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ABSTRACT

Recent studies have used the value spread to predict aggregate stock returns to construct cash-flow betas that appear to explain the size and value anomalies. We show that two related variables, the book-to-market spread (the book-to-market of value stocks minus that of growth stocks) and the market-to-book spread (the market-to-book of growth stocks minus that of value stocks) predict returns in different directions and exhibit opposite cyclical variations. Most important, the value spread mixes information on the book-to-market and market-to-book spreads, and appears much less useful in predicting returns.

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1 Introduction

We ask whether the value spread, the log book-to-market of value stocks minus that of growth stocks, can predict aggregate stock returns. We also study time series predictability associated with 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.

Our main finding is that the book-to-market spread tends to be countercyclical and predicts returns with a positive sign, and the market-to-book spread tends to be procyclical and predicts returns with a negative sign. More important, because the value spread mixes information on the book-to-market spread and the market-to-book spread, it appears largely acyclic and exhibits only weak predictive power of aggregate stock returns.

Although somewhat focused, our economic question is important. In an influential recent contribution, Campbell and Vuolteenaho (2004) explain the size and value anomalies in stock returns using an economically motivated two-beta model. They break the market beta of a stock 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. ICAPM suggests that cash-flow betas should have a higher price of risk. Empirically, the authors find that value stocks and small stocks have much higher cash-flow betas than growth stocks and large stocks. And this pattern can explain empirically the higher average returns of value and small stocks.[1]

Although the economic logic of the Campbell-Vuolteenaho model is elegant, the empirical success of their model in explaining the size and value anomalies depends critically on their

[1]Bansal, Dittmar, and Lundblad (2004) and Hansen, Heaton, and Li (2004) are two related contributions.

use of the small-stock value spread to predict aggregate stock returns. Since the small-stock value spread is not one of the traditional conditioning variables, it is natural to ask why this variable should be used to predict returns. This issue is particularly important because time series regressions of aggregate stock returns on arbitrary predictive variables might produce economically less meaningful, data-mined results. Furthermore, the ICAPM itself provides at best vague guidance as for the identities of underlying state variables driving returns.

We argue that, because the value spread can be expressed as the log market-to-book of growth stocks minus the log market-to-book of value stocks, the value spread is as much the book-to-market spread in logs as the market-to-book spread in logs. But because the book-to-market and market-to-book spreads have opposite cyclical properties and predict aggregate stock returns with opposite signs, the value spread appears essentially acyclic and much less useful in predicting returns. In all, we cast some doubt on the empirical results of the Campbell and Vuolteenaho (2004) model in explaining the size and value anomalies because of the lack of economic motivation regarding the use of the value spread to predict returns.

Our work also contributes to time series predictability. Two related papers are Kothari and Shanken (1997) and Pontiff and Schall (1998), who find that the aggregate book-to-market predicts positively future market excess returns and small firm excess returns, although the predictive relations are much weaker in the post-1960 period. Our analysis differs because we use the spreads in book-to-market and in market-to-book to predict aggregate stock returns. Although these spreads and the aggregate book-to-market are correlated, we find that they do contain different information on future returns. The aggregate book-to-market is a stronger predictor of market excess returns, but the book-to-market spread is a stronger predictor of small firm excess returns. Further, while the aggregate book-to-market dominates the market-to-book spread in predicting returns in the long sample, the market-to-book spread dominates the aggregate book-to-market in the postwar sample. And although our goal is not to establish the book-to-market and market-to-book spreads as two new predictors, we find that they do contain incremental information vis-à-vis other common predictors including the term premium, the default premium, the dividend yield, and the short-term interest rate. In particular, the book-to-market spread often dominates these variables in bivariate predictive regressions in the long sample.

We also try to interpret our evidence using the theoretical framework of Zhang (2005), who constructs a fully-specified neoclassical model to understand why value stocks earn higher average returns than growth stocks. Using his model and parametrization, we derive several explicit, new testable predictions. In particular, the model predicts that the book-to-market spread is countercyclical and should be a positive predictor of returns, the market-to-book spread is procyclical and should be a negative predictor of returns, and the value spread is largely acyclic and should be a weak predictor of returns.

The evidence seems largely supportive. From January 1927 to December 2001, the slopes from regressing future market excess returns and small firm excess returns onto the book-to-market spread over different horizons are positive and mostly significant. Further, the book-to-market spread covaries positively with countercyclical conditioning variables such as dividend yield, term premium, default premium, and aggregate book-to-market, but covaries negatively with the procyclical short-term interest rate. On the other hand, the slopes of the market-to-book spread in predictive regressions are negative and mostly significant. And the market-to-book spread covaries negatively with the countercyclical variables and positively with the procyclical short rate. Finally, the value spread yields mixed regression results. Their slopes are mostly positive in the long sample, but are mostly negative in the postwar sample. However, there are clearly holes in the model predictions. In particular, both the cyclical properties and the predictive power of the book-to-market and the market-to-book spreads are substantially weaker in the postwar sample.

The rest of the paper is organized as follows. Sections 2 and 3 describe our data and estimation methods, respectively. Section 4 presents our empirical results. Section 5 interprets the evidence. Finally, Section 6 concludes.

2 Data

This section discusses our sample construction and basic properties of the data.

2.1 Sample Construction

We measure the book-to-market spread, denoted $S_{\mathrm{b/m}}$, as the average book-to-market ratio of portfolio ten minus the average book-to-market ratio of portfolio one from the ten deciles sorted in ascending order on book-to-market. The average book-to-market ratio of a portfolio is calculated as the sum of book values of all stocks in the portfolio divided by the sum of market values of all stocks in the portfolio. We measure the market-to-book spread, denoted $S_{\mathrm{m/b}}$, as the average market-to-book ratio of portfolio one minus the average market-to-book ratio of portfolio ten. The average market-to-book ratio of a portfolio is calculated as the sum of market values of all stocks in the portfolio divided by the sum of book values of all stocks in the portfolio. Finally, we measure the value spread, denoted S, as the log book-to-market of portfolio ten minus the log book-to-market of portfolio one.

We obtain the book-to-market portfolio data from Kenneth French's website. The data set contains the calendar year-end book-to-market ratios for all the book-to-market deciles. 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 $t-1$. Both book value and market value are measured at the end of December of year $t-1$.

Our definition of the value spread is consistent with that of previous studies (e.g., Asness, Friedman, Krail, and Liew (2000), Campbell and Vuolteenaho (2004), Cohen, Polk, and Vuolteenaho (2003), and Yogo (2005)). However, the book-to-market spread in logs is mathematically equivalent to the market-to-book spread in logs, i.e.,

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

where "BE" denotes the book value and "ME" denotes the market value. Therefore, it seems that the interpretation of the value spread is not economically precise because the spread contains information on the difference between two extreme book-to-market deciles both in book-to-market and in market-to-book. As a measure of value, book-to-market contains different information from market-to-book, which is a measure of growth. Nevertheless, we retain the definition of the value spread as in Eq. (1), in order to be consistent with previous studies.

We follow Cohen, Polk, and Vuolteenaho (2003) and use the entire CRSP universe to construct the value spread. Campbell and Vuolteenaho (2004) construct their measure using the small-value and small-growth portfolios from the two-by-three sort on size and book-to-market (e.g., Fama and French (1993)). We have tried to construct our measures using the small-stock portfolios, but the results are very similar. For example, the correlation between the small-cap value spread and the entire-sample value spread is 0.98 from January 1927 to December 2001, and is 0.97 in the sample after 1945. We therefore omit the results from using the small-stock portfolios to save space.

2.2 Descriptive Statistics

Figure 2 plots the time series of the book-to-market spread (Panel A), the market-to-book spread (Panel B), and the value spread (Panel C) along with NBER recession dates in shadowed area. From Panel A, there is a structural break around 1945 for the book-to-market spread. Before 1945, the book-to-market spread is relatively high and volatile, especially in the Great Depression periods; after 1945, the book-to-market spread is relatively low and stable. We thus conduct empirical analysis both in the full sample from January 1927 to December 2001 and in the subsample after January 1945.

From Panels B and C of Figure 2, no structural breaks similar to that in the book-to-market spread are evident for the market-to-book spread and the value spread. The market-to-book spread is relatively low in the recessionary 1930s and 1970s and is relatively high in the expansionary 1960s and 1990s. This evidence suggests that the market-to-book spread tends to be procyclical. From Panel C, the value spread is relatively high in both the Great Depression and in the expansionary 1990s. This evidence suggests that the value spread does not exhibit clear-cut cyclical patterns. This is not surprising because the value spread contains information on both the book-to-market spread and the market-to-book spread.

Table 1 reports descriptive statistics for the book-to-market spread, the market-to-book spread, the value spread, and for the portfolio returns used as the dependent variables in predictive regressions. These portfolio returns include the equal-weighted market excess return, denoted $r_{\mathrm{ew}}^{\mathrm{mkt}}$; the value-weighted market excess return, denoted $r_{\mathrm{vw}}^{\mathrm{mkt}}$; the equal-weighted small-cap (quintile) excess return, denoted $r_{\mathrm{ew}}^{\mathrm{sml}}$; and the value-weighted small-cap (quintile) excess return, denoted $r_{\mathrm{vw}}^{\mathrm{sml}}$. Our choice of portfolio returns in predictive regressions follows previous time series predictability literature (e.g., Pontiff and Schall (1998)).

From the first row of Panels A and B in 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, and the average reduces to 2.32 and its volatility reduces to 1.13 in the postwar sample. The average market-to-book spread is more stable across samples: it is 4.32 in the full sample and is only slightly higher, 4.62, in the postwar sample. Finally, the average value spread is also stable across samples: it is 2.66 in the full sample and is 2.39 in the postwar sample. And the value spread is less volatile than the other two spreads.

All three spreads are fairly persistent. From the first row of Panel A in 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 persistence structure of the book-to-market spread 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.

More important, although these autocorrelations are high, they are much lower than the autocorrelations of the commonly used predictive variables such dividend yield, aggregate book-to-market, and earnings price ratio. Lewellen (2004, Table 1) reports that the first-order autocorrelations of these variables range from 0.988 to 0.999. The lower persistence in our predictive variables relative to the traditional variables has important implications for our choice of estimation methods, as we discuss later in Section 3.

We have also conducted the Augmented Dickey-Fuller (ADF) unit root tests with an intercept and 12 lags for the three spreads. The p-value of the ADF test for the book-to-market spread is 0.08 in the long sample; thus the null hypothesis of a unit root cannot be rejected at the five percent level, but can be rejected at the ten percent level. In the postwar sample, the p-value for the book-to-market spread is basically zero. The unit root hypothesis cannot be rejected for the market-to-book spread in both samples; for the value spread, the null cannot be rejected in the long sample, but can be rejected in the postwar sample.

The descriptive statistics of market excess returns and small firm excess returns are relatively well known, but they are reported in Table 1 for completeness. In particular, all the portfolio returns are positively autocorrelated over the one-month horizon, but generally uncorrelated thereafter, consistent with Lo and MacKinlay (1988).

3 Estimation

To investigate the stock return predictability associated with the book-to-market spread, the market-to-book spread, and the value spreads, we follow Fama and French (1988, 1989) and adopt the following simple regression framework:

$$r_{t+\tau} = \alpha_\tau + \beta_\tau S_t + \epsilon_{t+\tau} \tag{2}$$

where S_t is one of the three spreads ($S_{\mathrm{b/m}}$, S, or $S_{\mathrm{m/b}}$) measured at the beginning of time t. $r_{t+\tau}$ is the simple excess return of either the market portfolio or the small-stock portfolio return from time t to time $t+\tau$, where τ denotes different horizons including one-month, one-quarter, one-year, two-year, and five-year holding period.

Since all three spreads are fairly persistent, the standard inferences are biased because returns depend on changes in stock prices; thus changes in the book-to-market spread are likely to be negatively related to its 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 therefore have to account for the small sample bias.

We use two methods in this regard. The first is Nelson and Kim's (1993) randomization method that requires the estimation of the first-order autoregressive process for the regressor:

$$S_{t+\tau} = \theta + \rho S_t + \eta_{t+\tau}. \tag{3}$$

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 Eq. (3) 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 Eq. (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. A p-value less than 0.05 implies that the coefficient is significantly positive at the five percent significance level, and a p-value greater than 0.95 implies the coefficient is significantly negative at the five percent significance level.

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 Eqs. (2) and (3), $[\epsilon_t \; \eta_t]'$, 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 very 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. Because 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,[2] we therefore do not use his method to adjust for the small-sample bias.

4 Empirical Results

Section 4.1 reports results of using the book-to-market spread, the value spread, and the market-to-book spread to predict future returns. Section 4.2 studies potential sources of the predictability. And Section 4.3 examines the incremental predictive ability of these spreads relative to traditional predictive variables.

4.1 Univariate Regressions

From univariate regressions, we find that the book-to-market spread is generally a positive predictor of returns, the market-to-book spread is generally a negative predictor of returns, and the value spread predicts returns in either direction depending on the specific sample. While broadly consistent with the testable hypotheses developed in Section 5, the evidence casts some doubt on the practice of predicting returns with the value spread as done, for example, in Campbell and Vuolteenaho (2004).

Table 2 presents the predictive regressions of future stock returns onto the book-to-market

[2] 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.

spread, $S_{\mathrm{b/m}}$, both in the full sample from January 1927 to December 2001 (Panel A) and in the postwar sample from January 1945 to December 2001 (Panel B). We perform predictive regressions over different horizons, denoted τ, including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. For regressions with two-year and five-year horizons, we use overlapping quarterly observations.

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

Several interesting results emerge from Panel A of Table 2. Most important, the subpanel denoted β_τ shows that *all* the slopes are positive, suggesting that the book-to-market spread predicts positively future market excess return and small firm excess return. And the slopes are mostly significant: the subpanel denoted p_{NW} shows that the one-sided p-values associated with Newey-West t-statistics are mostly significant at five percent level. Using Nelson and Kim's (1993) and Stambaugh's (1999) methods to adjust for the small sample bias yields quantitatively similar results, from the subpanels denoted p_{NK} and p_{S}. Moreover, the magnitudes of the goodness-of-fit coefficients from the subpanel denoted R^2 increase with the horizon τ. This evidence suggests that the amount of the predictability rises with the regression horizon. Finally, the subpanels denoted b_{NK} and b_{S} report the estimated biases in the slopes using Nelson and Kim's and Stambaugh's methods, respectively. The biases are generally small and are less than ten percent of the slopes.

Panel B of Table 2 replicates the predictive regressions using the book-to-market spread as in Panel A, but in the postwar sample. All the slopes β_τ are again positive and increasing in regression horizon τ. Comparing Panels A and B reveals that the slopes in the subsample are much higher than those in the full sample. In some cases, the slopes are more than doubled, indicating a lower average book-to-market spread in the postwar sample than that in the long sample. But these slopes are also estimated with less precision. As a result, their significance is substantially lower in the subsample. Except for a few significant p_{NW}'s in short-horizon regressions, significant p-values appear only in the two-year and five-year horizons. Finally, for the most part, the R^2's are substantially lower in the postwar sample.

Table 3 regresses future stock returns onto the market-to-book spread, $S_{\mathrm{m/b}}$. From the first five rows of the table, *all* the slopes are negative in both the full sample and the postwar sample. This evidence suggests that the market-to-book spread is a negative predictor of future returns. From the p-values in Panel A, the slopes estimated from the full sample are mostly significant with only a few exceptions. Finally, from Panel B, the market-to-book spread is largely significant when predicting market excess returns in the postwar sample, but it is only significant in the long horizons when predicting small firm excess returns.

From Panel A of Table 4, the slopes of the value spread in predictive regressions are mostly positive in the full sample. The slopes are significant in predicting equal-weighted small firm excess returns. They are also significant in predicting the equal-weighted market excess returns and the value-weighted small firm excess returns in long horizons, but not the value-weighted market excess returns. However, Panel B shows that the predictive power of the value spread is unstable across samples. The slopes of the value spread become mostly negative in the postwar sample, although mostly insignificant.

In sum, Tables 2–4 show that, first, the book-to-market spread is a positive predictor of future returns from 1927 to 2001, but its predictive power is substantially weaker in the postwar sample. Second, the market-to-book spread is a significantly negative predictor of future market excess returns in both samples, and is mostly significant when predicting small firm excess returns. And finally, the value spread is a weak positive predictor of returns in the full sample and a weak negative predictor in the postwar sample. Overall, our evidence seems broadly consistent with the testable hypotheses developed in Section 5.

Interestingly, our evidence contrasts with that of Campbell and Vuolteenaho (2004) who finds the slope of the value spread in predicting returns to be negative. Two reasons can potentially explain the difference. First, the value spread contains information about both the book-to-market and the market-to-book spreads. But they have exactly opposite cyclical properties and predict returns with opposite signs. As another manifestation of the mixed properties of the value spread, Yogo (2005) regresses returns onto the value spread and three other variables, and finds the slope on the value spread to be significantly positive. Second, Campbell and Vuolteenaho use multiple regressions of future returns onto the value spread and three other variables that are correlated with the value spread. This makes direct interpretation and comparison to our results somewhat difficult.

4.2 Potential Sources of the Predictability

One potential source of stock return predictability associated with the book-to-market and market-to-book spreads is their cyclical properties. To investigate this possibility, we examine the cross correlations between these spreads and a set of conditioning variables commonly used to measure aggregate economic conditions. Other sources such as waves of investor sentiment can also drive this return predictability. Our simple tests do not distinguish these alternative explanations. Overall, our evidence suggests that the book-to-market spread seems countercyclical, the market-to-book spread seems procyclical, and the value spread seems weakly countercyclical in the long sample but weakly procyclical in the postwar sample.

Conditional Variables

We use five variables: dividend yield (div); default premium (def); term premium (term); short-term interest rate (rf); and the aggregate book-to-market (b/m). Our choice of these conditional variables is motivated from the time series predictability literature.[3]

These variables are constructed as follows. The dividend yield is the sum of dividend payments accruing to the CRSP value-weighted portfolio over the previous 12 months, divided by the contemporaneous level of the index. The default premium is the yield spread between Moody's Baa and Aaa corporate bonds. Data on the default yield are obtained from the monthly database of the Federal Reserve Bank of Saint Louis. The term premium is defined as the yield spread between a long-term and a one-year Treasury bond. Data on bond yields are obtained from the Ibbotson database. The one-month Treasury bill rate is obtained from CRSP. And finally, to construct the aggregate book-to-market ratio, we obtain the data on book value 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 value are from the CRSP monthly stock file.

Cross Correlations in the Full Sample

Panel A of Table 5 shows the cross correlations for the sample from January 1927 to December 2001. From the fifth row of the panel, the book-to-market spread displays positive

[3] 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.

correlations with all the well-known countercyclical variables including the dividend yield (0.45), the default premium (0.61), the term premium (0.39), and the aggregate book-to-market (0.85), where the pairwise cross correlations are reported in parentheses. Further, the book-to-market spread also displays a negative correlation of -0.52 with the procyclical short-term interest rate.

From the sixth row of Panel A in Table 5, the market-to-book spread correlates negatively with all the countercyclical variables including 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 short-term interest rate (0.20). The seventh row of Panel A shows that the cross correlation structure of the value spread with the conditioning variables is similar to that of the book-to-market spread, although the correlations are mostly smaller in magnitude. And finally, the value spread correlates highly with the book-to-market spread (0.82) and correlates weakly with the market-to-book spread (-0.09).

To summarize, the full-sample evidence shows that the book-to-market spread tends to be countercyclical, and the market-to-book spread tends to be procyclical. The value spread is also countercyclical, but the degree of its cyclical variation is much weaker than that of the book-to-market spread.

Cross Correlations in the Postwar Sample

From the fifth row of Panel B in Table 5, there are important changes in the cross correlations between the book-to-market spread and the conditioning variables in the postwar sample. Notably, the correlation between the book-to-market spread and the term premium is now close to zero, and that between the book-to-market spread and the default premium switches sign, from 0.61 in the long sample to -0.23 in the subsample. But 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 short-term interest rate (-0.50).

The sixth row of Panel B in Table 5 shows that the market-to-book spread continues to exhibit procyclical movements: its correlation with the dividend yield is -0.80, that with the default premium is -0.14, and that with the aggregate book-to-market is -0.88. However, its correlations with the term premium and the short term interest rate are close to zero.

Finally, the seventh row of Panel B in Table 5 shows that the cyclical variation of the value spread is less clear in the postwar sample. Although the value spread correlates negatively with the countercyclical aggregate book-to-market (-0.16), it also correlates negatively with the procyclical short term interest rate (-0.51).

Correlations with Future Stock Returns

Table 5 also reports the cross correlations between the various spreads and future stock returns. We measure all the returns at the end of period t or at the beginning of period $t+1$ and all the conditioning variables and the spreads at the beginning of period t. From the first four rows of Table 5, the book-to-market spread is positively correlated with the next period market excess returns and small-stock excess returns in the long sample (Panel A). The same holds in the postwar sample (Panel B), although the correlations are somewhat lower than those in the long sample. The market-to-book spread is negatively correlated with next period returns in both samples and the correlations are again higher in the long sample. The value spread correlates weakly and positively with future returns in the long sample, but correlates weakly and negatively with future returns in the postwar sample.

In sum, the correlation evidence between the three spreads and future returns is consistent with the general message from the univariate regression results. Once again, the mixed cyclical properties of the value spread cast some doubt on its use as a conditioning variable.

4.3 Relative Predictive Power

Having shown that the book-to-market and market-to-book spreads are much stronger predictive variables then the value spread, we now ask whether the book-to-market and market-to-book spreads contain incremental information about future returns beyond that captured by well-known predictive variables. We use bivariate and multiple regressions to evaluate the relative predictive power of the book-to-market and market-to-book spreads.

Although our goal is not to establish the book-to-market and market-to-book spreads as two new variables that should be included in the list of common conditioning variables, we consider this exercise important because of the relatively high cross-correlations between these variables in Table 5. We do not consider the value spread because its predictive ability seems too weak. Another reason is that its economic interpretation is much less clear than either the book-to-market or the market-to-book spread.

Bivariate Regressions with Aggregate Book-to-Market

Table 6 reports the bivariate regressions with the book-to-market spread and the aggregate book-to-market (Panels A and C) and the bivariate regressions with the market-to-book spread and the aggregate book-to-market (Panels B and D), both in the long sample and in the postwar sample. We only report the p-values from the Nelson and Kim (1993) method; those from Stambaugh's (1999) method are very similar and are omitted to save space.

From Panel A of Table 6, in the presence of the aggregate book-to-market, the book-to-market spread loses its ability to predict future market excess returns, but retains most of its ability to predict small firm excess returns. More important, the ability of the aggregate book-to-market to predict small firm excess returns documented in Pontiff and Schall (1998) diminishes substantially in the presence of the book-to-market spread. It seems that the two variables contain somewhat different information on future returns in the long sample. In the postwar sample, Panel C shows that both variables have mostly positive but insignificant slopes, and that they have comparable predictive power.

From Panel B of Table 6, the market-to-book spread loses almost all of its predictive ability in the presence of the aggregate book-to-market in the long sample. In particular, the slopes of the market-to-book spreads when predicting small firm excess returns are mostly positive and in a few cases even significant. But Panel D shows that in the postwar sample the predictive power of the market-to-book spread is much stronger than that of the aggregate book-to-market. All the slopes with the market-to-book spread are negative and mostly significant. And the slopes of the aggregate book-to-market often become negative and sometimes even significantly negative.

In sum, relative to the aggregate book-to-market, the book-to-market spread contains incremental information on the small firm excess returns but not on the market excess returns. The aggregate book-to-market dominates the market-to-book spread in predicting returns in the long sample, but is dominated by the market-to-book spread in the postwar sample.

Bivariate Regressions with Other Predictive Variables

Table 7 replicates the bivariate regressions in Table 6 but with the aggregate book-to-market replaced by the term premium. From Panel A, the book-to-market spread dominates the term premium in predicting future returns in the long sample. From Panel C, the term premium dominates the book-to-market spread in short horizons in the postwar sample, but the book-to-market spread retains some of its predictive power in long-horizon regressions. From Panels B and D, the slopes for the market-to-book spread are all negative in both samples; some of them are significant in the presence of the term premium.

Table 8 reports the bivariate regression of returns onto the book-to-market spread and the default premium (Panels A and C) and onto the market-to-book spread and the default premium (Panels B and D). From Panel A, the book-to-market spread retains most of its predictive ability in the long sample. From Panels B and D, the market-to-book spread is only significant in long-horizon regressions in both samples; the default premium remains strong in the long sample, but it loses almost all its predictive power in the postwar sample. Some of its slopes in the postwar sample even become negative and significant.

Table 9 uses the dividend yield along with the book-to-market spread or the market-to-book spread in bivariate regressions. From Panel A, the book-to-market spread largely dominates the dividend yield in the long sample. In the postwar sample, the predictive ability of the dividend yield seems mostly stronger than that of the book-to-market spread in long-horizon regressions, but the slopes for both predictors in short horizons are mostly insignificant. From Panels B and D, the dividend yield largely dominates the market-to-book spread in both samples.

Finally, Table 10 uses the short-term interest rate along with the book-to-market spread and the market-to-book spread in the bivariate regressions. From Panel A, the book-to-market spread largely dominates the short rate in the long sample; the short rate loses much of its predictive power except only in the five-year horizon. In the postwar sample, Panel C shows that the short rate dominates the book-to-market spread in the short horizons, but the book-to-market spread retains its predictive ability in long-horizon regressions. From Panels B and D, the market-to-book spread has predictive ability largely comparable with that of the short rate in both samples.

In short, the book-to-market spread often dominates common predictive variables in the long sample. And predictability is weaker in the postwar sample for all the variables. Finally, although often dominated by other variables in the long sample, the market-to-book spread retains its long horizon predictive ability in the postwar sample.

Multiple Regressions

Table 11 reports the results of regressing future returns onto the book-to-market spread and four conditioning variables including the term premium, the default premium, the dividend yield, and the short-term interest rate. 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).

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, as opposed to the two variables being negative predictors of returns. Alternative interpretations are certainly possible. But Table 11 also shows that the default premium is a significantly negative predictor, and the short rate is a positive although insignificant predictor of long horizon returns in the postwar sample. These counterintuitive results seem difficult to reconcile without multicollinearity.

Finally, Table 12 reports the multiple regressions of future returns onto the market-to-book spread and the four conditioning variables. The market-to-book spread loses most of its predictive power in the presence of the four other variables. But again no variable clearly dominates others in both samples. Although the slopes of the default premium are mostly significant, but its slopes in long-horizon regressions in the postwar sample are significantly negative, again suggesting multicollinearity at work.

5 Interpretation

What are the economic forces driving our empirical results? In this section, we provide some interpretation based on the asset pricing model of Zhang (2005). Undoubtedly, there are alternative interpretations. But Zhang's model provides one of the few fully-specified frameworks in which the book-to-market, market-to-book, and value spreads are explicitly modeled. Therefore, their cyclical properties and associations with aggregate expected returns can be characterized theoretically.

Zhang's (2005) model features both costly reversibility and time-varying price of risk. Cost reversibility means that it is more costly for firms to divest than to invest (e.g., Ramey and Shapiro (2001)), and countercyclical price of risk means that discount rates are higher in bad times than in good times (e.g., Fama and French (1988, 1989)). The basic point relevant to our purpose is that the model predicts the book-to-market spread to be countercyclical, the market-to-book spread to be procyclical, and the value spread to be weakly countercyclical.[4]

We refer readers to Zhang (2005) for the complete structure of the model. But Figure 1 plots, using his parametrization, the book-to-market spread (Panel A), the market-to-book spread (Panel B), and the value spread (Panel C) between value and growth firms against aggregate productivity used to capture aggregate economic conditions. High aggregate productivity indicates booms and low aggregate productivity indicates recessions. The solid lines represent the benchmark model with costly reversibility and time-varying price of risk, and the broken lines represent the simplified model without these two features. Panel A is borrowed from Panel B of Figure 4 in Zhang (2005), but the other two panels are new.

[4] Gomes, Kogan, and Zhang (2003) construct a related dynamic model and show that the cross-sectional dispersion 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 studies do not discuss explicitly the time series properties of the book-to-market and market-to-book spreads or their underlying economic mechanism.

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 is even more so in the simplified model. Finally, Panel C shows that the value spread is weakly countercyclical. In the language of stock return predictability, Zhang (2005) therefore predicts that the book-to-market spread is a positive predictor of future returns, the market-to-book spread is a negative predictor of future returns, and the value spread is a weak predictor of future returns.

Why is the book-to-market spread countercyclical in Zhang (2005)? In recessions, all firms invest less than average. Because of their relatively low profitability (e.g., Fama and French (1995)), value firms are more likely to cut 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. As a result, they are stuck with more unproductive assets, leading to higher book-to-market ratios in bad times.

Further, time-varying price of risk propagates the effects of costly reversibility. Higher discount rates in bad times lower firms' expected net present values. 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.

On the other hand, growth firms are less prone to effects of costly reversibility and time-varying price of risk. The reason is that their assets are more productive, so they have less incentives to scaling down in recessions. In all, the book-to-market spread is high in recessions and low in booms, as shown in Panel A of Figure 1.

Why is the market-to-book spread procyclical in Zhang (2005)? 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 become more productive given positive aggregate shocks. As a result, the dispersion in growth opportunities between value and growth firms is widened in booms. Furthermore, time-varying price of risk again boosts these effects. A lower discount rate in good times increases firms' expected net present values, causing growth firms to invest even more and grow even faster. In all, the market-to-book spread is high in good times and low in bad times, as shown in Panel B of Figure 1.

Figure 1 also shows that the market-to-book spread in the simplified model without costly reversibility is higher and exhibits stronger procyclical movements than the market-to-book spread in the benchmark model. The intuition is that, although firms do not face high costs when expanding capital, the mere possibility of high costs when scaling down in future recessions reduces firms' growth rates in good times in the benchmark model.

Finally, what explains the behavior of the value spread? Notice that the book-to-market spread in logs is mathematically equivalent to the market-to-book spread in logs, as shown in Eq. (1). The value spread therefore reflects both the countercyclical movements of the book-to-market spread and the procyclical movements of the market-to-book spread. This makes the cyclical properties of the value spread less clear, and explains why it is only weakly countercyclical, as shown in Panel C of Figure 1.

6 Conclusion

Our evidence suggests that the value spread, defined as the log book-to-market of value stocks minus the log book-to-market of growth stocks, is only a weak predictor of aggregate stock returns. Specifically, the value spread predicts weakly and positively aggregate stock returns in the sample from January 1927 to December 2001, but weakly and negatively in the postwar sample. But two related variables, the book-to-market spread, defined as the book-to-market of value stocks minus the book-to-market of growth stocks, and the market-to-book spread, defined as the market-to-book of growth stocks minus the market-to-book of value stocks, are more powerful predictors. The book-to-market spread tends to be countercyclical and predicts returns positively, and the market-to-book spread tends to be procyclical and predicts returns negatively. But the evidence is weaker in the postwar sample.

Theoretically, neoclassical models predict explicitly the documented cyclical properties and stock return predictability associated with the book-to-market and the market-to-book spreads. More important, because the value spread mixes information on the book-to-market and the market-to-book spreads that have opposite cyclical properties, the value spread appears much less powerful in predicting returns. Our results suggest that the empirical success of Campbell and Vuolteenaho (2004) in explaining the size and value anomalies should perhaps be somewhat tempered because their results depend critically on the use of the value spread as a predictive variable of aggregate stock returns.

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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 (in percent), volatility σ (in percent), autocorrelations (of order 1–12, 24, 36, 48, and 60), and p-value associated with the Augmented Dickey-Fuller (ADF) 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 that of growth stocks (equivalently, the log market-to-book of growth stocks minus the log market-to-market of value stocks; the equal-weighted and value-weighted market excess returns $r_{\mathrm{ew}}^{\mathrm{mkt}}$ and $r_{\mathrm{vw}}^{\mathrm{mkt}}$, respectively; and the equal-weighted and value-weighted small firm (quintile) excess returns $r_{\mathrm{ew}}^{\mathrm{sml}}$ and $r_{\mathrm{vw}}^{\mathrm{sml}}$, respectively. Panel A reports the results from January 1927 to December 2001, and Panel B reports the results from January 1945 to December 2001.

	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	0.081
$S_{\mathrm{m/b}}$	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	0.766
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	0.554
$r_{\mathrm{ew}}^{\mathrm{mkt}}$	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	0.000
$S_{\mathrm{m/b}}$	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	0.821
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	0.022
$r_{\mathrm{ew}}^{\mathrm{mkt}}$	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 : Predictive Regressions Using the Book-to-Market Spread

This table reports univariate, predictive regressions of returns onto the book-to-market spread across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. The book-to-market spread is measured as the book-to-market ratio of value stocks (portfolio ten) minus that of growth stocks (portfolio one) in the ten deciles sorted on book-to-market. For regressions with two-year and five-year horizons, we use overlapping quarterly observations. Table 1 contains detailed definitions for stock returns used as dependent variables. 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-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	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	β_τ				p_{NW}				β_τ				p_{NW}			
M	0.170	0.066	0.303	0.222	**0.043**	0.130	**0.023**	**0.038**	0.330	0.225	0.267	0.316	**0.039**	0.058	0.152	0.102
Q	0.617	0.257	1.102	0.818	0.079	0.131	0.059	0.074	1.104	0.779	0.999	1.121	**0.023**	**0.036**	0.097	0.061
Y	1.567	0.688	2.700	1.935	**0.000**	**0.007**	**0.001**	**0.001**	1.787	1.032	1.968	2.007	0.213	0.277	0.244	0.228
2Y	3.302	1.411	6.032	4.477	**0.000**	**0.002**	**0.000**	**0.000**	3.216	1.701	3.353	3.713	0.107	0.209	0.159	0.123
5Y	4.910	1.919	9.494	6.864	**0.001**	**0.004**	**0.001**	**0.001**	10.704	8.484	11.100	13.247	**0.001**	**0.005**	**0.010**	**0.004**
	b_{NK}				p_{NK}				b_{NK}				p_{NK}			
M	0.010	0.006	0.011	0.012	**0.003**	**0.047**	**0.000**	**0.003**	0.025	0.017	0.026	0.024	0.080	0.117	0.199	0.131
Q	0.033	0.019	0.054	0.052	**0.003**	**0.023**	**0.000**	**0.001**	0.095	0.066	0.125	0.098	0.079	0.121	0.192	0.133
Y	0.029	0.026	0.060	0.038	**0.007**	**0.044**	**0.001**	**0.010**	0.387	0.213	0.572	0.361	0.298	0.336	0.355	0.306
2Y	-0.023	-0.002	-0.045	-0.000	**0.000**	**0.000**	**0.000**	**0.000**	0.064	0.049	0.061	-0.016	**0.038**	0.123	0.096	0.053
5Y	0.007	-0.002	-0.061	-0.064	**0.000**	**0.000**	**0.000**	**0.000**	0.040	0.056	-0.181	-0.024	**0.000**	**0.000**	**0.001**	**0.000**
	b_{S}				p_{S}				b_{S}				p_{S}			
M	0.007	0.007	0.006	0.012	**0.000**	0.054	**0.000**	**0.000**	0.023	0.025	0.022	0.014	0.075	0.131	0.175	0.126
Q	0.027	0.024	0.038	0.056	**0.002**	**0.033**	**0.000**	**0.002**	0.083	0.080	0.126	0.113	0.079	0.093	0.175	0.135
Y	0.037	0.063	0.045	0.043	**0.004**	0.051	**0.000**	**0.004**	0.241	0.251	0.397	0.427	0.268	0.337	0.327	0.325
2Y	-0.008	0.018	-0.021	-0.027	**0.000**	**0.000**	**0.000**	**0.000**	0.059	0.088	0.022	0.080	**0.029**	0.134	0.079	0.050
5Y	-0.026	0.031	-0.066	-0.025	**0.000**	**0.000**	**0.000**	**0.000**	-0.161	0.065	-0.173	0.043	**0.000**	**0.000**	**0.000**	**0.000**
	R^2				T				R^2				T			
M	0.016	0.004	0.025	0.016	899	899	899	899	0.006	0.004	0.002	0.004	683	683	683	683
Q	0.049	0.018	0.073	0.051	299	299	299	299	0.017	0.013	0.008	0.011	227	227	227	227
Y	0.121	0.047	0.159	0.109	74	74	74	74	0.011	0.006	0.006	0.008	56	56	56	56
2Y	0.217	0.078	0.293	0.221	292	292	292	292	0.026	0.010	0.014	0.020	220	220	220	220
5Y	0.290	0.087	0.325	0.272	280	280	280	280	0.171	0.106	0.072	0.116	208	208	208	208

Table 3 : Predictive Regressions Using the Market-to-Book Spread

This table reports univariate, predictive regressions of returns on the market-to-book spread across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. The market-to-book spread is measured as the market-to-book ratio of growth stocks (portfolio one) minus that of value stocks (portfolio ten) in the ten deciles sorted on book-to-market. For regressions with two-year and five-year horizons, we use overlapping quarterly observations. Table 1 contains detailed definitions for stock returns used as dependent variables. 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-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	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	β_τ				p_{NW}				β_τ				p_{NW}			
M	-0.374	-0.228	-0.461	-0.376	**0.998**	**0.995**	**0.985**	**0.979**	-0.205	-0.170	-0.105	-0.129	**0.995**	**0.992**	0.781	0.844
Q	-1.206	-0.679	-1.572	-1.291	**0.994**	**0.988**	**0.976**	**0.974**	-0.612	-0.457	-0.377	-0.441	**0.994**	**0.976**	0.826	0.873
Y	-2.893	-1.293	-4.175	-3.195	**0.990**	0.949	**0.963**	**0.957**	-1.510	-0.950	-1.299	-1.296	**0.996**	0.918	0.888	0.888
2Y	-8.406	-4.575	-11.308	-9.506	**1.000**	**0.998**	**0.998**	**0.997**	-4.264	-2.658	-3.489	-3.562	**0.999**	**0.976**	**0.955**	**0.955**
5Y	-14.901	-9.882	-17.311	-16.843	**1.000**	**1.000**	**0.994**	**0.999**	-10.099	-8.054	-6.824	-9.141	**1.000**	**0.995**	0.936	**0.983**
	b_{NK}				p_{NK}				b_{NK}				p_{NK}			
M	-0.021	-0.025	-0.029	-0.014	**0.993**	**0.967**	**0.990**	**0.979**	-0.020	-0.017	-0.023	-0.015	**0.970**	**0.955**	0.754	0.833
Q	-0.081	-0.077	-0.148	-0.098	**0.987**	**0.953**	**0.970**	**0.963**	-0.069	-0.066	-0.086	-0.081	0.944	0.921	0.750	0.817
Y	-0.264	-0.156	-0.200	-0.065	**0.950**	0.843	0.939	0.933	-0.190	-0.162	-0.310	-0.194	0.843	0.806	0.732	0.756
2Y	0.005	-0.019	-0.060	0.046	**1.000**	**1.000**	**1.000**	**1.000**	-0.044	-0.019	-0.036	-0.026	**1.000**	**1.000**	**0.999**	**0.999**
5Y	-0.048	-0.026	0.060	0.047	**1.000**	**1.000**	**1.000**	**1.000**	0.095	0.018	-0.063	-0.018	**1.000**	**1.000**	**0.998**	**1.000**
	b_{S}				p_{S}				b_{S}				p_{S}			
M	-0.018	-0.019	-0.019	-0.025	**0.994**	**0.972**	**0.992**	**0.978**	-0.021	-0.021	-0.018	-0.018	**0.968**	**0.952**	0.791	0.837
Q	-0.061	-0.077	-0.072	-0.114	**0.987**	**0.954**	**0.982**	**0.970**	-0.080	-0.060	-0.069	-0.082	0.945	0.935	0.765	0.807
Y	-0.093	-0.157	-0.129	-0.198	**0.959**	0.845	**0.953**	0.927	-0.047	-0.152	-0.262	-0.249	0.876	0.819	0.739	0.754
2Y	-0.017	-0.003	-0.041	0.063	**1.000**	**1.000**	**1.000**	**1.000**	-0.043	-0.064	-0.092	-0.083	**1.000**	**1.000**	**0.996**	**1.000**
5Y	0.117	-0.053	0.039	0.002	**1.000**	**1.000**	**1.000**	**1.000**	0.075	-0.035	0.018	0.060	**1.000**	**1.000**	**1.000**	**1.000**
	R^2				T				R^2				T			
M	0.010	0.007	0.007	0.006	899	899	899	899	0.008	0.007	0.001	0.002	683	683	683	683
Q	0.023	0.015	0.018	0.016	299	299	299	299	0.017	0.015	0.004	0.006	227	227	227	227
Y	0.048	0.019	0.044	0.035	74	74	74	74	0.031	0.019	0.011	0.014	56	56	56	56
2Y	0.144	0.083	0.105	0.102	292	292	292	292	0.128	0.065	0.041	0.050	220	220	220	220
5Y	0.193	0.166	0.078	0.118	280	280	280	280	0.297	0.187	0.053	0.107	208	208	208	208

Table 4 : Predictive Regressions Using the Value Spread

This table reports univariate, predictive regressions of returns on the value spread across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. The value spread is measured as the log book-to-market of value (portfolio ten) minus that of growth (portfolio one) in the ten deciles sorted on book-to-market. For regressions with two-year and five-year horizons, we use overlapping quarterly observations. Table 1 contains detailed definitions for stock returns used as dependent variables. 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-value is in bold if it is greater than 95% or less than 5%.

Panel A: January 1927 to December 2001

τ	$r_{\text{ew}}^{\text{mkt}}$	$r_{\text{vw}}^{\text{mkt}}$	$r_{\text{ew}}^{\text{sml}}$	$r_{\text{vw}}^{\text{sml}}$	$r_{\text{ew}}^{\text{mkt}}$	$r_{\text{vw}}^{\text{mkt}}$	$r_{\text{ew}}^{\text{sml}}$	$r_{\text{vw}}^{\text{sml}}$
	β_τ				p_{NW}			
M	0.675	-0.021	1.755	1.028	0.159	0.519	**0.045**	0.128
Q	2.331	0.212	5.558	3.337	0.143	0.439	0.055	0.128
Y	9.237	1.676	20.568	12.348	**0.040**	0.319	**0.012**	**0.046**
2Y	16.543	1.415	41.024	24.413	**0.042**	0.413	**0.004**	**0.031**
5Y	41.568	6.710	98.084	62.719	**0.000**	0.163	**0.000**	**0.000**
	b_{NK}				p_{NK}			
M	0.093	0.030	0.154	0.123	0.116	0.544	**0.016**	0.079
Q	0.379	0.251	0.581	0.469	0.137	0.515	**0.035**	0.098
Y	0.777	0.827	1.370	1.152	0.086	0.398	**0.017**	0.074
2Y	0.085	0.145	0.530	0.157	**0.000**	0.348	**0.000**	**0.001**
5Y	0.125	0.300	-0.347	-0.225	**0.000**	0.067	**0.000**	**0.000**
	b_{S}				p_{S}			
M	0.080	0.040	0.087	0.113	0.115	0.562	**0.020**	0.079
Q	0.369	0.211	0.524	0.678	0.118	0.484	**0.039**	0.129
Y	0.950	0.974	0.845	1.113	0.078	0.407	**0.017**	0.066
2Y	0.360	-0.119	0.320	0.307	**0.000**	0.314	**0.000**	**0.000**
5Y	0.081	0.392	0.043	0.116	**0.000**	0.074	**0.000**	**0.000**
	R^2				T			
M	0.003	0.000	0.009	0.004	899	899	899	899
Q	0.008	0.000	0.020	0.009	299	299	299	299
Y	0.043	0.003	0.094	0.045	74	74	74	74
2Y	0.059	0.001	0.146	0.071	292	292	292	292
5Y	0.227	0.012	0.379	0.248	280	280	280	280

Panel B: January 1945 to December 2001

τ	$r_{\text{ew}}^{\text{mkt}}$	$r_{\text{vw}}^{\text{mkt}}$	$r_{\text{ew}}^{\text{sml}}$	$r_{\text{vw}}^{\text{sml}}$	$r_{\text{ew}}^{\text{mkt}}$	$r_{\text{vw}}^{\text{mkt}}$	$r_{\text{ew}}^{\text{sml}}$	$r_{\text{vw}}^{\text{sml}}$
	β_τ				p_{NW}			
M	-0.309	-0.518	-0.121	-0.057	0.678	0.820	0.552	0.526
Q	0.006	-0.517	0.405	0.547	0.499	0.622	0.442	0.415
Y	-4.083	-4.788	-0.783	-1.901	0.786	0.914	0.530	0.582
2Y	-13.818	-12.915	-7.436	-7.824	0.935	**0.954**	0.700	0.723
5Y	2.818	-7.478	31.698	27.427	0.418	0.721	0.088	0.108
	b_{NK}				p_{NK}			
M	0.036	-0.002	0.024	-0.058	0.698	0.815	0.588	0.495
Q	0.146	-0.062	-0.010	0.147	0.503	0.591	0.462	0.447
Y	0.561	0.498	1.198	-0.164	0.701	0.772	0.537	0.566
2Y	0.213	-0.167	0.216	0.227	**0.989**	**0.993**	0.795	0.828
5Y	-0.029	-0.049	-0.127	0.613	0.371	0.829	**0.008**	**0.017**
	b_{S}				p_{S}			
M	-0.007	-0.015	-0.009	0.001	0.675	0.820	0.546	0.518
Q	0.152	0.005	-0.036	-0.092	0.525	0.603	0.433	0.422
Y	0.790	0.810	0.714	0.467	0.705	0.791	0.541	0.576
2Y	0.263	0.017	-0.064	0.568	**0.991**	**0.991**	0.807	0.847
5Y	0.193	0.129	0.840	-0.124	0.377	0.819	**0.009**	**0.014**
	R^2				T			
M	0.000	0.001	0.000	0.000	683	683	683	683
Q	0.000	0.000	0.000	0.000	227	227	227	227
Y	0.004	0.009	0.000	0.001	56	56	56	56
2Y	0.029	0.033	0.004	0.005	220	220	220	220
5Y	0.001	0.005	0.035	0.030	208	208	208	208

Table 5 : Cross Correlations

This table reports the cross-correlations for the equal-weighted market excess return $r^{\mathrm{mkt}}_{\mathrm{ew}}$; the value-weighted market excess return $r^{\mathrm{mkt}}_{\mathrm{vw}}$; the equal-weighted small firm (quintile) excess return $r^{\mathrm{sml}}_{\mathrm{ew}}$; the value-weighted small firm (quintile) excess return $r^{\mathrm{sml}}_{\mathrm{vw}}$; the book-to-market spread $S_{\mathrm{b/m}}$ (the book-to-market of value stocks minus that of growth stocks); the value spread, S (the log book-to-market of value stocks minus that of growth stocks; equivalently, the log market-to-book of growth stocks minus that of value stocks); the market-to-book spread, $S_{\mathrm{m/b}}$ (the market-to-book of growth stocks minus that of value stocks); the dividend yield, div; the default premium, def; the term premium, term; the short-term interest rate, rf; and the aggregate book-to-market, b/m. Stock returns are measured at the end of period t or the beginning of period t+1, and all the conditioning variables are measured at the beginning of period t. Panel A reports the results for the sample from January 1927 to December 2001, and Panel B reports the results for the sample from January 1945 to December 2001.

Panel A: January 1927–December 2001

	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$S_{\mathrm{b/m}}$	$S_{\mathrm{m/b}}$	S	div	def	term	rf	b/m
$r^{\mathrm{mkt}}_{\mathrm{ew}}$	1.00	0.92	0.93	0.95	0.13	-0.10	0.05	0.11	0.16	0.10	-0.08	0.14
$r^{\mathrm{mkt}}_{\mathrm{vw}}$		1.00	0.76	0.81	0.07	-0.08	-0.00	0.07	0.06	0.08	-0.07	0.10
$r^{\mathrm{sml}}_{\mathrm{ew}}$			1.00	0.98	0.16	-0.09	0.10	0.11	0.19	0.11	-0.11	0.15
$r^{\mathrm{sml}}_{\mathrm{vw}}$				1.00	0.13	-0.08	0.06	0.08	0.14	0.10	-0.09	0.13
$S_{\mathrm{b/m}}$					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
term										1.00	-0.54	0.30
rf											1.00	-0.42
b/m												1.00

Panel B: January 1945–December 2001

	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$S_{\mathrm{b/m}}$	$S_{\mathrm{m/b}}$	S	div	def	term	rf	b/m
$r^{\mathrm{mkt}}_{\mathrm{ew}}$	1.00	0.91	0.88	0.91	0.08	-0.09	-0.02	0.10	0.10	0.14	-0.10	0.06
$r^{\mathrm{mkt}}_{\mathrm{vw}}$		1.00	0.71	0.76	0.06	-0.08	-0.04	0.10	0.06	0.14	-0.12	0.07
$r^{\mathrm{sml}}_{\mathrm{ew}}$			1.00	0.97	0.05	-0.03	-0.01	0.05	0.08	0.14	-0.11	-0.00
$r^{\mathrm{sml}}_{\mathrm{vw}}$				1.00	0.06	-0.04	-0.00	0.06	0.07	0.14	-0.12	0.02
$S_{\mathrm{b/m}}$					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 6 : Predictive Regressions: The Book-to-Market (Market-to-Book) Spread and the Aggregate Book-to-Market

This table reports bivariate, predictive regressions of returns onto the book-to-market (market-to-book) spread $S_{\mathrm{b/m}}$ ($S_{\mathrm{m/b}}$) and the aggregate book-to-market (b/m) across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slopes $\beta_{S,\tau}$, $\beta_{\mathrm{b/m},\tau}$, and p-values of slopes $p_{S,\mathrm{NK}}$ and $p_{\mathrm{b/m,NK}}$ using Nelson and Kim's (1993) method. All p-values are one-sided p-values that are 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–December 2001, $S_{\mathrm{b/m}}$ and b/m								Panel B: January 1927–December 2001, $S_{\mathrm{m/b}}$ and b/m							
τ	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$				$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.099	-0.430	1.237	0.627	0.418	0.906	**0.023**	0.113	0.163	-0.035	0.618	0.439	0.286	0.511	0.077	0.137
Q	0.021	-1.488	3.299	1.394	0.516	0.906	0.100	0.262	1.470	0.646	3.447	2.582	0.084	0.195	**0.033**	**0.050**
Y	6.682	1.803	15.788	10.074	0.135	0.334	**0.033**	0.097	1.326	0.995	3.934	2.487	0.374	0.360	0.252	0.315
2Y	6.630	-4.418	30.153	15.646	0.059	0.939	**0.000**	**0.003**	-1.486	-1.000	4.529	2.233	0.689	0.694	0.131	0.273
5Y	22.625	-5.622	78.627	44.076	**0.000**	0.916	**0.000**	**0.000**	-8.455	-10.155	5.828	-4.286	**0.977**	**0.999**	0.221	0.788
	$\beta_{\mathrm{b/m},\tau}$				$p_{\mathrm{b/m,NK}}$				$\beta_{\mathrm{b/m},\tau}$				$p_{\mathrm{b/m,NK}}$			
M	0.972	0.932	0.490	0.687	**0.015**	**0.005**	0.175	0.116	1.179	0.540	2.006	1.551	**0.000**	**0.020**	**0.000**	**0.000**
Q	4.012	3.430	3.344	3.721	**0.015**	**0.003**	0.072	**0.042**	5.128	2.642	8.732	6.838	**0.001**	**0.007**	**0.000**	**0.001**
Y	3.207	2.713	0.591	1.858	0.315	0.267	0.486	0.405	9.962	5.003	17.139	12.400	**0.014**	0.058	**0.004**	**0.015**
2Y	13.912	14.366	4.467	11.135	**0.000**	**0.000**	0.227	**0.021**	18.524	9.825	33.769	26.255	**0.000**	**0.000**	**0.000**	**0.000**
5Y	6.237	19.125	-28.175	-5.638	0.085	**0.000**	**0.997**	0.760	19.668	6.825	44.250	29.438	**0.000**	**0.019**	**0.000**	**0.000**

	Panel C: January 1945–December 2001, $S_{\mathrm{b/m}}$ and b/m								Panel D: January 1945–December 2001, $S_{\mathrm{m/b}}$ and b/m							
τ	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$				$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.338	0.099	0.637	0.607	0.165	0.350	0.072	0.069	-0.718	-0.427	-0.954	-0.800	**0.990**	0.944	**0.994**	**0.988**
Q	1.169	0.512	2.048	1.950	0.169	0.268	0.106	0.094	-1.755	-0.736	-2.351	-1.987	**0.956**	0.768	**0.953**	0.928
Y	-0.152	-1.043	2.475	1.945	0.535	0.618	0.353	0.364	-3.655	-0.993	-5.964	-4.803	0.839	0.611	0.849	0.822
2Y	-3.263	-3.992	1.587	1.353	0.849	0.933	0.323	0.388	-8.904	-3.370	-11.726	-9.985	**1.000**	**0.959**	**1.000**	**0.998**
5Y	2.024	-0.871	13.355	11.772	0.305	0.576	**0.010**	**0.018**	-11.355	-4.755	-11.458	-11.762	**0.998**	0.926	**0.986**	**0.992**
	$\beta_{\mathrm{b/m},\tau}$				$p_{\mathrm{b/m,NK}}$				$\beta_{\mathrm{b/m},\tau}$				$p_{\mathrm{b/m,NK}}$			
M	0.046	0.213	-0.464	-0.346	0.507	0.241	0.921	0.881	-0.339	-0.091	-0.840	-0.609	0.897	0.666	**0.996**	**0.961**
Q	0.114	0.508	-1.250	-0.927	0.483	0.335	0.831	0.792	-0.560	0.241	-1.801	-1.232	0.731	0.374	0.926	0.873
Y	2.799	2.894	-0.455	0.311	0.250	0.226	0.548	0.512	-0.423	1.271	-3.680	-2.322	0.594	0.387	0.805	0.705
2Y	9.228	7.885	3.007	3.867	**0.000**	**0.001**	0.215	0.121	-0.901	1.972	-5.892	-3.711	0.672	0.159	**0.970**	0.913
5Y	13.868	14.326	-0.780	4.681	**0.000**	**0.000**	0.571	0.194	5.739	9.647	-0.585	3.443	**0.029**	**0.002**	0.566	0.266

Table 7 : Predictive Regressions: The Book-to-Market (Market-to-Book) Spread and the Term Premium

This table reports bivariate, predictive regressions of returns onto the book-to-market (market-to-book) spread $S_{\mathrm{b/m}}$ ($S_{\mathrm{m/b}}$) and the term premium (term) across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slopes $\beta_{S,\tau}$, $\beta_{\mathrm{term},\tau}$, and p-values of slopes $p_{S,\mathrm{NK}}$ and $p_{\mathrm{term,NK}}$ using Nelson and Kim's (1993) method. All p-values are one-sided p-values that are 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–December 2001, $S_{\mathrm{b/m}}$ and term								Panel B: January 1927–December 2001, $S_{\mathrm{m/b}}$ and term							
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$				$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.748	0.212	1.413	0.993	**0.006**	0.183	**0.000**	**0.006**	-0.650	-0.395	-0.772	-0.631	**0.985**	**0.959**	**0.976**	0.946
Q	3.252	1.197	5.896	4.306	**0.004**	0.074	**0.000**	**0.004**	-2.187	-1.219	-2.773	-2.286	**0.978**	0.937	**0.959**	0.940
Y	7.864	3.027	14.015	9.539	**0.014**	0.129	**0.007**	**0.019**	-5.251	-2.252	-7.469	-5.656	0.921	0.761	0.921	0.876
2Y	17.477	6.421	32.737	23.654	**0.000**	**0.000**	**0.000**	**0.000**	-14.227	-7.612	-18.799	-15.824	**1.000**	**1.000**	**1.000**	**1.000**
5Y	25.867	5.886	53.083	36.005	**0.000**	**0.004**	**0.000**	**0.000**	-21.286	-13.526	-24.081	-23.516	**1.000**	**1.000**	**1.000**	**1.000**
	$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term,NK}}$				$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term,NK}}$			
M	0.452	0.381	0.615	0.559	**0.026**	**0.020**	**0.032**	0.052	0.672	0.420	1.080	0.876	**0.003**	**0.023**	**0.002**	**0.005**
Q	0.496	0.622	0.660	0.677	0.283	0.167	0.282	0.254	1.507	0.946	2.628	2.085	**0.047**	0.063	**0.024**	**0.029**
Y	4.068	2.871	5.830	5.469	0.119	0.121	0.097	0.107	6.579	3.812	10.509	8.592	**0.027**	0.050	**0.032**	**0.020**
2Y	2.901	3.924	3.233	4.050	0.111	**0.009**	0.190	0.088	8.094	5.559	13.859	11.471	**0.000**	**0.001**	**0.000**	**0.000**
5Y	5.549	13.000	2.868	8.161	**0.034**	**0.000**	0.293	**0.035**	13.122	13.697	20.727	19.425	**0.000**	**0.000**	**0.000**	**0.000**

	Panel C: January 1945–December 2001, $S_{\mathrm{b/m}}$ and term								Panel D: January 1945–December 2001, $S_{\mathrm{m/b}}$ and term							
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$				$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.363	0.246	0.289	0.345	0.104	0.154	0.173	0.157	-0.441	-0.366	-0.243	-0.291	**0.966**	**0.960**	0.792	0.838
Q	1.255	0.886	1.137	1.275	0.089	0.113	0.150	0.146	-1.310	-0.985	-0.844	-0.970	0.945	0.929	0.769	0.815
Y	2.064	1.254	2.274	2.295	0.282	0.356	0.312	0.307	-3.336	-2.118	-2.880	-2.867	0.856	0.773	0.731	0.741
2Y	3.700	1.972	3.853	4.269	**0.027**	0.116	0.101	**0.049**	-8.151	-5.176	-6.638	-6.795	**1.000**	**0.999**	**0.999**	**1.000**
5Y	12.330	9.796	12.786	15.259	**0.000**	**0.001**	**0.002**	**0.000**	-16.353	-13.294	-11.078	-14.825	**1.000**	**1.000**	**1.000**	**1.000**
	$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term,NK}}$				$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term,NK}}$			
M	0.652	0.571	0.872	0.800	**0.001**	**0.000**	**0.000**	**0.000**	0.671	0.586	0.883	0.814	**0.000**	**0.001**	**0.000**	**0.000**
Q	1.525	1.351	2.250	2.003	**0.011**	**0.003**	**0.004**	**0.005**	1.559	1.377	2.272	2.028	**0.012**	**0.006**	**0.009**	**0.007**
Y	2.576	2.767	2.858	2.422	0.156	0.089	0.220	0.252	2.529	2.740	2.794	2.357	0.148	0.095	0.215	0.237
2Y	0.473	3.321	-0.643	-0.030	0.354	**0.003**	0.596	0.482	0.710	3.474	-0.454	0.162	0.284	**0.002**	0.549	0.443
5Y	3.753	11.173	3.449	4.174	**0.028**	**0.000**	0.140	0.078	4.222	11.556	3.755	4.588	**0.022**	**0.000**	0.115	0.071

Table 8 : Predictive Regressions: The Book-to-Market (Market-to-Book) Spread and the Default Premium

This table reports bivariate, predictive regressions of returns onto the book-to-market (market-to-book) spread $S_{\mathrm{b/m}}$ ($S_{\mathrm{m/b}}$) and the default premium (def) across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slopes $\beta_{S,\tau}$, $\beta_{\mathrm{def},\tau}$, and p-values of slopes $p_{S,\mathrm{NK}}$ and $p_{\mathrm{def,NK}}$ using Nelson and Kim's (1993) method. All p-values are one-sided p-values that are 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–December 2001, $S_{\mathrm{b/m}}$ and def								
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.363	0.232	0.681	0.597	0.105	0.189	0.067	0.071
Q	1.995	1.106	3.714	3.101	**0.046**	0.089	**0.019**	**0.018**
Y	5.406	4.137	7.990	7.354	0.059	**0.048**	**0.045**	**0.049**
2Y	11.105	7.278	20.790	18.019	**0.000**	**0.000**	**0.000**	**0.000**
5Y	14.153	6.759	30.711	24.047	**0.000**	**0.002**	**0.000**	**0.000**
	$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def,NK}}$			
M	0.916	0.210	1.585	1.000	**0.007**	0.190	**0.001**	**0.008**
Q	2.306	0.527	3.878	2.335	**0.033**	0.291	**0.022**	0.093
Y	6.732	0.025	13.806	7.191	0.082	0.605	**0.015**	0.115
2Y	11.976	1.075	21.081	11.516	**0.000**	0.316	**0.000**	**0.001**
5Y	22.348	6.761	37.825	24.380	**0.000**	**0.003**	**0.000**	**0.001**

Panel B: January 1927–December 2001, $S_{\mathrm{m/b}}$ and def								
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	-0.426	-0.370	-0.330	-0.356	0.917	0.945	0.781	0.825
Q	-1.425	-1.057	-1.341	-1.369	0.900	0.916	0.818	0.822
Y	-3.221	-2.095	-3.237	-3.360	0.806	0.784	0.709	0.754
2Y	-10.476	-7.212	-11.299	-11.396	**1.000**	**1.000**	**0.998**	**1.000**
5Y	-15.330	-13.106	-11.523	-16.078	**1.000**	**1.000**	**0.963**	**1.000**
	$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def,NK}}$			
M	1.012	0.243	1.905	1.261	**0.004**	0.150	**0.000**	**0.001**
Q	3.135	0.907	5.813	3.876	**0.009**	0.143	**0.004**	**0.015**
Y	9.003	1.876	17.628	10.592	**0.024**	0.341	**0.012**	**0.030**
2Y	15.842	3.507	30.772	19.442	**0.000**	**0.040**	**0.000**	**0.000**
5Y	26.851	7.294	53.676	34.819	**0.000**	**0.004**	**0.000**	**0.000**

Panel C: January 1945–December 2001, $S_{\mathrm{b/m}}$ and def								
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.509	0.325	0.434	0.478	**0.030**	0.084	0.116	0.084
Q	1.655	1.079	1.552	1.628	**0.032**	0.070	0.111	0.078
Y	3.271	1.650	3.502	3.293	0.145	0.258	0.229	0.226
2Y	4.302	1.746	3.693	4.056	**0.018**	0.142	0.112	0.061
5Y	13.389	10.071	11.018	13.726	**0.000**	**0.000**	**0.004**	**0.000**
	$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def,NK}}$			
M	0.595	0.311	0.580	0.527	**0.001**	**0.044**	**0.027**	**0.033**
Q	1.660	0.805	1.726	1.468	**0.010**	0.076	0.051	0.050
Y	5.138	2.046	5.272	4.304	0.071	0.242	0.148	0.181
2Y	2.453	-0.852	-0.662	-0.867	**0.048**	0.676	0.599	0.614
5Y	3.791	1.084	-6.231	-5.391	**0.047**	0.323	**0.960**	0.936

Panel D: January 1945–December 2001, $S_{\mathrm{m/b}}$ and def								
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	-0.358	-0.320	-0.149	-0.209	0.936	0.948	0.664	0.756
Q	-1.108	-0.886	-0.598	-0.774	0.904	0.879	0.680	0.736
Y	-2.748	-1.884	-2.268	-2.392	0.808	0.728	0.672	0.709
2Y	-8.091	-5.347	-7.003	-7.185	**1.000**	**0.999**	**0.996**	**0.999**
5Y	-16.384	-13.244	-12.011	-15.761	**1.000**	**1.000**	**0.999**	**1.000**
	$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def,NK}}$			
M	0.426	0.191	0.459	0.387	**0.018**	0.135	0.052	0.070
Q	1.099	0.415	1.263	0.962	0.064	0.227	0.110	0.157
Y	3.905	1.354	4.045	3.115	0.125	0.359	0.251	0.279
2Y	0.276	-2.022	-2.539	-2.859	0.398	0.885	0.828	0.877
5Y	-1.617	-3.076	-10.534	-10.832	0.752	0.907	**0.995**	**1.000**

Table 9 : Predictive Regressions: The Book-to-Market (Market-to-Book) Spread and the Dividend Yield

This table reports bivariate, predictive regressions of returns onto the book-to-market (market-to-book) spread $S_{\mathrm{b/m}}$ ($S_{\mathrm{m/b}}$) and the dividend yield (div) across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slopes $\beta_{S,\tau}$, $\beta_{\mathrm{div},\tau}$, and p-values of slopes $p_{S,\mathrm{NK}}$ and $p_{\mathrm{div,NK}}$ using Nelson and Kim's (1993) method. All p-values are one-sided p-values that are 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–December 2001, $S_{\mathrm{b/m}}$ and div								Panel B: January 1927–December 2001, $S_{\mathrm{m/b}}$ and div							
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$				$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.709	0.238	1.442	1.090	**0.010**	0.126	**0.000**	**0.006**	-0.335	-0.341	-0.236	-0.392	0.878	0.925	0.718	0.865
Q	2.388	0.847	4.810	3.615	**0.023**	0.133	**0.005**	**0.014**	-0.114	-0.370	0.774	0.032	0.539	0.664	0.280	0.460
Y	6.417	2.857	11.838	9.115	**0.038**	0.140	**0.014**	**0.025**	1.294	0.384	3.736	0.436	0.389	0.485	0.284	0.468
2Y	10.004	3.545	21.962	16.420	**0.000**	**0.038**	**0.000**	**0.000**	-0.316	-1.837	5.154	0.132	0.573	0.860	0.087	0.503
5Y	13.576	1.762	35.196	22.586	**0.001**	0.244	**0.000**	**0.000**	-1.355	-4.544	10.425	1.867	0.678	**0.976**	0.056	0.389
	$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div,NK}}$				$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div,NK}}$			
M	0.478	0.273	0.467	0.267	0.136	0.243	0.244	0.396	0.568	0.147	0.957	0.491	0.094	0.425	0.058	0.210
Q	2.250	1.259	2.859	2.031	0.069	0.144	0.104	0.167	3.293	1.404	5.644	3.750	**0.012**	0.096	**0.004**	**0.019**
Y	6.458	2.751	9.474	5.452	0.113	0.241	0.115	0.225	10.385	4.365	17.661	10.049	**0.015**	0.118	**0.008**	0.073
2Y	18.363	9.403	25.685	18.808	**0.000**	**0.000**	**0.000**	**0.000**	22.846	9.871	39.324	26.588	**0.000**	**0.000**	**0.000**	**0.000**
5Y	31.603	20.104	41.550	36.295	**0.000**	**0.000**	**0.000**	**0.000**	37.027	18.273	63.697	47.710	**0.000**	**0.000**	**0.000**	**0.000**

	Panel C: January 1945–December 2001, $S_{\mathrm{b/m}}$ and div								Panel D: January 1945–December 2001, $S_{\mathrm{m/b}}$ and div							
τ	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$	$r^{\mathrm{mkt}}_{\mathrm{ew}}$	$r^{\mathrm{mkt}}_{\mathrm{vw}}$	$r^{\mathrm{sml}}_{\mathrm{ew}}$	$r^{\mathrm{sml}}_{\mathrm{vw}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$				$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.162	0.060	0.206	0.248	0.251	0.398	0.253	0.194	-0.074	-0.060	0.046	0.014	0.659	0.609	0.453	0.470
Q	0.540	0.275	0.648	0.800	0.251	0.350	0.305	0.210	0.116	0.258	0.610	0.368	0.480	0.353	0.318	0.361
Y	-1.809	-1.967	-0.834	-0.764	0.711	0.787	0.589	0.574	4.082	4.485	3.268	3.249	0.108	**0.032**	0.236	0.211
2Y	-2.686	-3.236	-0.620	-0.180	0.895	**0.957**	0.583	0.529	-0.240	2.477	-1.219	-1.208	0.579	**0.048**	0.703	0.709
5Y	4.259	2.198	9.794	10.708	0.054	0.189	**0.020**	**0.000**	-6.743	-3.114	-6.601	-8.969	**0.999**	0.918	**0.953**	**0.994**
	$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div,NK}}$				$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div,NK}}$			
M	0.409	0.377	0.185	0.211	0.201	0.205	0.520	0.430	0.433	0.360	0.328	0.349	0.212	0.222	0.355	0.294
Q	1.370	1.171	0.934	0.908	0.206	0.194	0.393	0.397	1.743	1.518	1.754	1.616	0.161	0.135	0.213	0.219
Y	7.284	5.997	5.769	5.715	0.102	0.093	0.236	0.206	9.518	8.462	7.874	7.841	**0.035**	**0.025**	0.143	0.146
2Y	11.951	9.720	8.378	8.329	**0.000**	**0.000**	**0.007**	**0.004**	10.332	9.882	7.116	7.310	**0.000**	**0.000**	**0.014**	**0.006**
5Y	16.250	15.256	6.011	9.152	**0.000**	**0.000**	0.091	**0.008**	13.695	14.190	6.299	8.254	**0.000**	**0.000**	0.063	**0.025**

Table 10 : Predictive Regressions: The Book-to-Market (Market-to-Book) Spread and the Short Term Interest Rate

This table reports bivariate, predictive regressions of returns onto the book-to-market (market-to-book) spread $S_{\mathrm{b/m}}$ ($S_{\mathrm{m/b}}$) and the short term interest rate (rf) across different horizons (τ), including monthly (M), quarterly (Q), annual (Y), two-year (2Y), and five-year (5Y) horizons. For regressions with two-year and five-year horizons, we use overlapping quarterly observations. We report the slopes $\beta_{S,\tau}$, $\beta_{\mathrm{rf},\tau}$, and p-values of slopes $p_{S,\mathrm{NK}}$ and $p_{\mathrm{rf,NK}}$ using Nelson and Kim's (1993) method. All p-values are one-sided p-values that are 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–December 2001, $S_{\mathrm{b/m}}$ and rf							
τ	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.833	0.230	1.469	1.048	**0.005**	0.142	**0.000**	**0.004**
Q	3.582	1.283	6.220	4.638	**0.002**	0.053	**0.000**	**0.000**
Y	9.236	3.411	15.102	10.688	**0.007**	0.095	**0.008**	**0.015**
2Y	19.909	8.097	34.440	25.896	**0.000**	**0.000**	**0.000**	**0.000**
5Y	25.271	7.928	46.566	32.787	**0.000**	**0.000**	**0.000**	**0.000**
	$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf,NK}}$			
M	-0.177	-0.253	-0.357	-0.314	0.756	0.904	0.842	0.843
Q	0.268	-0.300	0.131	0.135	0.399	0.679	0.437	0.461
Y	-0.418	-1.392	-2.250	-1.868	0.559	0.729	0.654	0.631
2Y	2.531	0.284	0.860	1.290	0.190	0.463	0.467	0.357
5Y	-5.403	-5.930	-14.946	-12.531	**0.961**	**0.990**	**0.991**	**0.996**

	Panel B: January 1927–December 2001, $S_{\mathrm{m/b}}$ and rf							
τ	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	-0.628	-0.383	-0.696	-0.579	**0.982**	0.945	0.934	**0.954**
Q	-2.131	-1.183	-2.567	-2.164	**0.960**	0.921	0.943	0.926
Y	-4.996	-2.031	-6.574	-5.108	0.899	0.750	0.886	0.843
2Y	-14.204	-7.793	-17.834	-15.412	**1.000**	**1.000**	**1.000**	**1.000**
5Y	-20.101	-13.754	-19.942	-21.044	**1.000**	**1.000**	**1.000**	**1.000**
	$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf,NK}}$			
M	-0.481	-0.295	-0.976	-0.740	**0.972**	0.928	**0.994**	**0.985**
Q	-1.154	-0.726	-2.563	-1.825	0.897	0.855	**0.961**	0.930
Y	-4.170	-2.734	-8.757	-6.367	0.879	0.838	0.948	0.900
2Y	-5.001	-2.398	-13.447	-9.088	**0.977**	0.906	**0.999**	**0.997**
5Y	-14.526	-7.389	-34.978	-25.315	**1.000**	**0.998**	**1.000**	**1.000**

	Panel C: January 1945–December 2001, $S_{\mathrm{b/m}}$ and rf							
τ	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	0.166	0.009	-0.072	0.005	0.281	0.567	0.633	0.533
Q	0.891	0.372	0.293	0.536	0.166	0.349	0.448	0.347
Y	1.429	-0.528	1.281	1.111	0.351	0.651	0.424	0.449
2Y	4.757	0.801	4.270	4.104	**0.001**	0.325	0.087	0.057
5Y	12.737	7.016	9.830	12.113	**0.000**	**0.004**	**0.010**	**0.001**
	$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf,NK}}$			
M	-0.409	-0.483	-0.739	-0.696	**0.985**	**0.998**	**1.000**	**0.995**
Q	-0.731	-1.035	-1.700	-1.489	0.854	**0.960**	**0.969**	**0.962**
Y	-1.041	-3.368	-1.746	-2.180	0.625	0.915	0.664	0.713
2Y	2.145	-2.339	0.839	-0.335	0.135	0.948	0.424	0.593
5Y	0.823	-5.420	-5.809	-6.179	0.383	**0.996**	0.946	**0.961**

	Panel D: January 1945–December 2001, $S_{\mathrm{m/b}}$ and rf							
τ	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	$\beta_{S,\tau}$				$p_{S,\mathrm{NK}}$			
M	-0.397	-0.325	-0.182	-0.232	0.944	0.942	0.708	0.777
Q	-1.222	-0.899	-0.709	-0.845	0.927	0.889	0.711	0.787
Y	-3.193	-1.875	-2.689	-2.659	0.835	0.726	0.697	0.712
2Y	-8.131	-4.981	-6.617	-6.718	**1.000**	**1.000**	**0.999**	**0.999**
5Y	-16.021	-12.594	-10.541	-14.206	**1.000**	**1.000**	**0.998**	**1.000**
	$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf,NK}}$			
M	-0.474	-0.472	-0.694	-0.688	**0.994**	**0.996**	**0.993**	**0.997**
Q	-1.123	-1.183	-1.817	-1.720	**0.952**	**0.985**	**0.969**	**0.971**
Y	-1.528	-2.985	-2.194	-2.546	0.715	0.893	0.680	0.742
2Y	0.070	-2.567	-1.047	-2.135	0.529	**0.970**	0.684	0.856
5Y	-4.986	-8.467	-10.366	-11.745	**0.987**	**1.000**	**1.000**	**1.000**

Table 11 : Multiple Regressions Using the Book-to-Market Spread

This table reports multiple, predictive regressions of returns onto 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) horizons. 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	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$	$r_{\mathrm{ew}}^{\mathrm{mkt}}$	$r_{\mathrm{vw}}^{\mathrm{mkt}}$	$r_{\mathrm{ew}}^{\mathrm{sml}}$	$r_{\mathrm{vw}}^{\mathrm{sml}}$
	$\beta_{S_{\mathrm{b/m}},\tau}$				$p_{S_{\mathrm{b/m}},\mathrm{NK}}$				$\beta_{S_{\mathrm{b/m}},\tau}$				$p_{S_{\mathrm{b/m}},\mathrm{NK}}$			
M	-0.01	0.00	-0.05	0.09	0.50	0.52	0.55	0.43	-0.10	-0.24	-0.24	-0.18	0.64	0.87	0.75	0.74
Q	1.55	0.74	2.63	2.55	0.10	0.18	0.07	0.06	0.14	-0.32	-0.28	-0.00	0.46	0.67	0.62	0.46
Y	3.40	3.13	2.46	4.10	0.15	0.12	0.22	0.13	-2.33	-3.94	-1.70	-2.10	0.73	0.93	0.67	0.71
2Y	9.90	7.75	14.92	15.93	**0.00**	**0.00**	**0.00**	**0.00**	-2.31	-5.05	-1.00	-1.31	0.84	**1.00**	0.63	0.67
5Y	2.69	1.14	4.35	5.46	0.21	0.33	0.25	0.14	4.49	0.27	6.44	6.96	**0.04**	0.45	0.07	**0.04**
	$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term},\mathrm{NK}}$				$\beta_{\mathrm{term},\tau}$				$p_{\mathrm{term},\mathrm{NK}}$			
M	0.21	0.35	-0.07	0.13	0.27	0.07	0.54	0.36	0.10	0.17	0.03	0.02	0.37	0.25	0.49	0.47
Q	0.66	0.89	0.24	0.71	0.27	0.18	0.41	0.33	0.41	0.55	0.33	0.41	0.35	0.27	0.40	0.40
Y	4.81	4.10	3.73	5.10	0.22	0.16	0.33	0.22	-0.74	-0.31	-1.74	-2.02	0.58	0.58	0.65	0.67
2Y	7.36	9.03	4.78	8.43	**0.01**	**0.00**	0.15	**0.04**	3.65	5.89	2.45	2.30	**0.05**	**0.00**	0.21	0.20
5Y	4.90	18.76	-10.78	3.75	0.11	**0.00**	0.89	0.28	7.88	15.52	6.61	7.40	**0.01**	**0.00**	0.09	**0.04**
	$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def},\mathrm{NK}}$				$\beta_{\mathrm{def},\tau}$				$p_{\mathrm{def},\mathrm{NK}}$			
M	0.95	0.09	2.10	1.30	**0.00**	0.33	**0.00**	**0.01**	1.19	0.74	1.58	1.44	**0.00**	**0.00**	**0.00**	**0.00**
Q	1.39	-0.25	3.49	1.61	0.16	0.59	0.07	0.21	2.96	1.69	4.20	3.50	**0.00**	**0.01**	**0.00**	**0.00**
Y	3.52	-2.56	12.82	5.38	0.28	0.81	0.06	0.26	7.50	4.35	9.79	8.64	**0.03**	0.08	**0.03**	**0.04**
2Y	0.72	-8.55	11.30	0.06	0.39	**1.00**	**0.01**	0.47	-3.84	-6.15	-6.30	-5.44	**0.96**	**1.00**	**0.98**	**0.97**
5Y	13.15	-8.15	42.44	18.20	**0.01**	**0.99**	**0.00**	**0.00**	-3.92	-7.18	-11.46	-11.07	0.93	**1.00**	**1.00**	**1.00**
	$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div},\mathrm{NK}}$				$\beta_{\mathrm{div},\tau}$				$p_{\mathrm{div},\mathrm{NK}}$			
M	0.18	0.26	-0.26	-0.18	0.55	0.37	0.87	0.84	0.24	0.33	-0.02	0.03	0.48	0.33	0.81	0.78
Q	1.92	1.44	1.79	1.63	0.19	0.22	0.29	0.30	0.88	1.06	0.33	0.44	0.48	0.33	0.67	0.66
Y	5.98	4.09	5.47	4.19	0.23	0.27	0.38	0.44	5.16	5.18	3.00	3.38	0.31	0.24	0.51	0.45
2Y	19.44	13.50	22.85	20.14	**0.00**	**0.00**	**0.00**	**0.00**	13.14	12.54	10.25	10.26	**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**	18.07	19.47	10.24	13.54	**0.00**	**0.00**	**0.02**	**0.00**
	$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf},\mathrm{NK}}$				$\beta_{\mathrm{rf},\tau}$				$p_{\mathrm{rf},\mathrm{NK}}$			
M	-0.36	-0.09	-1.08	-0.69	0.85	0.63	**0.98**	0.94	-1.23	-0.97	-1.81	-1.69	**1.00**	**1.00**	**1.00**	**1.00**
Q	0.27	0.31	-0.77	0.06	0.40	0.41	0.63	0.49	-2.79	-2.16	-4.57	-3.84	**1.00**	**0.99**	**1.00**	**0.99**
Y	1.44	1.83	-3.93	-0.71	0.45	0.35	0.67	0.52	-7.20	-7.16	-9.70	-9.56	0.91	0.93	0.91	0.90
2Y	7.24	8.36	1.13	6.76	**0.02**	**0.00**	0.39	0.07	3.92	2.39	4.37	2.50	0.06	0.14	0.13	0.25
5Y	-5.12	7.56	-31.91	-14.27	0.86	**0.01**	**1.00**	**0.97**	4.37	4.24	3.86	3.02	0.11	0.13	0.27	0.29

Table 12 : Multiple 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) horizons. 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

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.

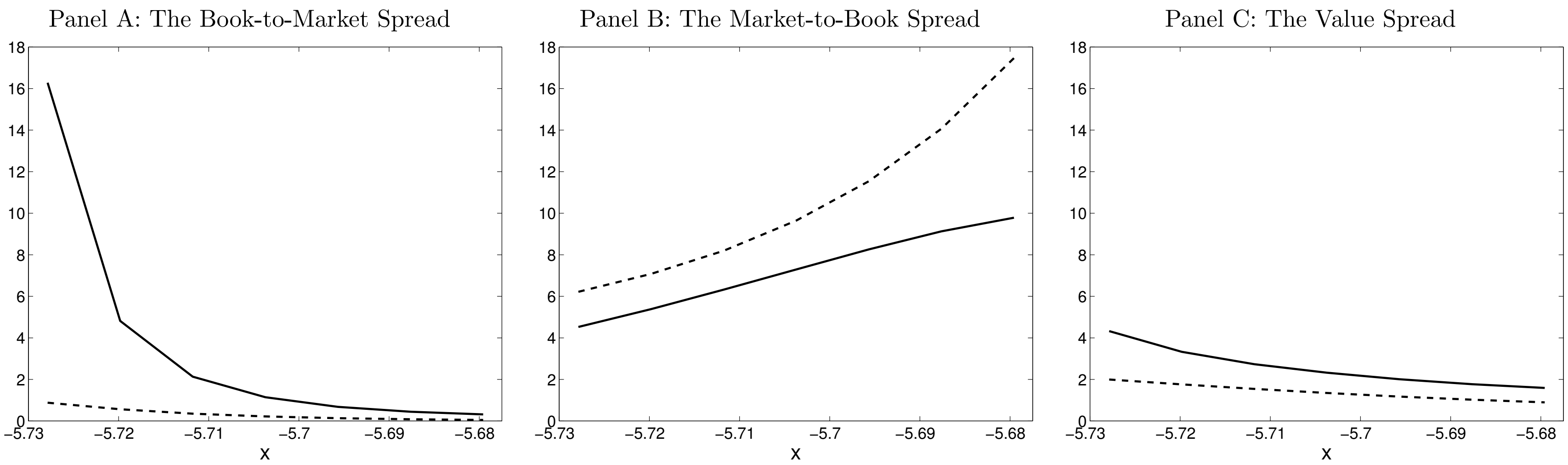

Figure 2 : Time Series of the Book-to-Market Spread, the Market-to-Book spread, and the Value Spread

This figure plots the time series of the book-to-market spread, ($S_{\mathrm{b/m}}$, Panel A), the market-to-book spread ($S_{\mathrm{m/b}}$, 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 ratio of decile ten (value portfolio) minus the average book-to-market ratio of decile one (growth portfolio) from the ten deciles sorted on book-to-market. The market-to-book spread is measured as the average market-to-book ratio of decile one minus the average market-to-book ratio of decile ten. Finally, the value spread is measured as the log book-to-market ratio 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 $t-1$.

Panel A: The Book-to-Market Spread, $S_{\mathrm{b/m}}$ Panel B: The Market-to-Book spread, $S_{\mathrm{m/b}}$ Panel C: The Value Spread, S