Practical Applications of When Does Capitalization Weighting Outperform? *Factor-Based Explanations*

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PA 2019, 6 (3) 1-5
doi: https://doi.org/10.3905/pa.6.3.300
http://pa.iijournals.com/content/6/3/1.6

Institutional Investor Journals
1120 Avenue of the Americas, 6th floor,
New York, NY 10036, Phone: +1 212-224-3589

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When Does Capitalization Weighting Outperform? *Factor-Based Explanations*

Practical Applications
Institutional Portfolio Research

Authors: Roger Clarke, Harindra de Silva, and Steven Thorley
Source: *The Journal of Index Investing,* Vol. 9, No. 1
Report Written By: Mark Adelson
Keywords: Factor investing, smart beta, capitalization-weighted index

Overview

In **When Does Capitalization Weighting Outperform? *Factor-Based Explanations***, from the Fall 2018 issue of ***The Journal of Index Investing***, **Roger Clarke** of **Ensign Peak Advisors**, **Harindra de Silva** of **Analytic Investors**, and **Steven Thorley** of **Brigham Young University** weigh in on the active/passive debate from a factor-investing perspective. Specifically, they examine whether the underperformance of actively managed mutual funds relative to capitalization-weighted indexes over the past 25 years can be explained by the funds' disproportionate exposure to specific equity market factors such as value, momentum, small size, low beta, and profitability. The authors posit that the aggregate holdings of the actively managed mutual funds have some similarities to an equal weighting of securities within the population of large-cap equities. This implies a significant tilt toward the small size factor by actively managed funds. Such funds also display tilts toward the momentum and profitability factors. Together, the factor tilts explain roughly half of the underperformance of actively managed mutual funds relative to the capitalization-weighted indexes.

Practical Applications

- **Capitalization-weighted indexes will likely outperform actively managed funds when the value and low-beta factors outperform.** This is because actively managed funds currently display tilts away from those factors.
- **Capitalization-weighted indexes will likely underperform actively managed funds when the momentum and profitability factors outperform.** This is because actively managed funds currently display tilts toward those factors.
- **Actively managed growth funds will likely display larger sensitivities to factor exposures than other actively managed funds.**

Key Definitions

Factor investing

Factor investing is an approach to security selection based on objective attributes that have historically been associated with excess returns. The Fama–French (1993) three-factor model started with a stock's ***beta*** and added ***size*** (i.e., small cap) and ***value*** (i.e., high ratio of book value-to-market equity) as attributes that explain superior returns. The Fama–French (2015) five-factor model added ***profitability*** and ***investment*** as additional factors.

Momentum factor

The momentum factor refers to the attribute of rising price as a predictor of further price appreciation.

Low-beta factor

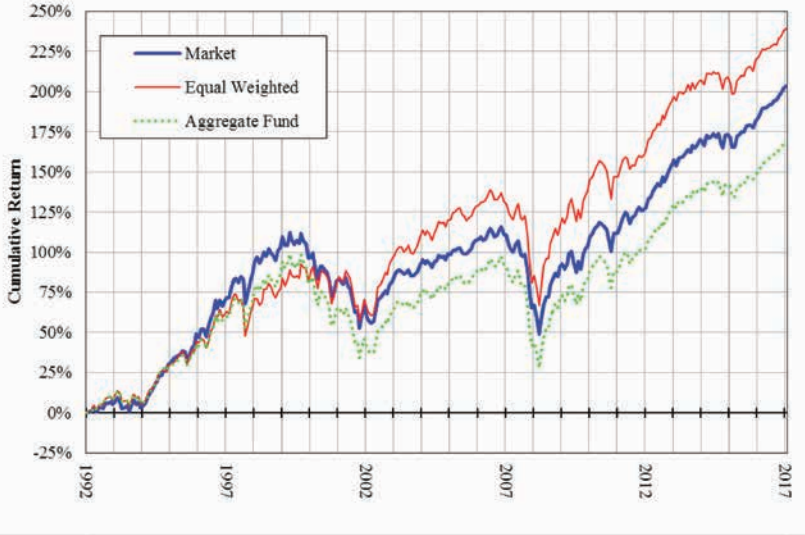
Beta (β) is the common measure of a stock's volatility relative to the market as a whole. More precisely, it is the sensitivity of a stock's expected excess returns to expected excess returns of the market as a whole. Beta is a key component of the capital asset pricing model (CAPM).[1] A beta of greater than 1 means that the stock is more exposed to the market trend and its volatility. A beta of less than 1 means it is less exposed to the market trend and volatility. The low-beta factor refers to the attribute of having low beta (i.e., less than 1).

1 Beta appears in the key formula for the CAPM: $E(r_i) = r_f + \beta_i[E(r_m) - r_f]$, where $E(r_i)$ is the expected return on stock i, r_f is the risk-free rate, β_i is the beta for stock i, and $E(r_m)$ is the expected return on the market.

Discussion

The authors first consider the long-term performance of three representative portfolios. The first is a capitalization-weighted portfolio of the 1,000 largest U.S. equities (excluding ETFs and ADRs). The second is an equally weighted portfolio of the same stocks. The third portfolio is an AUM-weighted composite of actively managed funds. The authors find that from 1993 through 2017 the equally weighted fund performed the best, delivering average annualized returns of 9.42% (Exhibit 1). The capitalization-weighted fund delivered average annualized returns of 8.14%. The composite based on actively managed mutual funds delivered annualized returns of 6.74% (i.e., 140 basis points below the capitalization-weighted fund). The authors explain that the underperformance of the actively managed mutual fund composite can be partly explained by the additional fees associated with active management.

Exhibit 1: Cumulative Portfolio Returns from 1993 to 2017



PURE FACTOR PORTFOLIOS

Next, the authors construct five additional portfolios, each designed to highlight the performance of a specific non-market factor. The five factors are (1) value, (2) momentum, (3) small size, (4) low beta, and (5) profitability. They apply the following criteria to associate individual stocks with each factor while controlling for the influence of the other factors:

> "When do capitalization-weighting indexes outperform actively managed mutual funds in the aggregate? Historically, most of the time, but especially when momentum and profitability stocks do poorly and value and low beta stocks do well."
>
> ***—When Does Capitalization Weighting Outperform? Factor-Based Explanations***

> "The aggregate fund has a total AUM of about $4.6 trillion at the end of 2017, or 18% of the total U.S. public equity market value of $25.1 trillion based on the largest 1,000 stocks."
>
> ***—When Does Capitalization Weighting Outperform? Factor-Based Explanations***

value:	earnings yield
momentum:	prior one-year return excluding the prior month
small size:	relative smallness within the 1,000-stock large-cap population
low beta:	negative prior 36-month S&P 500 beta
profitability:	gross profit margin lagged three months

The authors measured the performance of each of the "pure" factor portfolios over the period 1993–2017. They assessed the performance of the low beta portfolio with leverage of 1.35 to 1.00 to produce a leveraged beta of 1 for the portfolio (in line with the betas of the other four pure factor portfolios). The profitability factor and the levered low beta factor displayed generally strong performance over the entire period. The value factor was correlated with strong performance before around 2001, but since then has been mostly neutral. The momentum factor was correlated with very strong performance for the early portion of the sample period but has been erratic in more recent times. The small-size factor produced poor performance for the early portion of the sample period and then delivered a period of strong performance before becoming mostly neutral since 2009.

FACTOR EXPOSURES OF THE EQUALLY WEIGHTED PORTFOLIO

The authors then examined the factor exposures of the equally weighted portfolio using two methods. The first was a month-by-month point-in-time analysis based on the factor exposures of the underlying stocks. The second was a regression analysis that estimated factor exposures from returns over five-year intervals. The month-by-month analysis shows that from 1993 through 2017 the equally weighted portfolio had a consistent and significant tilt toward the small-size factor and much smaller, fluctuating tilts into and out of the other factors. The regression analysis generally agrees with the month-by-month analysis but also reveals a discernable tilt away from the low-beta factor starting in roughly 2005.

FACTOR EXPOSURES OF AGGREGATE ACTIVELY MANAGED MUTUAL FUNDS

The authors analyzed the factor exposures of the aggregate portfolio of actively managed mutual funds using regressions on portfolio returns. They found that actively managed funds had a pronounced tilt toward the small-size factor and somewhat smaller tilts (similar to the equally weighted portfolio) out of the value factor and the

low-beta factor. In addition, the analysis showed a statistically significant tilt toward the momentum factor.

The authors note that the managed-fund tilt toward the small-size factor has declined over time, which implies that actively managed funds have evolved to more closely resemble capitalization-weighted indexes. The authors report additional results for various fund types (e.g., growth or other).

> "*Pure* portfolios for the Value, Momentum, Small Size, Low Beta, and Profitability factors are defined by the security weights implicit in monthly capitalization-weighted Fama–Macbeth (1973) cross-sectional regressions."
>
> ***—When Does Capitalization Weighting Outperform? Factor-Based Explanations***

FUTURE PERFORMANCE OF ACTIVELY MANAGED MUTUAL FUNDS

Based on the analysis of factor performance from 1993 through 2017 and the discernable factor tilts of actively managed mutual funds, the authors project that actively managed mutual funds will likely outperform when the profitability factor and the momentum factor deliver strong returns because of their current tilts. Additionally, they project that the effect will be stronger in actively managed mutual funds that are characterized as growth funds.

Conversely, the authors project that capitalization-weighted index funds will likely outperform actively managed mutual funds when the value factor and the low-beta factor deliver stronger results.

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