

# Capacity and factor timing effects in active portfolio management<sup>☆</sup>

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## Abstract

Capacity constraints limit the profits of some investment strategies, while other strategies are more scalable. We develop a dollar-weighted return measure that parses the factor timing by investors and a strategy's capacity constraints. We find that actively managed funds exhibit significant capacity and timing effects, while index funds display only timing effects. A portfolio's liquidity, investment style, and distribution policy are important in explaining variation in capacity constraints. The analysis demonstrates that capacity and timing effects are important in analyzing portfolio manager skill and the cost of active investing.

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## 1. Introduction

Active portfolio management is a search for alpha in which the portfolio manager seeks to identify investment opportunities that more than compensate for their risks. To generate alpha in a portfolio is to exploit a “mispricing” through the lens of theoretical equilibrium models. Indeed, one tenet of most economic equilibrium models is that the profit-seeking actions of market participants compete away these abnormal profit opportunities. In this sense, there is an implied capacity constraint to any active portfolio management strategy: as more dollars seek out the same alpha-generating opportunities, those opportunities are depleted. This paper empirically examines the existence and nature of capacity constraints in active portfolio management.

Open-end mutual funds present an opportunity to examine potential capacity constraints because investors have the ability to add to or withdraw cash from the fund throughout the fund’s existence. We begin by observing that the reported returns of an open-end mutual fund generally differ from the realized returns that each shareholder experiences during their investment period in the fund. This difference arises from two primary sources. First, a “timing” effect results from the factor timing of the individual shareholder’s investment (or disinvestment) in the fund shares. Second, a “capacity” effect arises from the return the fund is able to earn on the incremental dollar investment in the fund’s underlying strategy. In this sense, a fund’s return can be considered a function of the underlying return-generating technology (i.e., the portfolio manager’s “skill”) and the interaction of capacity constraints inherent in the return-generating technology with the size of the assets employing that technology.

We derive a dollar-weighted average performance measure as a means to decompose the impact of the size of assets under management on fund performance into timing and capacity effects. In the model, the timing component reflects any correlation in the timing of fund flows and the realizations of a multi-factor model of expected fund returns. After controlling for timing, any residual difference represents a fund-specific effect arising from the correlation of flows and the underlying active strategy’s “alpha.” If managers fall short of their benchmark returns when exposed to flow, then we interpret this as an impact of capacity constraints in active portfolio management.

Relying on a database of open-end domestic equity mutual funds, we show that both capacity and timing effects are economically significant and distinct drivers of performance, averaging negative impacts of 50 and 70 basis points, respectively, per year across the sample. Variation in capacity effects is driven by investment style and the capitalization of the active strategy’s underlying holdings. Fund policies which encourage or inhibit flows also matter. Front-end loads suppress both timing and capacity effects. Management fees (excluding 12b-1) are significant in explaining capacity, while marketing fees (12b-1) explain timing. Passively managed funds (i.e., index funds) display only the timing effect of fund flows; they show no significant capacity effects.

This paper is structured as follows: Section 2 motivates the analysis and reviews the related literature. Section 3 develops a methodology to parse the difference between dollar-weighted return and time-weighted returns into timing and capacity components. Section 4 describes the data and empirical methods, while Section 5 presents the results for the timing and capacity effects and cross-sectional analysis. Section 6 offers a summary and conclusions.

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