Institutional Investors’ Beta Preference

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ABSTRACT

We examine the beta (systematic risk) preference of institutional investors using a simple model where a fund manager’s payoff function depends on excess returns relative to a benchmark. The model predicts that the manager would choose to hold stocks with higher betas than the benchmark, and that the optimal level of his portfolio beta depends on his perceived factor returns and volatility, reflecting his trade-off between expected performance and tracking error.

Keywords: Institutional Investors, Mutual Funds, Stock Preference, Portfolio Management

INTRODUCTION

During the past decades, institutional investors have been playing an increasingly dominating role in the U.S. stock market. According to the Conference Board, by 2009 institutional investors have owned 73% of the 1,000 largest U.S. public corporations, considerably higher than 47% in 1987. As pointed out by Campbell and Mei (1993), betas are central to modern finance, and practitioners especially institutional investors use betas to model and control their systematic risks. However, research that exclusively focuses on the systematic risk (beta) preference of institutional investors has been scarce and conflicting. On the one hand, Falkenstein (1996) shows that there is a negative but not statistically significant relationship between mutual fund ownership and stock beta. On the other hand, Karceski (2002) finds that equity mutual fund managers in aggregate overweight in high-beta stocks relative to the overall market. Bennett, Sias, and Starks (2003) and Frieder and Subrahmanyam (2005) document that other institutional investors also have a strong preference for high-beta stocks. Despite the scattering investigations on whether institutional investors choose high-beta stocks over low-beta stocks, several important questions on the beta preference of institutional investors remain unanswered. First, do institutional investors hold securities with higher beta risk than their benchmarks? It is not unusual for a growth fund to hold high-beta stocks, but is the average beta of stocks in its portfolio higher than the beta of its benchmark index, such as a growth index? Second, what factors affect their beta preference? In this paper, we try to answer both questions.

We set up a simple model to derive a fund manager's optimal level of portfolio beta, based on the assumption that his payoff function depends on returns in excess of a benchmark. This assumption is a reasonable reflection of the fact that nowadays most fund managers' performance is evaluated relative to a simple benchmark. As noted by Roll (1992), “Today's professional money manager is often judged by total return performance relative to a prespecified benchmark, usually a broadly diversified index of assets.” If a fund manager is properly benchmarked in the risk-adjusted sense, for example, Jensen's Alpha (Jensen, 1968), his abnormal return, alpha, should not be affected by his choice of beta. However, if the manager is concerned about beating the benchmark in an unadjusted sense, on the one hand, he would choose a portfolio to co-move with the risk factors (see, for example, Carhart, 1997) as much as possible such that he can earn higher factor premium than the benchmark if the factor premium is positive. For example, the manager may tilt his portfolio more than his benchmark toward small stocks, value stocks or momentum...
stocks. In this way, his loadings on the factors will be higher than those of his benchmark and thus he can earn higher factor premium than that of the benchmark portfolio. On the other hand, the more the manager chooses to co-move with the factors, the farther he is from the benchmark and the higher his tracking error will be, which the fund manager does not like. As pointed out by Peter L. Bernstein, “Benchmark risk – the prospect that a manager might stray too far from an index – ranks among the greater sins in their morality code.” Therefore, there is a trade-off between expected performance and tracking error, and the manager’s beta choice has an optimal level, which depends on his perceived future factor returns and volatilities as suggested by our simple model. In particular, our model predicts that after controlling for factors such as size, book-to-market ratio and momentum and focusing only on the fund manager’s choice of beta, in equilibrium, the manager would choose a higher beta for his portfolio than that of his benchmark, and that the optimal level of the beta is positively correlated with his expected market return and negatively correlated with his expected market volatility.

This paper makes an important contribution to the literature by taking on a new perspective on institutional investors' high beta preference. Most of the previous results show that institutional investors prefer higher beta stocks relative to the cross-sectional average. They only use one benchmark beta for their comparisons, which is the average beta in the market. In our paper, we have different benchmark betas for different stocks such that we can more precisely and explicitly control for stock characteristics.

MODEL

Our simple model is as follows. Suppose that a fund manager is subject to a benchmark M in the sense that his payoff function depends on returns in excess of the benchmark. In order to keep the model simple and in focus, we avoid imposing a complex performance measure on the manager, but instead assume that his performance is only measured by the excess return of the fund portfolio relative to his benchmark. This is a reasonable assumption since it is the simplest benchmarking method that can be easily understood by an average investor of the fund. We also assume that the fund manager is risk averse and has an exponential utility function which can be simply described in a mean variance format when returns are normally distributed. We also assume that it is costly to generate a positive alpha and denote the cost function as $c(\alpha)$.

We denote the fund manager’s benchmark return as $r_b$, and his portfolio return as $r_p$. Suppose that the return generating process is as follows: $r = \alpha + \beta' f + \epsilon$.

where $f$ is a vector of factor returns and $\beta$ is a vector of factor loadings.

The fund manager chooses the alpha and factor loadings to maximize his utility function, which is similar to the factor approach in Admati, Bhattacharya, Pfleiderer, and Ross (1986). Then we have

$$\max_{\alpha_p, \beta_p} E(U(\alpha_p + \beta_p' f - (\alpha_b + \beta_b' f))) - c(\alpha_p).$$

Solving this problem, we have

$$\Delta \beta = \beta_p - \beta_b = \frac{1}{\gamma} V(f)^{-1} E(f),$$

where $V(f)$ is the variance-covariance matrix of the factor returns, and the constant $\gamma$ represents the risk aversion coefficient of the fund manager.

Suppose we have four factors—excess market return (Mkt_Rf), size (SMB), value (HML) and momentum (UMD). After plugging in their variance-covariance matrix and their means from the historical factor returns data from Kenneth French’s website (shown in Table A of Appendix), we have

$$\Delta \beta = (2.97, 1.48, 5.41, 6.32)^T/\gamma.$$ This shows that the fund manager will choose higher factor loadings than those of his benchmark portfolio.
If we control for the size, value and momentum factors, the manager’s portfolio and the benchmark portfolio would have similar loadings on these three factors. His problem is thus narrowed down to the choice of the market beta of his portfolio. That is, the fund manager solves the following problem: \[ \max_{\alpha_p, \beta_p} \alpha_p + (\beta_p - \beta_b)E(r_m) - \frac{1}{2} \left( \sigma^2_p \sigma_m^2 \right) \gamma - c(\alpha_p), \] where \( r_b \) is the benchmark return.

Since we have controlled for size, value, and momentum here, the return difference between the manager’s portfolio and the benchmark is mostly due to the difference in their expected alphas and betas. Thus, the above problem can be transformed as follows:

\[ \max_{\alpha_p, \beta_p} \alpha_p + (\beta_p - \beta_b)E(r_m) - \frac{1}{2} \left( \sigma^2_p \sigma_m^2 \right) \gamma - c(\alpha_p), \]

where \( r_m \) is the market return, and \( \sigma_m \) is the market volatility.

By solving this problem we obtain \( \Delta \beta = \beta_p - \beta_b = \frac{E(r_m)}{\gamma \sigma_m^2} \), which has two important implications. First, in equilibrium, a fund manager will choose a portfolio beta that is higher than his benchmark beta. Second, the difference in betas is positively correlated with the expected market return, and negatively correlated with the manager’s perceived market volatility.

**CONCLUSION**

Although it is common sense that institutional investors seek to boost their alpha for better performance, it is less obvious why they would care about beta. In this paper, we develop a simple framework for modeling a fund manager’s beta choice relative to his benchmark. The model makes two predictions: First, the manager would choose a portfolio beta that is higher than the beta of his benchmark. Second, the difference between the manager’s portfolio beta and the beta of his benchmark is proportional to the mean-variance ratio of the market return. A better understanding of institutional investors’ beta choice will provide new insights into their portfolio management decisions as well as the tradeoff between risk and return in general. Our future research will empirically test our model predictions using mutual funds’ holdings data. We plan to match stocks with their characteristic-based benchmarks so that we can more accurately control for stock characteristics, such as size, book-to-market ratio and momentum.

**APPENDIX**

**Table A: Summary Statistics of the Fama French Factors**

This table reports the correlations and covariances between the returns of the commonly used factors—excess market return (Mkt_Rf), size (SMB), value (HML), and momentum (UMD) from 1927 to 2004. We obtain these monthly factor returns from Kenneth French’s website.

<table>
<thead>
<tr>
<th>Panel A: Correlations between Factors</th>
<th>Mkt Rf</th>
<th>SMB</th>
<th>HML</th>
<th>UMD</th>
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</thead>
<tbody>
<tr>
<td>Mkt_Rf</td>
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<td></td>
<td></td>
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<tr>
<td>SMB</td>
<td>0.33</td>
<td>1</td>
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<tr>
<td>HML</td>
<td>0.20</td>
<td>0.08</td>
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<td></td>
</tr>
<tr>
<td>UMD</td>
<td>-0.34</td>
<td>-0.17</td>
<td>-0.40</td>
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Panel B: Variance-Covariance Matrix

<table>
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<tr>
<th></th>
<th>Mkt_Rf</th>
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<th>HML</th>
<th>UMD</th>
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<tr>
<td>Mkt_Rf</td>
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<tr>
<td>SMB</td>
<td>0.0006</td>
<td>0.0011</td>
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<tr>
<td>HML</td>
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<td>0.0001</td>
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<tr>
<td>UMD</td>
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Panel C: Monthly Average Returns

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<tr>
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<tr>
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<td>UMD</td>
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REFERENCES


