

Using the returns to the stocks of firms in the bond data set, Fama-MacBeth cross-sectional regressions of monthly stock returns from July of year *t* to June of year *t+1* on BE/ME and SIZE are estimated. Panel A presents the mean monthly coefficients from the regressions for May 1974 to December 1994 (244 months; August and September 1975, December 1984, and January 1985 are unavailable). Panel B reports the mean monthly coefficients from the regressions for the May 1974 to November 1984 subperiod (125 months), and Panel C for the February 1985 to December 1994 subperiod (119 months). For the entire sample period, the monthly regressions have 215 stocks on average. There are 166 and 266 stocks on average in the monthly regressions of the first and second subperiods respectively.

BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*.

T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom are also reported for the monthly regressions.

	ln(BE/ME)	ln (SIZE)	Avg. R^2
A. 74:05 – 94:12			
	0.358***		0.02
	(2.45)		
		-0.066	0.02
		(-1.07)	
	0.293**	-0.016	0.04
	(1.94)	(-0.26)	
B. 74:05 – 84:11			
	0.680***		0.03
	(2.90)		
		-0.221**	0.02
		(-2.26)	
	0.512**	-0.136	0.05
	(2.04)	(-1.37)	
C. 85:02 – 94:12			
	0.020		0.01
	(0.121)		
		0.097	0.02
		(1.40)	
	0.062	0.110	0.03
	(0.36)	(1.61)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 4

Average Monthly Bond Returns to Portfolios
Formed by Sorting on BE/ME and SIZE
May 1974 – December 1994

Each month all available bonds are sorted into quintiles based on BE/ME and SIZE separately. Panel A and Panel B report the mean monthly equally-weighted returns to the BE/ME and SIZE portfolios respectively for the May 1974 to December 1994 period (244 months; August and September 1975, December 1984, and January 1985 are unavailable). Average BE/ME and SIZE are the mean of the monthly averages of the respective variables for each portfolio.

Panel C reports the mean monthly returns to portfolios formed by sorting all bonds each month into trintiles based on SIZE and then sorting each SIZE trintile into trintiles based on BE/ME.

BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. BE/ME, SIZE, and LEV are associated with the monthly returns in July of year *t* through June of year *t+1*.

	1 (low)	2	3	4	5 (high)
A. Sorting on BE/ME					
Avg. Return	0.847	0.902	0.863	0.860	1.058
Avg. BE/ME	0.40	0.68	0.89	1.08	1.69
Avg. SIZE (millions)	7,761	4,732	3,694	3,150	2,386
B. Sorting on SIZE					
Avg. Return	1.121	0.899	0.873	0.827	0.819
Avg. BE/ME	1.15	1.09	0.98	0.86	0.71
Avg. SIZE (millions)	426	1,309	2,236	4,046	13,261

C. Two-way Sorting on SIZE and then BE/ME

	BE/ME		
SIZE	1 (low)	2	3 (high)
1 (small)	0.946	1.031	1.132
2	0.844	0.839	0.919
3 (big)	0.803	0.810	0.836

Table 5

Cross-Sectional Regression Estimates of Monthly Corporate Bond Returns
May 1974 – December 1994

Fama-MacBeth cross-sectional regressions of monthly corporate bond returns from July of year *t* to June of year *t+1* on BE/ME, SIZE, LEV, DUR, CALL, SINK, and five ratings dummy variables are estimated from May 1974 to December 1994 (244 months; August and September 1975, December 1984, and January 1985 are unavailable). The monthly regressions have 638 bonds on average. The average monthly coefficients from the regressions are presented below.

BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. LEV is the book value of long-term debt divided by the book value of total assets, both at fiscal year-end *t-1*. DUR is the beginning-of-the-month modified duration. CALL is a dummy variable equal to one if the bond is callable, and zero otherwise. SINK is a dummy variable equal to one if the bond has a sinking fund provision, and zero otherwise. The ratings dummy variable A is equal to one if the bond has a beginning-of-the month Moody's rating of A or lower, and zero otherwise. Baa, Ba, B, and Caa are defined similarly.

T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom is also reported for the monthly regressions.

ln(BE/ME)	ln(SIZE)	LEV	DUR	CALL	SINK	A	Baa	Ba	B	Caa	Avg. R^2
0.108***											0.01
(2.47)											
	-0.096***										0.03
	(-3.01)										
0.057	-0.096***										0.04
(1.37)	(-2.96)										
0.071*	-0.066**	0.043	-0.064**	0.128**	0.169***						0.15
(1.84)	(-2.38)	(1.28)	(-2.28)	(2.195)	(3.515)						
0.044	-0.030					0.022	0.037	0.342*	0.391	0.263**	0.12
(1.12)	(-1.20)					(0.74)	(0.54)	(1.65)	(1.45)	(2.05)	
0.060	-0.031	0.034	-0.050*	0.094*	0.129***	-0.023	0.025	0.267	0.391	0.257**	0.22
(1.53)	(-1.18)	(0.99)	(-1.82)	(1.76)	(3.11)	(-0.65)	(0.37)	(1.30)	(1.48)	(2.01)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 6

Cross-Sectional Regression Estimates of Monthly Corporate Bond Returns
May 1974 – November 1984

Fama-MacBeth cross-sectional regressions of monthly corporate bond returns from July of year *t* to June of year *t+1* on BE/ME, SIZE, LEV, DUR, CALL, SINK, and five ratings dummy variables are estimated from May 1974 to November 1984 (125 months; August and September 1975 and December 1984 is unavailable). The monthly regressions have 411 bonds on average. The average monthly coefficients from the regressions are presented below.

BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. LEV is the book value of long-term debt divided by the book value of total assets, both at fiscal year-end *t-1*. DUR is the beginning-of-the-month modified duration. CALL is a dummy variable equal to one if the bond is callable, and zero otherwise. SINK is a dummy variable equal to one if the bond has a sinking fund provision, and zero otherwise. The ratings dummy variable A is equal to one if the bond has a beginning-of-the month Moody's rating of A or lower, and zero otherwise. Baa, Ba, B, and Caa are defined similarly.

T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom is also reported for the monthly regressions.

ln(BE/ME)	ln(SIZE)	LEV	DUR	CALL	SINK	A	Baa	Ba	B	Caa	Avg. R^2
0.093											0.02
(1.49)											
	-0.073*										0.04
	(-1.71)										
0.015	-0.074*										0.06
(0.25)	(-1.66)										
0.045	-0.044	0.058	-0.068*	0.139	0.157**						0.16
(0.86)	(-1.06)	(1.25)	(-1.70)	(1.59)	(2.03)						
0.005	-0.016					0.049	0.130	0.430	0.410	0.308	0.15
(0.08)	(-0.45)					(0.98)	(1.03)	(1.11)	(0.85)	(1.56)	
0.023	-0.015	0.036	-0.048	0.085	0.115*	-0.003	0.128	0.327	0.465	0.285	0.25
(0.42)	(-0.40)	(0.76)	(-1.23)	(1.08)	(1.91)	(-0.05)	(1.05)	(0.86)	(0.98)	(1.45)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 7

Cross-Sectional Regression Estimates of Monthly Corporate Bond Returns
February 1985 – December 1994

Fama-MacBeth cross-sectional regressions of monthly corporate bond returns from July of year *t* to June of year *t+1* on BE/ME, SIZE, LEV, DUR, CALL, SINK, and five ratings dummy variables are estimated from February 1985 to December 1994 (119 months; January 1994 is unavailable). The monthly regressions have 876 bonds on average. The average monthly coefficients from the regressions are presented below.

BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. LEV is the book value of long-term debt divided by the book value of total assets, both at fiscal year-end *t-1*. DUR is the beginning-of-the-month modified duration. CALL is a dummy variable equal to one if the bond is callable, and zero otherwise. SINK is a dummy variable equal to one if the bond has a sinking fund provision, and zero otherwise. The ratings dummy variable A is equal to one if the bond has a beginning-of-the month Moody's rating of A or lower, and zero otherwise. Baa, Ba, B, and Caa are defined similarly.

T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom is also reported for the monthly regressions.

ln(BE/ME)	ln(SIZE)	LEV	DUR	CALL	SINK	A	Baa	Ba	B	Caa	Avg. R^2
0.124**											0.00
(2.01)											
	-0.120***										0.02
	(-2.52)										
0.101*	-0.119***										0.03
(1.73)	(-2.53)										
0.098*	-0.090**	0.027	-0.059	0.116	0.181***						0.14
(1.73)	(-2.43)	(0.56)	(-1.51)	(1.52)	(3.25)						
0.085	-0.045					-0.006	-0.060	0.250*	0.371	0.215	0.08
(1.59)	(-1.26)					(-0.19)	(-1.18)	(1.93)	(1.61)	(1.32)	
0.098*	-0.048	0.032	-0.051	0.103	0.143***	-0.045	-0.082	0.203	0.313	0.227	0.18
(1.78)	(-1.28)	(0.64)	(-1.37)	(1.43)	(2.52)	(-1.06)	(-1.58)	(1.62)	(1.43)	(1.41)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 8

Cross-Sectional Regression Estimates of Monthly Stock Returns
May 1974 – December 1994

Using the returns to the stocks of firms in the bond data set, Fama-MacBeth cross-sectional regressions of monthly stock returns from July of year *t* to June of year *t+1* on BE/ME, SIZE, and five ratings dummy variables are estimated from May 1974 to December 1994 (244 months; August and September 1975, December 1984, and January 1985 are unavailable). The monthly regressions have 215 stocks on average. The average monthly coefficients from the regressions are presented below.

BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. The ratings dummy variable A is equal to one if the bond has a beginning-of-the month Moody's rating of A or lower, and zero otherwise. Baa, Ba, B, and Caa are defined similarly.

T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom is also reported for the monthly regressions.

ln(BE/ME)	ln(SIZE)	A	Baa	Ba	B	Caa	Avg. R^2
		0.095	0.063	-0.163	0.061	0.214	0.05
		(0.80)	(0.41)	(-0.55)	(0.13)	(0.60)	
0.200	-0.094	-0.105	-0.046	-0.141	-0.118	0.184	0.07
(1.28)	(-1.47)	(-0.79)	(-0.31)	(-0.46)	(-0.27)	(0.48)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 9

Cross-Sectional Regression Estimates of Monthly Stock Returns - January only
January 1975 – January 1994

Using the returns to the stocks of firms in the bond data set, Fama-MacBeth cross-sectional regressions of monthly stock returns in January of year *t+1* on BE/ME, SIZE, and five ratings dummy variables are estimated from January 1975 to January 1994 (19 months; January 1985 bond data are unavailable). The monthly regressions have 208 stocks on average. The average monthly coefficients from the regressions are presented below.
BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. The ratings dummy variable A is equal to one if the bond has a beginning-of-the month Moody's rating of A or lower, and zero otherwise. Baa, Ba, B, and Caa are defined similarly.
T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom is also reported for the monthly regressions.

ln(BE/ME)	ln(SIZE)	A	Baa	Ba	B	Caa	Avg. R^2
2.551***							0.06
(3.85)							
	-0.925***						0.04
	(-3.58)						
1.900**	-0.655**						0.08
(2.67)	(-2.36)						
		1.413**	2.032**	-0.839	1.836	2.509	0.07
		(2.41)	(2.32)	(-0.78)	(1.02)	(1.23)	
1.868**	-0.284	0.300	1.300*	-0.794	2.304	2.477	0.13
(2.52)	(-0.80)	(0.46)	(1.74)	(-0.62)	(1.14)	(0.95)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 10

Cross-Sectional Regression Estimates of Monthly Stock Returns - Non-January only
May 1974 – December 1994

Using the returns to the stocks of firms in the bond data set, Fama-MacBeth cross-sectional regressions of monthly stock returns in January of year *t+1* on BE/ME, SIZE, and five ratings dummy variables are estimated for non-January months from May 1974 to December 1994 (225 months; August and September 1975, and December 1984 bond data are unavailable). The monthly regressions have 215 stocks on average. The average monthly coefficients from the regressions are presented below.

BE/ME is the book value of common equity at fiscal year-end *t-1* divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. The ratings dummy variable A is equal to one if the bond has a beginning-of-the month Moody's rating of A or lower, and zero otherwise. Baa, Ba, B, and Caa are defined similarly.

T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom is also reported for the monthly regressions.

ln(BE/ME)	ln(SIZE)	A	Baa	Ba	B	Caa	Avg. R^2
0.173							0.02
(1.22)							
	0.007						0.02
	(0.11)						
0.157	0.038						0.04
(1.05)	(0.62)						
		-0.015	-0.103	-0.106	-0.089	0.021	0.04
		(-0.13)	(-0.71)	(-0.34)	(-0.19)	(0.06)	
0.060	-0.078	-0.139	-0.160	-0.085	-0.323	-0.010	0.06
(0.39)	(-1.24)	(-1.05)	(-1.09)	(-0.27)	(-0.73)	(-0.03)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 11

Cross-Sectional Regression Estimates of Monthly Corporate Bond Returns - January only
January 1975 – January 1994

Fama-MacBeth cross-sectional regressions of monthly corporate bond returns from July of year *t* to June of year *t+1* on BE/ME, SIZE, LEV, DUR, CALL, SINK, and five ratings dummy variables are estimated for January months from January 1975 to January 1994 (19 months; January 1985 is unavailable). The monthly regressions have 612 bonds on average. The average monthly coefficients from the regressions are presented below.

BE/ME is the book value of common equity at fiscal year-end *t-1*divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. LEV is the book value of long-term debt divided by the book value of total assets, both at fiscal year-end *t-1*. DUR is the beginning-of-the-month modified duration. CALL is a dummy variable equal to one if the bond is callable, and zero otherwise. SINK is a dummy variable equal to one if the bond has a sinking fund provision, and zero otherwise. The ratings dummy variable A is equal to one if the bond has a beginning-of-the month Moody's rating of A or lower, and zero otherwise. Baa, Ba, B, and Caa are defined similarly.

T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom is also reported for the monthly regressions.

ln(BE/ME)	ln(SIZE)	LEV	DUR	CALL	SINK	A	Baa	Ba	B	Caa	Avg. R^2
0.629**											0.03
(2.44)											
	-0.486***										0.06
	(-2.92)										
0.248	-0.477**										0.07
(1.06)	(-2.67)										
0.262	-0.434**	0.075	-0.073	0.338	0.076						0.17
(1.13)	(-2.32)	(0.58)	(-0.86)	(1.58)	(0.56)						
0.165	-0.230					0.012	0.925**	-0.013	1.069	0.199	0.16
(0.67)	(-1.25)					(0.07)	(2.07)	(-0.03)	(1.02)	(0.62)	
0.188	-0.254	-0.100	0.003	0.086	-0.005	-0.126	0.908*	0.036	1.089	0.213	0.25
(0.72)	(-1.26)	(-0.74)	(0.03)	(0.56)	(-0.03)	(-0.53)	(1.87)	(0.07)	(0.99)	(0.74)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 12

Cross-Sectional Regression Estimates of Monthly Corporate Bond Returns - Non-January
May 1974 – December 1994

Fama-MacBeth cross-sectional regressions of monthly corporate bond returns from July of year *t* to June of year *t+1* on BE/ME, SIZE, LEV, DUR, CALL, SINK, and five ratings dummy variables are estimated for non-January months from May 1974 to December 1994 (225 months; August and September 1975, and December 1984 bond data are unavailable) The monthly regressions have 640 bonds on average. The average monthly coefficients from the regressions are presented below.

BE/ME is the book value of common equity at fiscal year-end *t-1*divided by the market value of common equity at fiscal year-end *t-1*. SIZE is the market value of equity at the end of June of year *t*. LEV is the book value of long-term debt divided by the book value of total assets, both at fiscal year-end *t-1*. DUR is the beginning-of-the-month modified duration. CALL is a dummy variable equal to one if the bond is callable, and zero otherwise. SINK is a dummy variable equal to one if the bond has a sinking fund provision, and zero otherwise. The ratings dummy variable A is equal to one if the bond has a beginning-of-the month Moody's rating of A or lower, and zero otherwise. Baa, Ba, B, and Caa are defined similarly.

T-statistics are given in parentheses. The average R^2 adjusted for degrees of freedom is also reported for the monthly regressions.

ln(BE/ME)	ln(SIZE)	LEV	DUR	CALL	SINK	A	Baa	Ba	B	Caa	Avg. R^2
0.064											0.01
(1.56)											
	-0.063**										0.03
	(-2.05)										
0.041	-0.064**										0.04
(1.00)	(-2.06)										
0.054	-0.035	0.040	-0.063**	0.110*	0.177***						0.15
(1.48)	(-1.411)	(1.17)	(-2.13)	(1.82)	(3.48)						
0.034	-0.013					0.023	-0.038	0.372*	0.334	0.268**	0.11
(0.89)	(-0.60)					(0.79)	(-0.60)	(1.68)	(1.19)	(1.96)	
0.049	-0.012	0.046	-0.054**	0.094	0.140***	-0.014	-0.049	0.286	0.332	0.260*	0.21
(1.35)	(-0.52)	(1.29)	(-1.91)	(1.67) *	(3.31)	(-0.44)	(-0.83)	(1.32)	(1.22)	(1.91)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.

Table 13

Decomposing SIZE and BE/ME into Credit-Risk and Non-Credit-Risk Components
May 1974 – December 1994

Fama-MacBeth cross-sectional regressions of monthly corporate bond returns from July of year *t* to June of year *t+1* on the respective variables are estimated and reported in Panel A. NC_SIZE is the component of ln(SIZE) that is orthogonal to the credit ratings dummies (see Table 12). NC_BE/ME is defined similarly. CR_SIZE is the credit-ratings component of ln(SIZE) and is the predicted value of ln(SIZE) using the credit ratings dummies. The mean monthly coefficients from the regressions over the May 1974 to December 1994 period are given in Panel A (244 months; August and September 1975, December 1984, and January 1985 are unavailable). Panel B gives the results for stock returns.

T-statistics are given in parentheses.

	NC_SIZE	CR_SIZE	NC_BE/ME	CR_BE/ME
A. Bond Returns				
	-0.027	-0.165***		
	(-1.23)	(-3.22)		
			0.043	0.536**
			(1.24)	(2.38)
	-0.030	-0.165***	0.044	
	(-1.20)	(-3.22)	(1.11)	
B. Stock Returns				
	-0.118**	-0.037		
	(-2.07)	(-0.37)		
			0.267*	0.382
			(1.83)	(1.01)
	-0.094	-0.037	0.194	
	(-1.47)	(-0.37)	(1.25)	

***, **, * indicate significance levels of 1%, 5%, and 10% respectively.