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Delegated portfolio management, optimal fee contracts, and asset prices ☆

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Abstract

This paper proposes a model of asset-market equilibrium with portfolio delegation and optimal fee contracts. Fund managers and investors strategically interact to determine funds' investment profiles, while they share portfolio risk through fee contracts. In equilibrium, their investment decisions, fee schedules, and stock price feed back into one another. The model predicts that (1) stock market's expected return and volatility increase as more investor capital is intermediated by funds, (2) fund's expense ratio is stable despite volatile market, (3) aggregate fund flow is positively (inversely) related to subsequent (past) market return, and (4) funds provide investors with a volatility hedge by adjusting market exposure countercyclically.

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1. Introduction

The fund management industry has grown significantly in the past few decades.[1] Reflecting that, recently more and more papers have analyzed economic implications of delegated portfolio management. While some have considered asset-pricing implications and others have considered contracting implications, few have studied both in a unified model. The goal of this paper is to develop a tractable model of such a kind and draw empirical implications from the equilibrium relations of delegation and asset prices.

Our model has two distinguishing features compared to the existing ones. First, fund fees are determined in optimal contracting problems and interact with equilibrium stock prices. The fee arrangement serves as an optimal scheme of sharing portfolio risk among fund managers and fund investors, linking the principal-agent relationship in portfolio delegation and the stock market performance. Second, our model incorporates strategic behavior of both fund managers and fund investors in an asset-pricing model. This feature creates a feedback loop between both of these agents' optimal investment decisions and the stock market performance, allowing us to derive a rich set of predictions on the time variation of stock returns, fund returns, fund fees, fund flows, and investment strategies.

Specifically, we consider a discrete-time, infinite-horizon model with a risky stock and a riskless asset. The stock yields a normally distributed dividend each period, and the price is determined by market clearing. The riskless asset has an infinitely elastic supply at an exogenous rate of return and is freely accessible to all agents. There are three types of agents: direct investors, fund investors, and fund managers. All of them are risk-averse (CARA) price takers who live for two periods, constituting overlapping generations. The direct investors can access the stock on their own, whereas the fund investors cannot. To invest in the stock, the fund investors need to delegate capital to a fund manager who manages a portfolio of the assets on their behalf. This delegation is subject to an agency problem: potentially, each manager can abscond with the fund investors' assets. To prevent it from happening, the fund investors offer to the manager a fee contract that is attractive enough for him to continue running the fund rather than abscond. The model's key endogenous variables are (1) fund size, measured by assets under management (AUM), (2) fund's risk exposure, measured by the number of shares of the stock held per dollar of investor capital, (3) fund's fee schedule, which we allow to be any function of the fund's investment profit (i.e., the proceeds from the fund portfolio in excess of the riskless component), and (4) the stock price.

The model's equilibrium involves a feedback loop among these endogenous variables: fund investors and managers take into account the fee schedule when choosing the capital allocation and the fund's risk exposure, while the fee schedule depends on these agents' choices, and the stock price adjusts to make certain all these actions are consistent with market clearing. Due to the CARA-normal specification, the optimal fee schedule is (not surprisingly) in an affine form. The stock price, the fund's risk exposure, and AUM are all stochastically time varying, reflecting random shocks to the stock supply. This feature allows us to study issues of significant interest

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[1] Cuoco and Kaniel (2011) report that in the U.S. as of 2004, mutual funds managed assets more than \$8 trillion, hedge funds managed about \$1 trillion and pension funds more than \$12 trillion. According to Investment Company Institute (2014), in the U.S., the number of households owning mutual funds has increased from 23.4 million in 1990 to 56.7 million in 2013. In 2012, 23% of households' financial assets are managed by registered investment companies (household holdings of ETFs, closed-end funds, unit investment trusts, and mutual funds), while that proportion was only 3% in 1980.

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