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Is the Value Spread a Useful Predictor of Returns?

Naiping Liu
The Wharton School
University of Pennsylvania

Lu Zhang
Stephen M. Ross School of Business
at the University of Michigan

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Naiping Liu*
The Wharton School
University of Pennsylvania

Lu Zhang†
Stephen M. Ross School of Business
University of Michigan and NBER

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Abstract

No. Two related variables, the book-to-market spread (the book-to-market of value stocks minus the book-to-market of growth stocks) and the market-to-book spread (the market-to-book of growth stocks minus the market-to-book of value stocks) predict returns but with opposite signs. The value spread mixes the cyclical variations of the book-to-market and market-to-book spreads, and appear much less useful in predicting returns. Our evidence casts doubt on recent studies that rely critically on using the value spread to predict aggregate stock returns.

*Statistics Department, The Wharton School, University of Pennsylvania, 400 Jon M. Huntsman Hall, 3730 Walnut Street, Philadelphia PA 19104-6367. Tel: (215) 898-1247, fax: (215) 898-1280, and e-mail: nliu@wharton.upenn.edu.

†Address correspondence to: Finance Department, Stephen M. Ross School of Business, University of Michigan, 701 Tappan Street, ER 7605 Bus Ad, Ann Arbor MI 48109-1234; and NBER. Tel: (734) 615-4854, fax: (734) 936-0282, and e-mail: zhanglu@bus.umich.edu.

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1 Introduction

We study time series predictability with the value spread (the log book-to-market of value stocks minus the log book-to-market of growth stocks). Our central finding is that the value spread is largely acyclic and is not a useful predictor of aggregate stock returns.

Our economic question is important. In an influential article, Campbell and Vuolteenaho (2004) explain the size and value anomalies in stock returns using a two-beta model. The market beta is broken into two components, one reflecting news about the market's future cash flows, called the cash-flow beta, and another reflecting news about the market's discount rates, called the discount-rate beta. The ICAPM suggests that the cash-flow beta should have a higher market price of risk. Empirically, Campbell and Vuolteenaho find that value stocks have higher cash-flow betas than growth stocks, and this pattern helps explain the higher average returns of value stocks.[1]

Although the economic logic of the Campbell-Vuolteenaho (2004) model is elegant, its empirical performance depends critically on their use of the value spread to predict aggregate stock returns. Because the value spread is not one of the common conditioning variables, it is natural to ask why it should be used to predict returns. This issue is important because time series regressions of aggregate stock returns on arbitrary variables might produce economically meaningless, data-mined results.[2] Further, the ICAPM itself is largely silent about the identities of underlying state variables driving stock returns. Our evidence that the value spread does not predict returns casts doubt on the empirical performance of the Campbell-Vuolteenaho model.

What drives our results? The crux lies in the definition of the value spread:

$$\underbrace{\log\left(\frac{\text{BE}}{\text{ME}}\right)_{\text{value}} - \log\left(\frac{\text{BE}}{\text{ME}}\right)_{\text{growth}}}_{\textbf{The Book to Market Spread In Logs}} = \underbrace{\log\left(\frac{\text{ME}}{\text{BE}}\right)_{\text{growth}} - \log\left(\frac{\text{ME}}{\text{BE}}\right)_{\text{value}}}_{\textbf{The Market to Book Spread In Logs}} \tag{1}$$

[1] Bansal, Dittmar, and Lundblad (2002, 2005), Hansen, Heaton, and Li (2004), and Bansal, Dittmar, and Kiku (2006) are related contributions in the cross section of returns. Bansal and Yaron (2004) and Bansal, Khatchatrian, and Yaron (2005) apply the long run risk idea to asset pricing puzzles in aggregate stock market. Bansal (2006) surveys the related literature.

[2] Several important articles highlight the danger of data mining in the predictability literature (e.g., Lo and MacKinlay 1990; Ferson, Sarkissian, and Simin 2003; Valkanov 2003; Goyal and Welch 2005; Ang and Bekaert 2006).

where "BE" denotes the book value and "ME" denotes the market value. The value spread is defined as the log book-to-market of value stocks minus the log book-to-market of growth stocks, which is mathematically equivalent to the log market-to-book of growth stocks minus the log market-to-book of value stocks. The value spread therefore mixes the dynamics of the book-to-market spread (the book-to-market of value stocks minus the book-to-market of growth stocks) and the market-to-book spread (the market-to-book of growth stocks minus the market-to-book of value stocks).

Further, the book-to-market spread is dominated by the countercyclical book-to-market of value stocks that predicts returns with a positive sign. The market-to-book spread is dominated by the procyclical market-to-book of growth stocks that predicts returns with a negative sign. Because the value spread evenly combines these two variables with opposite cyclical variations and predict returns with opposite signs, it is largely acyclic and not much useful in predicting returns.

Specifically, the slopes from regressing future market and small-cap excess returns on the book-to-market spread are positive and mostly significant in the 1927–2001 period. The book-to-market spread is positively correlated with countercyclical variables such as dividend yield, term premium, default premium, and aggregate book-to-market, but is negatively correlated with the procyclical short-term T-bill rate. In contrast, the slopes of the market-to-book spread are negative and mostly significant. The market-to-book spread is also correlated negatively with the countercyclical variables and positively with the procyclical short rate. And the slopes of the value spread are insignificantly positive in the full sample, but are insignificantly negative in the postwar sample.

The cyclical variations of the various spreads are predicted by the theoretical model of Zhang (2005). Value firms are more likely to scale down their productive assets in recessions because of their lower profitability than growth firms. Because cutting capital is more costly than expanding capital, value firms are stuck with more unproductive assets. Growth firms are less prone to this effect because they have more productive assets and thus less incentives to scaling down in recessions. This effect generates high book-to-market ratios for value stocks and a high book-to-market spread in recessions. Further, growth firms invest more and grow faster than value firms, especially in expansions. Investing and growing are less urgent for value firms because their previously unproductive assets become more productive. And the spread in growth options captured by market value between value and growth firms widens in booms, giving rise to a procyclical market-to-book spread.

Another related work is Chen and Zhao (2006), who argue that the Campbell-Vuolteenaho (2004) beta-decomposition might be subject to model misspecifications. The estimated cash flow news depends critically on how well the discount rate news is modeled. A missing state variable in the discount-rate forecasting equation can change dramatically the estimated residual as the cash flow news.[3] Further, Chen and Zhao report that value stocks have lower cash flow betas for most combinations of common conditioning variables, once the value spread is not used or is replaced by the book-to-market spread or the market-to-book spread.

We develop testable hypotheses in Section 2. Section 3 describes the data. Section 4 presents predictive regressions using the various spreads. And Section 5 concludes.

2 Hypothesis Development

Based on the economic model of Zhang (2005), we propose three testable hypotheses:

H1: The book-to-market spread is countercyclical and predicts future returns with a positive sign.

H2: The market-to-book spread is procyclical and predicts future returns with a negative sign.

H3: The value spread is acyclic and has weak predictive power for future aggregate returns.

Figure 1 plots the book-to-market spread, the market-to-book spread, and the value spread against aggregate productivity based on the model solution in Zhang (2005). Panel A is borrowed from Panel B of Figure 4 in Zhang, but the other two panels are new. High aggregate productivity indicates booms and low aggregate productivity indicates recessions. The solid lines are from the benchmark model with costly reversibility and time-varying price of risk, and the broken lines are

[3] For example, Chen and Zhao (2006) show that the Campbell-Vuolteenaho (2004) return-decomposition approach generates the counterintuitive finding that Treasury bonds have higher cash flow betas than discount rate betas. But in principle, Treasury bonds should have zero cash flow betas because their future cash flows are known ex-ante.

from a simplified model with neither. Cost reversibility means that it is more costly for firms to divest than to invest, and the time-varying price of risk means that aggregate discount rates are higher in bad times than in good times (e.g., Fama and French 1989).

From Panel A in Figure 1, the book-to-market spread is clearly countercyclical in the benchmark model, but is largely constant in the simplified model. From Panel B, the market-to-book spread is clearly procyclical and even more so in the simplified model. And from Panel C, the value spread is only weakly countercyclical in the benchmark model and is largely constant in the simplified model.

Because aggregate expected returns are countercyclical, the cyclical variations of the various spreads give rise to their different predictive power for future aggregate returns. The book-to-market spread should be a positive predictor, the market-to-book spread should be a negative predictor, and the value spread should be a weak predictor of future returns. These predictions from Zhang (2005) form the basis for our testable hypotheses *H1–H3*.[4]

More important, what are the driving forces behind the cyclical variations of the various spreads? We provide some intuition based on the fully-specified model of Zhang (2005). First, why is the book-to-market spread countercyclical? In recessions, all firms invest less than average. Because of their relatively low profitability (e.g., Fama and French 1995), value firms are likely to cut more capital than growth firms. When investment is reversible, value firms can scale down easily. But with costly reversibility, value firms face higher costs when divesting. Accordingly, these firms are stuck with more unproductive assets, giving rise to higher book-to-market ratios in bad times.

The time-varying price of risk propagates the effect of costly reversibility. Higher discount rates in bad times lower the expected net present value for all firms. As future prospects become even gloomier, value firms want to scale down even more, giving rise to even higher book-to-market ratios in bad times. Growth firms are less prone to the combined effect of costly reversibility and time-varying price of risk because growth firms with more productive assets have less incentives to scaling

[4]Gomes, Kogan, and Zhang (2003) construct a related model and show that the cross-sectional spread of book-to-market is countercyclical (see Panel d of their Figure 5). Other related papers include Berk, Green, and Naik (1999), Carlson, Fisher, and Giammarino (2004), Kogan (2004) and Cooper (2005). However, these papers do not discuss explicitly the time series properties of the book-to-market spread, the market-to-book spread, and the value spread.

down in recessions. The book-to-market spread is thus higher in recessions (Panel A of Figure 1).

Second, why is the market-to-book spread procyclical? In good times, growth firms invest more and grow faster than value firms. Investing and growing are less urgent for value firms because their previously unproductive assets now become more productive from positive aggregate shocks. Accordingly, the spread in growth opportunities between value and growth firms widens in booms. The time-varying price of risk again magnifies this effect. A lower discount rate in good times increases firms' expected net present value, causing growth firms to invest even more and grow even faster than value firms. The market-to-book spread is therefore higher in booms (Panel B of Figure 1).

Figure 1 also shows that the market-to-book spread in the simplified model is higher and more procyclical than the market-to-book spread in the benchmark model. Intuitively, although firms do not face higher costs when expanding capital, the mere possibility of higher costs when scaling down in future recessions reduces firms' growth rates in good times in the benchmark model.

And the book-to-market spread is almost entirely driven by the book-to-market of value firms. The market-to-book spread is almost entirely driven by the market-to-book of growth firms (see the evidence in Section 3.2 below). Therefore, the countercyclical property of the book-to-market spread reflects a similar pattern of the book-to-market of value firms. And the procyclical property of the market-to-book spread reflects a similar pattern of the market-to-book of growth firms.[5]

Finally, from equation (1), the value spread evenly combines the countercyclical variations of the book-to-market spread and the procyclical variations of the market-to-book spread. It is therefore not surprising that the value spread is only weakly countercyclical (Panel C of Figure 1).

3 Data

3.1 Variable Construction

We measure the book-to-market spread as the average book-to-market of decile ten (value) minus the average book-to-market of decile one (growth) from a one-way sort in ascending order on book-

[5]We thank the editor and the anonymous referee for making this important point to us.

to-market. The average book-to-market of a portfolio is calculated as the sum of book values of all stocks divided by the sum of market values of all stocks in the portfolio. We measure the market-to-book spread as the average market-to-book of decile one minus the average market-to-book of decile ten. The average market-to-book of a portfolio is calculated as the sum of market values of all stocks divided by the sum of book values of all stocks in the portfolio. And the value spread is measured as the log book-to-market of decile ten minus the log book-to-market of decile one.

The book-to-market portfolio data are from Kenneth French's website. The data contain the calendar yearend book-to-market ratios for all the book-to-market deciles. For months from January to December of year t, the book-to-market of a given portfolio is constructed by dividing its book-to-market at the end of December of year t–1 by its compounded gross return from the end of December of year $t-1$. We measure both book values and market values at the end of December of year $t-1$.

Our definition of the value spread is consistent with previous studies (e.g., Asness, Friedman, Krail, and Liew 2000; Campbell and Vuolteenaho 2004; Cohen, Polk, and Vuolteenaho 2003; Yogo 2005). We follow Cohen et al. and use the entire CRSP universe to construct the value spread. Campbell and Vuolteenaho construct their measure using the small-value and small-growth portfolios from the two-by-three sort on size and book-to-market. We have constructed our measures using the small-stock portfolios and found quantitatively similar results (not reported). For example, the correlation between the small-cap value spread and the full-sample value spread is 0.98 from January 1927 to December 2001, and is 0.97 in the sample after 1945.

We also use a list of well-known conditioning variables in our tests: dividend yield (div); default premium (def); term premium (term); short-term T-bill rate (rf); and aggregate book-to-market (b/m). Our choice of the variables is standard from the time series predictability literature.[6]

These variables are constructed as follows. The dividend yield is the sum of dividend payments accruing to the CRSP value-weighted market portfolio over the previous 12 months, divided by the

[6]An incomplete list of papers includes: Fama and French (1988), dividend yield; Keim and Stambaugh (1986), default premium; Campbell (1987) and Fama and French (1989), term premium; Fama and Schwert (1977) and Fama (1981), short-term T-bill rate; Kothari and Shanken (1997) and Pontiff and Schall (1998), aggregate book-to-market.

contemporaneous level of the index. The default premium is the yield spread between Moody's Baa and Aaa bond yields from the monthly database of the Federal Reserve Bank of Saint Louis. The term premium is defined as the yield spread between the ten-year and one-year Treasury bond yields from the Ibbotson database. The one-month T-bill rate is from CRSP. To construct the aggregate book-to-market, we obtain the data on book values by combining the COMPUSTAT annual research file and Moody's book equity data collected by Davis, Fama, and French (2000) available from Kenneth French's website. The monthly data on market values are from the CRSP monthly stock file.

3.2 Preliminary Analysis

Because the basic properties of the book-to-market spread, the market-to-book spread, and the value spread are not well known, we first present a battery of preliminary tests.

Descriptive Statistics

Table 1 reports descriptive statistics for the various spreads and for the portfolio returns used as the dependent variables in predictive regressions, including the equally weighted market excess return, the value-weighted market excess return, the equally weighted small-cap (quintile) excess return, and the value-weighted small-cap (quintile) excess return. Our choice of portfolio returns in predictive regressions follows Pontiff and Schall (1998).

From Table 1, the book-to-market spread is on average 4.57 with a monthly volatility of 5.45 from January 1927 to December 2001. The average drops to 2.32 and its volatility 1.13 in the postwar sample. In contrast, the book-to-market of growth decile has an average of 0.25, a monthly volatility of 0.10, and a range from 0.08 to 0.71 (not reported in the table). This evidence suggests that the book-to-market spread is almost entirely driven by the book-to-market of value decile (their correlation is 0.99). Table 1 also reports that the average market-to-book spread is 4.32 in the full sample and 4.62 in the postwar sample. In contrast, the market-to-book of value decile has an average of 0.38, a monthly volatility of 0.22, and a range from 0.02 to 0.95 (not reported in the table). This evidence suggests that the market-to-book spread is almost entirely driven by the market-to-book of growth decile (their correlation is again 0.99). The average value spread is stable across samples, 2.66 in the full sample and 2.39 in the postwar sample.

All the three spreads are fairly persistent. From Panel A of Table 1, the first-order autocorrelation of the book-to-market spread in the long sample is 0.95, it reduces to 0.67 at the 12-th order, but is still 0.50 even at the 60-th order. The autocorrelation structure remains basically unchanged in the subsample. The value spread and the market-to-book spread have slightly higher autocorrelations in the full sample, but have comparable autocorrelations in the postwar sample. Despite their high magnitudes, these autocorrelations are much lower than those of the common conditioning variables such as dividend yield, aggregate book-to-market, and earnings-price ratio.[7]

Table 1 also reports the Augmented Dickey-Fuller unit root tests with an intercept and 12 lags for the three spreads. For the book-to-market spread, the null unit-root hypothesis cannot be rejected at the 5% significance level in the full sample (p-value = 0.08), but can be rejected in the postwar sample (p-value = 0.00). For the market-to-book spread, the null cannot be rejected in both samples. The test results for the value spread are similar to those for the book-to-market spread.

The descriptive statistics of the market and small-cap excess returns are well-known, but are reported in Table 1 for completeness. All the portfolio returns are positively autocorrelated over the one-month horizon, but largely uncorrelated thereafter, consistent with Lo and MacKinlay (1988).

Time Series

Figure 2 presents some preliminary, albeit informal, evidence on hypotheses *H1–H3*. The figure plots the time series of the book-to-market spread, the market-to-book spread, and the value spread over the 1927–2001 period along with NBER recession dates. From Panel A, a structural break is clearly visible around 1945 for the book-to-market spread. The book-to-market spread is high and volatile before 1945, especially during the Great Depression, and is low and stable afterwards. We hence conduct empirical analysis both in the full 1927–2001 sample and in the 1945–2001 subsample.

[7] For example, Lewellen (2004, Table 1) reports that the first-order autocorrelations of dividend yield, aggregate book-to-market, and earnings-price ratio range from 0.988 to 0.999. The lower persistence in our spread variables affects our choice of estimation methods (see Appendix A for details).

From Panels B and C of Figure 2, no similar structural breaks are evident for the market-to-book spread and the value spread. The market-to-book spread is low in the recessionary 1930s and 1970s and high in the expansionary 1960s and 1990s, suggesting procyclical variations. From Panel C, the value spread is high in both the Great Depression and in the expansionary 1990s, suggesting ambiguous cyclical variations. From equation (1), the value spread mixes the cyclical properties of the book-to-market spread and the market-to-book spread. Indeed, Panel C shows that the dynamics of the value spread are dominated by the book-to-market of value stocks in the first half of the sample but by the market-to-book of growth stocks in the second half of the sample.

Cross Correlations

To further study the cyclical properties of the various spreads, we examine their cross correlations with a set of business cycle indicators. Consistent with hypotheses *H1–H3*, the book-to-market spread is countercyclical, the market-to-book spread is procyclical, and the value spread is weakly countercyclical in the long sample but weakly procyclical in the postwar sample.

Panel A of Table 2 shows the cross correlations for the 1927–2001 sample. The book-to-market spread displays positive correlations with all the countercyclical variables: the dividend yield (0.45), the default premium (0.61), the term premium (0.39), and the aggregate book-to-market (0.85) (the pairwise cross correlations are reported in parentheses). The book-to-market spread also displays a negative correlation of −0.52 with the procyclical T-bill rate. The market-to-book spread correlates negatively with all the countercyclical variables: the dividend yield (−0.69), the default premium (−0.30), the term premium (−0.11), and the aggregate book-to-market (−0.75), but correlates positively with the procyclical T-bill rate (0.20). The correlations of the value spread with the conditioning variables are similar to those of the book-to-market spread, but are smaller in magnitude.

Panel B of Table 2 reports that the countercyclical property of the book-to-market spread largely persists in the postwar sample. The book-to-market spread continues to correlate positively with the countercyclical dividend yield (0.51) and aggregate book-to-market (0.73), and negatively with the procyclical T-bill rate (−0.50). However, the correlation with the term premium is now close to zero, and the correlation with the default premium switches sign, from 0.61 in the long sample to −0.23 in the subsample. The market-to-book spread continues to exhibit procyclical variations in the postwar sample: its correlations with the dividend yield, the default premium, and the aggregate book-to-market are −0.80, −0.14, and −0.88, respectively. However, its correlations with the term premium and the T-bill rate are now close to zero.

More interesting, the cyclical variations of the value spread are more ambiguous in the postwar sample. Although it correlates negatively with the countercyclical aggregate book-to-market (−0.16), it also correlates negatively with the procyclical T-bill rate (−0.51).

4 Predictive Regressions

We now report our central finding that the value spread does not appear to be a powerful predictor of future returns. To provide additional intuition, we also study time series predictability with the book-to-market spread and the market-to-book spread.

4.1 Predictability with the Value Spread

In predictive regressions, the value spread predicts future returns with a positive sign in the full 1927–2001 sample but with a negative sign in the postwar 1945–2001 sample.

We adopt Fama and French's (1988, 1989) regression framework:

$$r_{t+\tau} = \alpha_\tau + \beta_\tau S_t + \epsilon_{t+\tau} \quad (2)$$

where S_t is one of the spreads at the beginning of month t. $r_{t+\tau}$ is the equally weighted or value-weighted excess return for the market or small-cap portfolio from t to $t+\tau$, and τ denotes different horizons including one-month, one-quarter, one-year, two-year, or five-year holding period.

Because all the three spreads are fairly persistent, the standard inferences are biased because returns depend on changes in stock prices and changes in the spreads are likely to be correlated to their contemporaneous returns. This correlation induces a spurious bias in the estimates from regressing future returns on a persistent regressor (e.g., Stambaugh 1999). To obtain the correct p-values for the slope coefficients, we adjust for the small-sample bias using the methods of Kim and Nelson (1993) and Stambaugh (1999) (see Appendix A for details).

To test zero slopes, we report three p-values: the p-value from the Newey-West (1987) t-statistic adjusted for heteroscedasticity and autocorrelations up to 12 lags, $p_{\rm NW}$; the p-value constructed from the finite-sample distribution of the slopes using Nelson and Kim's (1993) method, $p_{\rm NK}$; and the p-value obtained from Stambaugh's (1999) method, $p_{\rm S}$. All the p-values are one-sided values that are the estimated probabilities of obtaining a slope at least as large as that estimated from the actual data. A p-value less than 5% implies that the slope is significantly positive at the 5% level, and a p-value greater than 0.95 implies that the slope is significantly negative at the 5% level.

Table 3 reports the univariate predictive regressions of future returns on the value spread both in the full 1927–2001 sample and in the postwar 1945–2001 sample. The β_τ-subpanel in Panel A shows that most of the slopes are positive, suggesting that the value spread predicts future market and small-cap excess returns with a positive sign in the full sample. And from the $p_{\rm NW}$-subpanel, the p-values from the Newey-West (1987) t-statistics are often significant at the 5% level. Using Nelson and Kim's (1993) and Stambaugh's (1999) methods to adjust for the small-sample bias yields largely similar inferences. And the R^2-subpanel shows that the value spread has more predictive power for equally weighted returns than for value-weighted returns.

However, Panel B of Table 3 reports that the predictability with the value spread is unstable across samples. The β_τ-subpanel in Panel B shows that the slopes are mostly negative, albeit insignificant, suggesting that the value spread predicts returns only weakly and with a negative sign in the subsample. More important, comparing the two R^2-subpanels in Panels A and B shows that the predictive power of the value spread in the subsample is much lower than that in the full sample. For example, the R^2 from regressing the future five-year equally weighted market excess return on the value spread is 23% in the full sample, but is close to zero in the subsample. And the R^2 from regressing the future five-year equally weighted small-cap excess return on the value spread is 38% in the full sample, but is only 4% in the subsample.

Our evidence contrasts with Campbell and Vuolteenaho (2004) who finds a negative slope for the value spread in multiple regressions. To facilitate comparison with their evidence, Table 4 reports multiple regressions of future returns on the value spread, along with the term premium, the default premium, the dividend yield, and the T-bill rate. This regression is similar to that of Campbell and Vuolteenaho (2004, Table 2). Panel A largely replicates their evidence that the value spread is a strong negative predictor of future market excess returns in the long sample. But the predictive power is reduced somewhat in the postwar sample (Panel B). More important, the predictive power is sensitive to regression specifications because the slope changes sign in univariate regressions (Table 3). In all, our evidence casts doubt on time series predictability with the value spread.

4.2 Predictability with the Book-to-Market and the Market-to-Book Spreads

We now show that both the book-to-market spread and the market-to-book spread have stronger predictive power than the value spread, but they predict returns with opposite signs. This evidence provides additional intuition for the weak predictability with the value spread. Namely, the value spread evenly combines information on value and growth stocks (equation 1), thereby mixing the cyclical variations of the book-to-market spread and market-to-book spread.

Table 5 reports univariate regressions of future returns on the book-to-market spread. From Panel A, the slopes are all positive and mostly significant, suggesting that the book-to-market spread predicts returns with a positive sign, consistent with hypothesis *H1* in Section 2. Panel B shows that the slopes in the subsample are again positive. The magnitudes of the slopes are higher than those in the full sample, but the slopes are also estimated with less precision. More important, the consistent signs for the slopes across samples suggests that the book-to-market spread has more predictive power than the value spread. Additional evidence on this point is provided by the R^2-subpanels. The R^2s from using the book-to-market spread are often much higher than those from using the value spread. For example, regressing future five-year equally weighted and value-weighted market excess returns on the book-to-market spread in the postwar sample yields R^2s of 17% and 11%, compared to their counterparts from using the value spread, zero and 1%, respectively.

Table 6 reports predictive regressions using the market-to-book spread. The slopes are all negative in both the full sample and the postwar sample. The slopes from the full sample are mostly significant and are largely significant when predicting market excess returns, but only significant when predicting long-horizon small-cap excess returns in the postwar sample. The evidence suggests that the market-to-book spread is reliable negative predictor of returns, consistent with hypothesis *H2*. Both the consistent signs and the higher R^2s again suggest more predictive power than the value spread. For example, regressing future five-year equally weighted and value-weighted market excess returns on the market-to-book spread in the postwar sample yields R^2s of 30% and 19%, compared to their counterparts from using the value spread, zero and 1%, respectively.[8]

To complete the analysis, Table 7 reports multiple regressions using the book-to-market spread along with four common conditioning variables. From Panel A, the slopes of the book-to-market spread are mostly positive although insignificant in the long sample. No variable clearly dominates the others. From Panel B, the book-to-market spread has mostly negative although insignificant slopes in the postwar sample. This result is very similar to that of aggregate book-to-market documented in Pontiff and Schall (1998, Panel B of Table 3). And Table 8 reports multiple regressions with the market-to-book spread, which loses most of its predictive power in the presence of other variables. Again no variable clearly dominates others in both samples.

We interpret the negative slopes of the book-to-market spread (and the aggregate book-to-market) in multiple regressions as a result of multicollinearity. For example, Table 7 shows that the default premium is a significantly negative predictor, and the T-bill is a positive although insignificant predictor of long horizon returns in the postwar sample. And from Table 8, the slopes of the default premium in long-horizon regressions in the postwar sample are significantly negative.

[8] However, using the value spread to predict five-year small-cap excess returns in the full sample yields higher R^2s than those from using the market-to-book spread.

These counterintuitive results are difficult to explain without invoking multicollinearity.

In untabulated results, we have conducted extensive bivariate regressions to evaluate relative predictability with the book-to-market spread and the market-to-book spread in the presence of other well-known conditioning variables. Relative to the aggregate book-to-market, the book-to-market spread contains incremental information on the small-cap excess returns but not on the market excess returns. The reason is probably that the book-to-market spread is dominated by the book-to-market of value stocks that covary more with small stocks.[9]

And the aggregate book-to-market dominates the market-to-book spread in predicting returns in the long sample but is dominated in the postwar sample. The book-to-market spread often dominates the four common conditioning variables in bivariate regressions in the long sample. Predictability is weaker for all the variables in the postwar sample. The consumption-wealth ratio of Lettau and Ludvigson (2001a, 2001b) displays impressive predictive power of future returns. But even in the presence of this variable, the book-to-market spread and the market-to-book spread retain their predictive power in long-horizon regressions.

5 Conclusion

The value spread (the log book-to-market of value stocks minus the log book-to-market of growth stocks) is at best a weak predictor of aggregate stock returns. The book-to-market spread is countercyclical and predicts returns with a positive sign, and the market-to-book spread is procyclical and predicts returns with a negative sign. By definition, the value spread is both the book-to-market spread in logs and the market-to-book spread in logs, therefore mixing the opposite cyclical variations of the book-to-market and the market-to-book spreads. Accordingly, the value spread appears largely acyclic and much less useful in predicting returns. Our evidence casts doubt on the Campbell-Vuolteenaho (2004) results because they depend critically on using the value spread to predict aggregate stock returns.

[9] We are grateful to the anonymous referee for making this point.

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A Adjusting for the Small-Sample Bias

We use two methods to adjust for the Stambaugh (1999) small-sample bias in predictive regressions. The first is Nelson and Kim's (1993) randomization method that requires the estimation of the first-order autoregressive process for the regressor:

$$S_{t+\tau} = \theta + \rho S_t + \eta_{t+\tau}. \tag{A1}$$

We then retain both the estimated $\eta_{t+\tau}$ and the contemporaneous excess returns $r_{t+\tau}$ to control for their contemporaneous correlations. The pairs $(\eta_{t+\tau}, r_{t+\tau})$ are then randomized by resampling without replacement. From the randomized series, we create pseudo series of the regressor by substituting the randomized $\eta_{t+\tau}$ in equation (A1) along with estimated $\hat{\theta}$ and $\hat{\rho}$. The initial value, S_0, is picked randomly from the original series of S_t in the data.

This procedure creates pseudo series of the regressor and the excess returns that have similar time-series properties as the actual data do. However, these pseudo data are generated under the null hypothesis that there is no return predictability associated with S_t. We then estimate equation (2) using these pseudo data and store the coefficients. This process is repeated for 1000 times. Bias is defined as the sample mean of these 1000 coefficient estimates. The one-sided p-value is the estimated probability of obtaining a coefficient that is at least as large as the coefficient estimated from the actual data.

The second method we use to correct for the small sample bias is due to Stambaugh (1999). He assumes that the vector of residuals from equations (2) and (A1), $[\epsilon_t \ \eta_t]'$, follows an i.i.d.multivariate normal distribution, $N(0, \Sigma)$. He then shows that the finite-sample distribution of the bias in slope, $\hat{\beta} - \beta$, depends on ρ and Σ but not on α, β, or θ. After setting ρ and Σ to be their respective sample estimates, we use simulations to obtain the finite-sample distribution of $\hat{\beta} - \beta$. We then use it to calculate the one-sided p-value and bias in slope. Despite the distributional assumption of $[\epsilon_t \ \eta_t]'$, the p-values from this method are largely similar to those obtained from the randomization method of Nelson and Kim (1993).

Lewellen (2004) argues that Stambaugh's (1999) method may understate the significance of the slopes in predictive regressions. This effect is likely to be quantitatively important if ρ is very close to one. From Table 1, the monthly autocorrelations of the spreads are mostly below 0.98. Lewellen argues that a persistent regressor must have a monthly first-order autocorrelation above 0.98 to have a sizable impact on the significance of the slopes.[10] We therefore do not use his method to adjust for the small-sample bias.

[10] More specifically, Lewellen (2004, p. 7) states that "with 25 years of data, this [method] requires a monthly autocorrelation around 0.98 and an annual autocorrelation around 0.85; with 50 years of data, the values are 0.99 and 0.90, respectively."

Table 1 : Descriptive Statistics of Portfolio Returns, the Book-to-Market Spread, the Market-to-Book spread, and the Value Spread

This table reports descriptive statistics including mean, m, volatility, σ, autocorrelations, ρ, of order 1–12, 24, 36, 48, and 60, and p-values associated with the Augmented Dickey-Fuller unit root test with an intercept and 12 lags. We report these statistics for the book-to-market spread, $S_{\mathrm{b/m}}$, defined as the average book-to-market of value stocks minus the average book-to-market of growth stocks; the market-to-book spread, $S_{\mathrm{m/b}}$, defined as the average market-to-book of growth stocks minus the average market-to-book of value stocks; the value spread, S, defined as the log book-to-market of value stocks minus the log book-to-market of growth stocks; the equally weighted and value-weighted market excess returns $r_{\mathrm{ew}}^{\mathrm{mkt}}$ and $r_{\mathrm{vw}}^{\mathrm{mkt}}$, respectively; and the equally weighted and value-weighted small-cap (quintile) excess returns $r_{\mathrm{ew}}^{\mathrm{sml}}$ and $r_{\mathrm{vw}}^{\mathrm{sml}}$, respectively. The means and volatilities of portfolio returns are in monthly percent.

Panel A: January 1927–December 2001

	m	σ	ρ_1	ρ_2	ρ_3	ρ_4	ρ_5	ρ_6	ρ_7	ρ_8	ρ_9	ρ_{10}	ρ_{11}	ρ_{12}	ρ_{24}	ρ_{36}	ρ_{48}	ρ_{60}	p_{ADF}
$S_{\mathrm{b/m}}$	4.57	5.45	0.95	0.91	0.87	0.83	0.81	0.78	0.76	0.74	0.73	0.72	0.70	0.67	0.60	0.55	0.42	0.50	0.08
$S_{\mathrm{m/b}}$	4.32	1.94	0.97	0.94	0.92	0.89	0.88	0.86	0.84	0.83	0.81	0.80	0.79	0.78	0.77	0.63	0.57	0.40	0.77
S	2.66	0.57	0.98	0.97	0.96	0.95	0.94	0.92	0.92	0.91	0.90	0.90	0.89	0.88	0.85	0.81	0.76	0.72	0.55
$r_{\mathrm{ew}}^{\mathrm{mkt}}$	0.95	7.32	0.19	0.01	−0.11	−0.06	0.00	−0.04	0.01	0.03	0.15	0.07	−0.02	0.01	0.01	0.03	−0.01	0.02	
$r_{\mathrm{vw}}^{\mathrm{mkt}}$	0.66	5.46	0.10	−0.02	−0.12	0.01	0.08	−0.03	0.01	0.04	0.09	0.01	−0.03	0.00	0.03	0.02	−0.02	0.02	
$r_{\mathrm{ew}}^{\mathrm{sml}}$	1.49	10.44	0.22	0.03	−0.07	−0.08	−0.05	−0.03	0.03	0.02	0.17	0.09	0.03	0.07	0.03	0.05	0.02	0.05	
$r_{\mathrm{vw}}^{\mathrm{sml}}$	1.07	9.50	0.20	0.01	−0.08	−0.08	−0.05	−0.03	0.03	0.01	0.17	0.08	0.02	0.04	0.01	0.04	−0.01	0.02	

Panel B: January 1945–December 2001

	m	σ	ρ_1	ρ_2	ρ_3	ρ_4	ρ_5	ρ_6	ρ_7	ρ_8	ρ_9	ρ_{10}	ρ_{11}	ρ_{12}	ρ_{24}	ρ_{36}	ρ_{48}	ρ_{60}	p_{ADF}
$S_{\mathrm{b/m}}$	2.32	1.13	0.96	0.92	0.88	0.85	0.82	0.80	0.77	0.75	0.72	0.70	0.69	0.68	0.60	0.53	0.66	0.56	0.00
$S_{\mathrm{m/b}}$	4.62	2.05	0.97	0.94	0.93	0.91	0.89	0.87	0.86	0.84	0.83	0.82	0.80	0.79	0.81	0.67	0.63	0.42	0.82
S	2.39	0.30	0.96	0.92	0.89	0.86	0.83	0.80	0.77	0.75	0.73	0.70	0.69	0.67	0.59	0.41	0.36	0.24	0.02
$r_{\mathrm{ew}}^{\mathrm{mkt}}$	0.78	4.84	0.14	−0.01	−0.03	−0.01	0.03	−0.02	−0.03	−0.10	0.01	−0.01	0.01	0.05	0.02	0.01	0.06	0.02	
$r_{\mathrm{vw}}^{\mathrm{mkt}}$	0.66	4.11	0.04	−0.03	−0.01	0.02	0.09	−0.04	0.00	−0.04	0.01	−0.01	−0.01	0.03	0.02	−0.02	0.01	−0.03	
$r_{\mathrm{ew}}^{\mathrm{sml}}$	1.01	6.17	0.22	0.02	−0.03	0.01	0.00	0.00	0.00	−0.10	−0.02	−0.00	0.05	0.12	0.08	0.09	0.14	0.10	
$r_{\mathrm{vw}}^{\mathrm{sml}}$	0.84	5.95	0.20	0.01	−0.05	−0.00	−0.00	0.02	0.03	−0.09	−0.01	−0.01	0.03	0.05	0.03	0.04	0.07	0.04	

Table 2 : Cross Correlations

This table reports the cross-correlations for the book-to-market spread $S_{\mathrm{b/m}}$ (the book-to-market of value stocks minus the book-to-market of growth stocks); the market-to-book spread, $S_{\mathrm{m/b}}$ (the market-to-book of growth stocks minus the market-to-book of value stocks); the value spread, S (the log book-to-market of value stocks minus the log book-to-market of growth stocks); the dividend yield, div; the default premium, def; the term premium, term; the T-bill rate, rf; and the aggregate book-to-market, b/m. All the correlations are measured contemporaneously.

	Panel A: January 1927–December 2001							
	$S_{\mathrm{b/m}}$	$S_{\mathrm{m/b}}$	S	div	def	term	rf	b/m
$S_{\mathrm{b/m}}$	1.00	−0.42	0.82	0.45	0.61	0.39	−0.52	0.85
$S_{\mathrm{m/b}}$		1.00	−0.09	−0.69	−0.30	−0.11	0.20	−0.75
S			1.00	0.30	0.48	0.37	−0.66	0.55
div				1.00	0.51	0.12	−0.31	0.59
def					1.00	0.34	−0.09	0.52
ter						1.00	−0.54	0.30
rf							1.00	−0.42
b/m								1.00
	Panel B: January 1945–December 2001							
	$S_{\mathrm{b/m}}$	$S_{\mathrm{m/b}}$	S	div	def	term	rf	b/m
$S_{\mathrm{b/m}}$	1.00	−0.53	0.46	0.51	−0.23	0.01	−0.50	0.73
$S_{\mathrm{m/b}}$		1.00	0.44	−0.80	−0.14	0.03	0.05	−0.88
S			1.00	−0.28	−0.41	0.02	−0.51	−0.16
div				1.00	0.15	−0.11	−0.11	0.76
def					1.00	0.06	0.63	0.09
term						1.00	−0.41	−0.02
rf							1.00	−0.15
b/m								1.00

Table 3 : Univariate Predictive Regressions With the Value Spread

This table reports univariate predictive regressions of returns across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons on the value spread. The value spread is measured as the log book-to-market of decile ten (value) minus the book-to-market of decile one (growth) in the ten deciles sorted on book-to-market. We use four portfolio returns in the left hand side of the regressions: the equally weighted and value-weighted market excess returns ($r_{\mathrm{ew}}^{\mathrm{mkt}}$ and $r_{\mathrm{vw}}^{\mathrm{mkt}}$, respectively) and the equally weighted and value-weighted small-cap (quintile) excess returns ($r_{\mathrm{ew}}^{\mathrm{sml}}$ and $r_{\mathrm{vw}}^{\mathrm{sml}}$, respectively). For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slope β_τ, p-values associated with Newey-West t-statistics p_{NW}, biases in the slope b_{NK} and p-values of the slopes p_{NK} using Nelson and Kim's (1993) method, biases in the slope b_{S} and p-values of the slopes p_{S} using Stambaugh's (1999) method, R^2, and the number of observations, T. All p values are one-sided p-values as estimated probabilities of obtaining a coefficient at least as large as the coefficient estimated from the actual data series. A p-value less than 0.05 implies the coefficient is significantly positive at 0.05 level, whereas a p-value greater than 0.95 implies the coefficient is significantly negative at 0.05 level. p-values greater than 95% or less than 5% are in bold.

Panel A: January 1927 to December 2001

τ	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	β_τ				p_{NW}			
M	0.68	−0.02	1.76	1.03	0.16	0.52	**0.05**	0.13
Q	2.33	0.21	5.56	3.34	0.14	0.44	0.06	0.13
Y	9.24	1.68	20.57	12.35	**0.04**	0.32	**0.01**	**0.05**
2Y	16.54	1.42	41.02	24.41	**0.04**	0.41	**0.00**	**0.03**
5Y	41.57	6.71	98.08	62.72	**0.00**	0.16	**0.00**	**0.00**
	b_{NK}				p_{NK}			
M	0.09	0.03	0.15	0.12	0.12	0.54	**0.02**	0.08
Q	0.38	0.25	0.58	0.47	0.14	0.52	**0.04**	0.10
Y	0.78	0.83	1.37	1.15	0.09	0.40	**0.02**	0.07
2Y	0.09	0.15	0.53	0.16	**0.00**	0.35	**0.00**	**0.00**
5Y	0.13	0.30	−0.35	−0.23	**0.00**	0.07	**0.00**	**0.00**
	b_{S}				p_{S}			
M	0.08	0.04	0.09	0.11	0.12	0.56	**0.02**	0.08
Q	0.37	0.21	0.52	0.68	0.12	0.48	**0.04**	0.13
Y	0.95	0.97	0.85	1.11	0.08	0.41	**0.02**	0.07
2Y	0.36	−0.12	0.32	0.31	**0.00**	0.31	**0.00**	**0.00**
5Y	0.08	0.39	0.04	0.12	**0.00**	0.07	**0.00**	**0.00**
	R^2				T			
M	0.00	0.00	0.01	0.00	899	899	899	899
Q	0.01	0.00	0.02	0.01	299	299	299	299
Y	0.04	0.00	0.09	0.05	74	74	74	74
2Y	0.06	0.00	0.15	0.07	292	292	292	292
5Y	0.23	0.01	0.38	0.25	280	280	280	280

Panel B: January 1945 to December 2001

τ	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	β_τ				p_{NW}			
M	−0.31	−0.52	−0.12	−0.06	0.68	0.82	0.55	0.53
Q	0.01	−0.52	0.41	0.55	0.50	0.62	0.44	0.42
Y	−4.08	−4.79	−0.78	−1.90	0.79	0.91	0.53	0.58
2Y	−13.82	−12.92	−7.44	−7.82	0.94	**0.95**	0.70	0.72
5Y	2.82	−7.48	31.70	27.43	0.42	0.72	0.09	0.11
	b_{NK}				p_{NK}			
M	0.04	−0.00	0.02	−0.06	0.70	0.82	0.59	0.50
Q	0.15	−0.06	−0.01	0.15	0.50	0.59	0.46	0.45
Y	0.56	0.50	1.20	−0.16	0.70	0.77	0.54	0.57
2Y	0.21	−0.17	0.22	0.23	**0.99**	**0.99**	0.80	0.83
5Y	−0.03	−0.05	−0.13	0.61	0.37	0.83	**0.01**	**0.02**
	b_{S}				p_{S}			
M	−0.01	−0.02	−0.01	0.00	0.68	0.82	0.55	0.52
Q	0.15	0.01	−0.04	−0.09	0.53	0.60	0.43	0.42
Y	0.79	0.81	0.71	0.47	0.71	0.79	0.54	0.58
2Y	0.26	0.02	−0.06	0.57	**0.99**	**0.99**	0.81	0.85
5Y	0.19	0.13	0.84	−0.12	0.38	0.82	**0.01**	**0.01**
	R^2				T			
M	0.00	0.00	0.00	0.00	683	683	683	683
Q	0.00	0.00	0.00	0.00	227	227	227	227
Y	0.00	0.01	0.00	0.00	56	56	56	56
2Y	0.03	0.03	0.00	0.01	220	220	220	220
5Y	0.00	0.01	0.04	0.03	208	208	208	208

Table 4 : Multiple Predictive Regressions Using the Value Spread

This table reports multiple predictive regressions of returns over different horizons (τ) including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) periods on the value spread (S), the term premium (term), the default premium (def), the dividend yield (div), and the short-term Treasury bill rate (rf). We use four portfolio returns in the left hand side of the regressions: the equally weighted and value-weighted market excess returns ($r^{\text{mkt}}_{\text{ew}}$ and $r^{\text{mkt}}_{\text{vw}}$, respectively) and the equally weighted and value-weighted small-cap (quintile) excess returns ($r^{\text{sml}}_{\text{ew}}$ and $r^{\text{sml}}_{\text{vw}}$, respectively). For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slopes and their corresponding p-values using Nelson and Kim's (1993) method. All p-values are one-sided p-values which are the estimated probabilities of obtaining a coefficient at least as large as the coefficient estimated from the actual data series. A p-value less than 0.05 implies the coefficient is significantly positive at 0.05 level, whereas a p-value greater than 0.95 implies the coefficient is significantly negative at 0.05 level. p-value is in bold if it is greater than 95% or less than 5%.

	Panel A: January 1927 to December 2001								Panel B: January 1945 to December 2001							
τ	$r^{\text{mkt}}_{\text{ew}}$	$r^{\text{mkt}}_{\text{vw}}$	$r^{\text{sml}}_{\text{ew}}$	$r^{\text{sml}}_{\text{vw}}$	$r^{\text{mkt}}_{\text{ew}}$	$r^{\text{mkt}}_{\text{vw}}$	$r^{\text{sml}}_{\text{ew}}$	$r^{\text{sml}}_{\text{vw}}$	$r^{\text{mkt}}_{\text{ew}}$	$r^{\text{mkt}}_{\text{vw}}$	$r^{\text{sml}}_{\text{ew}}$	$r^{\text{sml}}_{\text{vw}}$	$r^{\text{mkt}}_{\text{ew}}$	$r^{\text{mkt}}_{\text{vw}}$	$r^{\text{sml}}_{\text{ew}}$	$r^{\text{sml}}_{\text{vw}}$
	$\beta_{S,\tau}$				$p_{S,\text{NK}}$				$\beta_{S,\tau}$				$p_{S,\text{NK}}$			
M	−1.30	−0.98	−1.74	−1.60	**1.00**	**1.00**	**1.00**	**1.00**	−0.29	−0.42	−0.53	−0.48	0.88	**0.97**	**0.96**	**0.95**
Q	−2.87	−2.39	−3.75	−3.45	**0.99**	**1.00**	**0.98**	**0.99**	0.09	−0.38	−0.51	−0.34	0.48	0.72	0.69	0.63
Y	−3.58	−4.24	−4.02	−4.57	0.80	0.93	0.71	0.79	0.23	−1.77	0.57	−0.47	0.52	0.83	0.50	0.59
2Y	−5.48	−7.57	−0.38	−4.76	**0.96**	**1.00**	0.54	0.89	−1.69	−3.61	−1.29	−2.57	0.86	**0.99**	0.71	0.87
5Y	3.18	−12.67	25.82	9.08	0.22	**1.00**	**0.00**	0.09	3.57	−1.82	9.63	7.18	0.09	0.78	**0.01**	**0.02**
	$\beta_{\text{term},\tau}$				$p_{\text{term},\text{NK}}$				$\beta_{\text{term},\tau}$				$p_{\text{term},\text{NK}}$			
M	−0.11	0.11	−0.50	−0.28	0.60	0.35	0.84	0.72	**0.00**	**0.04**	−0.14	−0.14	0.50	0.42	0.68	0.68
Q	−0.10	0.30	−0.80	−0.24	0.51	0.39	0.61	0.53	0.42	0.46	0.17	0.27	0.33	0.29	0.44	0.44
Y	3.86	3.01	2.72	3.88	0.25	0.25	0.38	0.30	−0.08	−0.13	−1.08	−1.72	0.55	0.58	0.58	0.67
2Y	5.52	6.89	3.71	6.35	**0.05**	**0.00**	0.24	0.06	3.37	5.31	2.10	1.49	0.06	**0.00**	0.24	0.30
5Y	5.39	15.96	−5.55	5.31	0.08	**0.00**	0.74	0.17	8.52	14.73	9.36	9.07	**0.00**	**0.00**	**0.03**	**0.03**
	$\beta_{\text{def},\tau}$				$p_{\text{def},\text{NK}}$				$\beta_{\text{def},\tau}$				$p_{\text{def},\text{NK}}$			
M	1.75	0.69	3.14	2.34	**0.00**	**0.01**	**0.00**	**0.00**	1.25	0.82	1.68	1.54	**0.00**	**0.00**	**0.00**	**0.00**
Q	4.09	1.66	7.38	5.27	**0.01**	**0.05**	**0.00**	**0.00**	2.95	1.75	4.29	3.57	**0.00**	**0.01**	**0.00**	**0.00**
Y	7.53	1.68	16.54	10.35	0.08	0.37	**0.02**	0.08	7.36	4.49	9.61	8.64	**0.02**	0.07	**0.03**	**0.04**
2Y	10.00	0.66	20.63	12.61	**0.00**	0.37	**0.00**	**0.00**	−3.65	−5.76	−6.12	−5.03	**0.95**	**1.00**	**0.98**	**0.97**
5Y	12.95	−0.01	29.96	16.23	**0.00**	0.50	**0.00**	**0.01**	−4.32	−6.83	−12.87	−12.00	**0.95**	**1.00**	**1.00**	**1.00**
	$\beta_{\text{div},\tau}$				$p_{\text{div},\text{NK}}$				$\beta_{\text{div},\tau}$				$p_{\text{div},\text{NK}}$			
M	−0.13	0.03	−0.67	−0.55	0.88	0.75	0.99	0.99	0.07	**0.04**	−0.36	−0.26	0.77	0.81	**0.99**	**0.98**
Q	1.29	0.91	0.95	0.86	0.36	0.38	0.49	0.47	0.98	0.77	0.00	0.30	0.41	0.45	0.80	0.71
Y	5.39	3.37	4.79	3.42	0.28	0.31	0.42	0.47	4.30	2.89	2.53	2.34	0.38	0.46	0.54	0.56
2Y	18.53	12.24	22.80	19.36	**0.00**	**0.00**	**0.00**	**0.00**	11.59	9.17	9.40	8.90	**0.00**	**0.00**	**0.00**	**0.01**
5Y	28.08	23.06	28.73	31.18	**0.00**	**0.00**	**0.00**	**0.00**	20.78	19.12	15.26	18.16	**0.00**	**0.00**	**0.00**	**0.00**
	$\beta_{\text{rf},\tau}$				$p_{\text{rf},\text{NK}}$				$\beta_{\text{rf},\tau}$				$p_{\text{rf},\text{NK}}$			
M	−1.42	−0.89	−2.48	−2.04	**1.00**	**1.00**	**1.00**	**1.00**	−1.43	−1.20	−2.14	−2.00	**1.00**	**1.00**	**1.00**	**1.00**
Q	−2.82	−1.98	−5.11	−4.00	**0.96**	**0.97**	**0.99**	**0.98**	−2.79	−2.29	−4.84	−4.12	**0.99**	**0.99**	**1.00**	**1.00**
Y	−3.12	−3.12	−8.36	−6.41	0.73	0.79	0.83	0.80	−5.74	−6.39	−8.32	−8.78	0.87	0.91	0.85	0.89
2Y	−2.11	−1.56	−6.70	−5.06	0.72	0.75	0.89	0.87	3.73	2.05	3.80	1.00	0.08	0.20	0.16	0.42
5Y	−3.98	−3.09	−13.64	−9.86	0.82	0.83	0.95	0.92	4.93	2.48	8.62	5.33	0.09	0.24	0.07	0.16

Table 5 : Univariate Predictive Regressions With the Book-to-Market Spread

This table reports univariate predictive regressions of returns over different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) periods on the book-to-market spread. The book-to-market spread is measured as the book-to-market ratio of value stocks (decile ten) minus the book-to-market of growth stocks (decile one) in the ten deciles based on a one-way sort on book-to-market. We use four portfolio returns in the left hand side of the regressions: the equally weighted and value-weighted market excess returns ($r_{\rm ew}^{\rm mkt}$ and $r_{\rm vw}^{\rm mkt}$, respectively) and the equally weighted and value-weighted small-cap (quintile) excess returns ($r_{\rm ew}^{\rm sml}$ and $r_{\rm vw}^{\rm sml}$, respectively). For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slope β_τ, p-values associated with the Newey-West (1987) t-statistics $p_{\rm NW}$, biases in the slope $b_{\rm NK}$ and p-values of the slopes $p_{\rm NK}$ using Nelson and Kim's (1993) method, biases in the slope $b_{\rm S}$ and p-values of the slopes $p_{\rm S}$ using Stambaugh's (1999) method, R^2, and the number of observations, T. All p values are one-sided p-values as estimated probabilities of obtaining a coefficient at least as large as the coefficient estimated from the actual data series. A p-value less than 0.05 implies the coefficient is significantly positive at 0.05 level, whereas a p-value greater than 0.95 implies the coefficient is significantly negative at 0.05 level. p-values greater than 95% or less than 5% are in bold.

	Panel A: January 1927 to December 2001								Panel B: January 1945 to December 2001							
τ	$r_{\rm ew}^{\rm mkt}$	$r_{\rm vw}^{\rm mkt}$	$r_{\rm ew}^{\rm sml}$	$r_{\rm vw}^{\rm sml}$	$r_{\rm ew}^{\rm mkt}$	$r_{\rm vw}^{\rm mkt}$	$r_{\rm ew}^{\rm sml}$	$r_{\rm vw}^{\rm sml}$	$r_{\rm ew}^{\rm mkt}$	$r_{\rm vw}^{\rm mkt}$	$r_{\rm ew}^{\rm sml}$	$r_{\rm vw}^{\rm sml}$	$r_{\rm ew}^{\rm mkt}$	$r_{\rm vw}^{\rm mkt}$	$r_{\rm ew}^{\rm sml}$	$r_{\rm vw}^{\rm sml}$
	β_τ				$p_{\rm NW}$				β_τ				$p_{\rm NW}$			
M	0.17	0.07	0.30	0.22	**0.04**	0.13	**0.02**	**0.04**	0.33	0.23	0.27	0.32	**0.04**	0.06	0.15	0.10
Q	0.62	0.26	1.10	0.82	0.08	0.13	0.06	0.07	1.10	0.78	1.00	1.12	**0.02**	**0.04**	0.10	0.06
Y	1.57	0.69	2.70	1.94	**0.00**	**0.01**	**0.00**	**0.00**	1.79	1.03	1.97	2.01	0.21	0.28	0.24	0.23
2Y	3.30	1.41	6.03	4.48	**0.00**	**0.00**	**0.00**	**0.00**	3.22	1.70	3.35	3.71	0.11	0.21	0.16	0.12
5Y	4.91	1.92	9.49	6.86	**0.00**	**0.00**	**0.00**	**0.00**	10.70	8.48	11.10	13.25	**0.00**	**0.01**	**0.01**	**0.00**
	$b_{\rm NK}$				$p_{\rm NK}$				$b_{\rm NK}$				$p_{\rm NK}$			
M	0.01	0.01	0.01	0.01	**0.00**	**0.05**	**0.00**	**0.00**	0.03	0.02	0.03	0.02	0.08	0.12	0.20	0.13
Q	0.03	0.02	0.05	0.05	**0.00**	**0.02**	**0.00**	**0.00**	0.10	0.07	0.13	0.10	0.08	0.12	0.19	0.13
Y	0.03	0.03	0.06	0.04	**0.01**	**0.04**	**0.00**	**0.01**	0.39	0.21	0.57	0.36	0.30	0.34	0.36	0.31
2Y	−0.02	−0.00	−0.05	−0.00	**0.00**	**0.00**	**0.00**	**0.00**	0.06	0.05	0.06	−0.02	**0.04**	0.12	0.10	0.05
5Y	0.01	−0.00	−0.06	−0.06	**0.00**	**0.00**	**0.00**	**0.00**	0.04	0.06	−0.18	−0.02	**0.00**	**0.00**	**0.00**	**0.00**
	$b_{\rm S}$				$p_{\rm S}$				$b_{\rm S}$				$p_{\rm S}$			
M	0.01	0.01	0.01	0.01	**0.00**	0.05	**0.00**	**0.00**	0.02	0.03	0.02	0.01	0.08	0.13	0.18	0.13
Q	0.03	0.02	0.04	0.06	**0.00**	**0.03**	**0.00**	**0.00**	0.08	0.08	0.13	0.11	0.08	0.09	0.18	0.14
Y	0.04	0.06	0.05	0.04	**0.00**	0.05	**0.00**	**0.00**	0.24	0.25	0.40	0.43	0.27	0.34	0.33	0.33
2Y	−0.01	0.02	−0.02	−0.03	**0.00**	**0.00**	**0.00**	**0.00**	0.06	0.09	0.02	0.08	**0.03**	0.13	0.08	0.05
5Y	−0.03	0.03	−0.07	−0.03	**0.00**	**0.00**	**0.00**	**0.00**	−0.16	0.07	−0.17	0.04	**0.00**	**0.00**	**0.00**	**0.00**
	R^2				T				R^2				T			
M	0.02	0.00	0.03	0.02	899	899	899	899	0.01	0.00	0.00	0.00	683	683	683	683
Q	0.05	0.02	0.07	0.05	299	299	299	299	0.02	0.01	0.01	0.01	227	227	227	227
Y	0.12	0.05	0.16	0.11	74	74	74	74	0.01	0.01	0.01	0.01	56	56	56	56
2Y	0.22	0.08	0.29	0.22	292	292	292	292	0.03	0.01	0.01	0.02	220	220	220	220
5Y	0.29	0.09	0.33	0.27	280	280	280	280	0.17	0.11	0.07	0.12	208	208	208	208

Table 6 : Univariate Predictive Regressions With the Market-to-Book Spread

This table reports univariate predictive regressions of returns over different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) periods on the market-to-book spread . The market-to-book spread is measured as the market-to-book ratio of growth stocks (decile one) minus the market-to-book of value stocks (decile ten) in the ten deciles sorted on book-to-market. We use four portfolio returns in the left hand side of the regressions: the equally weighted and value-weighted market excess returns ($r_{\rm ew}^{\rm mkt}$ and $r_{\rm vw}^{\rm mkt}$, respectively) and the equally weighted and value-weighted small-cap (quintile) excess returns ($r_{\rm ew}^{\rm sml}$ and $r_{\rm vw}^{\rm sml}$, respectively). For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slope β_τ, p-values associated with the Newey-West (1987) t-statistics $p_{\rm NW}$, biases in the slope $b_{\rm NK}$ and p-values of the slopes $p_{\rm NK}$ using Nelson and Kim's (1993) method, biases in the slope $b_{\rm S}$ and p-values of the slopes $p_{\rm S}$ using Stambaugh's (1999) method, R^2, and the number of observations, T. All p values are one-sided p-values as estimated probabilities of obtaining a coefficient at least as large as the coefficient estimated from the actual data series. A p-value less than 0.05 implies the coefficient is significantly positive at 0.05 level, whereas a p-value greater than 0.95 implies the coefficient is significantly negative at 0.05 level. p-values greater than 95% or less than 5% are in bold.

Panel A: January 1927 to December 2001

τ	$r_{\rm ew}^{\rm mkt}$	$r_{\rm vw}^{\rm mkt}$	$r_{\rm ew}^{\rm sml}$	$r_{\rm vw}^{\rm sml}$	$r_{\rm ew}^{\rm mkt}$	$r_{\rm vw}^{\rm mkt}$	$r_{\rm ew}^{\rm sml}$	$r_{\rm vw}^{\rm sml}$
		β_τ				$p_{\rm NW}$		
M	−0.37	−0.23	−0.46	−0.38	**1.00**	**1.00**	**0.99**	**0.98**
Q	−1.21	−0.68	−1.57	−1.29	**0.99**	**0.99**	**0.98**	**0.97**
Y	−2.89	−1.29	−4.18	−3.20	**0.99**	0.95	**0.96**	**0.96**
2Y	−8.41	−4.58	−11.31	−9.51	**1.00**	**1.00**	**1.00**	**1.00**
5Y	−14.90	−9.88	−17.31	−16.84	**1.00**	**1.00**	**0.99**	**1.00**
		$b_{\rm NK}$				$p_{\rm NK}$		
M	−0.02	−0.03	−0.03	−0.01	**0.99**	**0.97**	**0.99**	**0.98**
Q	−0.08	−0.08	−0.15	−0.10	**0.99**	**0.95**	**0.97**	**0.96**
Y	−0.26	−0.16	−0.20	−0.07	**0.95**	0.84	0.94	0.93
2Y	0.01	−0.02	−0.06	0.05	**1.00**	**1.00**	**1.00**	**1.00**
5Y	−0.05	−0.03	0.06	0.05	**1.00**	**1.00**	**1.00**	**1.00**
		$b_{\rm S}$				$p_{\rm S}$		
M	−0.02	−0.02	−0.02	−0.03	**0.99**	**0.97**	**0.99**	**0.98**
Q	−0.06	−0.08	−0.07	−0.11	**0.99**	**0.95**	**0.98**	**0.97**
Y	−0.09	−0.16	−0.13	−0.20	**0.96**	0.85	**0.95**	0.93
2Y	−0.02	−0.00	−0.04	0.06	**1.00**	**1.00**	**1.00**	**1.00**
5Y	0.12	−0.05	0.04	0.00	**1.00**	**1.00**	**1.00**	**1.00**
		R^2				T		
M	0.01	0.01	0.01	0.01	899	899	899	899
Q	0.02	0.02	0.02	0.02	299	299	299	299
Y	0.05	0.02	0.04	0.04	74	74	74	74
2Y	0.14	0.08	0.11	0.10	292	292	292	292
5Y	0.19	0.17	0.08	0.12	280	280	280	280

Panel B: January 1945 to December 2001

τ	$r_{\rm ew}^{\rm mkt}$	$r_{\rm vw}^{\rm mkt}$	$r_{\rm ew}^{\rm sml}$	$r_{\rm vw}^{\rm sml}$	$r_{\rm ew}^{\rm mkt}$	$r_{\rm vw}^{\rm mkt}$	$r_{\rm ew}^{\rm sml}$	$r_{\rm vw}^{\rm sml}$
		β_τ				$p_{\rm NW}$		
M	−0.21	−0.17	−0.11	−0.13	**1.00**	**0.99**	0.78	0.84
Q	−0.61	−0.46	−0.38	−0.44	**0.99**	**0.98**	0.83	0.87
Y	−1.51	−0.95	−1.30	−1.30	**1.00**	0.92	0.89	0.89
2Y	−4.26	−2.66	−3.49	−3.56	**1.00**	**0.98**	**0.96**	**0.96**
5Y	−10.10	−8.05	−6.82	−9.14	**1.00**	**1.00**	0.94	**0.98**
		$b_{\rm NK}$				$p_{\rm NK}$		
M	−0.02	−0.02	−0.02	−0.02	**0.97**	**0.96**	0.75	0.83
Q	−0.07	−0.07	−0.09	−0.08	0.94	0.92	0.75	0.82
Y	−0.19	−0.16	−0.31	−0.19	0.84	0.81	0.73	0.76
2Y	−0.04	−0.02	−0.04	−0.03	**1.00**	**1.00**	**1.00**	**1.00**
5Y	0.10	0.02	−0.06	−0.02	**1.00**	**1.00**	**1.00**	**1.00**
		$b_{\rm S}$				$p_{\rm S}$		
M	−0.02	−0.02	−0.02	−0.02	**0.97**	**0.95**	0.79	0.84
Q	−0.08	−0.06	−0.07	−0.08	0.95	0.94	0.77	0.81
Y	−0.05	−0.15	−0.26	−0.25	0.88	0.82	0.74	0.75
2Y	−0.04	−0.06	−0.09	−0.08	**1.00**	**1.00**	**1.00**	**1.00**
5Y	0.08	−0.04	0.02	0.06	**1.00**	**1.00**	**1.00**	**1.00**
		R^2				T		
M	0.01	0.01	0.00	0.00	683	683	683	683
Q	0.02	0.02	0.00	0.01	227	227	227	227
Y	0.03	0.02	0.01	0.01	56	56	56	56
2Y	0.13	0.07	0.04	0.05	220	220	220	220
5Y	0.30	0.19	0.05	0.11	208	208	208	208

Table 7 : Multiple Predictive Regressions With the Book-to-Market Spread

This table reports multiple predictive regressions of returns on the book-to-market spread ($S_{\mathrm{b/m}}$), the term premium (term), the default premium (def), the dividend yield (div), and the short-term Treasury bill rate (rf) across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) periods. We use four portfolio returns in the left hand side of the regressions: the equally weighted and value-weighted market excess returns ($r^{\mathrm{mkt}}_{\mathrm{ew}}$ and $r^{\mathrm{mkt}}_{\mathrm{vw}}$, respectively) and the equally weighted and value-weighted small-cap (quintile) excess returns ($r^{\mathrm{sml}}_{\mathrm{ew}}$ and $r^{\mathrm{sml}}_{\mathrm{vw}}$, respectively). For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slopes and their corresponding p-values using Nelson and Kim's (1993) method. All p-values are one-sided p-values which are the estimated probabilities of obtaining a coefficient at least as large as the coefficient estimated from the actual data series. A p-value less than 0.05 implies the coefficient is significantly positive at 0.05 level, whereas a p-value greater than 0.95 implies the coefficient is significantly negative at 0.05 level. p-value is in bold if it is greater than 95% or less than 5%.

Panel A: January 1927 to December 2001

τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S_{\mathrm{b/m}},\tau}$				$p_{S_{\mathrm{b/m}},\mathrm{NK}}$			
M	−0.01	0.00	−0.05	0.09	0.50	0.52	0.55	0.43
Q	1.55	0.74	2.63	2.55	0.10	0.18	0.07	0.06
Y	3.40	3.13	2.46	4.10	0.15	0.12	0.22	0.13
2Y	9.90	7.75	14.92	15.93	**0.00**	**0.00**	**0.00**	**0.00**
5Y	2.69	1.14	4.35	5.46	0.21	0.33	0.25	0.14
	$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term},\mathrm{NK}}$			
M	0.21	0.35	−0.07	0.13	0.27	0.07	0.54	0.36
Q	0.66	0.89	0.24	0.71	0.27	0.18	0.41	0.33
Y	4.81	4.10	3.73	5.10	0.22	0.16	0.33	0.22
2Y	7.36	9.03	4.78	8.43	**0.01**	**0.00**	0.15	**0.04**
5Y	4.90	18.76	−10.78	3.75	0.11	**0.00**	0.89	0.28
	$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def},\mathrm{NK}}$			
M	0.95	0.09	2.10	1.30	**0.00**	0.33	**0.00**	**0.01**
Q	1.39	−0.25	3.49	1.61	0.16	0.59	0.07	0.21
Y	3.52	−2.56	12.82	5.38	0.28	0.81	0.06	0.26
2Y	0.72	−8.55	11.30	0.06	0.39	**1.00**	**0.01**	0.47
5Y	13.15	−8.15	42.44	18.20	**0.01**	**0.99**	**0.00**	**0.00**
	$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div},\mathrm{NK}}$			
M	0.18	0.26	−0.26	−0.18	0.55	0.37	0.87	0.84
Q	1.92	1.44	1.79	1.63	0.19	0.22	0.29	0.30
Y	5.98	4.09	5.47	4.19	0.23	0.27	0.38	0.44
2Y	19.44	13.50	22.85	20.14	**0.00**	**0.00**	**0.00**	**0.00**
5Y	27.63	24.98	24.92	29.89	**0.00**	**0.00**	**0.00**	**0.00**
	$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf},\mathrm{NK}}$			
M	−0.36	−0.09	−1.08	−0.69	0.85	0.63	**0.98**	0.94
Q	0.27	0.31	−0.77	0.06	0.40	0.41	0.63	0.49
Y	1.44	1.83	−3.93	−0.71	0.45	0.35	0.67	0.52
2Y	7.24	8.36	1.13	6.76	**0.02**	**0.00**	0.39	0.07
5Y	−5.12	7.56	−31.91	−14.27	0.86	**0.01**	**1.00**	**0.97**

Panel B: January 1945 to December 2001

τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S_{\mathrm{b/m}},\tau}$				$p_{S_{\mathrm{b/m}},\mathrm{NK}}$			
M	−0.10	−0.24	−0.24	−0.18	0.64	0.87	0.75	0.74
Q	0.14	−0.32	−0.28	−0.00	0.46	0.67	0.62	0.46
Y	−2.33	−3.94	−1.70	−2.10	0.73	0.93	0.67	0.71
2Y	−2.31	−5.05	−1.00	−1.31	0.84	**1.00**	0.63	0.67
5Y	4.49	0.27	6.44	6.96	**0.04**	0.45	0.07	**0.04**
	$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term},\mathrm{NK}}$			
M	0.10	0.17	0.03	0.02	0.37	0.25	0.49	0.47
Q	0.41	0.55	0.33	0.41	0.35	0.27	0.40	0.40
Y	−0.74	−0.31	−1.74	−2.02	0.58	0.58	0.65	0.67
2Y	3.65	5.89	2.45	2.30	**0.05**	**0.00**	0.21	0.20
5Y	7.88	15.52	6.61	7.40	**0.01**	**0.00**	0.09	**0.04**
	$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def},\mathrm{NK}}$			
M	1.19	0.74	1.58	1.44	**0.00**	**0.00**	**0.00**	**0.00**
Q	2.96	1.69	4.20	3.50	**0.00**	**0.01**	**0.00**	**0.00**
Y	7.50	4.35	9.79	8.64	**0.03**	0.08	**0.03**	**0.04**
2Y	−3.84	−6.15	−6.30	−5.44	**0.96**	**1.00**	**0.98**	**0.97**
5Y	−3.92	−7.18	−11.46	−11.07	0.93	**1.00**	**1.00**	**1.00**
	$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div},\mathrm{NK}}$			
M	0.24	0.33	−0.02	0.03	0.48	0.33	0.81	0.78
Q	0.88	1.06	0.33	0.44	0.48	0.33	0.67	0.66
Y	5.16	5.18	3.00	3.38	0.31	0.24	0.51	0.45
2Y	13.14	12.54	10.25	10.26	**0.00**	**0.00**	**0.00**	**0.00**
5Y	18.07	19.47	10.24	13.54	**0.00**	**0.00**	**0.02**	**0.00**
	$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf},\mathrm{NK}}$			
M	−1.23	−0.97	−1.81	−1.69	**1.00**	**1.00**	**1.00**	**1.00**
Q	−2.79	−2.16	−4.57	−3.84	**1.00**	**0.99**	**1.00**	**0.99**
Y	−7.20	−7.16	−9.70	−9.56	0.91	0.93	0.91	0.90
2Y	3.92	2.39	4.37	2.50	0.06	0.14	0.13	0.25
5Y	4.37	4.24	3.86	3.02	0.11	0.13	0.27	0.29

Table 8 : Multiple Predictive Regressions Using the Market-to-Book Spread

This table reports multiple predictive regressions of returns on the market-to-book spread ($S_{\mathrm{m/b}}$), the term premium (term), the default premium (def), the dividend yield (div), and the short-term Treasury bill rate (rf) across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) periods. We use four portfolio returns in the left hand side of the regressions: the equally weighted and value-weighted market excess returns ($r^{\mathrm{mkt}}_{\mathrm{ew}}$ and $r^{\mathrm{mkt}}_{\mathrm{vw}}$, respectively) and the equally weighted and value-weighted small-cap (quintile) excess returns ($r^{\mathrm{sml}}_{\mathrm{ew}}$ and $r^{\mathrm{sml}}_{\mathrm{vw}}$, respectively). For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slopes and their corresponding p-values using Nelson and Kim's (1993) method. All p-values are one-sided p-values which are the estimated probabilities of obtaining a coefficient at least as large as the coefficient estimated from the actual data series. A p-value less than 0.05 implies the coefficient is significantly positive at 0.05 level, whereas a p-value greater than 0.95 implies the coefficient is significantly negative at 0.05 level. p-value is in bold if it is greater than 95% or less than 5%.

	Panel A: January 1927 to December 2001								Panel B: January 1945 to December 2001							
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S_{\mathrm{m/b}},\tau}$				$p_{S_{\mathrm{m/b}},\mathrm{NK}}$				$\beta_{S_{\mathrm{m/b}},\tau}$				$p_{S_{\mathrm{m/b}},\mathrm{NK}}$			
M	−0.44	−0.34	−0.49	−0.56	0.93	0.92	0.88	0.92	−0.11	−0.08	−0.03	−0.06	0.67	0.61	0.53	0.60
Q	−0.36	−0.34	0.16	−0.32	0.60	0.63	0.46	0.60	0.04	0.24	0.44	0.22	0.51	0.34	0.34	0.43
Y	0.94	0.69	2.32	−0.21	0.43	0.40	0.38	0.56	3.62	4.14	2.38	2.36	0.19	0.07	0.31	0.26
2Y	−0.33	−0.83	3.76	−0.13	0.56	0.66	0.18	0.52	0.64	3.68	−0.74	−0.87	0.37	**0.00**	0.58	0.63
5Y	−1.37	−2.82	8.58	1.73	0.66	0.87	0.13	0.43	−6.11	−1.45	−6.57	−8.97	**0.99**	0.75	**0.96**	**0.99**
	$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term},\mathrm{NK}}$				$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term},\mathrm{NK}}$			
M	0.17	0.32	−0.12	0.06	0.27	0.09	0.56	0.44	0.11	0.20	0.08	0.05	0.34	0.22	0.40	0.42
Q	0.50	0.79	0.07	0.49	0.36	0.21	0.46	0.35	0.39	0.64	0.43	0.43	0.34	0.24	0.40	0.37
Y	4.73	4.00	3.81	4.87	0.19	0.14	0.29	0.25	0.25	1.13	−1.04	−1.23	0.50	0.45	0.59	0.62
2Y	6.66	8.41	4.23	7.35	**0.02**	**0.00**	0.20	**0.05**	4.13	7.22	2.53	2.41	**0.03**	**0.00**	0.23	0.20
5Y	4.57	18.39	−10.21	3.54	0.13	**0.00**	0.88	0.27	6.32	15.29	4.65	5.06	**0.02**	**0.00**	0.15	0.13
	$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def},\mathrm{NK}}$				$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def},\mathrm{NK}}$			
M	1.00	0.13	2.13	1.42	**0.01**	0.29	**0.00**	**0.00**	1.19	0.72	1.55	1.43	**0.00**	**0.00**	**0.00**	**0.00**
Q	2.39	0.25	5.08	3.21	**0.05**	0.39	**0.01**	0.06	2.97	1.65	4.15	3.48	**0.00**	**0.02**	**0.00**	**0.00**
Y	5.33	−0.87	13.94	7.72	0.15	0.67	**0.04**	0.14	6.92	3.63	9.40	8.24	**0.04**	0.13	**0.04**	**0.05**
2Y	6.80	−3.72	19.97	9.80	**0.02**	0.93	**0.00**	**0.01**	−4.02	−6.76	−6.29	−5.44	**0.96**	**1.00**	**0.97**	**0.97**
5Y	14.92	−7.24	44.47	21.43	**0.00**	**0.98**	**0.00**	**0.00**	−3.13	−7.05	−10.52	−9.90	0.89	**1.00**	**1.00**	**1.00**
	$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div},\mathrm{NK}}$				$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div},\mathrm{NK}}$			
M	−0.16	0.00	−0.64	−0.60	0.91	0.78	**0.97**	**0.99**	0.10	0.17	−0.14	−0.10	0.73	0.59	0.92	0.91
Q	1.65	1.18	1.91	1.38	0.26	0.26	0.30	0.39	0.97	1.13	0.59	0.62	0.46	0.34	0.62	0.60
Y	6.75	4.65	7.29	4.07	0.21	0.22	0.28	0.43	7.22	7.02	4.29	4.49	0.20	0.13	0.46	0.41
2Y	19.20	12.90	25.59	20.07	**0.00**	**0.00**	**0.00**	**0.00**	12.62	13.23	9.20	8.97	**0.00**	**0.00**	**0.00**	**0.00**
5Y	26.74	23.20	30.22	30.90	**0.00**	**0.00**	**0.00**	**0.00**	15.39	18.52	8.01	9.76	**0.00**	**0.00**	**0.05**	**0.02**
	$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf},\mathrm{NK}}$				$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf},\mathrm{NK}}$			
M	−0.39	−0.12	−1.10	−0.78	0.87	0.66	**0.98**	**0.96**	−1.19	−0.84	−1.67	−1.59	**1.00**	**1.00**	**1.00**	**1.00**
Q	−0.55	−0.09	−2.09	−1.25	0.64	0.54	0.81	0.74	−2.86	−1.94	−4.34	−3.80	**0.99**	**0.98**	**1.00**	**1.00**
Y	−0.21	0.30	−5.00	−2.79	0.52	0.47	0.71	0.65	−5.23	−4.21	−8.32	−7.96	0.83	0.85	0.85	0.88
2Y	2.22	4.38	−6.08	−1.29	0.26	**0.04**	0.87	0.60	5.30	5.75	4.81	3.09	0.03	0.01	0.11	0.20
5Y	−6.57	6.83	−33.71	−16.98	0.92	**0.02**	**1.00**	**0.99**	0.91	3.87	−0.79	−2.28	0.40	0.14	0.57	0.69

Figure 1 : Theoretical Properties of the Book-to-Market Spread, the Market-to-Book spread, and the Value Spread Implied from the Model of Zhang (2005)

The figure reports the cyclical properties of the book-to-market spread (book-to-market of value portfolio minus book-to-market of growth portfolio), the market-to-book spread (market-to-book of growth portfolio minus market-to-book of value portfolio), and the value spread (log book-to-market of value portfolio minus that of growth portfolio). These properties are based on the theoretical model of Zhang (2005). Panel A plots the book-to-market spread; Panel B plots the market-to-book spread; and Panel C plots the value spread. All the spreads are plotted against aggregate economic conditions modeled as aggregate productivity, denoted x. Two versions of the model are considered. The solid lines are for the benchmark model with costly reversibility and time-varying price of risk. The broken lines are for the special case with symmetric adjustment cost and constant price of risk. Panel A is borrowed from Zhang (2005, Figure 4, Panel B).

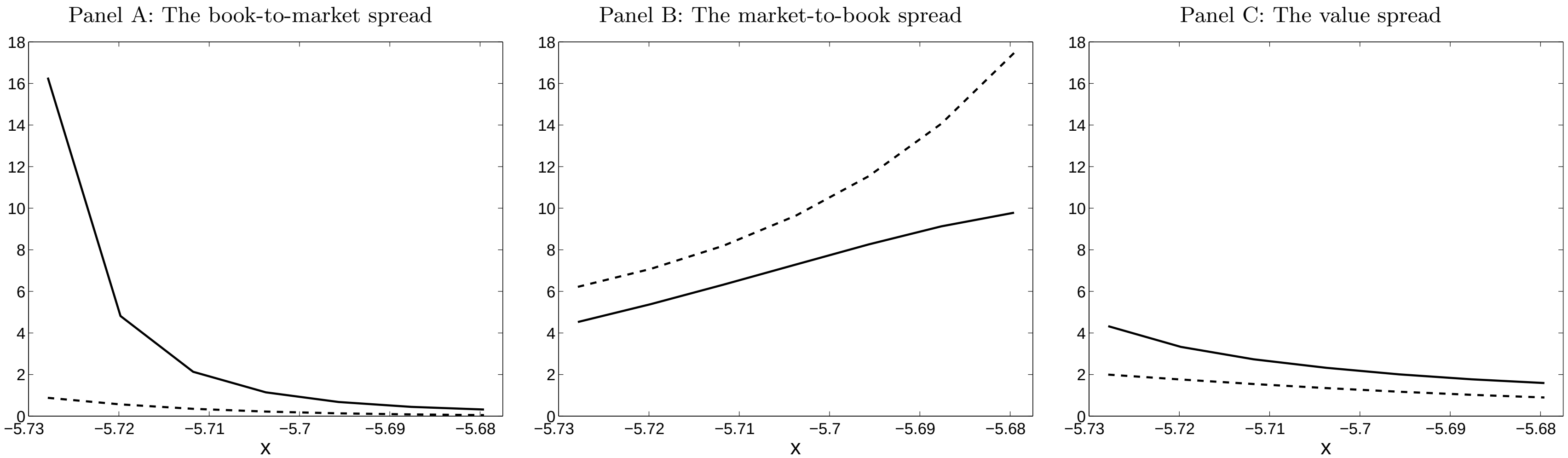

Figure 2 : Time Series of the Book-to-Market Spread, the Market-to-Book spread, and the Value Spread (January 1927–December 2001)

This figure plots the time series of the book-to-market spread, ($S_{\text{b/m}}$, Panel A), the market-to-book spread ($S_{\text{m/b}}$, Panel B), and the value spread (S, Panel C) from January 1927 to December 2001. NBER recession dates are plotted in shadowed area. The book-to-market spread is measured as the average book-to-market of decile ten (value) minus the average book-to-market of decile one (growth) from the ten deciles sorted on book-to-market. The market-to-book spread is measured as the average market-to-book of decile one minus the average market-to-book of decile ten. And the value spread is measured as the log book-to-market of decile ten minus the log book-to-market of decile one. We obtain the Fama-French portfolio data from Kenneth French's website. The data set contains the calendar year-end book-to-market ratios for all the portfolios. For months from January to December of year t, the book-to-market ratio of a given portfolio is constructed by dividing its book-to-market ratio at the end of December of year $t-1$ by its compounded gross return from the end of December of year $t-1$.