Equity Book Values Greater Than Market Values: Accounting, Risk, or Mispricing?

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Abstract

Despite accounting conservatism, equity book values greater than market values (*BTM* > 1) are not rare. The question we address is why. We find *BTM* > 1 is not only not rare, but also pervasive and persistent. More importantly, *BTM* > 1 is not attributable to potentially overstated equity book values, which calls into question *BTM* as a measure of conservative accounting for nearly 30% of firms. Rather, *BTM* > 1 is attributable to low equity market values, which partially stem from macroeconomic risk and other risk that is different for firms with *BTM* > 1. These findings call into question the use of Fama and French's *HML* factor to reflect risk for firms with *BTM* > 1. Mispricing associated with investor myopia in over-extrapolating weakening in a firm's otherwise strong fundamental performance contributes to the low equity market values. Taken together, our findings reveal the *BTM* threshold of one has meaningful implications for accounting and finance.

JEL classification: D84, G11, G14, M41

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I. Introduction

U.S. accounting amounts reflect conservative procedures, such as the non-recognition of internally generated intangible assets and application of lower-of-cost-or-market rules that asymmetrically update book values of tangible assets. These procedures imply that equity book value will be less than equity market value and, thus, instances of equity book value exceeding equity market value should be rare. Yet, Piotroski (2000) reports that from 1976 to 1996 the equity book-to-market ratio (henceforth *BTM*) is well above one for more than 20% of firm-years. These statistics reveal that *BTM* greater than one is not rare. The question we address is why. Specifically, our research questions are: When do equity book values greater than equity market values occur? Are they attributable to accounting practices that potentially overstate equity book values? Are they attributable to low equity market values and, if they are, are the low market values indicative of different risk faced by investors in these firms or of mispricing? Addressing these questions provides insights into how accountants and investors should interpret equity book values that exceed equity market values.

Our inquiry is motivated by the prominence of *BTM* in accounting and finance. In accounting, *BTM* is commonly used to measure the extent to which a firm's accounting is conservative. Specifically, lower *BTM* is interpreted as evidence of more conservative accounting resulting from, for example, unrecognized internally generated intangible assets and the general prohibition against increasing recognized asset amounts when asset values increase. These accounting practices suggest *BTM* should be less than one. In contrast, *BTM* greater than one suggests potentially overstated equity book values resulting from, for example, incomplete impairment of goodwill and other recognized intangibles and unrecognized liabilities associated with operating leases and pension obligations. That different accounting practices result in *BTM* less than and greater than one suggest the threshold of one is meaningful. *BTM* greater than one does not simply reflect less conservatism than *BTM* less than one reflects, it potentially reflects "anti-conservative" accounting practices. Despite the different implications of *BTM* less than and greater than one, with the exception of identifying potentially under-impaired goodwill, prior research does not consider implications this threshold might have for accounting. We do and find that *BTM* greater than one does not reflect anti-conservative accounting practices.

BTM also plays an important role in finance. One of the most well-documented findings in financial economics is the positive association between *BTM* and future equity returns. One explanation for this finding is that *BTM* measures some type of risk for which investors demand compensation. Another explanation is that investor myopia causes some equity market values to deviate from intrinsic values and those deviations subsequently reverse. Regardless of the explanation, studies examining the positive *BTM*-return relation rank firms into high and low *BTM* categories, rather than focusing on a particular threshold of *BTM*. Thus, prior research does not specifically consider implications of the *BTM* greater than one threshold might have for risk assessment and returns prediction. We do and find it has meaningful implications.

We base our analyses on 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016. Our research design comprises three main steps. In the first step, we provide descriptive statistics on equity book-to-market ratios greater than one. We find that 28% of firm-year observations have $BTM > 1$, and $BTM > 1$ occurs in substantial proportions in every industry and year. Not surprisingly, there are fewer instances of $BTM > 1$ in industries with substantial unrecognized intangible assets and more instances of $BTM > 1$ in recession years.

Regardless, these statistics confirm that *BTM* > 1 is pervasive, not rare. We also find that *BTM* increases nonlinearly across its deciles and the non-linearity occurs when *BTM* > 1, which suggests *BTM* > 1 is not simply an extension of the *BTM* ≤ 1 distribution. Our findings also reveal that *BTM* is persistent from one year to the next; firms with *BTM* > 1 in one year are likely to have *BTM* > 1 in the subsequent year. Thus, *BTM* > 1 is not primarily attributable to transitory circumstances.

As a prelude to addressing the questions of whether *BTM* > 1 arises from "anti-conservative" overstated book values or low market values, we examine the evolution of the median of each component of *BTM*—book value of equity and market value of equity—in the three years after a firm has *BTM* > 1. We find that *BTM* > 1 firms experience increases in equity book value in the subsequent three years, which is inconsistent with overstated equity book values explaining *BTM* > 1. These firms experience significantly larger subsequent increases in market value of equity, which suggests it is more likely that low equity market values explain the pervasiveness of *BTM* > 1.

In the second step, we focus on the numerator of *BTM*—equity book value—and test whether *BTM* > 1 is explained by accounting practices that could overstate equity book value. In particular, we test for a significantly positive relation between whether a firm has *BTM* > 1 and its recognized goodwill and other intangible assets, and unrecognized operating lease and pension obligations. Although we cannot rule out specific instances of overstated equity book value, we find no significant positive relation between *BTM* > 1 and any of these accounting practices regardless of whether we consider them separately or together. These findings indicate that overstated equity book value is not the driver of pervasive *BTM* > 1.

In the third step, we focus on the denominator of *BTM*—equity market value—and test whether *BTM* > 1 is explained by low equity market value. Prior research documents that *BTM* and *HML*, a returns-predicting factor based on *BTM*, both predict future returns. We confirm for our sample the prior research finding of a positive and monotonic relation between *BTM* decile and mean monthly returns over the next year. More importantly for our research question, we find that a hedge strategy of taking a long (short) position in the top (bottom) decile of *BTM* > 1 generates significantly higher returns than analogous deciles of *BTM* and *BTM* ≤ 1. We also find that the Fama and French (1993) *HML* risk factor, which is based on the full distribution of *BTM*, explains subsequent returns when *BTM* ≤ 1, but not when *BTM* > 1. An alternative *HML* factor constructed using only *BTM* > 1 observations is significantly positively associated with *BTM* hedge returns when *BTM* > 1. These findings suggest that *BTM* > 1 reflects risk, but not the same risk that *BTM* ≤ 1 reflects, and taken together the findings suggest that low equity market value is a driver of *BTM* > 1.

We also test whether subsequent returns associated with *BTM* > 1 reflect exit or macroeconomic risk faced by investors in these firms, or reflect mispricing associated with investor myopia. Specifically, we test whether firms are more likely to exit the sample when *BTM* > 1, which presents risk to investors because firm exit limits the potential upside of the investment. We find no evidence that *BTM* > 1 is associated with exit risk in that the findings reveal the probability of exit is smaller when *BTM* > 1, not larger. We also test whether firms exhibit more macroeconomic risk when *BTM* > 1, which presents risk to investors because *BTM* > 1 is more prevalent during recession years. We find that the higher hedge return associated with *BTM* > 1 is concentrated in recession years, which supports the inference that firms exhibit greater macroeconomic risk when *BTM* > 1.

We next determine whether investor mispricing of fundamental performance helps explain subsequent returns for firms with *BTM* > 1. We base these tests on Piotroski's (2000) *FSCORE*, which is a measure increasing in the firm's financial health. If *BTM* > 1 poses greater financial or operating risk to investors, we expect weaker financial health when *BTM* > 1. However, firms with *BTM* > 1 have higher, not lower, *FSCORE* than firms with *BTM* ≤ 1. Investor myopia could explain this finding if investors over-extrapolate some signals and under-extrapolate others in forming expectations of the firm's future performance, thereby resulting in systematic changes in equity market values unrelated to risk. Based on prior research, we predict that investors over-extrapolate changes in firms' fundamentals and under-extrapolate levels of fundamentals. To test this prediction, we separate *FSCORE* into its levels and changes components, and test whether firms with *BTM* > 1 exhibit higher levels of, but lower changes in, fundamentals. The findings support our prediction. We interpret these findings as evidence that *BTM* > 1 results from low market values attributable to investors over-extrapolating decreases in firms' fundamentals and under-extrapolating strong levels of fundamentals.

Taken together, our findings reveal that the pervasiveness of *BTM* > 1 is not attributable to overstated equity book values. Rather, *BTM* > 1 largely is attributable to low equity market values. These low equity market values are partially attributable to macroeconomic and other risk faced by investors in these firms that differs from the risk they face in other firms, and partially attributable to mispricing associated with investor myopia in over-extrapolating recent decreases in the firm's fundamental performance.

The remainder of the paper proceeds as follows. Section 2 describes the sample and data and provides descriptive statistics on the pervasiveness of *BTM* > 1. Sections 3, 4, and 5 discuss related research, describe the research design, and present findings relating to whether *BTM* > 1 is attributable to overstated equity book values, low equity market values including whether the low values are attributable to risk or mispricing, and investor myopia. Section 6 provides a summary and concluding remarks.

II. Equity Book-to-Market Ratios > 1

To address our research question, we proceed in three main steps. First, this section provides descriptive statistics on equity book-to-market ratios greater than one. Second, section 3 focuses on the numerator of *BTM*—equity book value—and tests whether *BTM* > 1 is explained by accounting practices that could overstate equity book value. Third, section 4 focuses on the denominator of *BTM*—equity market value—and tests whether *BTM* > 1 is explained by low equity market value.

Sample, Data, and Descriptive Statistics

We conduct our analyses on a sample of firms with common equity shares listed on NYSE, AMEX, and NASDAQ from 1962 to 2016.[1] We exclude financial firms (i.e., those with one-digit SIC code = 6), observations with negative equity book values, and observations with fewer than 24 months of prior returns on CRSP.[2] For each firm-year, *BTM* is the ratio of book value of equity, *BVE*, to market value of equity, *MVE*. We obtain *BVE* (*MVE*) from Compustat (CRSP), and *BVE* (*MVE*) for year *t* pertains to the fiscal year that ends in calendar year *t* (last trading day of December of year *t*).[3] These procedures follow Fama and French (1992) and

[1] We use COMPUSTAT exchange codes 11, 12, and 14 to identify firms with common shares listed on the NYSE, AMEX, and NASDAQ.
[2] 2,618 observations have negative equity book value, which is approximately 2% of the potential sample.
[3] *BVE* is stockholder's book equity (Compustat item SEQ) plus balance sheet deferred taxes and investment tax credit (TXDITC) minus the redemption value of preferred stock (PSTKRV). If SEQ is not available, we consider two substitutes: the sum of common stockholder's book equity (CEQ) and par value of preferred stock (PSTK), and the difference between book value of total assets (AT) and book value of total liabilities (LT). If neither of these is available, we treat the observation as missing. If TXDITC is not available, we assume it equals zero. If PSTKRV is not available, we consider two substitutes: liquidating value of preferred stock (PSTKL), and par value of preferred stock (PSTK). If neither is available, we treat the observation as missing. Our inferences are the same if we

Davis, Fama, and French (2000) and yield a final sample of 118,268 annual observations for 53 years and 8,654 firms.

Table 1 presents descriptive statistics for the variables we use in our analyses, separately for the combined sample, when *BTM* > 1, and when *BTM* ≤ 1. In addition to *BTM*, *BVE*, and *MVE*, Table 1 presents statistics for *HBTM*, which is an indicator variable that equals one if *BTM* > 1, and zero otherwise. Table 1 reveals that for the combined sample, the mean of *BTM* is 0.86, which is less than one, and the means of *BVE* and *MVE* are $960.46 and $2,218.38 million. The *HBTM* mean reveals that *BTM* > 1 occurs in 28% of our sample. When *BTM* ≤ 1, mean *BTM* is 0.49, which is considerably smaller than one, and the means of *BVE* and *MVE* are $1,023.36 and $2,857.13 million, which are larger than those for the combined sample. When *BTM* > 1, mean *BTM* is 1.84, which is considerably higher than one, and the means of *BVE* and *MVE* are $796.90 and $557.34 million, which are smaller than those for the combined sample.

Nonlinearity in *BTM* at *BTM* > 1?

Figure 1 provides a graph of the median book-to-market ratio by *BTM* decile. The 25^{th} and 75^{th} percentiles of each decile are the bounds of the shaded region. As a point of reference, we include a dotted horizontal line at *BTM* equal to one. Consistent with Table 1, Figure 1 reveals that not only the median *BTM*, but also the 25^{th} percentile, exceeds one for deciles 9 and 10. It also reveals a nonlinearity in the distribution of median *BTM* across deciles. This nonlinearity is most evident in the transition from decile 8 to decile 10, namely, when *BTM* crosses the threshold of one. Thus, Figure 1 reveals the prevalence of *BTM* > 1 as well as a

compute *BTM* using *MVE* measured on the last trading day of the fiscal year or at the beginning of the fourth month after the fiscal year end.

nonlinearity in the distribution of *BTM*. This nonlinearity suggests *BTM* > 1 and *BTM* ≤ 1 have different distributions.

Time and Industry Concentration of *BTM* > 1

To determine whether *BTM* > 1 is concentrated in a particular time period or industry, Figure 2 provides a graph of the percentage of firm-years with *BTM* > 1 by year (industry) in Panel A (Panel B). Panel A reveals a considerable percentage of *BTM* > 1 observations in every year, but *BTM* > 1 is more common in recession periods identified by the National Bureau of Economic Research (NBER). NBER classifies recession periods as macroeconomic contractions from the month of the peak to the month of the trough. Specifically, the year with smallest (largest) proportion of *BTM* > 1 is 1968 (1974), which corresponds to the peak (trough) of the expansion (recession) that began in 1961 (1973). Similar peaks in the frequency of *BTM* > 1 appear in other recession periods (e.g., 1970, 1981, 2001, and 2008), which are shaded in blue on the graph. However, even in non-recession periods *BTM* > 1 occurs frequently.

Panel B of Figure 2 presents the percentage of *BTM* > 1 by industry, using the Barth, Beaver, Hand, and Landsman (1999) industry definitions and separately for recession and non-recession years.[4] Percentages for (non-)recession years appear in (red) blue. To the extent these frequencies are the same, they overlap and appear purple. Panel B reveals that for all industries except Extractives, there is a greater incidence of *BTM* > 1 during recession years. Even in non-recession years, *BTM* > 1 for at least twenty percent of firms in all but four industries. These exceptions—pharmaceuticals, computers, instruments, and chemicals—are all characterized by

[4] Because we measure *MVE* at December 31 for all firms in subsequent analyses, we need to classify each year. We classify a year as a recession year if December 31 of that year is at least two months after an NBER peak or within two months of an NBER trough. This approach ensures *MVE* reflects at least some market-wide decline in equity values, and not the full market-wide recovery. There are eight recession years—1970, 1973, 1974, 1981, 1982, 1990, 2001, and 2008.

substantial internally generated intangible assets, which are not recognized under U.S. accounting standards and, thus, are not included in *BVE*. However, even in these industries, *BTM* > 1 are frequent.

Persistence of *BTM* > 1

To provide evidence on the persistence of *BTM* > 1, Table 2 presents transition probabilities for each decile of *BTM* from year 0 to year 1. That is, for each decile in year 0 (i.e., each row), the cells present the probability of a firm in that decile appearing in each decile in year 1 (i.e., each column). Recall that almost 30% of the observations have *BTM* > 1, which is our focus. Thus, we construct the deciles such that deciles 8 to 10 (1 to 7) have *BTM* > 1 (*BTM* ≤ 1). Because some firms exit the sample during year t + 1, the probabilities in each row do not sum to 100.[5] The shading of the cells highlights their relative values. Table 2 reveals the greatest (lowest) persistence in the extreme deciles (deciles 5 and 6). More importantly for our research question, Table 2 reveals that the probability of a firm with *BTM* > 1 in year 0 having *BTM* > 1 in year 1 ranges from 52.52% (25.89 + 19.70 + 6.93) for firms in decile 8 to 83.4% for firms in decile 10 (6.93 + 19.77 + 56.70). The unconditional probability of *BTM* > 1 is 28%. Thus, these statistics in Table 2 indicate that *BTM* > 1 is persistent.

BTM > 1 can result from high *BVE* or low *MVE*. To provide preliminary evidence as to whether either of these is plausible, Figure 3 presents graphs of median *BVE* and *MVE* separately from year t to year t + 3, for *BTM* > 1 (*BTM* ≤ 1) in year t and scaled by the year t median in Panel A (Panel B). The figure is based on observations for firms with data in year t through year t + 3. To avoid overlapping observations, year t occurs every four years during our sample period, which results in 8,900 (19,330) observations for *BTM* > 1 (*BTM* ≤ 1). If *BTM* > 1 is

[5] The exit percentages range from 6.00% in decile 8 to 8.12% in decile 6.

associated with high *BVE* (low *MVE*) subsequent to *BTM* > 1 we expect *BVE* (*MVE*) to decrease (increase).

Panel A reveals that after *BTM* > 1 both *MVE* and *BVE* increase from year *t* to year *t* + 3—median *MVE* increases 86% and median *BVE* increases 12%. That *MVE* increases substantially and *BVE* increases modestly, not decreases, suggest low *MVE* is the more plausible reason for *BTM* > 1. Untabulated statistics reveal that median *BTM* is greater than one in all three subsequent years, which is consistent with the high persistence of *BTM* > 1 in Table 2. Median *BTM* is 1.51 in year *t* and 1.27, 1.14, and 1.08 in years *t* + 1, *t* + 2, and *t* + 3. Panel B presents analogous statistics for *BTM* ≤ 1. It reveals that *MVE* and *BVE* both increase, but by similar percentages—median *MVE* increases 46% and median *BVE* increases 54%. Untabulated statistics reveal that median *BTM* is less than one in all three subsequent years; median *BTM* is 0.49 in year *t* and 0.47, 0.50, and 0.49 in years *t* + 1, *t* + 2, and *t* + 3. That the increase in *MVE* is smaller than that in Panel A—46% versus 86%—is consistent with low *MVE* being a reason for *BTM* > 1. However, that the increase in *BVE* is larger than in Panel A—54% versus 12%—suggests high *BVE* also could be a reason. Untabulated statistics reveal that the differences between the *MVE* and *BVE* increases in each panel and the differences between the *MVE* increases in panels A and B and between the *BVE* increases in panels A and B all are significant.

III. High Equity Book Value?

Many accounting practices result in equity book values that are less than equity market values, such as those that preclude write-ups of assets when asset values increase and preclude recognition of internally generated intangible assets. However, other accounting practices can result in equity book values that exceed their market values. That different accounting practices result in *BTM* less than and greater than one suggest the threshold of one is meaningful. We test whether *BTM* > 1 is associated with potentially overstated equity book values resulting from accounting practices. Because Figure 2 reveals that *BTM* > 1 is not concentrated in particular time periods or industries, we focus on accounting practices that affect firms across years and industries, namely those relating to potentially overstated recognized intangible assets, including goodwill, and to unrecognized operating lease and pension obligations.

Indefinite-lived recognized intangible assets, such as goodwill, are not amortized. Although accounting standards specify that these assets be written down when they are impaired, impairment practices leave considerable room for discretion. Incomplete write-downs would result in the recognized asset amount exceeding its value and, thus, contribute to *BTM* > 1. Ramanna and Watts (2012) employs *BTM* > 1 in the criteria it uses for identifying firms with potentially unrecognized goodwill impairment. The study finds evidence that managers exercise discretion to avoid recognizing goodwill impairment. The avoidance of such write-downs contribute to overstated *BVE* and, thus, *BTM* > 1.

Operating lease obligations are unrecognized, but prior research shows that investors treat them as liabilities when assessing firm risk (Ely 1995; Dhaliwal et al. 2011; Bratten et al. 2013). These studies focus on risk assessment because unrecognized operating lease right-of-use assets accompany operating lease liabilities, and if these assets and liabilities were recognized at approximately the same amount, firms' reported leverage would increase. Although firms disclose future minimum lease commitments, they do not disclose information relating to the right-of-use asset or contingent lease payments. However, it is likely that contingent lease payments result in actual lease commitments that exceed contractual minimums, which suggests firms have a net unrecognized operating lease liability (Ely 1995; Ge et al. 2009). Firms' defined benefit pension plans are often underfunded and the net pension obligation was not recognized until 2007. Yet, Landsman (1986), Barth (1991), and Barth et al. (1993) find investors view net pension obligations as liabilities when determining firms' equity values, and Dhaliwal (1986) and Jin et al. (2006) find that these unrecognized liabilities are included in investors' assessments of firm risk.

Based on this prior research, we predict a positive relation between whether a firm has *BTM* > 1 and the amounts of its recognized goodwill, other recognized intangible assets, unrecognized operating lease obligations, and unrecognized net pension obligations. To test these predictions, we estimate several versions of equation (1).

$$HBTM_{it} = \beta_1 GW_{it} + \beta_2 INTAN_{NOGWit} + \beta_3 PENSION_{it} + \beta_4 OPLEASE_{it} + \beta_5 CHE_{it} + \beta_6 AR_{it} + \beta_7 INVT_{it} + \beta_8 PPE_{it} + \beta_9 OA_{it} + \beta_{10} LT_{it} + \gamma_i + \gamma_t + \epsilon_{it} \quad (1)$$

HBTM is an indicator variable that equals one if *BTM* > 1, and zero otherwise. Subscripts *i* and *t* denote firms and years.[6]

GW is the recognized amount of goodwill and $INTAN_{NOGW}$ is the recognized amount of intangible assets excluding goodwill. *OPLEASE* is the firm's operating lease obligation, which is the present value of the firm's disclosed future minimum operating lease commitments over the next five years.[7] *PENSION* is the firm's net pension obligation measured as the projected benefit obligation minus the fair value of plan assets. Barth (1991) finds that these measures of pension assets and obligations are closest to those investors assess when valuing the firm's

[6] We estimate Equation (1) using OLS because our interest is in whether the associations are significant, on average, and using OLS enables us to include firm fixed effects.
[7] We use a rate of 8% to discount these commitments. In February 2016, the FASB issued Accounting Standard Codification Topic 842, which requires firms to capitalize long-term leases previously classified as operating leases. This requirement is effective beginning in December 2019 fiscal years, which is after the end of our sample period.

equity.[8] A negative *PENSION* observation indicates a firm's plan assets exceed its pension obligation. We predict β_1, β_2, β_3, and β_4 are positive.

CHE, *AR*, *INVT*, and *PPE* are the recognized amounts of cash and cash equivalents, accounts receivable, inventory, and property, plant and equipment. *OA* is other assets, which is total assets minus *CHE*, *AR*, *INVT*, *PPE*, $INTAN_{NOGW}$, and *GW*. *LT* is total liabilities. Thus, unscaled $CHE + AR + INVT + PPE + INTAN_{NOGW} + GW – LT$ equals *BVE*. We include these variables as controls for correlation between our four variables of interest and other recognized assets and liabilities. γ_i and γ_t denote firm and year fixed effects.[9] We deflate all explanatory variables by number of common shares outstanding at the end of fiscal year *t* and cluster standard errors by firm and year when constructing *t*-statistics (Gow, Ormazabal, and Taylor 2010).

Table 3, Panel A, provides descriptive statistics on these variables for the combined sample and separately when $BTM \leq 1$ and $BTM > 1$. We have only 81,931 observations for *PENSION* because the disclosures used in its construction are available only beginning in 1985. Table 3, Panel A reveals that mean *GW* is 0.02 when $BTM \leq 1$, but is 0.07 when $BTM \leq 1$, and untabulated analyses confirm that these means are significantly different. These statistics are consistent with Ramanna and Watts (2012) and with overstated goodwill being a potential driver of $BTM > 1$. Panel A also reveals that the means of $INTAN_{NOGW}$, *OPLEASE*, and *PENSION* are 0.01, 0.01, and 0.00 for the combined sample and when $BTM \leq 1$ and $BTM > 1$. These statistics

[8] Effective with December 2007 fiscal year ends, Statement of Financial Accounting Standards No. 158 (FASB 2006) requires firms to recognize net pension obligations, measured as the projected benefit obligation minus the fair value of plan assets. Thus, beginning in 2007 *PENSION* equals zero.

[9] Our inferences relating to *GW*, $INTAN_{NOGW}$, *OPLEASE*, and *PENSION* are unaffected if we omit the firm fixed effects or include industry fixed effects instead.

reveal no differences between *BTM* > 1 and *BTM* ≤ 1 in accounting practices for intangible assets other than goodwill, operating leases, and pension obligations.

Table 3, Panel B, presents regression summary statistics from estimating five versions of Equation (1), one for each of *GW*, $INTAN_{NOGW}$, *OPLEASE*, and *PENSION* considered separately, and one with all four included. Panel B reveals the coefficients on *GW*, *OPLEASE*, and *PENSION* are not significantly different from zero. The coefficients (standard errors) are 0.01, –0.01, and –0.10 (0.02, 0.09, and 0.08) when each is considered separately and 0.01, 0.16, –0.09 (0.02, 0.11, and 0.09) when considered together in column (5). Although the coefficient on $INTAN_{NOGW}$ is significantly different from zero in column (2) when it is considered separately, it is not significantly different from zero in column (5) when it is considered together with the other variables.[10] The insignificance of goodwill in Panel B's multivariate relation, together with its significantly larger univariate mean in Panel A, reveals that the difference in Panel A largely is attributable to correlation with the other explanatory variables in Equation (1). Taken together, Table 3, Panel B, provides no evidence supporting accounting practices as the reason for firms reporting *BTM* > 1.

Our findings regarding goodwill seemingly are inconsistent with those of Ramanna and Watts (RW, 2012). Because the RW sample comprises only observations with *BTM* > 1, we cannot compare the two sets of findings by estimating Equation (1) using a sample constructed as in RW. However, from a sample of 7,363 firm-year observations from 2003 to 2006 with recognized goodwill greater than $1 million, RW identifies 124 observations with potentially unrecognized goodwill impairment as those with *BTM* ≤ 1 in year t – 2 and *BTM* > 1 in years t – 1 and t. This is only 1.68% of firm-years with recognized goodwill (124/7,363). Thus, a

[10] The coefficients and standard errors round to the same two decimal places. However, in column (2) (column (3)) they are 0.03366 and 0.02035 (0.02701 and 0.02399), which result in a t-statistic of 1.65 (1.13).

plausible reason for the differences between the goodwill findings in Table 3 and those in RW is that although there are instances of potentially unrecognized goodwill impairment, such instances are not common.[11]

IV. Low Equity Market Value?

It is well-established in the finance literature (e.g., Fama and French 1992), that firms with higher equity book-to-market ratios have predictably higher subsequent returns. The larger subsequent increases in equity market value when *BTM* > 1 presented in Figure 3 are consistent with the findings in this literature. Thus, we next test whether *BTM* > 1 is associated with low equity market values by testing whether firms with *BTM* > 1 have significantly higher subsequent returns than their position in high deciles of *BTM* would suggest.

Is *BTM* > 1 Simply an Extension of *BTM* in Predicting Returns?

We begin by replicating standard returns prediction tests for our sample and then we test whether predictable returns are higher when *BTM* > 1. In particular, following Fama and French (1992), at the end of June of each calendar year we construct decile portfolios based on *BTM* and measure average monthly returns to each portfolio for the 12 months following portfolio formation. Specifically, for each firm in year *t*, we calculate the average monthly return from July of year $t + 1$ to June of year $t + 2$.[12] We then calculate the hedge return associated with

[11] We also examine changes in *BVE* and *MVE* over the three years subsequent to a firm having *BTM* > 1 as in Figure 3, based on a sample constructed following RW, but for our longer sample period. Specifically, the sample comprises observations from 1962 to 2016 with *BTM* ≤ 1 in year $t – 2$, *BTM* > 1 in years $t – 1$ and *t*, and recognized goodwill in year *t*. Consistent with RW, untabulated findings reveal that median *BVE* decreases over years $t + 1$ to $t + 3$. Relative to year *t*, median *BVE* decreases 5% (8%) by the end of year $t + 1$ ($t + 2$). In year $t + 3$, median *BVE* increases and by the end of year $t + 3$ is only 1% lower than in year *t*. These statistics are consistent with the RW sample selection procedures identifying firm-years with potentially overstated *BVE*. However, there are much larger increases in median *MVE*. Relative to year *t*, median *MVE* increases 23%, 53%, and 86% by the end of years $t + 1$, $t + 2$, and $t + 3$. Additional untabulated findings reveal that these patterns are evident in recession and non-recession periods. These findings support our inference that high *BVE* is not the driver of *BTM* > 1.
[12] The six-month minimum gap between fiscal year-end and return measurement ensures *BVE* is available before returns are measured. Firms are required to file Forms 10-K with the SEC within 90 days of fiscal year-end, but some firms do not comply (e.g., Alford, Jones, and Zmijewski 1992; Fama and French 1992).

taking a long (short) position in firms in the top (bottom) *BTM* decile. We do this for the combined sample, when $BTM \leq 1$, and when $BTM > 1$.

Table 4 presents the findings. The combined sample findings in the first set of columns confirm the Fama and French (1992) findings of a positive and monotonic relation between *BTM* decile and mean monthly returns over the next year. The returns range from 1.18% in the bottom decile to 2.33% in the top decile. The hedge return averages 1.15% per month and is significantly different from zero (*t*-stat. = 14.63). The findings based on deciles of $BTM \leq 1$ are in the second set of columns. The returns are positive and nearly monotonic across deciles. The hedge return of 0.48% is significantly different from zero (*t*-stat. = 6.13), but noticeably smaller than the hedge return for the combined sample. This finding suggests that the variation in returns for $BTM > 1$ firms is important for the combined sample *BTM* hedge return. The third set of columns reveals the hedge return for deciles based on $BTM > 1$ is 0.84% (*t*-stat. = 5.24), which is smaller than that for the combined sample but larger than for deciles based on $BTM \leq 1$. Untabulated statistics reveal the 0.36% difference in hedge returns—0.84 – 0.48—is significant (*t*-stat. = 2.27).[13] These findings are consistent with Figure 3, which shows $BTM > 1$ firms have larger subsequent increases in equity market value than $BTM \leq 1$ firms.

A limitation of the univariate sorting approach in Table 4 is the inability to distinguish co-movement in multiple factors related to returns. Thus, we estimate Equation (2), which is

[13] To test whether the differences-in-differences are significantly different from zero, we follow Barth and Israeli's (2013) linear regression framework. Specifically, we estimate a regression based on observations in *BTM* deciles 1 and 10, where the deciles are constructed separately for $BTM > 1$ and $BTM \leq 1$. The dependent variable is average monthly returns and the explanatory variables are indicator variables for *BTM* decile 10 and $BTM > 1$ and an interaction of these two indicator variables. The coefficient on the interaction variable is the difference between $BTM > 1$ and $BTM \leq 1$ in the hedge returns based on return difference between deciles 10 and 1. We use a *t*-test to test whether the coefficient, and thus the difference-in-difference, is significantly different from zero.

based on the Carhart (1997) multifactor model, to test whether the findings in Table 4 apply only to *BTM* or to other previously identified risk factors.

$$HedgeRet_t = a + b\,BETA_t + s\,SML_t + h\,HML_t + g\,HML\_High_t + u\,UMD_t + \epsilon_t \qquad (2)$$

HedgeRet$_t$ is the average monthly hedge return obtained by taking a long (short) position in the top (bottom) *BTM* decile portfolio for 12 months beginning in July of year *t*. *BETA* is the CAPM beta factor, *SML* and *HML* are the Fama and French (1993) size and book-to-market factors, and *UMD* is the Carhart (1997) momentum factor. We obtain these factors from Ken French's data library. The nonlinearity in *BTM* evidenced in Figure 1 leads us to include in Equation (2) a modified *HML* factor, *HML_High*, which is constructed based on the Fama and French (1993) procedure for constructing *HML* but using only *BTM* > 1 firm-year observations, rather than the full distribution of *BTM*.

We estimate three versions of Equation (2), one that includes *HML* and excludes *HML_High*, one that includes *HML_High* and excludes *HML*, and one that includes them both. If *BTM* predicts returns differently depending on whether *BTM* > 1, we predict *g* > 0 and *h* is not significantly different from zero when *BTM* > 1. Following Lee and Swaminathan (2000), we use heteroskedasticity-robust standard errors to calculate test statistics for coefficients in Equation (2).

Table 5 presents summary statistics from estimating each version of Equation (2) based on the combined sample, when *BTM* ≤ 1, and when *BTM* > 1. The first set of columns presents results from the version of Equation (2) that includes *HML* but not *HML_High*. It reveals that for the combined sample and when *BTM* ≤ 1 the coefficients on *HML* are significantly positive (coefs. = 1.17 and 0.97; s.e. = 0.20 and 0.14). The Intercepts of 0.63 and 0.24 for the two samples are significantly different from zero (s.e. = 0.14 and 0.12), which indicates there are abnormal returns to a *BTM* hedging strategy in addition to those associated with *BETA*, *HML*, *SMB*, and *UMD*. When *BTM* > 1 the coefficient on *HML* is positive but not significantly different from zero (coef. = 0.31; s.e. = 0.23). This finding indicates, as predicted, that *HML* does not predict returns for firms with *BTM* > 1. In addition, Intercept of 0.37 is insignificantly different from zero.[14] These findings indicate that *BTM* > 1 is not simply an extension of *BTM* when predicting returns.

The second set of columns in Table 5 presents results from estimating the version of Equation (2) that includes *HML_High* but not *HML*. It reveals that for all three samples *HML_High* is significantly positively related to returns (coefs. = 1.13, 0.80, and 0.76; s.e. = 0.18, 0.16, and 0.26). That *HML_High* predicts returns for all three samples when *HML* is excluded from Equation (2) is not surprising in light of untabulated statistics that reveal the Pearson correlation between *HML* and *HML_High* is 0.45, which is significantly different from zero.

The third set of columns in Table 5 reveals that for the combined sample, *HML* and *HML_High* are both incrementally significantly positively associated with the hedge returns (coefs. = 0.92 and 0.54; s.e. = 0.18 and 0.21). These findings suggest that despite their significant positive correlation, *HML* and *HML_High* have different predictive ability for subsequent returns. Consistent with this difference and with our predictions, when *BTM* ≤ 1 (*BTM* > 1) *HML* (*HML_High*) is significantly positively associated with hedge returns and *HML_High* (*HML*) is not. When *BTM* ≤ 1, the *HML* (*HML_High*) coefficient and standard error are 0.86 and 0.14 (0.25 and 0.16); when *BTM* > 1, they are –0.04 and 0.19 (0.79 and 0.29).

[14] These findings may seem to suggest that there are no abnormal returns to a *BTM* hedging strategy when *BTM* > 1, which is inconsistent with the findings in Table 4. However, untabulated findings from estimating Equation (2) when *BTM* > 1 including only an intercept reveal a coefficient (*t*-statistic) of 0.62 (3.09). This finding indicates that the insignificant findings in Table 5 are attributable to low power induced by including explanatory variables that are uncorrelated with the dependent variable.

These findings indicate that *HML* (*HML_High*) incrementally predicts subsequent returns only when *BTM* ≤ 1 (*BTM* > 1).

What Type of Risk?

Finding that a risk factor is significantly associated with future hedge returns does not indicate the type of risk the factor reflects. Thus, we provide evidence on the extent to which *BTM* > 1 reflects types of risk potentially faced by investors in such firms. One type of risk is the possibility that the firm exits the sample because equity market values lower than equity book values could reflect investors' assessments of negative growth prospects for these firms. Another is macroeconomic risk because equity market values lower than equity book values could reflect greater sensitivity of the firm's equity market value to downturns in the economy. Consistent with this possibility, Petkova and Zhang (2005) finds that high *BTM* indicates greater sensitivity to macroeconomic conditions and Figure 2 reveals *BTM* > 1 occurs more frequently during recession years, except in the Extractives industry.

Exit risk

Firms typically exit the sample because of events such as delisting, bankruptcy, mergers, and acquisitions. Regardless of the reason, exit represents an adverse outcome to long-term investors because it limits the upside potential of their investment. We conduct two analyses to determine whether exit risk is a plausible explanation for *BTM* > 1 being a significant predictor of future hedge returns. First, we present univariate statistics to determine whether firms with *BTM* > 1 are more likely to exit the sample in the subsequent three years. Second, we estimate a multivariate relation between subsequent exit and *BTM* > 1, other risk factors, and variables likely associated with exit, as specified by Equation (3).

$$EXIT_{it} = \beta_1 \log(MVE)_{it} + \beta_2 \log(BTM)_{it} + \beta_3 HBTM_{it} + \beta_4 \log(BTM)_{it} \times HBTM_{it} + \beta_5 LEV_{it} + \beta_6 ROA_{it} + \beta_7 MOM_{it} + \gamma_t + \gamma_j + \epsilon_{it} \quad (3)$$

EXIT is an indicator variable that equals one if firm *i* exits the sample in years *t* + 1 to *t* + 3. *LEV* is the ratio of total debt to total assets and *ROA* is return on assets, i.e., the ratio of net income to lagged total assets. *MOM*, which underlies the *UMD* factor, is the firm's cumulative return beginning (ending) six months (one month) before end of fiscal year *t*. γ_t and γ_j are year and industry fixed effects.[15]

Table 6, Panel A, presents transition probabilities between *BTM* > 1 and *BTM* ≤ 1. We also include a category of "Not Present" to identify firms that exit the sample. Consistent with Table 2, Panel A of Table 6 reveals substantial persistence of *BTM* > 1 in that the likelihoods of maintaining *BTM* > 1 for one, two, and three subsequent years are 68.63%, 56.16%, and 48.28%. These statistics indicate that having *BTM* > 1 is slow to change over time. More importantly, Table 6, Panel A, also reveals that the frequencies of exit are similar when *BTM* > 1 and *BTM* ≤ 1. When *BTM* > 1 (*BTM* ≤ 1), the "Not Present" likelihoods for the subsequent three years are 6.58%, 12.63%, and 18.84% (7.60%, 14.66%, and 20.94%). In fact, these statistics reveal the probability of exit is smaller when *BTM* > 1, not larger.

Table 6, Panel B, presents summary statistics from estimating Equation (3). The coefficients on log(*MVE*), *LEV*, and *ROA* are significantly negative, positive, and negative (coefs. = –0.02, 0.05, and –0.07; s.e. = 0.002, 0.02, and 0.03), which indicate the likelihood of exit is decreasing in market value of equity and profitability and increasing in leverage. These findings suggest investors in more distressed firms—namely those with lower *MVE*, lower profitability, and higher financial leverage—face greater exit risk. More importantly for our

[15] We do not include firm fixed effects in Equation (3) because *EXIT* does not vary over time for a firm.

research question, despite the fact that firms with *BTM* > 1 have low *MVE*—at least relative to *BVE*—Panel B reveals that the coefficients on *HBTM* and log(*BTM*) × *HBTM* are not significantly different from zero (coefs. = –0.003 and 0.01; s.e. = 0.01 and 0.01). These findings reveal that *BTM* > 1 is not significantly related to exit. Taken together, the Table 6 findings provide no support for *BTM* > 1 reflecting exit risk.

Macroeconomic risk

Macroeconomic risk arises when a firm's equity returns are more sensitive to market returns during recessions. This higher sensitivity results in lower equity market values during the market downturn and higher returns subsequently during the market recovery. We conduct two analyses to determine whether macroeconomic risk is a plausible explanation for *BTM* > 1 as a significant predictor of future hedge returns. First, we evaluate *BTM* returns predictability separately in recession and non-recession years. If *BTM* > 1 reflects greater macroeconomic risk, we predict that *BTM* hedge returns are larger when based on *BTM* > 1 than when based on *BTM* ≤ 1 in recession years, and similar in non-recession years. Second, we estimate Equation (2) for non-recession years. If *BTM* > 1 reflects macroeconomic risk, we predict smaller hedge returns for *BTM* > 1 in non-recession years than in the full sample period.[16]

Table 7, Panel A, presents the average monthly returns to *BTM* decile portfolios for recession years. It reveals that the combined sample hedge return is larger than in the full sample period in Table 4, 1.83% versus 1.15%. As predicted, Panel A also reveals that the hedge return when *BTM* > 1 is significantly greater than the return when *BTM* ≤ 1, 1.52% versus 0.08%. Whereas the 1.52% is significantly positive, the 0.08% is not (*t*-stats. = 4.45 and 0.36).[17] Table

[16] We do not estimate Equation (2) for recession years because there are only eight such years.
[17] Harvey, Liu, and Zhu (2016) shows that a factor explaining the cross-section of expected returns should have a *t*-stat greater than 3. Based on this benchmark, when *BTM* ≤ 1 in recession years, *BTM* does not have significant predictability for expected returns.

7, Panel B, presents analogous statistics for non-recession years. Also as predicted, it reveals that the hedge returns for *BTM* > 1 and *BTM* ≤ 1 are similar, 0.62% versus 0.53%, and untabulated statistics reveal that these returns are not significantly different (diff. = 0.11%; *t*-stat. = 0.58). These findings complement those in Petkova and Zhang (2005) by revealing that subsequent returns associated with poor macroeconomic conditions are concentrated in firms with *BTM* > 1.

Table 8 presents summary statistics from estimating Equation (2) based on non-recession years. As in Table 5, the first set of columns in Table 8 reveal that for the combined sample and when *BTM* ≤ 1 the coefficient on *HML* is significantly positive (coefs. = 1.12 and 0.97; s.e. = 0.22 and 0.16) and when *BTM* > 1 the coefficient on *HML* is not significantly different from zero (coef. = 0.17; s.e. = 0.24). Also as in Table 5, the Intercepts for the combined sample and when *BTM* ≤ 1 (*BTM* > 1) are significantly positive (is insignificantly different from zero).

The next two sets of columns present findings from the remaining versions of Equation (2), which are consistent with our predictions. As in Table 5, the first set reveals that *HML_High* is significantly positively related to hedge returns for all three samples. However, as predicted and consistent with *BTM* > 1 indicating macroeconomic risk, the coefficient on *HML_High* when *BTM* > 1 is much smaller than in Table 5 (coef. = 0.45 versus 0.76), which is not the case for the other two samples. For the combined sample (when *BTM* ≤ 1) the coefficients are 1.02 and 1.13 (0.87 and 0.80) in Tables 5 and 8. The final set of columns reveals that for the combined sample and when *BTM* ≤ 1, *HML* and *HML_High* are significantly positively incrementally associated with hedge returns (coefs. = 0.97, 0.42, 0.83, and 0.36; s.e. = 0.21, 0.21, 0.15, and 0.18). When *BTM* > 1, as in Table 5, *HML* is not significant in explaining hedge returns (coefs. = –0.003 and 0.45; s.e. = 0.21 and 0.24), but *HML_High* is. However, as with the prior set of columns, *HML_High*'s coefficient is considerably smaller than in Table 5, 0.45 versus 0.79, as predicted Taken together, the findings in Table 8 support the inference that firms exhibit greater macroeconomic risk when *BTM* > 1.

V. Mispricing Associated with Investor Myopia?

Fama (1970, 1998) explains that without a model of expected returns, *BTM* hedge returns cannot be identified as relating to rational pricing of risk or to mispricing. One alternative to risk-based explanations is that investor myopia causes firms with low (high) *BTM* to be overpriced (underpriced) (Rosenberg, Reid, and Lanstein 1985; Lakonishok, Shleifer, and Vishny 1994; Daniel and Titman 1997).

Piotroski (2000) develops *FSCORE* as a metric to distinguish high *BTM* firms that are more likely to be mispriced from those that have greater risk associated with weaker fundamentals. A firm's *FSCORE* for each year is the sum of nine financial signals selected to reflect a firm's fundamental performance along three dimensions: profitability, financial leverage and liquidity, and operating efficiency. The signals are set to one (zero) if the signal's realization in the year is a positive (negative) indicator of future profitability and cash flows.[18] Piotroski (2000) finds that the top *BTM* quintile firms with *FSCORE* = 8 or 9 earn larger subsequent returns than top *BTM* quintile firms with *FSCORE* = 0 or 1. This finding suggests that large subsequent returns for high *BTM* firms more likely are attributable to firms with high, not low, *FSCORE*, which is inconsistent with the returns being compensation for bearing risk associated weak fundamentals (Fama and French, 1995; Chen and Zhang, 1998). Thus, the returns more likely arise from mispricing. Consistent with the mispricing interpretation, Piotroski and So

[18] See Appendix A for details on the construction of *FSCORE*.

(2012) finds that firms with high *BTM* and high *FSCORE* are undervalued because investors erroneously have pessimistic expectations for these firms.

Mispricing-based explanations for *BTM* hedge returns often contend that investors myopically fixate on past performance and overlook the tendency of firm performance to mean revert. For example, Lakonishok, Shleifer, and Vishny (LSV, 1994) posits that investors over-extrapolate past sales growth. Although investors might over-extrapolate changes in fundamentals, such as sales growth, it is not obvious that such over-extrapolation also applies to levels of fundamentals. Finding that subsequent returns for firms with high *FSCORE* arise from mispricing is not necessarily inconsistent with investors over-extrapolating past performance because *FSCORE* comprises levels and changes components. Based on LSV, we predict investors over-extrapolate changes in fundamentals, but not levels, when forecasting future performance. Thus, the subsequent returns for firms with high *FSCORE* could arise from investor myopia if the high *FSCORE* reflects strong, but weakening fundamentals.

To test this prediction, we separate *FSCORE* into two components: *FSCORE_Level* and *FSCORE_Change*. *FSCORE_Level* is the sum of the four *FSCORE* components that relate to levels of fundamentals. These are the components that equal one if return on assets is positive, operating cash flow is positive, accruals is income-decreasing, or the firm does not issue new equity. *FSCORE_Change* is the sum of the remaining five *FSCORE* components, all of which relate to changes in fundamentals. These are the components that equal one if return on assets increases, the current ratio increases, leverage decreases, gross-margin-to-sales ratio increases, or sales turnover increases. By construction, *FSCORE_Level* (*FSCORE_Change*) varies from 0 to 4 (0 to 5). We estimate *FSCORE*, *FSCORE_Level*, and *FSCORE_Change* for the combined sample and separately when *BTM* > 1 and when *BTM* ≤ 1. We predict that high *FSCORE* comprises higher *FSCORE_Level* and lower *FSCORE_Change* when *BTM* > 1.

Table 9 presents descriptive statistics for *FSCORE*. It reveals that for the combined sample mean *FSCORE* is 5.26, mean *FSCORE_Level* is 2.72, and mean *FSCORE_Change* is 2.53. When *BTM* ≤ 1, mean *FSCORE* is 5.21 and mean *FSCORE_Level* (*FSCORE_Change*) is 2.63 (2.58), which is lower (higher) than for the combined sample. However, when *BTM* > 1 mean *FSCORE* is 5.39, which— consistent with the findings in Piotroski (2000)—is higher, not lower, than when *BTM* ≤ 1 and for the combined sample. This finding reveals that firms with *BTM* > 1 are not more distressed than firms with *BTM* ≤ 1. More importantly, when *BTM* > 1, mean *FSCORE_Level* (*FSCORE_Change*) is 2.97 (2.42), which is higher (lower) than for the combined sample and when *BTM* ≤ 1. Untabulated statistics reveal that these means differ significantly. Thus, although firms with *BTM* > 1 have higher *FSCORE* than firms with *BTM* ≤ 1, the higher *FSCORE* results from higher *FSCORE_Level*. Firms with *BTM* > 1 have lower *FSCORE_Change*. These findings are consistent with investors over-extrapolating weakening firm fundamentals, which results in understated *MVE* for firms with *BTM* > 1 arising from mispricing.

Figure 4, Panel A, presents two overlapping distributions of *FSCORE* by *BTM* level. When *BTM* ≤ 1 (*BTM* > 1), the distribution appears red (blue); when they overlap it appears purple. Panel A reveals that when *BTM* > 1, there is a greater density of high *FSCORE* values (specifically, values 7, 8, and 9), which is consistent with Piotroski (2000) and Table 9 in indicating that *BTM* > 1 is associated with stronger, not weaker, financial performance. Figure 4, Panels B and C, present distributions of *FSCORE_Level* and *FSCORE_Change*. Panel B reveals that the distribution of *FSCORE_Level* is generally left-skewed, but significantly more so when

BTM > 1. More than 30% (Less than 15%) of observations have *FSCORE_Level* equal to four when *BTM* > 1 (*BTM* ≤ 1). These distributions indicate that firms with *BTM* > 1 have stronger fundamental levels than firms with *BTM* ≤ 1. The distribution of *FSCORE_Change* in Panel C is noticeably more symmetric than that of *FSCORE_Level*. However, when *BTM* > 1 (*BTM* ≤ 1) there is a greater (lower) density of observations in the lower half of the *FSCORE_Change* distribution. Thus, Panel C indicates that, on average, firms with *BTM* > 1 have weakening fundamental performance.

Separating *FSCORE* into its level and change components offers insights into the dynamics of investor expectations of future performance relative to firm fundamentals. In particular, the negative association between *BTM* > 1 and *FSCORE_Change* suggests investors myopically over-extrapolate changes in firms' fundamentals. Similarly, the positive association between *BTM* > 1 and *FSCORE_Level* suggests investors under-extrapolate levels of firms' fundamentals. These findings suggest the larger hedge returns associated with *BTM* > 1 result, at least in part, from low *MVE* associated with investor myopia.

VI. Summary and Concluding Remarks

Motivated by the prominence of equity book-to-market ratios, *BTM*, in accounting and finance, the question we address is why equity book-to-market ratios that are greater than one are not rare occurrences in light of conservative U.S. accounting practices. Our specific research questions are: When do equity book values greater than equity market values occur? Are they attributable to accounting practices that potentially overstate equity book values? Are they attributable to low equity market values and, if they are, are the low market values indicative of different risk faced by investors in these firms or of mispricing? Addressing these questions provides insights into how accountants and investors should interpret *BTM* greater than one.

Our first set of analyses reveals that 28% of firm-year observations have *BTM* > 1, and *BTM* > 1 occurs in substantial proportions in every industry and year. These statistics confirm that *BTM* > 1 is pervasive, not rare. Our findings also reveal that *BTM* is persistent from one year to the next. We also find a nonlinearity in how *BTM* increases across its deciles and that the nonlinearity occurs when *BTM* > 1, which suggests *BTM* > 1 is not simply an extension of the *BTM* ≤ 1 distribution. We find that firms with *BTM* > 1 experience increases in equity book value in the subsequent three years, which is inconsistent with overstatement of equity book values explaining *BTM* > 1. These firms also experience significantly larger subsequent increases in market value of equity, which is consistent with low equity market values explaining *BTM* > 1.

Our second set of analyses reveals no evidence to suggest the pervasiveness of *BTM* > 1 is explained by accounting practices that could overstate equity book value. In particular, firms with *BTM* > 1 do not have significantly more recognized goodwill, recognized other intangible assets, unrecognized operating lease obligations, and net pension obligations regardless of whether we consider these items separately or together.

Our third set of analyses reveals that *BTM* > 1 is explained by low equity market value. In particular, we find that a hedge strategy of taking a long (short) position in the top (bottom) decile of *BTM* > 1 generates significantly higher returns than analogous deciles of *BTM*. We also find that the Fama and French (1993) *HML* risk factor, which is based on the full distribution of *BTM*, explains subsequent returns when *BTM* ≤ 1, but not when *BTM* > 1. An alternative *HML* factor constructed using only *BTM* > 1 observations is significantly positively associated with *BTM* hedge returns when *BTM* > 1. These findings suggest that *BTM* > 1 reflects risk, but not the same risk that *BTM* ≤ 1 reflects. We find no evidence that investors in *BTM* > 1 firms face greater risk associated with the firm exit. In fact, the probability of exit is smaller when *BTM* > 1, not larger. We find that *BTM* > 1 is more prevalent during recession years and the larger hedge return associated with *BTM* > 1 is concentrated in recession years, which supports the inference that investors in firms with *BTM* > 1 face greater macroeconomic risk.

We determine whether investor mispricing of fundamental performance helps explain subsequent returns for firms with *BTM* > 1. If *BTM* > 1 poses greater financial or operating risk to investors, we expect weaker financial health when *BTM* > 1. However, firms with *BTM* > 1 have stronger, not weaker, financial health as measured by Piotroski's (2000) *FSCORE* than firms with *BTM* ≤ 1. Separating *FSCORE* into its levels and changes components reveals that firms with *BTM* > 1 exhibit higher levels of, but weakening fundamentals. We interpret these findings as evidence that *BTM* > 1 results from low market values associated with investors over-extrapolating decreases in firms' fundamentals and under-extrapolating strong levels of fundamentals.

In sum, our findings reveal that *BTM* > 1 is pervasive and persistent. The findings also reveal that the pervasiveness of *BTM* > 1 is not attributable to potentially overstated equity book values. These findings call into question the use of *BTM* as an indicator of conservative accounting for the nearly 30% of firms that have *BTM* > 1. Instead, our findings reveal that the pervasiveness of *BTM* > 1 is attributable to low equity market values. These low equity market values partially are attributable to macroeconomic risk and other unidentified risk faced by investors in these firms that is different from the risk faced by investors in other firms. These findings call into question the use of the Fama and French (1992) *HML* factor in reflecting risk for firms with *BTM* > 1. Our findings also reveal that mispricing associated with investor myopia in over-extrapolating recent weakening in firm's fundamental performance contributes to the low equity market values underlying *BTM* > 1. Taken together, our findings reveal that the equity book-to-market ratio threshold of one has meaningful implications for accounting and finance.

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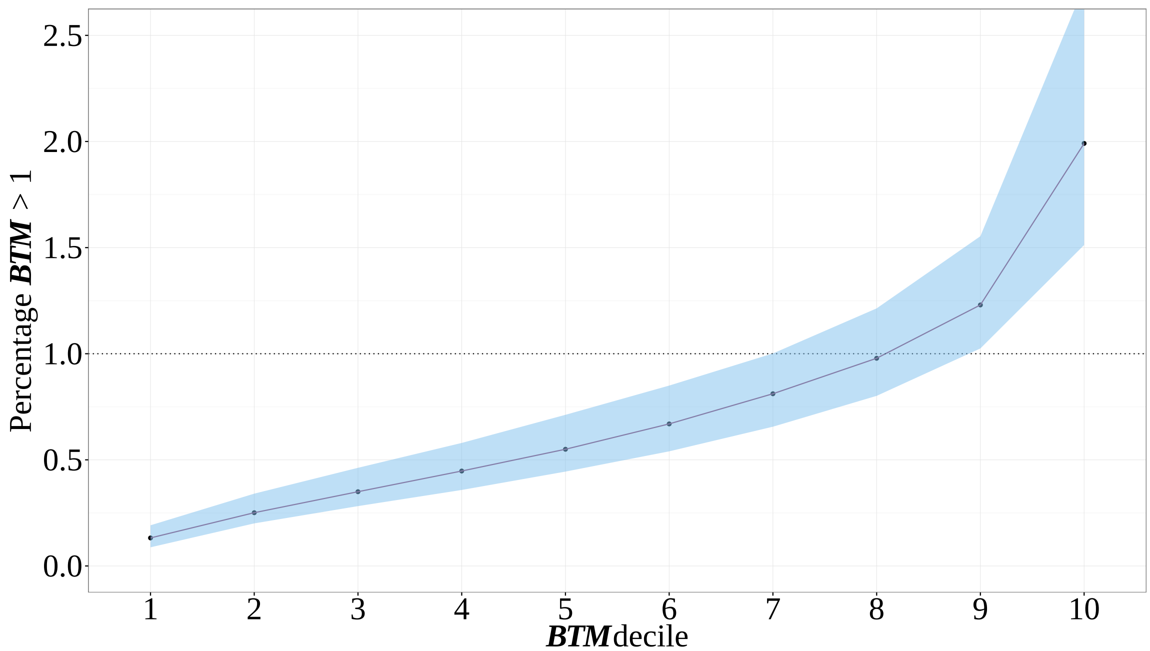
APPENDIX A
Variable definitions

<table>
<tr><th>Variable</th><th>Definition</th></tr>
<tr><td>AR</td><td>Net accounts receivable at the end of the year</td></tr>
<tr><td>BETA</td><td>Fama and French (1993) CAPM market return factor</td></tr>
<tr><td>BTM</td><td>Book-to-market ratio, defined as BVE divided by MVE</td></tr>
<tr><td>BVE</td><td>Book value of equity at the end of the year, defined as stockholder’s book equity (COMPUSTAT item SEQ) plus balance sheet deferred taxes and investment tax credit (TXDITC) minus the redemption value of preferred stock (PSTKRV). If SEQ is not available, we consider two substitutes: the sum of common stockholder’s book equity (CEQ) and par value of preferred stock (PSTK), and the difference between book value of total assets (AT) and book value of total liabilities (LT). If neither of these is available, we treat the observation as missing. If TXDITC is not available, we assume it equals zero. If PSTKRV is not available, we consider two substitutes: liquidating value of preferred stock (PSTKL), and par value of preferred stock (PSTK). If neither is available, we treat the observation as missing.</td></tr>
<tr><td>CFO</td><td>Cash flow from operations scaled by beginning-of-year total assets</td></tr>
<tr><td>CHE</td><td>Cash and cash equivalents at the end of the year</td></tr>
<tr><td>EXIT</td><td>Indicator variable equaling one if the firm exits the sample in years $t + 1$ to $t + 3$ after portfolio formation</td></tr>
<tr><td>FSCORE</td><td>Piotroski (2000) measure of financial strength, defined as the sum of nine indicator variables:
<table>
<tr><td>F_ACCRUA</td><td>= 1 if CFO > ROA</td></tr>
<tr><td>F_CFO</td><td>= 1 if CFO > 0</td></tr>
<tr><td>F_EQOFFER</td><td>= 1 if the firm did not issue common equity</td></tr>
<tr><td>F_ROA</td><td>= 1 if ROA > 0</td></tr>
<tr><td>F_ΔROA</td><td>= 1 if change in ROA is positive</td></tr>
<tr><td>F_ΔLEVER</td><td>= 1 if change in ratio of long-term debt to average total assets is negative</td></tr>
<tr><td>F_ΔLIQUID</td><td>= 1 if change in current ratio is positive</td></tr>
<tr><td>F_ΔMARGIN</td><td>= 1 if change in the ratio of gross margin to total sales is positive</td></tr>
<tr><td>F_ΔTURN</td><td>= 1 if change in the ratio of total sales to beginning total assets is positive</td></tr>
</table></td></tr>
<tr><td>FSCORE_Change</td><td>Sum of F_ΔROA, F_ΔLEVER, F_ΔLIQUID, F_ΔMARGIN, and F_ΔTURN</td></tr>
<tr><td>FSCORE_Level</td><td>Sum of F_ROA, F_CFO, F_ACCRUAL, and F_EQOFFER</td></tr>
<tr><td>HBTM</td><td>Indicator variable equaling one if BTM > 1</td></tr>
</table>

HedgeRet	The difference between the mean of average monthly return over the next twelve months among firms with *BTM* in the 10th decile and *BTM* in the 1st decile at the end of June
HML	Fama and French (1993) High Minus Low return factor
HML_High	Modified *HML* factor based only on observations when *BTM* > 1
INVT	Total inventory at the end of the year
LT	Total liabilities at the end of the year
MOM	Cumulative buy and hold stock return over the six months prior to portfolio formation, omitting the month of portfolio formation
MVE	Market value of equity, defined as the product of number of shares outstanding and share price at the end of December
OA	Other assets, defined as total assets at the end of the year minus *CHE*, *AR*, *INVT*, *PPE*, $INTAN_{NOGW}$, and *GW*
OPLEASE	Present value of future minimum operating lease payments for the next five years, based on an 8% discount rate
PENSION	Net pension obligation, calculated as the projected pension obligation less fair value of plan assets at the end of the year
PPE	Net property, plant, and equipment assets at the end of the year
Ret	Average monthly return for the twelve months starting from July of year t to June of year t + 1
SMB	Fama and French (1993) Small Minus Big return factor
ROA	Return on assets, defined as net income before extraordinary items scaled by beginning-of-year total assets
UMD	Carhart (1997) Up Minus Down momentum return factor

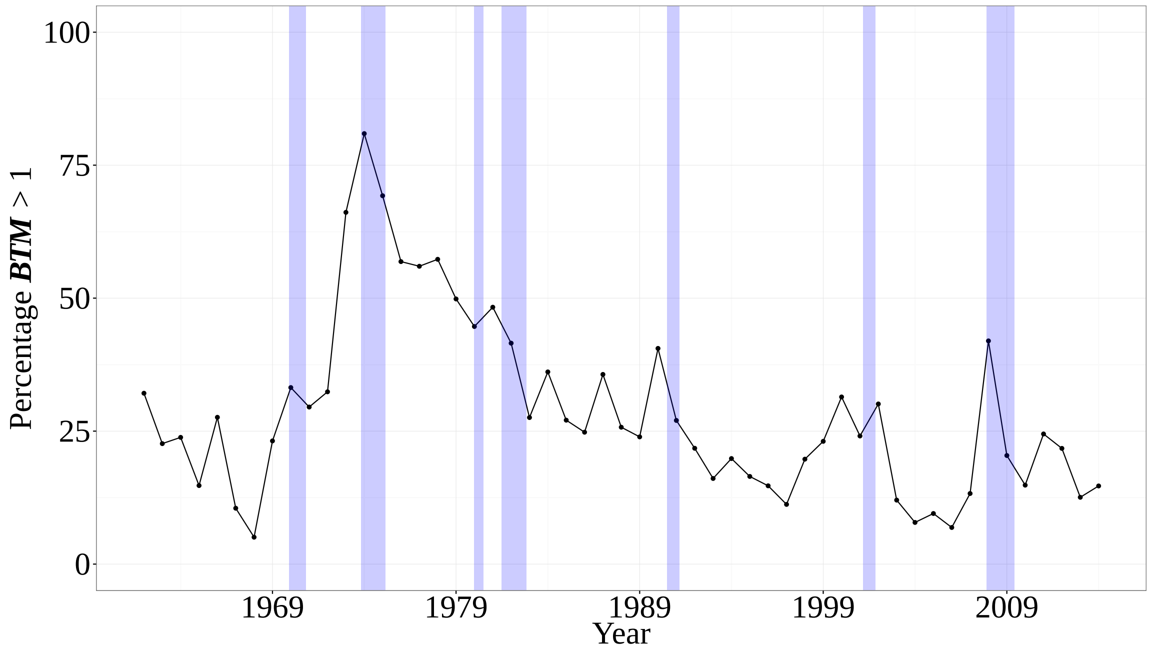
Figure 1: Distribution of book-to-market ratio (BTM) by decile



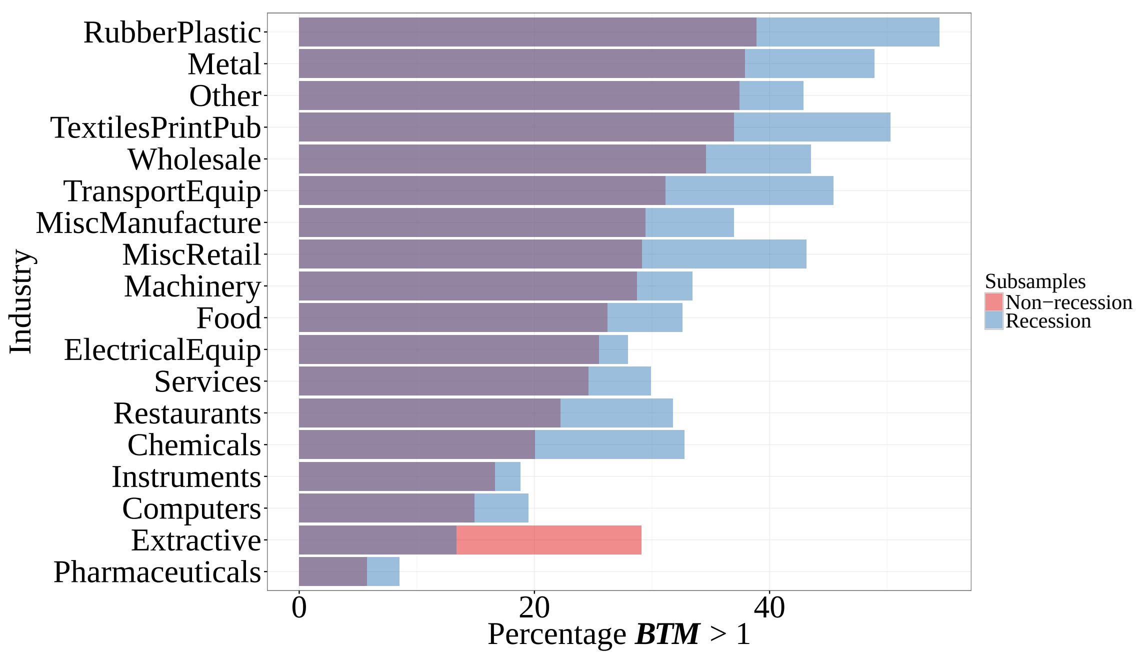
This figure presents the distribution of equity book-to-market ratios (BTM) by BTM decile. The deciles are formed at the end of June of each calendar year. Median BTM for each decile is indicated with a solid dot, which is connected across deciles by a solid line. The shaded region around the median indicates the 25th and 75th percentiles of BTM for each decile. The dotted horizontal line identifies $BTM = 1$ for reference. The sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016.

Figure 2: Percentage of firm-years with book-to-market ratios (BTM) greater than one by year

Panel A: By year



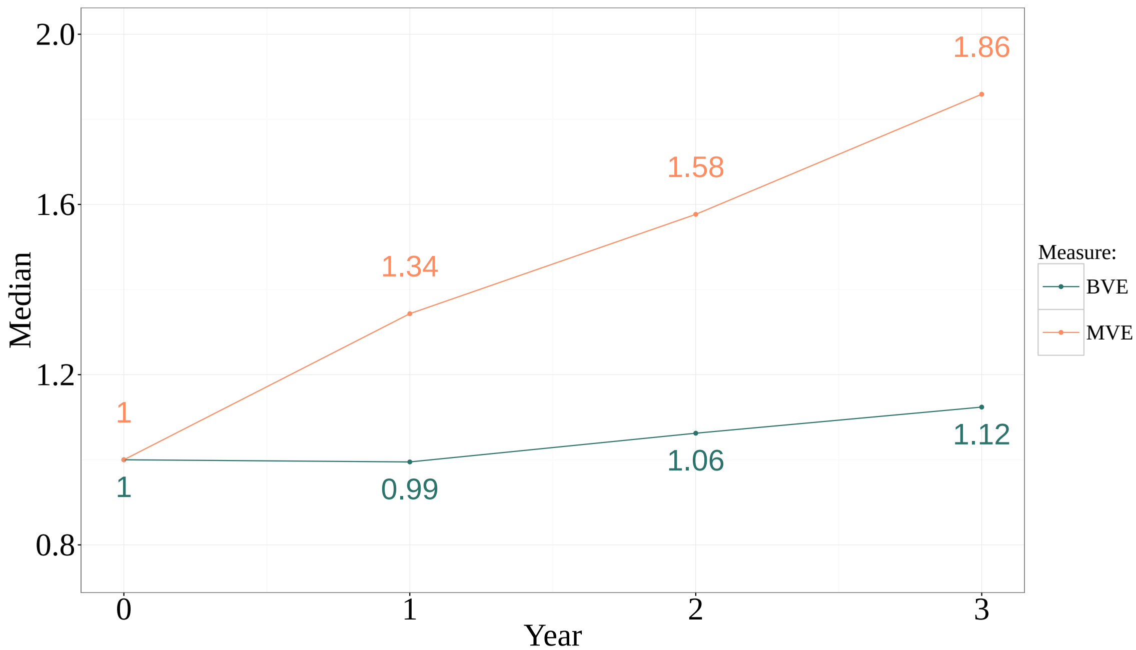
Panel B: By industry



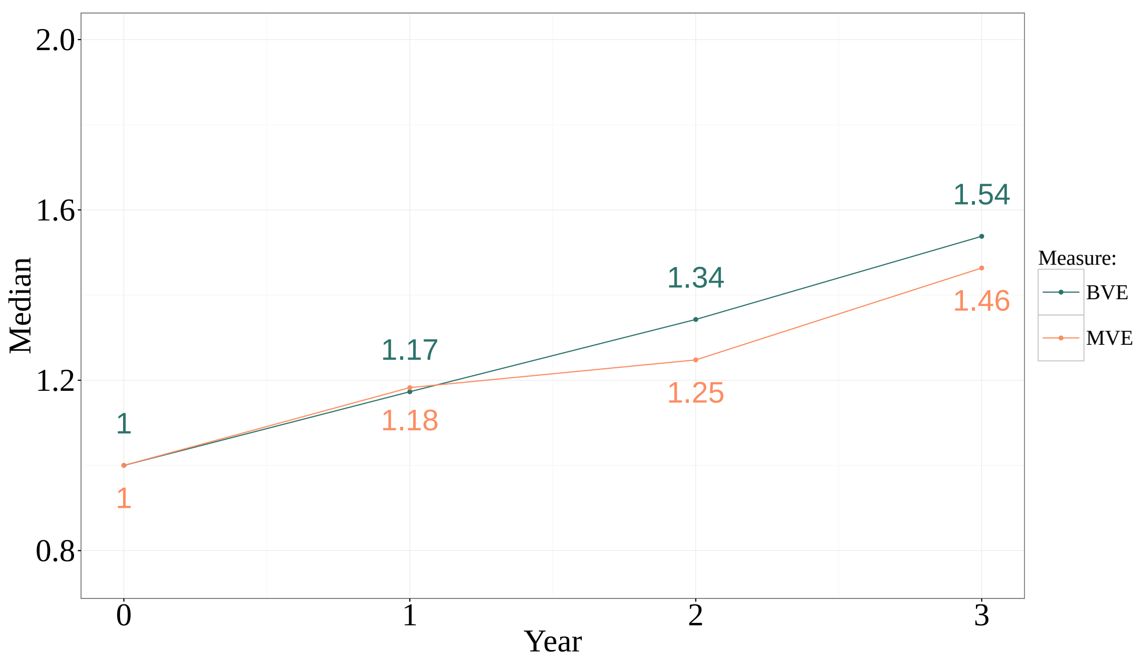
Panel A (B) presents a graph, by year (industry), of the percentage of firm-years with $BTM > 1$. Industries are defined following Barth, Beaver, Hand, and Landsman (1999). The sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016.

Figure 3: Evolution of components of book-to-market ratio (BTM)

Panel A: $BTM > 1$



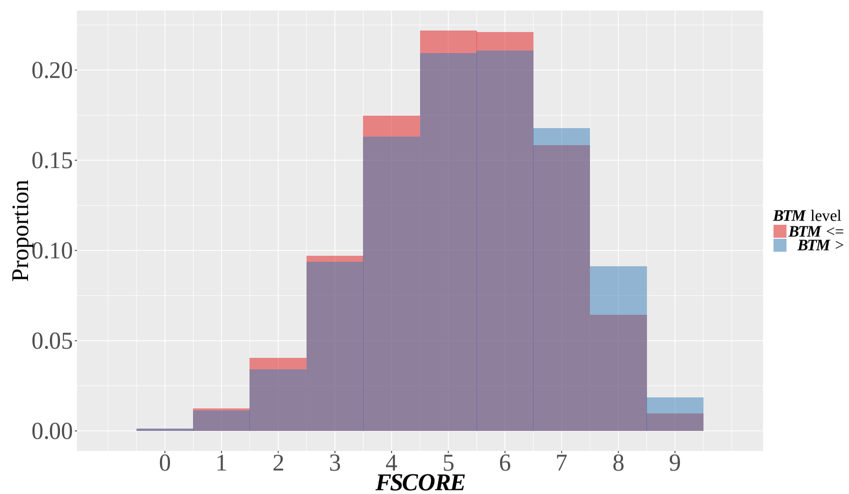
Panel B: $BTM \leq 1$



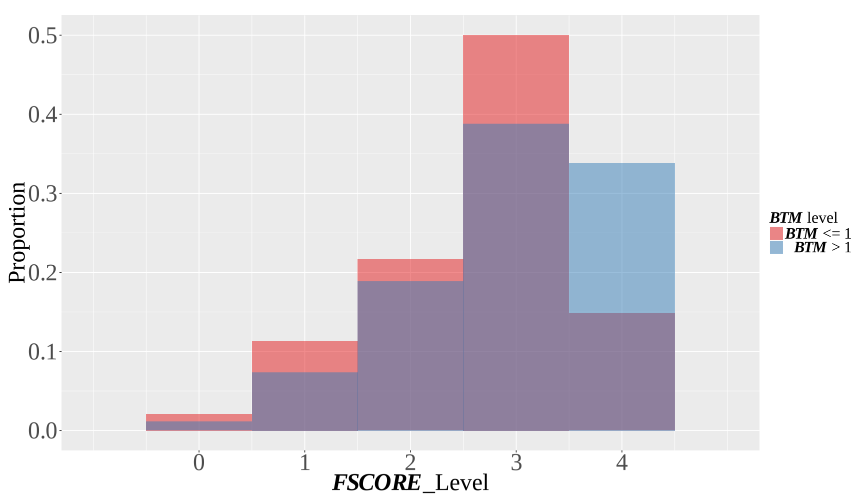
This figure presents the evolution of the components of the equity book-to-market ratio (BTM): book value of equity (BVE) and market value of equity (MVE). Panel A (B) presents, for the sample of firms with $BTM >$ ($\leq$) 1, median book and market values of equity over the three years subsequent to decile formation. All medians are scaled by year 0 values to present relative changes. The sample comprises 8,900 (19,300) annual observations in Panel A (B) from U.S. firms between 1962 and 2016.

Figure 4: Book-to-market ratio (BTM) and $FSCORE$

Panel A: $FSCORE$ distribution



Panel B: $FSCORE\_Level$ distribution



Panel C: $FSCORE\_Change$ distribution

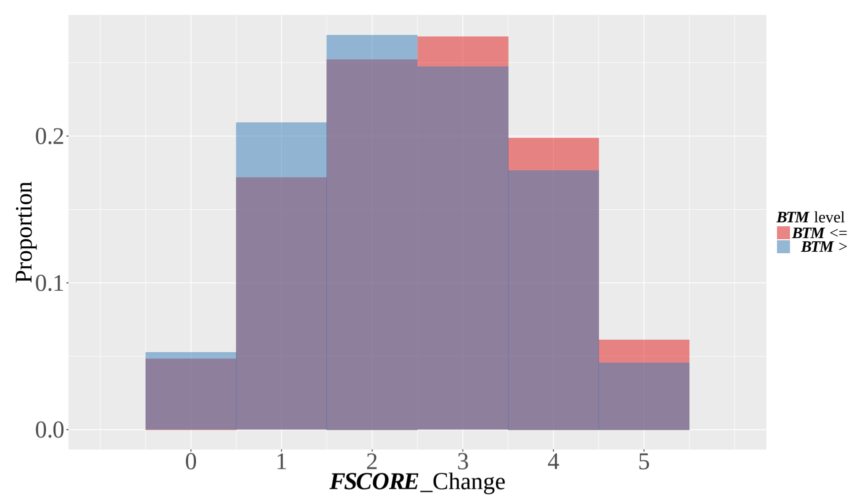


Figure 4: Book-to-market ratio (BTM) and $FSCORE$ (continued)

This table presents summary statistics on the relation between equity book-to-market ratios (BTM) and Piotroski's (2000) $FSCORE$. Panel A presents the distribution of $FSCORE$. Panels B and C present distributions of $FSCORE\_Level$ and $FSCORE\_Change$, where $FSCORE\_Level$ ($FSCORE\_Change$) is the sum of $FSCORE$ components pertaining to levels of (changes in) fundamentals. The sample comprises annual observations from 8,654 U.S. firms between 1962 and 2016. The combined ($BTM \leq 1$; $BTM > 1$) sample comprises 100,135 (71,705; 28,430) observations.

Table 1: Descriptive statistics

	Combined sample		$BTM \leq 1$		$BTM > 1$	
Variable	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
BTM	0.86	1.31	0.49	0.25	1.84	2.18
BVE	960.46	4989.03	1023.36	4994.53	796.90	4971.07
MVE	2218.38	12512.72	2857.13	14546.06	557.34	3110.24
$HBTM$	0.28	0.45	0.00	0.00	1.00	0.00

This table presents descriptive statistics for variables used in our analyses. All variable definitions appear in Appendix A. The combined sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016.The $BTM \leq 1$ ($BTM > 1$) sample comprises 85,420 (32,848) observations. BTM is the equity book-to-market ratio.

Table 2: Transition matrix of book-to-market ratio (BTM)

***BTM* decile in year 0** \ ***BTM* decile in year 1**	1	2	3	4	5	6	7	8	9	10
10	0.19	0.25	0.49	0.60	1.37	2.07	4.46	6.93	19.77	56.70
9	0.25	0.54	1.01	1.80	3.16	4.87	9.64	19.21	32.30	18.47
8	0.42	0.93	2.13	3.29	5.62	9.44	15.40	25.89	19.70	6.93
7	0.71	1.54	2.77	5.05	9.12	17.15	26.69	18.53	10.17	3.95
6	0.83	2.62	4.77	9.42	17.06	24.06	17.65	10.43	5.07	2.18
5	1.66	4.39	9.64	17.73	22.87	17.63	9.10	5.92	2.76	1.48
4	3.11	9.35	18.28	24.13	18.46	8.92	4.59	3.20	1.63	1.15
3	7.01	19.13	27.57	19.19	9.06	4.51	2.33	2.02	1.19	0.59
2	19.17	35.99	19.85	8.12	3.83	2.15	1.24	1.06	0.54	0.48
1	59.26	18.53	6.01	3.14	1.66	1.09	0.81	0.81	0.66	0.55

This table presents a one-year transition matrix that shows, for deciles of equity book-to-market ratios (BTM) formed in year 0, the percentage of firms in each decile in year 1. Deciles 1-7 are formed using the $BTM \leq 1$ sample and Deciles 8-10 are formed using the $BTM > 1$ sample. The combined sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016.

Table 3: Regressions of an indicator for whether equity book-to-market ratio (BTM) is greater than one, $HBTM$, on components of book value of equity

Panel A: Descriptive statistics

	Combined sample		$BTM \leq 1$		$BTM > 1$	
Variable	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
GW	0.03	1.69	0.02	0.05	0.07	3.21
$INTAN_{NOGW}$	0.01	0.10	0.01	0.04	0.01	0.17
$OPLEASE$	0.01	0.08	0.01	0.03	0.01	0.14
$PENSION$	0.00	0.04	0.00	0.02	0.00	0.08
CHE	0.05	2.33	0.03	0.07	0.10	4.42
AR	0.06	1.32	0.04	0.12	0.11	2.50
$INVT$	0.05	0.29	0.04	0.08	0.08	0.54
PPE	0.13	1.57	0.09	0.16	0.22	2.96
OA	0.11	6.89	0.03	0.10	0.30	13.06
LT	0.24	7.55	0.14	0.26	0.49	14.32

Table 3: Regressions of an indicator for whether equity book-to-market ratio (BTM) is greater than one, $HBTM$, on components of book value of equity (continued)

$$HBTM_{it} = \beta_1 GW_{it} + \beta_2 INTAN_{NOGWit} + \beta_3 PENSION_{it} + \beta_4 OPLEASE_{it} + \beta_5 CHE_{it} \\ + \beta_6 AR_{it} + \beta_7 INVT_{it} + \beta_8 PPE_{it} + \beta_9 OA_{it} + \beta_1 0LT_{it} + \gamma_i + \gamma_t + \varepsilon_{it}$$

Panel B: Regression summary statistics

	Dependent variable:				
	$HBTM$				
	(1)	(2)	(3)	(4)	(5)
GW	0.01				0.01
	(0.02)				(0.02)
$INTAN_{NOGW}$		0.03*			0.03
		(0.02)			(0.02)
$OPLEASE$			−0.01		0.16
			(0.09)		(0.11)
$PENSION$				−0.10	−0.09
				(0.08)	(0.09)
CHE	0.001	0.002	0.002	0.003**	0.0002
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
AR	−0.04**	−0.05**	−0.04**	−0.02	−0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
$INVT$	0.23	0.23	0.22	0.01	0.03
	(0.15)	(0.14)	(0.14)	(0.06)	(0.09)
PPE	−0.004	−0.01	−0.004	0.0001	−0.01
	(0.003)	(0.005)	(0.005)	(0.002)	(0.01)
OA	0.003	0.002	0.003	−0.002	−0.003
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
LT	−0.01	−0.001	−0.003	0.004	0.01
	(0.01)	(0.01)	(0.01)	(0.005)	(0.01)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	118,268	118,268	118,268	81,931	81,931
Adjusted R^2	0.40	0.40	0.40	0.35	0.35

Table 3: Regressions of an indicator for whether equity book-to-market ratio (BTM) is greater than one, $HBTM$, on components of book value of equity (continued)

This table presents descriptive statistics and regression summary statistics from the estimation of Equation (1). In Panel A, the $BTM \leq 1$ ($BTM > 1$) sample comprises 71,705 (28,430) observations. The sample is 81,931 for analyses that employ $PENSION$. In Panel B, standard errors clustered by firm and year appear in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%. All variable definitions appear in Appendix A. The sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016.

Table 4: Mean returns by equity book-to-market ratio (BTM) decile

	Combined sample		$BTM \leq 1$		$BTM > 1$	
BTM Decile	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
1	1.18	5.48	1.12	5.68	2.07	4.72
2	1.29	5.00	1.14	4.88	2.05	5.52
3	1.42	4.47	1.25	5.28	2.11	4.22
4	1.49	4.67	1.34	4.66	2.03	4.76
5	1.53	4.52	1.34	4.54	2.10	4.23
6	1.66	4.27	1.43	4.40	2.41	4.99
7	1.70	4.37	1.45	4.33	2.51	4.93
8	1.74	4.45	1.52	4.29	2.40	5.04
9	2.01	4.94	1.49	4.51	2.72	6.08
10	2.33	6.52	1.59	4.39	2.91	7.92
Q10−Q1:	1.15		0.48		0.84	
t-stat:	14.63		6.13		5.24	

This table presents the mean monthly return to portfolios formed by BTM decile. The combined sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016. The $BTM \leq 1$ ($BTM > 1$) sample comprises 85,420 (32,848) observations.

Table 5: Annual regressions of hedge portfolio returns

$$HedgeRet_t = a + bBETA_t + sSML_t + hHML_t + gHML\_High_t + uUMD_t + \varepsilon_t$$

	Dependent variable: HedgeRet								
Sample:	Combined	$BTM \leq 1$	$BTM > 1$	Combined	$BTM \leq 1$	$BTM > 1$	Combined	$BTM \leq 1$	$BTM > 1$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
BETA	0.04	−0.11	0.29	-0.28^{*}	-0.37^{**}	0.20	−0.03	−0.14	0.19
	(0.12)	(0.09)	(0.19)	(0.16)	(0.15)	(0.16)	(0.11)	(0.10)	(0.17)
HML	1.17^{***}	0.97^{***}	0.31				0.92^{***}	0.86^{***}	−0.04
	(0.20)	(0.14)	(0.23)				(0.18)	(0.14)	(0.19)
HML_High				1.13^{***}	0.80^{***}	0.76^{***}	0.54^{**}	0.25	0.79^{***}
				(0.18)	(0.16)	(0.26)	(0.21)	(0.16)	(0.29)
SMB	0.43^{***}	0.05	−0.06	0.14	−0.18	−0.18	0.35^{**}	0.01	−0.19
	(0.16)	(0.12)	(0.22)	(0.17)	(0.14)	(0.19)	(0.15)	(0.12)	(0.21)
UMD	−0.05	0.01	0.03	0.09	0.09	0.17	0.05	0.06	0.17
	(0.13)	(0.10)	(0.22)	(0.17)	(0.15)	(0.18)	(0.11)	(0.11)	(0.19)
Intercept	0.63^{***}	0.24^{**}	0.37	0.92^{***}	0.54^{***}	0.29	0.59^{***}	0.22^{*}	0.30
	(0.14)	(0.12)	(0.30)	(0.21)	(0.18)	(0.23)	(0.12)	(0.11)	(0.26)
Observations	53	53	53	53	53	53	53	53	53
Adjusted R^2	0.58	0.66	-0.001	0.38	0.36	0.14	0.63	0.67	0.13

Table 5: Annual regressions of hedge portfolio returns (continued)

This table presents summary statistics from a regression of annual hedge portfolio returns on the Fama-French (1993) and Carhart (1997) risk factors. HML_High is a modification of HML based on instances of equity book-to-market ratios (BTM) > 1. Heteroskedasticity-robust standard errors appear in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%. All variable definitions appear in Appendix A. The combined sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016.The $BTM \leq 1$ ($BTM > 1$) sample comprises 85,420 (32,848) observations.

Table 6: Exit risk

Panel A: Likelihood of $BTM > 1$ from year 0 to year 3, in percentages

BTM in Year 0	BTM in Year N	Year 1	Year 2	Year 3
$BTM > 1$	$BTM > 1$	68.63	56.16	48.28
	$BTM \leq 1$	24.80	31.21	32.88
	Not Present	6.58	12.63	18.84
$BTM \leq 1$	$BTM > 1$	9.72	12.13	12.85
	$BTM \leq 1$	82.68	73.20	66.21
	Not Present	7.60	14.66	20.94

Table 6: Exit risk (continued)

$$EXIT_{it} = \beta_1 \log(MVE)_{it} + \beta_2 \log(BTM)_{it} + \beta_3 HBTM_{it} + \beta_4 \log(BTM)_{it} \times HBTM_{it}$$
$$+ \beta_5 LEV_{it} + \beta_6 ROA_{it} + \beta_7 MOM_{it} + \gamma_i + \gamma_t + \varepsilon_{it}$$

Panel B: Probability of exit

	Dependent variable:
	EXIT
$\log(MVE)$	-0.02^{***}
	(0.002)
$\log(BTM)$	0.005
	(0.01)
$HBTM$	-0.003
	(0.01)
$\log(BTM)\times HBTM$	0.01
	(0.01)
LEV	0.05^{***}
	(0.02)
ROA	-0.07^{***}
	(0.03)
MOM	-0.01
	(0.01)
Industry FE	Yes
Year FE	Yes
Observations	117,362
Adjusted R^2	0.30

This table presents analyses related to likelihood of exit related to the incidence of equity book-to-market ratios $(BTM) > 1$. All variable definitions appear in Appendix A. Panel A presents a three-year transition matrix which shows the likelihood of a firm having BTM > 1 or BTM ≤ 1 in each of the next three years, grouped by whether BTM > 1 or BTM ≤ 1 in year 0. Panel B presents summary statistics from the estimation of Equation (3). In Panel B, standard errors clustered by industry and year appear below coefficient estimates. *, **, and *** indicate significance at 10%, 5%, and 1%. The combined sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016.The $BTM \leq 1$ $(BTM > 1)$ sample comprises 85,420 (32,848) observations.

Table 7: Mean returns by equity book-to-market (BTM) decile separately for recession and non-recession periods

Panel A: Recession years

	Full sample		$BTM \leq 1$		$BTM > 1$	
BTM Decile	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
1	1.80	4.81	1.76	5.01	2.58	4.51
2	2.14	6.95	1.70	4.65	2.29	6.66
3	1.98	4.13	2.31	8.80	2.76	3.77
4	2.02	4.88	1.75	4.33	2.43	4.76
5	2.01	5.39	1.60	4.07	2.62	3.99
6	2.24	4.59	1.72	4.39	3.11	4.73
7	2.31	4.37	1.89	4.82	3.25	4.67
8	2.55	4.31	1.93	4.83	2.71	5.51
9	2.88	4.81	1.84	4.66	3.91	5.66
10	3.63	7.59	1.84	4.09	4.09	8.53
Q10−Q1:	1.83		0.08		1.52	
t-stat:	8.53		0.36		4.45	

Panel B: Non-recession years

	Full sample		$BTM \leq 1$		$BTM > 1$	
BTM Decile	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
1	1.07	5.58	1.04	5.76	1.91	4.77
2	1.14	4.56	1.07	4.91	1.97	5.09
3	1.32	4.52	1.11	4.64	1.90	4.34
4	1.40	4.63	1.29	4.70	1.90	4.75
5	1.45	4.35	1.31	4.59	1.94	4.29
6	1.56	4.21	1.39	4.40	2.19	5.05
7	1.60	4.36	1.39	4.27	2.27	4.99
8	1.60	4.45	1.47	4.21	2.29	4.87
9	1.86	4.95	1.44	4.50	2.34	6.16
10	2.10	6.29	1.56	4.43	2.53	7.68
Q10−Q1:	1.03		0.53		0.62	
t-stat:	12.26		6.32		3.46	

This table presents the mean monthly return to portfolios formed by decile of BTM ratio. Panel A (B) presents mean portfolio returns using the sample of recession (non-recession) years. We classify a year as a recession year if December 31 of that year is at least two months after an NBER peak or within two months of an NBER trough. There are eight recession years: 1970, 1973, 1974, 1981, 1982, 1990, 2001, and 2008. The combined sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016.The $BTM \leq 1$ ($BTM > 1$) sample comprises 85,420 (32,848) observations.

Table 8: Annual regressions of hedge portfolio returns in non-recession years

$$HedgeRet_t = a + bBETA_t + sSML_t + hHML_t + gHML\_High_t + uUMD_t + \varepsilon_t$$

	Dependent variable: HedgeRet								
Sample:	Combined	$BTM \leq 1$	$BTM > 1$	Combined	$BTM \leq 1$	$BTM > 1$	Combined	$BTM \leq 1$	$BTM > 1$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
BETA	0.02	−0.13	0.22	−0.28	−0.38**	0.18	−0.02	−0.16	0.18
	(0.12)	(0.10)	(0.19)	(0.17)	(0.15)	(0.17)	(0.11)	(0.11)	(0.18)
HML	1.12***	0.97***	0.17				0.97***	0.83***	−0.003
	(0.22)	(0.16)	(0.24)				(0.21)	(0.15)	(0.21)
HML_High				1.02***	0.87***	0.45*	0.42*	0.36**	0.45*
				(0.22)	(0.18)	(0.25)	(0.21)	(0.18)	(0.24)
SMB	0.42***	0.02	−0.08	0.15	−0.21	−0.15	0.36**	−0.03	−0.15
	(0.16)	(0.12)	(0.21)	(0.17)	(0.13)	(0.20)	(0.15)	(0.12)	(0.21)
UMD	0.01	−0.01	0.09	0.11	0.08	0.16	0.07	0.05	0.16
	(0.13)	(0.10)	(0.24)	(0.19)	(0.15)	(0.22)	(0.12)	(0.11)	(0.22)
Intercept	0.59***	0.34***	0.31	0.93***	0.63***	0.29	0.57***	0.33***	0.29
	(0.15)	(0.11)	(0.33)	(0.24)	(0.19)	(0.28)	(0.13)	(0.10)	(0.31)
Observations	45	45	45	45	45	45	45	45	45
Adjusted R^2	0.56	0.67	-0.05	0.28	0.39	0.01	0.59	0.70	-0.02

Table 8: Annual regressions of hedge portfolio returns in non-recession years cont.

This table presents summary statistics from the regression of annual hedge portfolio returns on the Fama-French (1993) and Carhart (1997) risk factors on a sample excluding recession periods. HML_High is a modification of HML based on instances of equity book-to-market ratios (BTM) $>$ 1. Heteroskedasticity-robust standard errors appear in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%. The combined sample comprises 118,268 annual observations from 8,654 U.S. firms between 1962 and 2016. The $BTM \leq 1$ ($BTM > 1$) sample comprises 85,420 (32,848) observations.

Table 9: Descriptive statistics for Piotroski's (2000) *FSCORE* and components

	Combined sample		$BTM \leq 1$		$BTM > 1$	
Variable	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
FSCORE	5.26	1.66	5.21	1.64	5.39	1.70
FSCORE_Level	2.72	0.96	2.63	0.94	2.97	0.96
FSCORE_Change	2.53	1.28	2.58	1.28	2.42	1.27

This table presents descriptive statistics for *FSCORE* and its components. *FSCORE_Level* (*FSCORE_Change*) is the sum of *FSCORE* components pertaining to levels of (changes in) fundamentals. *BTM* is equity book-to-market ratio. See Appendix A for details on construction of *FSCORE*. The sample comprises annual observations from 8,654 U.S. firms between 1962 and 2016. The combined ($BTM \leq 1$; $BTM > 1$) sample comprises 100,135 (71,705; 28,430) observations.