

FIGURE 13.1 Difference in return to factor portfolios in year prior to above-average versus below-average GDP growth. Both SMB and HML portfolio returns tend to be higher in years preceding better GDP growth.

Source: J. Liew and M. Vassalou, "Can Book-to-Market, Size and Momentum Be Risk Factors that Predict Economic Growth?" *Journal of Financial Economics* 57 (2000), pp. 221–45. © 2000 with permission from Elsevier Science.

Risk-Based Interpretations

Liew and Vassalou¹⁷ show that returns on style portfolios (HML or SMB) seem to predict GDP growth, and thus may in fact capture some aspects of business cycle risk. Each bar in Figure 13.1 is the average difference in the return on the HML or SMB portfolio in years before good GDP growth versus in years with poor GDP growth. Positive values mean the portfolio does better in years prior to good macroeconomic performance. The predominance of positive values leads them to conclude that the returns on the HML and SMB portfolios are positively related to future growth in the macroeconomy, and so may be proxies for business cycle risk. Thus, at least part of the size and value premiums may reflect rational rewards for greater risk exposure.

Petkova and Zhang¹⁸ also try to tie the average return premium on value portfolios to risk premiums. Their approach uses a conditional CAPM. In the conventional CAPM, we treat both the market risk premium and firm betas as given parameters. In contrast, as we noted earlier in the chapter, the conditional CAPM allows both of these terms to vary over time, and possibly to co-vary. If a stock's beta is high when the market risk premium is high, this positive association leads to a "synergy" in its risk premium, which is the product of its beta and market risk premium.

What might lead to such an association between beta and the market risk premium? Zhang¹⁹ focuses on irreversible investments. He notes that firms classified as value firms

¹⁷J. Liew and M. Vassalou, "Can Book-to-Market, Size and Momentum Be Risk Factors that Predict Economic Growth?" *Journal of Financial Economics* 57 (2000), pp. 221–45.

¹⁸Ralitsa Petkova and Lu Zhang, "Is Value Riskier than Growth?" *Journal of Financial Economics* 78 (2005), pp. 187–202.

¹⁹Lu Zhang, "The Value Premium," *Journal of Finance* 60 (2005), pp. 67–103.

(with high book-to-market ratios) on average will have greater amounts of tangible capital. Investment irreversibility puts such firms more at risk for economic downturns because in a severe recession, they will suffer from excess capacity from assets already in place. (In contrast, growth firms are better able to deal with a downturn by deferring investment plans.) The greater exposure of high book-to-market firms to recessions will result in higher down-market betas. Moreover, some evidence suggests that the market risk premium also is higher in down markets, when investors are feeling more economic pressure and anxiety. The combination of these two factors might impart a positive correlation between the beta of high B/M firms and the market risk premium.

To quantify these notions, Petkova and Zhang attempt to fit both beta and the market risk premium to a set of "state variables," that is, variables that summarize the state of the economy. These are:

DIV = market dividend yield.

DEFLT = default spread on corporate bonds (Baa – Aaa rates).

TERM = term structure spread (10-year – 1-year Treasury rates).

TB = 1-month T-bill rate.

They estimate a first-pass regression, but first substitute these state variables for beta as follows:

$$\begin{aligned} r_{\text{HML}} &= \alpha + \beta r_{M_t} + e_i \\ &= \alpha + \underbrace{[b_0 + b_1 \text{DIV}_t + b_2 \text{DEFLT}_t + b_3 \text{TERM}_t + b_4 \text{TB}_t]}_{\beta_t} r_{M_t} + e_i \\ &= \beta_t \quad \leftarrow \text{a time-varying beta} \end{aligned}$$

The strategy is to estimate parameters b_0 through b_4 and then fit beta using the parameter estimates and the values at each date of the four state variables. In this way, they can estimate beta in each period.

Similarly, one can estimate the determinants of a time-varying market risk premium, using the same set of state variables:

$$r_{\text{Mkt},t} - r_{ft} = c_0 + c_1 \text{DIV}_t + c_2 \text{DEFLT}_t + c_3 \text{TERM}_t + c_4 \text{TB}_t + e_t$$

We can estimate the expected market risk premium for each period using the regression parameter estimates and the values of the state variables for that period. The fitted value from this regression is the estimate of the market risk premium.

Finally, Petkova and Zhang examine the relationship between beta and the market risk premium. They define the state of economy by the size of the premium. A peak is defined as the periods with the 10% lowest risk premiums; a trough has the 10% highest risk premiums. The results, presented in Figure 13.2, support the notion of a counter-cyclical value beta: the beta of the HML portfolio is negative in good economies, meaning that the beta of value stocks (high book-to-market) is less than that of growth stocks (low B/M), but the reverse is true in recessions. While the covariance between the HML beta and the market risk premium is not sufficient to explain by itself the average return premium on value portfolios, it does suggest that at least part of the explanation may be a rational risk premium.

Behavioral Explanations

On the other side of the debate, several authors make the case that the value premium is a manifestation of market irrationality. The essence of the argument is that analysts tend to extrapolate recent performance too far out into the future, and thus tend to overestimate the value of firms with good recent performance. When the market realizes its mistake, the prices of these firms fall. Thus on average, "glamour firms," which are characterized by

recent good performance, high prices and lower book-to-market ratios, tend to underperform “value firms” because their high prices reflect excessive optimism relative to those lower book-to-market firms.

Figure 13.3, from a study by Chan, Karceski, and Lakonishok,²⁰ makes the case for overreaction. Firms are sorted into deciles based on income growth in the past 5 years. By construction, the growth rates uniformly increase from the first through the tenth quintile. The book-to-market ratio for each decile at the *end* of the 5-year period (the dashed line) tracks recent growth very well. B/M falls steadily with growth over past 5 years. This is evidence that *past* growth is extrapolated and then impounded in price. High past growth leads to higher prices and lower B/M ratios.

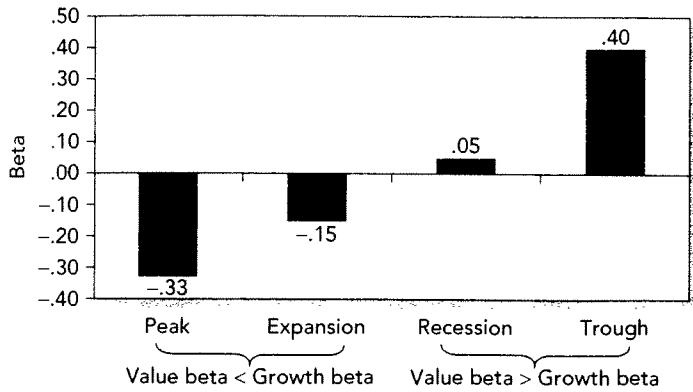


FIGURE 13.2 HML beta in different economic states. The beta of the HML portfolio is higher when the market risk premium is higher.

Source: Ralitsa Petkova and Lu Zhang, “Is Value Riskier than Growth?” *Journal of Financial Economics* 78 (2005), pp. 187–202. © 2005 with permission from Elsevier Science.

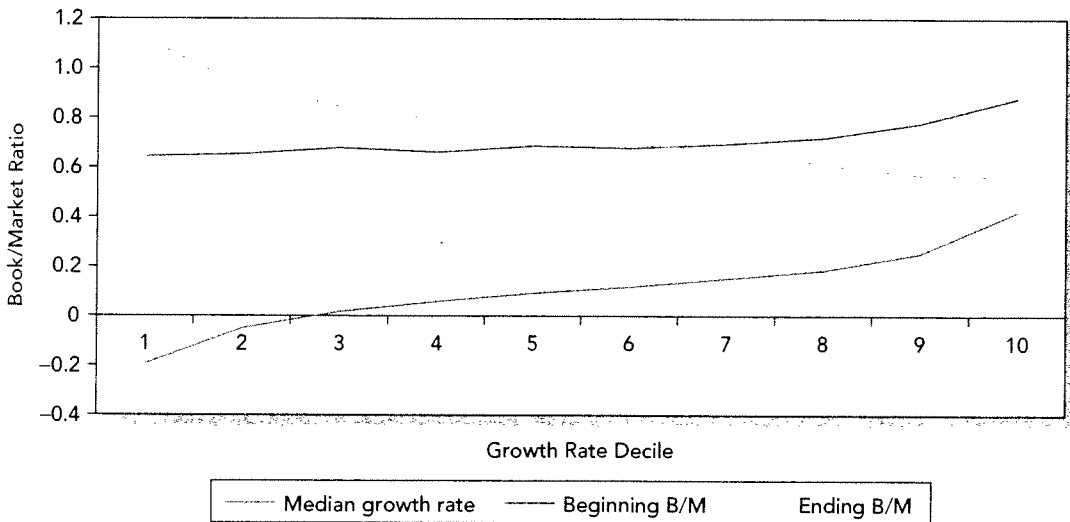


FIGURE 13.3 The book-to-market ratio reflects past growth, but not future growth prospects. B/M tends to fall with income growth experienced at the *end* of a 5-year period, but actually increases slightly with future income growth rates.

Source: L.K.C. Chan, J. Karceski, and J. Lakonishok, “The Level and Persistence of Growth Rates,” *Journal of Finance* 58 (April 2003), pp. 643–84. Reprinted by permission of the publisher, Blackwell Publishing, Inc.

²⁰L.K.C. Chan, J. Karceski, and J. Lakonishok, “The Level and Persistence of Growth Rates,” *Journal of Finance* 58 (April 2003), pp. 643–84.