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Asymmetric contracts, cash flows and risk taking of mutual funds ☆

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ABSTRACT

Fund managers in delegated portfolio management face asymmetries in their compensation contracts and in the fund flows contingent on their funds' performance relative to a benchmark. In this study we investigate the impacts of contract asymmetry and fund flow asymmetry on the risk-taking behavior of open-end funds whose delegation contracts are performance based, and show that their impacts are opposite. When the two asymmetries apply simultaneously, the impact of one on the fund's risk-taking alleviates the impact of the other. Raising the return-sharing ratio cannot make the manager take more risk, but increasing the cash flow volume can. We also show that the tracking-error variance can measure the degree of risk that the fund takes.

1. Introduction

There are two types of asymmetry in the wealth management market, the compensation asymmetry (bonus vs. punishment) in delegation contracts based on performance relative to a benchmark, and the fund flow asymmetry due to funds' relative performance. When a fund outperforms the market index or its peers' average performance it usually attracts cash inflows; when a fund underperforms its benchmark the cash outflows are usually limited (Chevalier and Ellison, 1997; Gruber, 1996; Sirri and Tufano, 1998).

Research on asymmetric contracts in delegated portfolio management can be categorized into two groups. The first group studies the impact of symmetric and asymmetric contracts on asset selection and asset prices. Starks (1987) argues that symmetric contracts dominate "bonus" contracts in inducing the manager to build better portfolio that satisfies investors' needs. Das and Sundaram (2002) compare symmetric (with fulcrum fees) and asymmetric (with incentive fees) contracts from the standpoint of investor welfare and find that equilibrium investor welfare may be higher under incentive fees than fulcrum fees under robust conditions. Hugonnier and Kaniel (2010) show that funds' fees are positively related to their risks because high-fee funds invest more in risky assets. Cuoco and Kaniel (2011) study asset pricing under symmetric and asymmetric delegation contracts. Basak and Pavlova (2013) and Kaniel and Kondor (2013) explore how fund managers' solicitude of relative performance affect asset prices in a financial market dominated by investment delegations.

The second group of research investigates the impact of asymmetric delegation contracts on fund risk-taking behaviors. Asymmetric delegation contracts award managers' above-benchmark performance but do not punish their subpar performance to the same degree. Thus managers face only limited liabilities, so the asymmetric contracts have similar properties as call options. Grinblatt and Titman (1989) argue that if managers can hedge their compensation they would adopt investment strategies with higher volatility. Assuming that managers are risk averse, however, Carpenter (2000) shows that option-like contracts do not necessarily cause more risk-taking. Ross (2004) believes that option-like compensation contracts can cause managers to take less risk than when trading for themselves because of the magnifying effect of such contracts. Panageas and Westerfield (2009) find that the risk-seeking incentives of option-like contracts rely on combining finite horizons and convex compensation schemes rather than on convexity alone.

The compensation of fund managers usually includes a percentage of the assets under management, so the asymmetry between fund flows and fund performance provides an implicit incentive to fund managers, who often adjust investment strategies based on relative performance. Goriaev et al. (2003) and Taylor (2003) investigate the competition between two funds with different performance and find that the fund with better mid-year performance holds more risky assets at the end of the year to maintain its leading position to attract cash inflows. Basak et al. (2007) find that risk adjustment behaviors are limited for managers to chase above-benchmark performance. It depends on the manager's risk tolerance whether to increase the risks in the fund portfolio. Assuming that the managers' compensations are based on the relative performance in the industry, Basak et al. (2008) prove theoretically that underperforming funds in midyear (relative to

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industry average or benchmark) usually increase risk-taking in the second half of the year, while overperforming funds tend to be more conservative in their strategies to maintain their lead. Alexander and Baptista (2008) find that adding VaR constraints to the TEV model in Roll (1992) can make active investors to choose more efficient portfolios. van Binsbergen et al. (2008) study the impact of performance-based contracts on investment strategies in decentralized investment management and show that the design of the benchmark can affect the incentives in the firm. When studying the implications of dynamic flows on a mutual fund's portfolio decisions, Hugonnier and Kaniel (2010) predict a positive relationship between a fund's proportional fee rate and its volatility.

Over the past several decades performance-based-fee (PBF) compensation structures have been increasingly adopted in the open-end mutual fund industry. Although Stoughton (1993) and Admati and Pleiderer (1997) find that PBF contracts provide no incentives for fund managers, Elton and Gruber (2003) provide evidence that in the US markets funds with PBF structures perform better than those without such compensation structures. Ou-Yang (2003) finds that symmetric PBF contracts are optimal for dynamic delegation portfolio management. Gomez and Sharma (2006) believe that under short-sell constraints linear PBF contracts can provide incentives to managers and dominate quadratic contracts. Li and Tiwari (2009) find that option-like PBF contracts can overcome managers' underinvestment in acquiring private information. Cvitanić et al. (2009) argue that nonlinear contracts are optimal for dynamic delegation portfolio management. Dybvig et al. (2010) show that the optimal choice is linear PBF contracts with appropriate benchmarks when there exist restrictions on asset selection. Kyle et al. (2011) internalize the information acquisition in their model and assert that linear PBF contracts can provide incentives for managers to acquire information.

While existing literature examines the impact of either the contract asymmetry or the fund flow asymmetry on funds' risk taking strategies, open-end funds with asymmetric PBF delegation contracts are subject to the influence of both asymmetries simultaneously. In this paper we build a streamlined model to explore the impact and interaction of the two types of asymmetry, and the results complement the existing literature on fund flow asymmetry or contract asymmetry. When a fund's performance is evaluated against an exogenous benchmark, the manager tries to balance between two priorities: catching up with or beating the benchmark, and maintaining the lead. To achieve the former the strategy is to invest more in the risky asset, which offers higher expected return and risk than the benchmark does; for the latter the strategy is to invest less in the risky asset. These two priorities always coexist, but the manager's focus shifts as the fund's performance changes relative to the benchmark.

The remaining of this paper proceeds as the following. Section 2 sets up the basic model of delegated portfolio management, including the two types of asymmetry. In Section 3 we first study separately the impact of contract asymmetry and fund flow asymmetry, then we investigate the interaction between the two types of asymmetry. Section 4 examines the impact of return-sharing ratio and fund flow volume on funds' asset selections. In Section 5 we demonstrate that the tracking error variance is a better measure of fund risk than the return volatility. Section 6 collects concluding remarks.

2. The model

In this study we consider a simple delegated portfolio management framework in which the manager's compensation and the fund's cash flow are determined by the fund's performance relative to an exogenous benchmark. Thus the manager faces two types of asymmetry. The manager can either invest in the benchmark portfolio (as an indexing strategy) or take a chance with a risky asset/portfolio that offers higher expected return and risk.

Assumption 1. Assume that there are two assets (or portfolios of assets) on the market, the risky asset A and the benchmark asset B. The returns of the two assets are $\widetilde{R}_a \sim N(\mu_a, \sigma_a^2)$, $\widetilde{R}_b \sim N(\mu_b, \sigma_b^2)$ respectively, where $\mu_a > \mu_b$ and $\sigma_a^2 > \sigma_b^2$. Thus asset A has higher risk and higher return compared to asset B. Similar to the setup in Basak et al. (2007) and Chen and Pennacchi (2009), the portfolio in a fund consists of two parts: the investment in the benchmark portfolio B and the investment in the risky asset A. θ represents the fraction of fund invested in the risky asset or deviation from the benchmark, so it can be interpreted as the risk exposure of the fund. The higher the θ, the higher the risk of the portfolio. The return of the fund portfolio is,

$$\widetilde{R} = \theta\widetilde{R}_a + (1-\theta)\widetilde{R}_b \tag{1}$$

This measure of risk exposure (θ) is consistent with the recommendation in portfolio choice literature and different from the popular choice of risk measure in corporate finance literature, the return volatility of an investment or project. This measure captures the strength of the manager's desire to adjust her risk exposure relative to some benchmark asset allocation and conforms to the popular industry practices of relative evaluation and benchmarking (Basak et al., 2007, 2008; Taylor, 2003; van Binsbergen et al., 2008). As argued by Chen and Pennacchi (2009), when fund managers' compensation is based on relative performance the tracking error volatility is a more appropriate and robust measure of risk-taking. The return volatility is less relevant because all investments are subject to the same macro risks.

Assumption 2. S is the size of the fund, and it changes as per $S = S_0\left(1 + \omega\prod\left(\widetilde{R}, \widetilde{R}_b\right)\right)$, where

$$\Pi\left(\widetilde{R}, \widetilde{R}_b\right) = \begin{cases} 1 & \widetilde{R} - \widetilde{R}_b \geq \eta \\ -\dfrac{1}{d} & \widetilde{R} - \widetilde{R}_b < -\eta \end{cases} \tag{2}$$

$\omega > 0$ represents the fund flow volume (in a percentage term): higher ω means that more money moves into or out of the fund. η is a performance threshold: when the return of the fund beats the return of the benchmark by this threshold, new money flows into the fund; in the opposite scenario money flows out of the fund.[1] $d \geq 1$ represents the fund flow asymmetry. When $d = 1$, the fund flow is symmetric when the portfolio return is higher or lower than the benchmark return. As $d \to +\infty$ the asymmetry is the highest, meaning there is no outflow even if the fund underperforms the benchmark. s_0 is the initial fund size, and for convenience we assume that $s_0 = 1$ and $\omega/d < 1$.

This simple digital model (2) is motivated by the focus of this study, that is, how the fund flow asymmetry affects risk taking of funds. It isolates the fund flow asymmetry from other properties of fund flows that have been examined in the literature such as collar-shape and (local) convexity (Basak and Makarov, 2014; Basak et al., 2007; Carpenter, 2000; Sirri and Tufano, 1998). This model serves the purpose of this paper and improves the tractability of the model. It captures the asymmetric fund flows contingent on fund relative performance that have been identified and adopted in the literature (Basak et al., 2007; Chevalier and Ellison, 1997).

Assumption 3. The delegation contract of the fund manager is $\widetilde{W} = W_0 + S\pi$, where W_0 is the fixed income independent of fund

[1] According to Chevalier and Ellison (1997), the asymmetric relationship between fund performance and fund flow exists primarily in the best- and worst-performing funds, and the performance is measured by the industry ranking. Not to lose generality, this study measures the relative performance with the difference between the fund return and benchmark portfolio return, and categorizes funds into two groups as per a threshold: one group as outperformers and the other group as underperformers. This categorization is consistent with Basak et al.(2007, 2008) among others.