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Equilibrium prices in the presence of delegated portfolio management ☆

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ABSTRACT

This paper analyzes the asset pricing implications of commonly used portfolio management contracts linking the compensation of fund managers to the excess return of the managed portfolio over a benchmark portfolio. The contract parameters, the extent of delegation, and equilibrium prices are all determined endogenously within the model we consider. Symmetric (fulcrum) performance fees distort the allocation of managed portfolios in a way that induces a significant and unambiguous positive effect on the prices of the assets included in the benchmark and a negative effect on the Sharpe ratios. Asymmetric performance fees have more complex effects on equilibrium prices and Sharpe ratios, with the signs of these effects fluctuating stochastically over time in response to variations in the funds' excess performance.

1. Introduction

In modern economies, a significant share of financial wealth is delegated to professional portfolio managers rather than managed directly by the owners, creating an agency relationship. In the U.S., as of 2004, mutual funds managed assets in excess of $8 trillion, hedge funds managed about $1 trillion, and pension funds more than $12 trillion. In other industrialized countries, the percentage of financial assets managed through portfolio managers is even larger than in the U.S. (see, e.g., Bank for International Settlements, 2003).

While the theoretical literature on optimal compensation of portfolio managers in dynamic settings points to contracts that are likely to have very complicated path dependencies,[2] the industry practice seems to favor

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[2] A distinctive feature of the agency problem arising from portfolio management is that the agent's actions (the investment strategy and

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relatively simple compensation schemes that typically include a component that depends linearly on the value of the managed assets plus a component that is linearly or non-linearly related to the excess performance of the managed portfolio over a benchmark.

In 1970, the U.S. Congress amended the Investment Advisers Act of 1940 so as to allow contracts with registered investment companies to include performance-based compensation, provided that this compensation is of the "fulcrum" type, that is, provided that it includes penalties for underperforming the chosen benchmark that are symmetric to the bonuses for exceeding it. In 1985, the SEC approved the use of performance-based fees in contracts in which the client has either at least $500,000 under management or a net worth of at least $1 million. Performance-based fees were also approved by the Department of Labor in August 1986 for ERISA-governed pension funds. As of 2004, 50% of U.S. corporate pension funds with assets above $5 billion, 35% of all U.S. pension funds, and 9% of all U.S. mutual funds used performance-based fees.[3] Furthermore, Brown, Harlow, and Starks (1996), Chevalier and Ellison (1997), and Sirri and Tufano (1998) show that, even when mutual fund managers do not receive explicit incentive fees, an implicit non-linear performance-based compensation still arises with periodic proportional fees as a result of the fact that the net investment flow into mutual funds varies in a convex fashion as a function of recent performance.[4]

Given the size of the portfolio management industry, studying the implications of this delegation and of the fee structures commonly used in the industry on equilibrium asset prices appears to be a critical task. The importance of models addressing the implications of agency for asset pricing was emphasized by Allen (2001): "In the standard asset pricing paradigm it is assumed investors directly invest their wealth in markets. While this was an appropriate assumption for the U.S. in the 1950 when individuals directly held over 90% of corporate equities, or even in 1970 when the figure was 68%, it has become increasingly less appropriate as time has progressed […] For actively managed funds, the people that make the ultimate investment decisions are not the owners. If the people making the investment decisions obtain a high reward when things go well and a limited penalty if they go badly they will be willing to pay more than the discounted cash flow for an asset. This is the type of incentive scheme that many financial institutions give to investment managers."

Existing theoretical research on delegated portfolio management has been primarily restricted to partial equilibrium settings and has focused on two main areas. The first examines the agency problem that arises between investors and portfolio managers, studying how compensation contracts should be structured: it includes Bhattacharya and Pfleiderer (1985), Starks (1987), Kihlstrom (1988), Stoughton (1993), Heinkel and Stoughton (1994), Admati and Pfleiderer (1997), Das and Sundaram (2002), Palomino and Prat (2003), Ou-Yang (2003), Larsen (2005), Liu (2005), Dybvig, Farnsworth, and Carpenter (2006), Cadenillas, Cvitanić, and Zapatero (2007), Cvitanić, Wan, and Zhang (2009), and Li and Tiwari (2009). The second examines how commonly observed incentive contracts impact managers' decisions: it includes Grinblatt and Titman (1989), Roll (1992), Carpenter (2000), Chen and Pennacchi (2005), Hugonnier and Kaniel (2010), and Basak, Pavlova, and Shapiro (2007).

We complement this literature by considering a different problem. As in the literature on optimal behavior of portfolio managers, we take the parametric class of contracts as exogenously given, motivated by commonly observed fee structures. However, we carry the analysis beyond partial equilibrium by studying how the behavior of portfolio managers affects equilibrium prices when the extent of portfolio delegation and the parameters of the management contract are all determined endogenously.

A first step in studying the implications of delegated portfolio management on asset returns was made by Brennan (1993), who considered a static mean–variance economy with two types of investors: individual investors (assumed to be standard mean–variance optimizers) and "agency investors" (assumed to be concerned with the mean and the variance of the difference between the return on their portfolio and the return on a benchmark portfolio). Equilibrium expected returns were shown to be characterized by a two-factor model, with the two factors being the market and the benchmark portfolio. Closely related mean–variance models have appeared in Gómez and Zapatero (2003) and Cornell and Roll (2005).[5]

To our knowledge, the only general equilibrium analyses of portfolio delegation in dynamic settings are in two recent papers by Kapur and Timmermann (2005) and Arora, Ju, and Ou-Yang (2006). Kapur and Timmermann consider a restricted version of our model with mean–variance preferences, normal returns, and fulcrum performance fees, while Arora, Ju, and Ou-Yang assume CARA utilities and normal dividends and do not endogenize the extent of portfolio delegation: as a result of these assumptions, fulcrum performance fees are optimal in their

(*footnote continued*)
possibly the effort spent acquiring information about securities' returns) affect both the drift and the volatility of the relevant state variable (the value of the managed portfolio), although realistically the drift and the volatility cannot be chosen independently. This makes the problem significantly more complex than the one considered in the classic paper by Holstrom and Milgrom (1987) and its extensions. With a couple of exceptions, as noted by Stracca (2006) in his recent survey of the literature on delegated portfolio management, "the literature has reached more negative rather than constructive results, and the search for an optimal contract has proved to be inconclusive even in the most simple settings."

[3] The use is concentrated in larger funds: the percentages of assets under management controlled by mutual funds charging performance fees out of funds managing assets of $0.25–1 billion, $1–5 billion, $5–10 billion, and above $10 billion were 2.8%, 4.4%, 9.2%, and 14.2%, respectively (data obtained from Greenwich Associates and the Investment Company Institute).

[4] Lynch and Musto (2003) and Berk and Green (2004) provide models in which this convex relationship between flows and performance arises endogenously.

[5] Brennan (1993) found mixed empirical support for the two-factor model over the period 1931–1991, while Gómez and Zapatero (2003) found stronger support over the period 1983–1997.