ClearBridge
Investments

Examining Passive Crowding as a Risk Factor

Key Takeaways

▶ We hypothesize that passive flows increase the likelihood of stocks becoming overvalued because passive investment vehicles are valuation agnostic.

▶ Our backtests show that passive crowded securities — those that have experienced comparatively large increases in ownership by passive ETFs and index mutual funds — tend to exhibit significantly lower forward returns than passive uncrowded stocks.

▶ Most of the alpha generated by this passive crowding factor is derived from the underperformance of passive crowded stocks, making it most suitable as an exclusionary criterion.

▶ Systematically managing a portfolio's exposure to these securities should help deliver positive alpha.

Why Look at Changes in Passive Ownership?

We understand why and how large trades influence security prices — trades by active managers are generally driven by opinions on the intrinsic value of the security, and when the market observes these trades it adjusts its own assessment of the security's value.[1] In layman's terms, observing a large number of buy or sell orders prompts market participants to question whether their assessment of a stock's value is correct and to adjust accordingly. This is a major tenet of the efficient market hypothesis, as it is the primary mechanism by which price discovery occurs. However, as the share of institutionally managed U.S. equity assets held by passive funds[2] has grown to roughly 40% since the global financial crisis, we wonder whether this mechanism can actually detract from market efficiency.

Trades by passive mutual funds and ETFs are motivated solely by flows into and out of these funds, which at most embed an opinion at a thematic level (asset class, sector, factor, etc.). Since the market has no way of systematically distinguishing between trades placed by informed active managers and valuation-agnostic passive funds, it stands to reason that the market might mistakenly adjust its assessment of a security's

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1   "Continuous Auctions and Insider Trading," Albert S. Kyle http://people.stern.nyu.edu/lpederse/courses/LAP/papers/Information,Fundamental/Kyle85.pdf

2   We define a passive fund as any fund that does not presume to have an opinion on the underlying valuation or fundamentals of a specific stock. This includes index, sector, and smart beta mutual funds and ETFs.

intrinsic value in response to changes in ownership by passive funds. This should, in theory, lead to mispricings that active managers can exploit.

Finding the Optimal Factor

To determine whether our theory is correct and how to best capture the signal (if any) present in passive ownership, we built and backtested portfolios partitioned by several permutations of passive ownership changes.[3]

Our Investable Universe

We started with a universe of all common stocks, REITs and MLPs listed on U.S. exchanges, while excluding ADRs. We then filtered out stocks whose trailing three-month average daily volume (ADV) was below the 25th percentile, and whose market cap was below the 20th percentile of the Russell 3000 Index. This translated to a minimum tradeable ADV of about $2.3 million and a minimum market cap of about $350 million at the end of 2018. By doing so, we tested our factor using only stocks in which an institutional asset manager could realistically have taken meaningful positions.

Portfolio Construction

We created nine portfolios using sequential sorts by size (large, mid and small) and trailing change in the percent of shares outstanding owned by passive funds (passive crowded, neutral and passive uncrowded).[4] We first grouped the universe by market cap, with stocks larger than the 83rd percentile of the Russell 3000 classified as large caps, stocks larger than the 66th percentile but smaller than the 83rd percentile classified as mid caps, and the remainder classified as small caps. We then sorted each size group by the trailing change in the percent of shares outstanding owned by passive funds. We classified the top decile (10%) of each size group sorted by change in passive ownership as "passive crowded," the bottom decile as "passive uncrowded," and the middle 80% as "neutral." This allowed us to analyze passive crowded, neutral and passive uncrowded within each size group. In order to create the passive crowded, neutral and passive uncrowded portfolios for an all cap universe, we combined the corresponding portfolios from each size group.

3   We tested passive flows over the past one, three, six, nine and 12 months, and measured forward returns over the subsequent one, three, six, nine and 12 months.

4   We opted to construct portfolios using a sequential sort because it ensures that small, mid and large cap stocks are proportionally represented in the passive crowded and passive uncrowded portfolios. This was necessary because we found that the passive crowded portfolio was dominated by small cap stocks otherwise.

Portfolio Performance

We tested the performance of portfolios constructed using changes in passive ownership over the last one, three, six, nine and 12 months and measured forward returns over one-, three-, six-, nine- and 12-month holding periods. We found that between December 2007 and December 2018, passive uncrowded portfolios outperformed their passive crowded counterparts across nearly all of these permutations.[5] We ultimately decided to construct our crowding factor using trailing six-month passive flows (Exhibit 1).

Exhibit 1: The Passive Crowding Factor Generates Positive Returns across All Market Caps
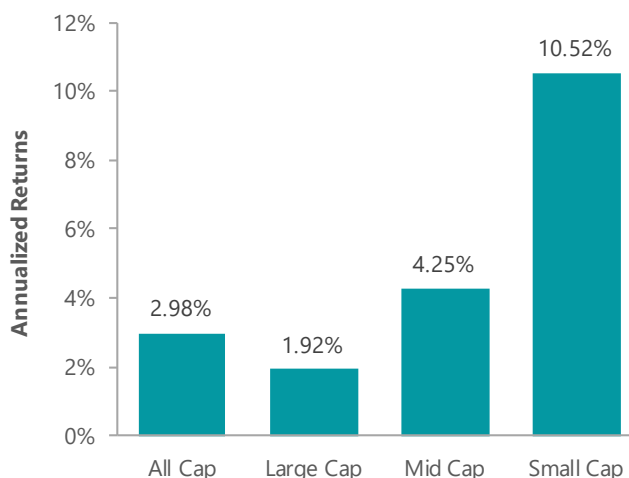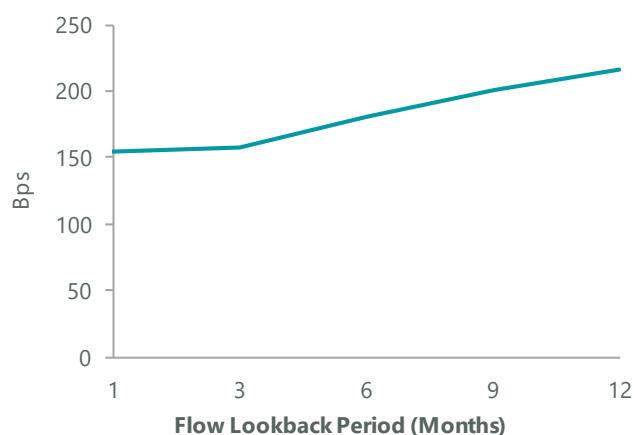

Source: ClearBridge Investments.

A long-short passive crowding factor constructed using six-month change in passive ownership generated, on average, 2.98% over the next month (expressed in annualized terms) in the all cap universe, 1.92% in the large cap universe, 4.25% in the mid cap universe, and 10.52 % in the small cap universe. In other words, the passive crowding factor, a strategy of buying uncrowded stocks and simultaneously selling short (betting against) crowded stocks, generated positive returns across all market caps.

While testing the different permutations of this long-short crowding factor, we observed comparatively strong performance when using passive flows over the trailing three to nine months, which is consistent with economic intuition. On the one hand, we are most concerned with trading that has occurred recently because its effects are less likely to have already been arbitraged away. On the other hand, short-term flows do not vary across stocks nearly as much as long-

5   We used December 2007 as a starting point because passive AUM and flows were negligible prior to the financial crisis.

term flows do (most of the signal tends to reside in extreme observations, which manifest more often over longer time horizons). This is evidenced by the differences in their cross-sectional standard deviation, making it difficult to derive a meaningful signal from them (Exhibit 2). Given that the best performance seems to cluster around three-to-nine-month flows, we are confident in the robustness of factors constructed using any of these lookback periods. However, we believe using trailing six-month flows is likely the most sensible as the marginal gain in the spread of flows declines when looking back further.

Exhibit 2: Average Cross-Sectional Standard Deviation of Passive Flows

Source: ClearBridge Investments.

Exhibit 3: Expected Turnover of Crowded Portfolios over Varying Holding Periods
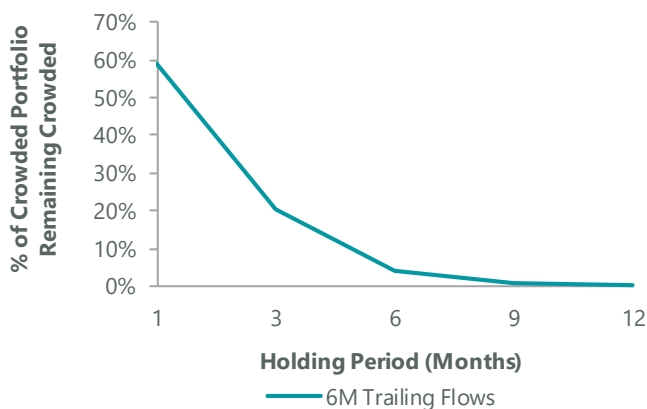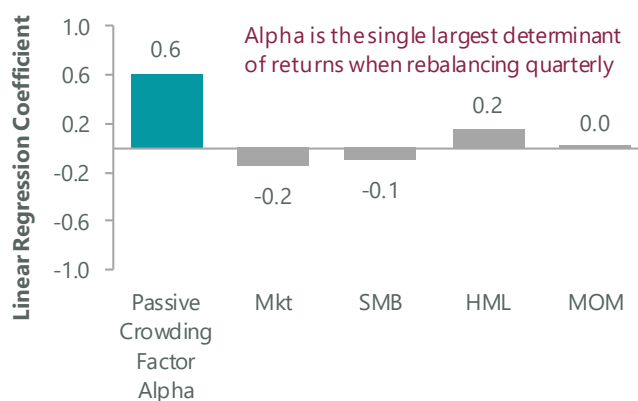

Source: ClearBridge Investments.

Regarding holding periods, we found that one-, three-, and six-month forward returns were comparatively strong, which is likely due to the fact that the underlying passive crowding factor changes rapidly, and by six months its signal has decreased significantly (Exhibit 3). Accordingly, we suspect that rebalancing monthly would generate better returns than rebalancing

quarterly across all market caps, given that about 80% of the passive crowded portfolio is no longer passive crowded after three months. However, in the absence of compelling evidence that this difference would be significant, we find any holding period between one and six months acceptable. For the purpose of these backtests, we assumed a one-month holding period.

The Passive Crowding Factor

We ultimately determined that trailing six-month change in passive ownership was the most sensible metric. The resulting value-weighted[6] factor generated positive gross returns across all market cap groups,[7] indicating that meaningful purchases by passive funds can indeed drive stocks to overvaluation. We also note that the all cap passive crowding factor generated positive alpha even when regressed against the Fama-French factors (Exhibits 4 and 5).[8] In other words, even after controlling for the effects of market beta and the size (SMB), value (HML) and momentum (MOM) factors, the passive crowding factor still generated positive risk-adjusted returns, demonstrating that it is a robust factor in and of itself and not merely a proxy for other known risk factors.

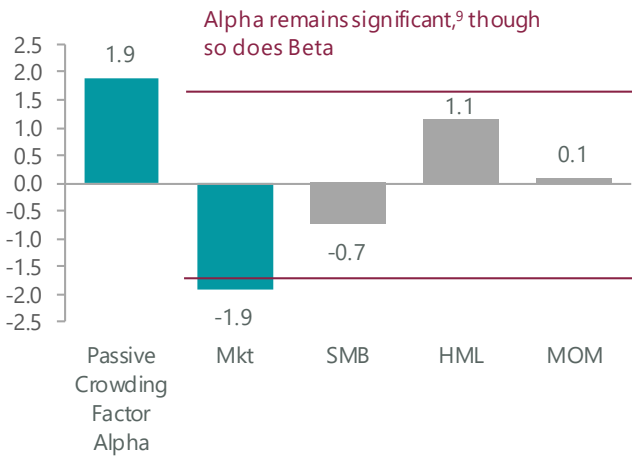**Exhibit 4: Regression Coefficients against Fama-French Factors**

Source: ClearBridge Investments.

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6   We also tested the factor using equal-weighted returns, and the results are broadly consistent with the conclusions we draw from the value-weighted factor.

7   We note that the factor performs particularly well in the small cap space, where passive funds can trade larger portions of the float for a given AUM level. We suspect the opposite is true for large cap stocks, which would explain the comparatively weak signal.

8   The Fama-French factors are market excess returns, size and value. We also incorporate the momentum factor into this test. See Ken French's faculty website for a detailed description of the construction of these factors: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research

Exhibit 5: T-Stats of Regression Coefficients

Alpha remains significant,[9] though so does Beta

Source: ClearBridge Investments.

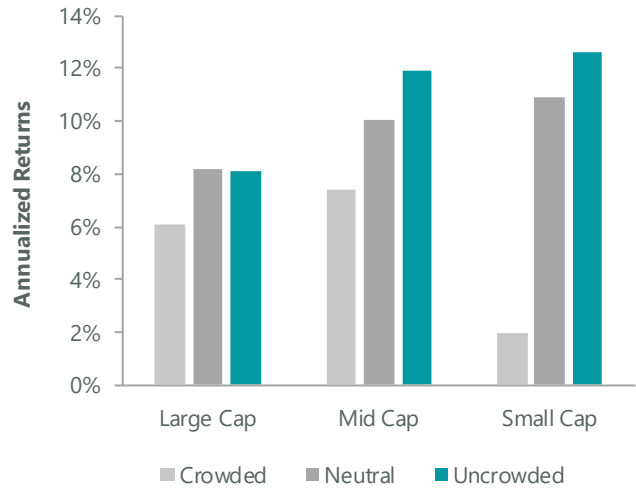**Exhibit 6: The Passive Uncrowded Portfolio Outperforms the Neutral Portfolio in Mid and Small Caps**

Source: ClearBridge Investments.

Implications for Portfolio Managers

While our long-short passive crowding factor generated statistically significant positive returns, we believe it is more appropriate to use it as an exclusionary and risk management criterion rather than as a stock selection criterion. While passive uncrowded stocks tended to significantly outperform passive crowded stocks over time, their outperformance relative to the neutral section of our universe, while generally positive, was minor (Exhibit 6). This is not surprising given the magnitude of flows into passive assets over the backtest period (Exhibit 7), which is why even the bottom decile of our universe tended not to see extremely negative changes in ownership by passive funds (Exhibits 8 and 9). We recognize that flows into passive funds may eventually taper, and perhaps even reverse, at which point the passive uncrowded portfolio could become a stronger predictor of future performance. The total percentage of a stock's float owned by passive funds could also become a relevant metric if flows reverse. While stocks with high passive ownership levels did not exhibit meaningful underperformance in our backtests (they slightly outperformed), it stands to reason that they could experience increased volatility and poor returns in the event of systemic outflows out of passive funds.
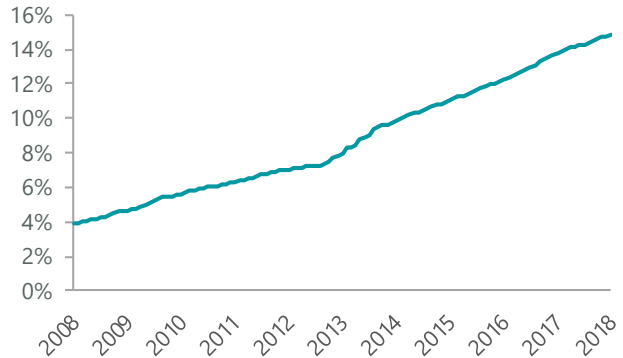
9   We use 95% as our threshold for statistical significance. The red lines denote the corresponding t-values necessary to pass the test for significance.
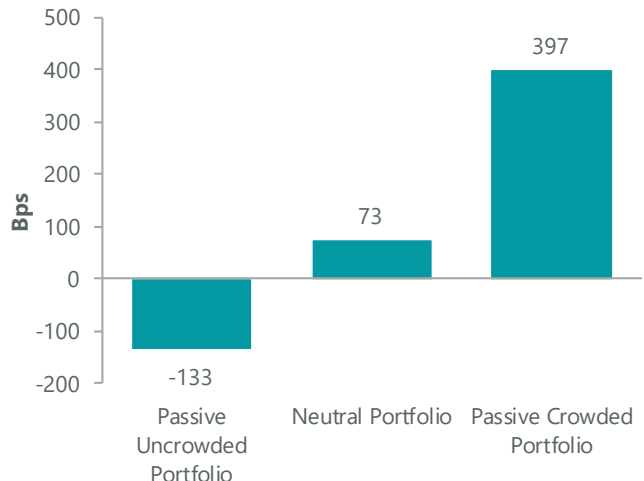
**Exhibit 7: Percent of Our Investable Universe Owned by Passive Funds (12m Moving Average)**

Source: ClearBridge Investments. Investible universe includes both institutional- and non-institutional-owned assets.

Exhibit 8: Average Trailing 6-month Change in Ownership of Stocks by Passive Funds (bps)

Source: ClearBridge Investments.

Exhibit 9: Average % Stocks with a >100bps Ownership Change by Passive Funds
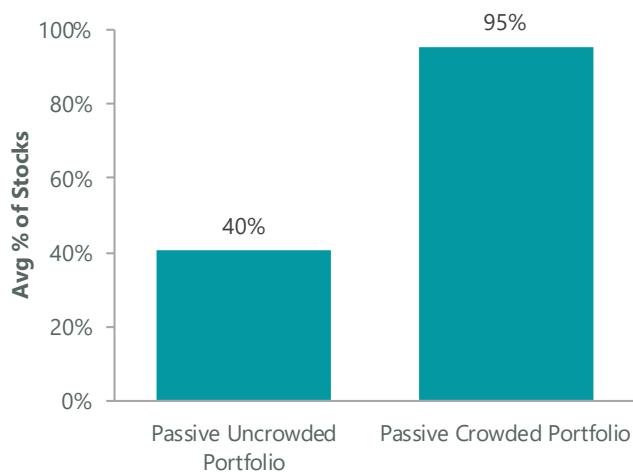
Source: ClearBridge Investments.

As it stands, however, changes in ownership by passive vehicles is the only metric that generates a meaningful signal we can exploit, and most of the alpha from this factor comes from the underperformance of passive crowded stocks. For example, simply removing all passive crowded securities from one's universe generates meaningful increases in returns across all size groups (Exhibit 10).

Exhibit 10: Annualized Returns Across Universes

	Universe	Universe ex Crowded	Difference (Bps)
All Cap	8.32%	8.46%	14
Large Cap	8.09%	8.17%	8
Mid Cap	9.78%	10.28%	50
Small Cap	10.23%	11.01%	78

Source: ClearBridge Investments.

We use the examples above to illustrate the power of passive crowding as an exclusionary factor but are not advocating to unilaterally avoid or sell all passive crowded securities. As with any quantitative factor, passive crowding performs well in aggregate, but its batting average for individual securities is only slightly better than even. In other words, we believe the passive crowding factor can be useful to augment existing stock selection frameworks and should be monitored and managed on an aggregate portfolio level.

Conclusion

Ultimately, we believe the passive crowding factor can be a useful addition to the stock selection and portfolio construction process. Our backtests provide compelling evidence that passive crowded securities meaningfully underperform passive uncrowded securities over the subsequent one to six months. While we find no empirical evidence to suggest that levels of ownership by passive funds is a predictor of underperformance, we believe there is a compelling economic argument in support of this factor's effectiveness should investor funds flow out of passive investment vehicles.

About the Authors

Farhan Mustafa, CFA
Managing Director
Head of Investment Risk Management,
Head of Quantitative Research
• Member of the CFA Institute
• MBA from the Robert H. Smith School of Business, University of Maryland, College Park
• BA in Economics and Computer Science from Washington and Lee University

Barath Balu, CFA
Assistant Vice President
Quantitative Research Associate
• Member of the CFA Institute
• Masters in Finance from the University of Maryland
• BA in Economics from the University of Maryland

ClearBridge Investments
620 Eighth Avenue, New York, NY 10018
800 691 6960
ClearBridge.com