

Small-Cap Value Mutual Funds - Analysis

EXECUTIVE SUMMARY

Assumptions

- Winsorized extreme quarterly return values in the lower and upper tails and replace them with the 99th and 1st percentile return values to account for errors/abnormalities in data
- Replaced non-numeric and missing monthly return values with 0%
- Assumed monthly returns from CRSP were adjusted for capital distributions

Methodology

We gathered quarterly mutual fund return data to look at other variables affecting fund performance besides AUM. It was difficult to tell which variables were associated with capital distributions in the quarterly data, so we used monthly data for returns instead, which we presumed adjusted for this already. Next, we compounded monthly returns to get quarterly returns and merged with original quarterly data.

We then grouped the funds by total net assets to get a proxy for fund size (i.e. small, medium, large) and compared the mean returns across these three groups as a basic initial analysis. We re-binned funds to allow for dynamic movement across size groups since one firm can change to a different bin from quarter to quarter based on changes in their AUM.

We performed iterative regression analysis, segmenting by each “quarter-year” time period, regressing quarterly returns on log-transformed total net assets for each fund to control for factors correlated across time (market-wide factors). We aggregated the regression results and visualized the aggregated distributions of coefficient estimates, test-statistics and R^2 values. We then sought to isolate the effect of total net assets on fund performance by incorporating other fund variables into our regression models.

Results

To begin, we performed exploratory analysis on the quarterly return data.

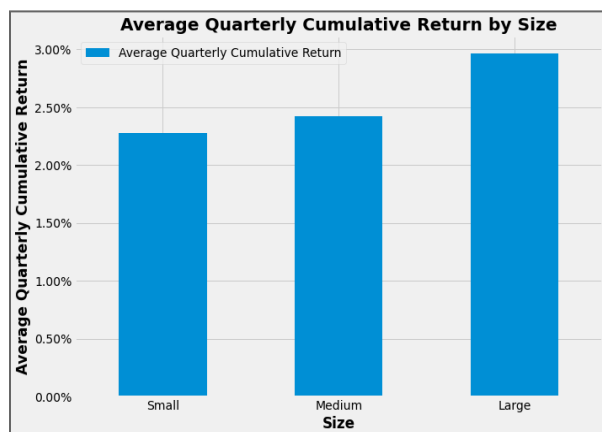


Figure 1: Quarterly Returns by Size of Fund

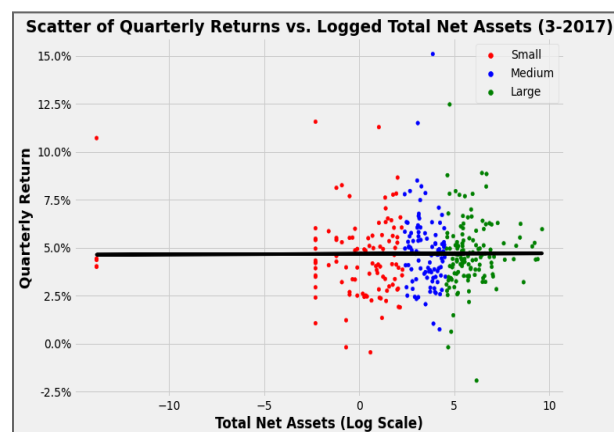


Figure 2: Quarterly Returns vs. Logged TNA (3rd QTR, 2017)

As can be seen above in **Figure 1**, there appears to be a positive relationship between fund size and returns. Upon further investigation, we found that when slicing for a given quarter-year period, the trend line falls flat when we generate a scatter of quarterly returns against logged total net assets (**see Figure 2**).

	R^2	Beta	Test Statistic
Mean	0.0148	0.0006	0.8549
25%	0.0050	0.0000	0.0060
50%	0.1052	0.0007	1.0393
75%	0.0192	0.0015	1.8599

Figure 3: Aggregated Regression Results

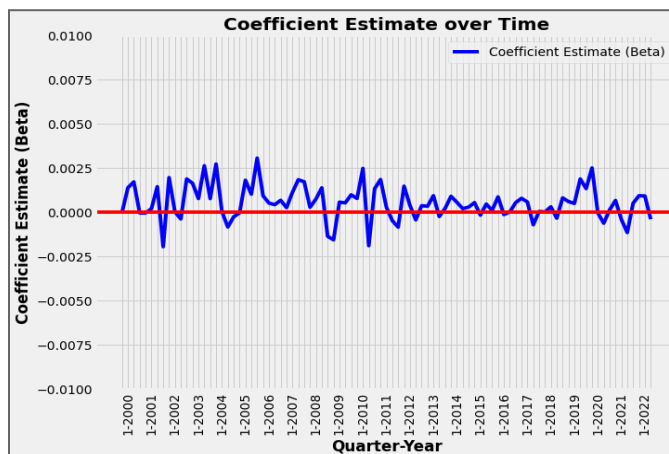


Figure 4: Coefficient Estimate for Total Net Assets Over Time

Looking at the summary of our aggregated regression results, it can be seen that limited statistical significance is attached to the coefficient on log-transformed total net assets, indicating that it has little predictive power in determining fund performance in Small-Cap Value mutual funds across quarter-year periods. This lack of significance is also constant over the time period of our data.

- Mean of distribution of Betas is 0.0006 (essentially zero - has no effect on fund return).
- Mean of distribution of R^2 is 0.0148.
 - Even after adding another predictor (indicator variable for Retail or Institutional Fund), the model did a poor job of explaining variance in fund returns.
- Over time, the Beta estimates fluctuate around zero. We observe no strong relationship between logged total net assets and fund performance for any extended period.

Key Takeaways

- Coefficient for logged total net assets was near zero for every quarter-year regression model fit
- Adding other fund based controls was ineffective as many either were highly collinear with fund returns or had too many missing values to justify including in the model
- The negligible impact of total net assets has not changed over time

After adding controls for time and fund characteristics, we were able to conclude that there was not a statistically significant relationship between fund size (AUM) and performance of Small-Cap Value mutual funds. The performance of a fund should depend primarily on its strategy. Although larger funds may enjoy benefits such as access to more resources, our results indicate that any of these potential benefits are negligible in predicting performance.