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An econometric model of serial correlation and illiquidity in hedge fund returns[☆]

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Abstract

The returns to hedge funds and other alternative investments are often highly serially correlated. In this paper, we explore several sources of such serial correlation and show that the most likely explanation is illiquidity exposure and smoothed returns. We propose an econometric model of return smoothing and develop estimators for the smoothing profile as well as a smoothing-adjusted Sharpe ratio. For a sample of 908 hedge funds drawn from the TASS database, we show that our estimated smoothing coefficients vary considerably across hedge-fund style categories and may be a useful proxy for quantifying illiquidity exposure.

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1. Introduction

One of the fastest growing sectors of the financial services industry is the hedge fund or alternative investments sector. Long the province of foundations, family

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offices, and high net-worth investors, hedge funds are now attracting major institutional investors such as large state and corporate pension funds and university endowments. Efforts are underway to make hedge fund investments available to individual investors through more traditional mutual-fund investment vehicles. One of the main reasons for such interest is the performance characteristics of hedge funds. Often known as high-octane investments, many hedge funds have yielded double-digit returns to their investors and, in some cases, in a fashion that seems uncorrelated with general market swings and with relatively low volatility. Most hedge funds accomplish this by maintaining both long and short positions in securities (hence the term “hedge fund”) which, in principle, gives investors an opportunity to profit from both positive and negative information while, at the same time, providing some degree of market neutrality because of the simultaneous long and short positions.

However, several recent empirical studies have challenged these characterizations of hedge fund returns, arguing that the standard methods of assessing their risks and rewards are misleading. For example, [Asness et al. \(2001\)](#) show in some cases where hedge funds purport to be market neutral, i.e., funds with relatively small market betas, including both contemporaneous and lagged market returns as regressors and summing the coefficients yields significantly higher market exposure. Moreover, in deriving statistical estimators for Sharpe ratios of a sample of mutual and hedge funds, [Lo \(2002\)](#) shows that the correct method for computing annual Sharpe ratios based on monthly means and standard deviations can yield point estimates that differ from the naive Sharpe ratio estimator by as much as 70%.

These empirical properties have potentially significant implications for assessing the risks and expected returns of hedge fund investments. We can trace them to a single common source of significant serial correlation in their returns.

This is surprising because serial correlation is often (though incorrectly) associated with market inefficiencies, implying a violation of the Random Walk Hypothesis and the presence of predictability in returns. This seems inconsistent with the popular belief that the hedge fund industry attracts the best and the brightest fund managers in the financial services sector. In particular, if a fund manager’s returns are predictable, the implication is that the manager’s investment policy is not optimal. If the manager’s returns next month can be reliably forecasted as positive, the fund manager should increase positions this month to take advantage of this forecast, and vice versa for the opposite forecast. By taking advantage of such predictability, the fund manager will eventually eliminate it, along the lines of [Samuelson’s \(1965\)](#) original “proof that properly anticipated prices fluctuate randomly.” Given the outsize financial incentives of hedge fund managers to produce profitable investment strategies, the existence of significant unexploited sources of predictability seems unlikely.

In this paper, we argue that in most cases, serial correlation in hedge fund returns is not due to unexploited profit opportunities, but is more likely the result of illiquid securities that are contained in the fund. For example, these illiquid securities can include securities that are not actively traded and for which market prices are not always readily available. In such cases, the reported returns of funds containing

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