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Do hedge funds dynamically manage systematic risk? ☆

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ABSTRACT

Defining systematic risk management (SRM) skill as persistently low fund systematic risk, we find evidence of time varying allocation of hedge fund management effort across the business cycle. In weak market states, skilled managers focus on minimization of systematic risk via dynamic reallocations across asset classes at the cost of fund alpha and foregoing market timing opportunities. As markets strengthen, attention shifts to asset selection within consistent asset classes. The superior performance of low systematic risk funds previously documented arises due to the superior asset selection ability of managers in strong market states. Incremental allocations by investors arise due to this superior performance and not due to recognition of SRM skill.

1. Introduction

Measuring investment manager skill and fund performance has been a topic of interest to academics dating back to the inception of the asset pricing literature. Since the early models of Jensen (1968), Sharpe (1966), and Treynor and Mazuy (1966), investment manager skill has been analyzed across two dimensions – asset selection and market timing. More recent work recognizes the dynamic and independent nature of both the asset selection and market timing dimensions of manager skill (Kacperczyk et al., 2014). It need not follow that a manager skilled in one dimension is necessarily skilled in the other. Mutual fund managers can create shareholder value via either channel and evidence suggests they allocate effort and attention independently to each dimension across the business cycle.

The self-reported value proposition of many hedge funds is to create alpha via asset selection skill while minimizing the exposure of the fund to systematic risk.[4] While an extensive literature examines the existence of asset selection skill in hedge fund managers, the second equally important systematic risk management skill (SRM) dimension has received relatively little attention.[5] Despite their declared objective of low systematic risk, Patton (2009) reports that

[4] For example, Daniel Och, chairman and chief executive of Och-Ziff Capital Management, stated "Investors continue to actively seek access to investment managers that generate risk-adjusted returns which have a low correlation to the equity markets and consistently protect capital. We believe that this focus has led to increased allocations to the hedge fund industry in the first half of this year, and that this acceleration will continue," quoted in Ahmed, Azam, "Och-Ziff Quarterly Earnings rise 19%", New York Times, August 2, 2011.
[5] See, for example, Fung et al. (2008), Bali et al. (2014, 2013), Cao et al. (2013), Ramadorai (2012) and Sun et al. (2012) among many other who examine hedge fund performance. We discuss the more limited hedge fund systematic risk literature in detail below.

approximately one quarter of "market neutral" hedge funds exhibit significant exposure to systematic risk. Similarly, a series of papers report that a significant portion of the variability in hedge fund returns can be explained by common risk factors.[6] These results suggest that akin to market timing, maintaining low systematic risk is an acquired skill not common to all hedge fund managers. Our objective is to examine the existence of SRM skill in the hedge fund industry.

We frame our analysis in the theoretical model of Titman and Tiu (2011) which can be viewed as a simplification of Treynor and Black (1973).[7] In the model, the hedge fund manager must allocate assets to create a mean–variance efficient portfolio by combining three investments: a risk-free asset (r_f), a publicly available index (F) and a proprietary strategy (A). The excess return to the portfolio is a function of the weight (w) placed on the index relative to the proprietary strategy given by $R - r_f = w_A(A - r_f) + w_F(F - r_f)$. Since the proprietary strategy consists of a long-short or similar strategy, its return is unrelated to the return of the publicly available index ($Corr(A, F) = 0$). In the Titman and Tiu (2011) model, there is no distinction between the manager's ability to select assets in the proprietary strategy and his ability to ensure that the strategy and the public index remain independent. Thus, more skilled managers allocate a greater proportion of fund assets to the proprietary strategy ($w_A > w_F$) and for these superior managers, low fund systematic risk arises indirectly via the allocation strategy. Specifically, superior funds are characterized as having low R^2 values in the regression of fund return on proxies for systematic risk.

In contrast, in this paper, we argue that managerial skill is multidimensional and inherently more complex. Specifically, we argue that managerial ability to maintain the independence condition (i.e. $Corr(A, F) = 0$) is separate from asset selection ability. In other words, the skill to select assets that are under and over-valued is different from the skill of maintaining low systematic risk and anticipating market conditions that may disrupt the long-short hedge. It is well understood that asset correlations vary over time and tend to increase in times of stress in financial markets.[8] Buraschi et al. (2014) show that hedge funds that achieve low systematic risk via implementation of long-short and arbitrage strategies incur significant correlation risk, resulting in low ex-post portfolio diversification and hedge effectiveness.[9] In a multidimensional covariance matrix, the effects of correlation shocks are not easily predicted. Hence, management of correlation risk entails broad reductions of portfolio reliance on long-short positions, with the potential of uncoupling the beta hedge. In this paper, we extend the analysis of Titman and Tiu (2011), allowing (and testing) for a separation in manager skill between asset selection and SRM. We analyze the prevalence and determinants of SRM skill and its consequences for fund performance and investor preferences. The typical definition of skill in the context of asset management is the ability, drawn from one's knowledge, experience, and training, to persistently achieve excellence in performance. In the context of stock picking and market timing, skill is associated with persistence in fund alpha.[10] In our setting, we associate SRM skill with persistence in low fund systematic risk.

To measure hedge fund systematic risk, we utilize a novel measure motivated by Pukthuanthong and Roll (2009) who analyze levels of world systematic risk across equity indexes for a broad sample of developed, emerging, and frontier countries. This approach has the advantage of enabling the joint consideration of a highly inclusive set of systematic risk factors within the confines of a limited number of degrees of freedom when estimating annual systematic risk with monthly fund returns. Specifically, we estimate the principal components (PC) of 251 assets and measure systematic risk as the R^2 value from the regression of hedge fund returns on those PCs.

We commence our analysis by examining how fund-level systematic risk exposure changes over time, both unconditionally, and conditional on market state. If systematic risk levels do not change over time or across the cross-section of funds, then an examination of persistence in systematic risk as a proxy for manager skill will be non-informative. Tracking the systematic risk quintile rank of each fund between years in a transition matrix, we find that on average, only 30% of funds remain in the same risk quintile over a two-year period. These results suggest that SRM skill, proxied by persistence in systematic risk, is a rare commodity processed by relatively few managers. Partitioning by market state, the levels of systematic risk and correlation risk both increase when markets weaken. However, the ability of fund managers to stay in their original quintile rankings does not appear to change across market states.

How do managers influence the systematic risk exposure of their funds? The actual asset transactions of hedge funds are largely unobservable. Like all financial intermediaries, hedge funds are required to disclose long equity positions to the Securities and Exchange Commission (SEC) quarterly in Form 13-F. However, holdings are reported by investment company (not by fund) and holdings of other assets and short positions are not disclosed. Given these limitations, we therefore examine time variation in factor loadings, focusing on the broadly utilized Fung and Hsieh (2004) seven factors. Mapping factor loadings over two-year periods, we show that loading variability is greatest for the equity risk, size spread, bond risk and credit risk factors. The standard deviation of the loading on these factors is typically two to three times the standard deviation on the other three factors. In other words, on average, managers appear to adjust exposure to equity risk, size spread, bond risk, and credit risk factors when managing the systematic risk exposure of their funds.

Which manager and fund types possess greater SRM skill? We find that the determinants of SRM skill can be loosely grouped into three categories. First, manager education and experience are both related to systematic risk persistence. Funds managed by better-educated managers (proxied by SAT score) and managed by more experienced managers have higher SRM skill. Similarly, larger and older funds which likely attract better qualified managers typically have higher SRM skill. Second, systematic risk is sensitive to fund distress indicators. SRM skill is lower for fund managers who manage funds with low investor flows, poor performance, and greater performance volatility, both at the fund and style level. Finally, correlation risk and market conditions both significantly drive SRM. Higher SRM funds have significantly lower correlation risk. This relation is accentuated in periods of stress in financial markets when asset correlations are more likely to shift away from historical correlation patterns.

How is SRM skill level related to fund performance? We initially relate alpha to systematic risk persistence, factor loading variability (to capture the magnitude of risk adjustment), correlation risk and controls. We find a weak positive relation (significantly weaker than documented in prior studies) between SRM skill and alpha, suggesting separation between the two skill sets. Low systematic risk does not appear to be associated with higher fund performance. We next partition the model by market state. If the two skills are inherently related, the relation between alpha and SRM should be reasonably time invariant. However, if the skills are

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[6] See Avarmov et al. (2011), Fung and Hsieh (2004), Mitchell and Pulvino (2001), Aggarwal and Naik (2004) and Bollen (2013).

[7] Model details appear in Appendix A.

[8] See Bollerslev et al. (1988), Jorion (2000), Moskowitz (2003) and Engle and Sheppard (2006), among others.

[9] Buraschi et al. (2014) define correlation risk as the risk derived from unexpected changes in the correlation between the returns of different assets or asset classes.

[10] See, for example, Berk and Van Binsbergen (2015).