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Do Mutual Fund Managers Outperform by Low-Balling their Benchmarks?

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Abstract

Do mutual fund managers outperform through a bias toward smaller-cap stocks than represented by the benchmark index? This study attempts to explain mutual fund outperformance through testing the average market cap (AMC) of mutual funds relative to their respective benchmark indexes. If outperforming funds show a bias toward smaller average holdings, then outperformance may be attributed to the value premium associated with small-cap stocks. Using Morningstar Direct, excess returns and average market cap of Holdings were collected on a quarterly basis for 1542 actively managed funds citing the S&P 500, S&P MidCap 400 and Russell 2000 as their primary benchmark. Fund managers were expected to have smaller average holdings than represented in the benchmark index. The results of the correlation analysis were significant and consistent with this hypothesis for all three indexes.

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Introduction

Mutual fund outperformance is subject to the benchmark index used to gauge performance. An outperforming fund may be composed of stocks with a significantly smaller average market-cap relative to its benchmark index. In this case, the representative index would be an inappropriate benchmark due to the value premium associated with small-cap holdings. This value premium contributes to the fund's excess return over the benchmark index, and true comparability is lost. Findings from existing studies have been largely dependent on sample selection, and similar studies have provided different results. This study explores a potential source of outperformance through a different approach. If outperforming funds show a consistent bias toward smaller-cap stocks on average, these mutual fund managers are effectively "low-balling" their benchmarks to achieve out-performance.

Literature Review

Fama and French (1993) note that stocks with small market caps and high book-to-market ratios consistently outperform the market. To adjust for the effect of these portfolio components, their analysis utilizes a three-factor model, which builds upon the Capital Asset Pricing Model (CAPM), to evaluate portfolio returns. The additional factors in the Fama-French three-factor model allow for a more thorough explanation of portfolio returns by accounting for excess returns resulting from the size premium associated with small cap and value stocks.

Block and French (2002) find that using multiple indexes to evaluate mutual fund performance more effectively captured the impact of investments with high and low market-caps. Since the S&P 500 does not include many smaller firms, it does not truly represent the market. To account for this issue of value-weighted composition, Block and French analyzed a fund's bias toward value weighting or equal weighting.

Their analysis of 506 mutual funds indicate that fund managers typically bias toward equal-weighting, and this result was consistent for funds utilizing different size benchmarks (small-cap, mid-cap, and large-cap). Using a two-index model, Block and French analyzed their sample against the Wilshire 5000 Value-Weighted and Equal-Weighted indexes. Their results indicate that this approach yields a higher explanatory power than a single index approach. This suggests that the current analysis of mutual fund outperformance should incorporate multiple indexes for a more accurate depiction of the "market."

De Silva and Lee (2009) note that after expected excess returns are derived, a risk target needs to be defined in order to determine the final active weights. In active management, active return, or what is commonly known as alpha, is typically defined as the return of the active portfolio in excess of the benchmark portfolio. Active risk is defined as the standard deviation of alpha, also known as tracking error. In a nutshell, the objective of active management is to maximize alpha for a given level of tracking error.

Allen (2005) shows that, based on average quarterly returns, institutional small-cap US equity portfolios over a 20 year period from June 1984 to June 2004 outperformed the Russell 2000 by at least 500 basis points. This outperformance is surprisingly consistent, and is substantially greater than the average large-cap portfolio's return for the same period, which underperformed the Russell 1000 index by 30 basis points. With that in mind, one begins to question the concept of efficient markets, which argues against the possibility of persistent outperformance. On the other hand, active management proponents would argue that even in the most efficient markets such as the U.S., small-cap stocks are often neglected, leading to inefficiencies in pricing and demand.

Allen's study uses data collected on the first day of every quarter from September 1984 to June 2004. Quarterly rates of return are collected directly from managers by mail, e-mail questionnaires, a web interface, and telephone calls. The collected data represent composite returns for institutional separate account products or commingled funds. Mutual funds were excluded because their returns are reported net of fees, contain large cash positions, and are often managed with different objectives. Collected returns in this study, on the whole, were also AIMR compliant post-1990. In total, the sample represents 783 products each with a minimum three-year performance record. Over the 20 year span, the sample began with 126 products, 657 products were created, and 205 were terminated. The dominant benchmarks for this sample were the Russell 2000, containing 80% (627) of the products, the Russell 2500, containing 16% (128 products), and the remaining 28 products were benchmarked against the S&P 600.

Allen's analysis implements a control for survivorship bias, which if unchecked would skew the sample toward better-performing managers and disproportionately increase the performance results of a given sample. The longer a small-cap product survives, the more poorly it performs relative to newly introduced products. This is reinforced by a steadily diverging mean and median over the 20 year period. The sample's mean outperforms the median, which indicates that survivorship bias has a minimal effect given that the median can only include managers that survived the entire measurement period while the mean includes all managers present each quarter.

The sample was also exposed to instant history bias, or the impact of a portfolio's first three years of returns that are typically reported on the same day following a manager's successful three-year run. Adjusting for this bias by eliminating the first three years of returns actually indicates an underperformance by 94 basis points per year. Adjustments also need to be

made to the benchmark index in order to control for persistent factors underlying outperformance and potential benchmark misspecification. Allen shows that a customized benchmark that incorporates 85% Russell 2000 and 15% Russell 2500 Growth would be a better benchmark for the sample of returns. However, the extent of outperformance relative to the Russell 2000 and Russell 2500 indexes does not indicate the presence of a significant consistent factor bias.

Allen concludes that the performance of his sample strongly supports that institutional small-cap managers have provided consistent and significant outperformance versus benchmarks over the last 20 years. 20% of the outperformance is attributed to a factor that consistently shows the first three years of a small-cap manager's performance are commonly the highest, but structural limitations preclude access to these years for the typical institutional investor. Lastly, survivorship bias and persistent factor biases, though present, were substantially mitigated in this sample and did not significantly contribute to the outperformance in this study.

Shankar's (2007) analysis of actively versus passively managed indexes provides some insight on the primary differences between the Russell 2000 and S&P 600 Indexes. The actively constructed S&P 600 Index provided better returns than the passively constructed Russell 2000 Index in eight of the nine overlapping three-year periods that were analyzed from 1994 to 2004. The average difference in three-year returns for these two small-cap indexes was 9.2%, which was substantially larger when compared to the average difference for large cap indexes (S&P 500 and Russell 2000) of 0.8% for the same period. Sharpe ratios of the S&P 600 are also superior to those of the Russell 2000, indicating that active index construction leads to improvements in both raw returns and risk-adjusted returns. This performance difference was also consistent in index fund returns, which incorporates all transaction costs. Overall, this study supports the role of active portfolio management, especially when a portfolio focuses on a

particular market segment. Thus it appears that the S&P 600 Index would be a superior benchmark for small-cap portfolio analysis given its actively managed nature.

Hackel, Livnat, and Rai's (1994) study presents a small-cap investment strategy that selects individual securities based on consistent patterns of operating and free cash flows (FCF), low financial leverage, and low free cash flow multiples. The following criteria were utilized in stock selection: Stocks must have a FCF multiple between 5 and 20, the four-year average operating and FCF of the firm must be positive, the growth rate of net operating cash flow and FCF must be above 5%, and lastly the ratio of total debt to four-year average FCF should be less than 10. These filters generate a final portfolio in any given year that ranged from 77 firms in 1990 to 167 firms in 1984, which were then analyzed over a 12 month period. An equal investment was made in each firm. The resulting average of portfolio returns was 21.6 percent a year, compared to a CRSP value-weighted average annual return of 16.6%. The portfolio return exceeded that of the index in 10 of 14 years. Finally, the portfolios constructed for this study outperformed portfolios with similar size, beta, and book/market values over the same period, which supports the notion that the additional risk of an actively managed portfolio is not applicable to these excess returns.

Though there is a limited amount of academic literature on the topic of micro-cap stocks, practitioners have explored this sub-strata of capitalization analysis in depth. Meziani and Portes (2012) look at the importance of micro-cap influence on small-cap portfolio performance. The Dow Jones Wilshire U.S. Micro-Cap Index (DWMI) is used as a benchmark for long-term performance of the study's strategic portfolio. Over a 10 year period from January 1999 to February 2008, the results indicate that micro-caps provide a significant contribution to portfolio performance. This suggests that micro-caps would be better placed in a distinct asset category.

Of the indexes analyzed in the study, the DWMI exhibits the highest average return at 19.22%, and the S&P 600 at 15.46%. The DWMI's annualized volatility of 0.1909 is also superior with the S&P 600 as the closest competitor at 0.2377. Sharpe ratios also indicate that the DWMI is an outperformer of among indexes when risk-adjusted returns are considered. The study then discusses the importance of DWMI's high alpha and its relevance to the scarcity of information in lower market-cap segments, which in turn provides greater opportunities to exploit mispricing of securities. Overall, this study supports that excess returns and reductions in systematic risk can be attributed to portfolio weighting in favor of micro-cap stocks.

Another consideration for small-cap portfolio returns is the inclusion of index-listed stocks and the price effect that adding or removing a stock from an index bears on long-term value. Shankar and Miller (2006) examine S&P 600 index changes and the resulting effects on prices of stocks that are added or removed from this index. Though the price effects are more pronounced for smaller firms upon announcement of addition (positive return) or removal (negative return), the effect is typically reversed within a sixty days. This study's results support the price-pressure hypothesis that changes in the distribution of security holders has no lasting effect on prices or trading volumes.

Ian Brink (2010) focuses on the risks associated with small-cap investing. Volatility risk is a prevalent concern for many small-cap firms due to a higher exposure to swings in market conditions. Liquidity also poses a risk for small-cap investors given the limited information and market for small-cap stocks. Though this risk bears little relevance to the quality of a firm, it can lead to missed opportunities for capitalizing on gains or mitigating potential losses. The impact of speculation must also be considered when building small-cap portfolios. For example, market hype surrounding a newly introduced stock my lead to substantial increase in demand, driving up

the price. Within a short period of time, expectations may reverse and the stock's price would plummet. Many small-caps have been negatively impacted by this behavior in the past, especially within high-technology and energy industries. Thus, it is essential that small-cap portfolio managers be diligent when researching and selecting stocks.

Hypothesis

The study's main hypothesis can be expressed as follows:

H_1: Average market-cap holdings of outperforming mutual funds are smaller than those of the representative benchmark index

Data Collection and Description

Using Morningstar Direct, average market cap of Holdings (AMC) and excess returns (ER) over benchmark were collected for all actively managed US mutual funds on a quarterly basis from January 1, 2001 through September 30, 2012. Funds citing the S&P 500, S&P MidCap 400 and Russell 2000 as their primary benchmark were then selected to represent Large, Mid, and Small-Cap holdings respectively. Fund names from the AMC and ER tables were then matched to produce a consolidated table. This provided a sample of 1542 funds, including 1302 for the S&P 500, 47 for the S&P 400 MidCap, and 193 funds for the Russell 2000. Quarterly AMC data was then collected for three index funds tracking these indexes. These index funds were selected based on their consistent reporting of quarterly returns and include the Vanguard Institutional Index fund which tracks the S&P 500, the Dreyfus MidCap Index fund which tracks the S&P MidCap 400, and the Northern Small Cap Index fund which tracks the Russell 2000.

Analysis

To test whether fund managers bias their portfolios toward smaller cap stocks to achieve outperformance, the deviation of the quarterly AMC is calculated for each fund from the quarterly AMC for each fund's respective (benchmark) index fund:

$$AMC_{DEVIATION} = \text{Average Market-Cap}_{FUND} - \text{Average Market-Cap}_{INDEX\ FUND}$$

To account for funds with missing or unreported quarterly AMCs, the AMC of the representative index fund was substituted for individual funds on a case by case basis. If AMCs were missing for three or fewer consecutive quarters before or after a reporting date, then the AMC of the benchmark index fund was substituted, otherwise the AMC would be left blank (excluding it from further calculations). The median of $AMC_{DEVIATION}$ and average of Excess Returns (AER) were then calculated for each fund over the 11 year period. The medians of $AMC_{DEVIATION}$ and AERs for each fund were correlated for each benchmark class, and results indicated a significant, consistent negative correlation for each class, as show in Exhibit 1.

Exhibit 1

	Correlation(Median $AMC_{DEVIATION}$, AER)	One-Tailed t-test
Large-cap (S&P 500)	-0.174	-6.365 significant at 1% level (±2.326)
Mid-cap (S&P 400)	-0.351	-2.518 significant at 1% level (±2.415)
Small-cap (Russell 2000)	-0.129	-1.805 significant at 5% level (±1.653)

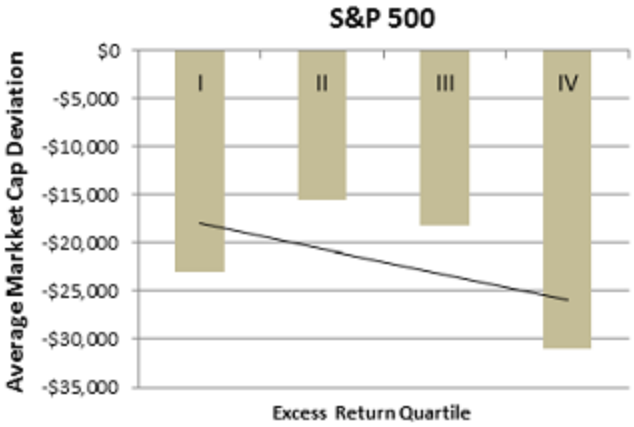
These results are significant at the 1% level for the S&P 500 and S&P MidCap 400, and at 5% for the Russell 2000. This indicates that outperforming funds have significantly smaller average holdings than their representative benchmark index.

For a visual representation, funds were sorted by quartiles based on Average ER with quartile "IV" containing the highest average excess returns per fund and quartile "I" containing the lowest average excess returns per fund. Then, the average $AMC_{DEVIATION}$ of each quartile was graphed. The following results show non-monotonic, but definitively negative linear relation, indicating that as deviation below benchmark index increases, excess return increases as well. The result is most apparent for the S&P 500 in Exhibit 2.

Exhibit 2

S&P 500 $AMC_{DEVIATION}$ by Quartile

		AMC	AER
Quartile	IV	-$31,013	1.17%
	III	-$18,227	0.11%
	II	-$15,505	-0.17%
	I	-$23,053	-1.06%

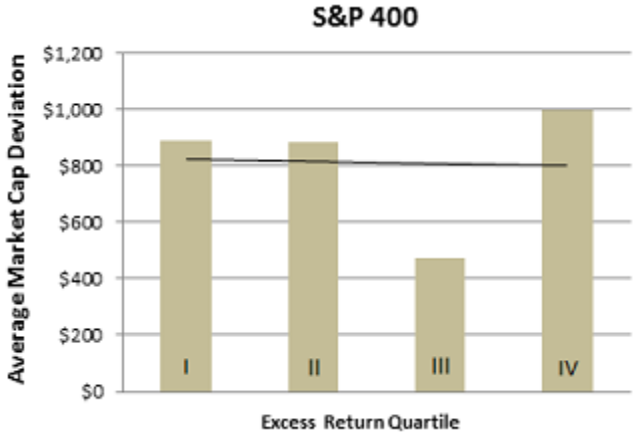


The S&P MidCap 400, in Exhibit 3, shows a slightly negative trend.

Exhibit 3

S&P 400 $AMC_{DEVIATION}$ by Quartile

		AMC	AER
Quartile	IV	$999	0.28%
	III	$474	-0.11%
	II	$882	-0.28%
	I	$889	-0.79%

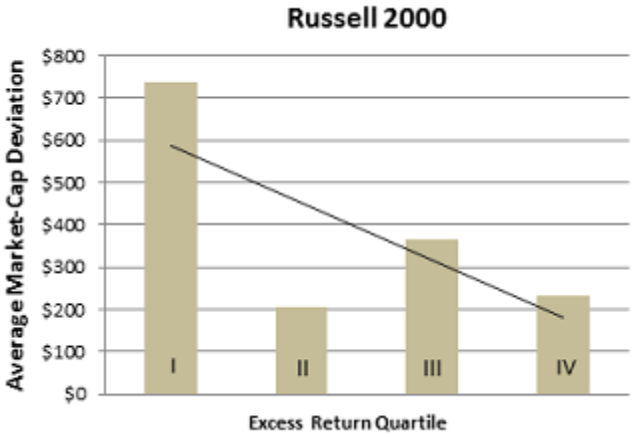


Lastly, the Russell 2000, in Exhibit 4, shows a clear, negative trend toward higher deviations from benchmark (smaller value) and the relation to higher excess returns.

Exhibit 4

Russell 2000 $AMC_{DEVIATION}$ by Quartile

		AMC	AER
Quartile	IV	$231	0.92%
	III	$367	0.24%
	II	$205	-0.12%
	I	$737	-0.90%



Conclusion

The results of this study show that mutual fund managers outperform by overweighting the smaller-cap stocks to capture a size premium, and in effect, generate excess return relative to benchmarks. Though the relation between small-cap overweighting and outperformance is not monotonic, it is reasonable to conclude that on average, a fund that is biased toward stocks with a smaller market-cap than represented in the benchmark index will perform better than the benchmark. Using the Fama-French (1993) three-factor model would likely reveal that the reported outperformance is not pure alpha but a size effect. Unsophisticated retail investors, however, are unlikely to investigate the source of reported outperformance this thoroughly.

References

Allen, Gregory C. "The Active Management Premium in Small-Cap U.S. Equities." *The Journal of Portfolio Management* Vol. 31-3 (2005). 10-17.

Block, Stanley B., and Dan W. French. "The Effect of Portfolio Weighting on Investment Performance Evaluation: The Case of Actively Managed Mutual Funds." *Journal of Economics and Finance* Vol. 26-1 (2002). 16-28.

Brink, Ian. "Small Cap Investing." *Funds on Friday* Volume 577 (2010).

Da Silva, Alexandre, Lee Wai,, and Bobby Pornrojnangkool. "The Black-Litterman Model for Active Portfolio Management." *Journal of Portfolio Management* Vol. 35-2 (2009). 61-70.

Fama, Eugene F., and Kenneth R. French. "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics* Vol. 33 (1993). 3-56.

Hackel, Kenneth, Joshua Livnat, and Atul Rai. "The Free Cash Flow/Small-Cap Anomaly." *Financial Analysts Journal* (1994). 33-42.

Meziani, A. Seddik, and Luis San Vicente Portes. "Micro-Cap Stocks: On the Quest for Lower Risk and Higher Returns." *Journal of Business & Policy Research* Vol. 5 (2010). 1-11.

Shankar, S. Gowri. "Active Versus Passive Index Management: A Performance Comparison of the S&P and the Russell Indexes." *The Journal of Investing* Vol. 16-2 (2007). 85-95.

Shankar, S. Gowri, and James M. Miller. "Market Reaction to Changes in the S&P SmallCap 600 Index." *The Financial Review* Vol. 41 (2006). 339-360.