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Small-Cap Value Fund Return Against Fund Size Analysis Data

Data Collection & Assumptions

Monthly returns, monthly total net assets, fund identification number, "lipper" class, and date from the quarterly mutual fund database were acquired from WRDS CRSP and filtered to retrieve only those funds classed as small-cap value by the "lipper" class variable. Then we removed rows when the returns field had missing values and replaced missing values in the AUM column – most of the AUM missing values occur in 2008 probably due to CRSP collection error. We considered setting our observation window from January 1975 to June 2021 because the data prior to 1975 was exceedingly chaotic and contained errors such as duplicated dates with different AUMs. Aside from that, we excluded funds with an average AUM of less than $1 million and an observation period of less than 12 months. Based on funds' AUMs at a certain date (month), we divided them into three categories: Small, Medium, and Large. The reason for this is that we anticipate an inter-period grouping is the more relevant for these funds, comparing to a non-date-based grouping.

Data Analysis

	mean	std
Small	0.01045	0.43534
Medium	0.00906	0.06821
Large	0.00922	0.05589

Table 1: Statistics Summary

The monthly return averages for each class were calculated, and the table on the left was generated. The Small Class has the highest average monthly returns, as we can observe. **The Small class's average monthly return is roughly 1.05 percent, which is 0.1 percent greater than the other two classes' average monthly returns.** Small funds, on the other hand, have a significantly higher standard deviation than medium and large funds. This is critical to remember because, while the average small cap fund may perform better than the average large cap fund, the dispersion of those results is much greater than with larger funds, and if we choose the wrong fund at the wrong time, our performance may be significantly different than the average.

With that said, we do not believe the standard deviation is the most appropriate risk metric for this investigation. Outliers have a significant effect on standard deviation, smaller funds are penalized for their high positive outliers. As a result, we've chosen to measure risk using the mean absolute deviation (MAD). The following output shows the monthly return and MADS for each fund size. As expected, the MAD is still larger for smaller funds, but the difference is less pronounced.

Figure 1: Average Monthly Return

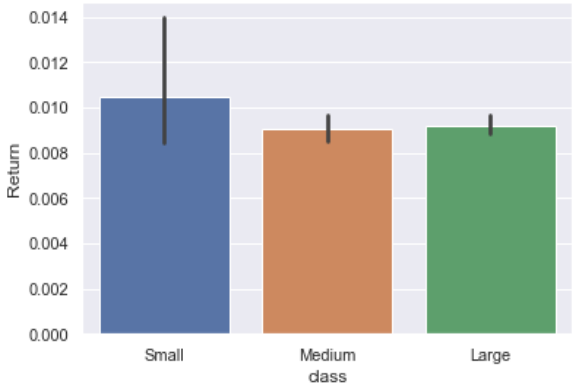
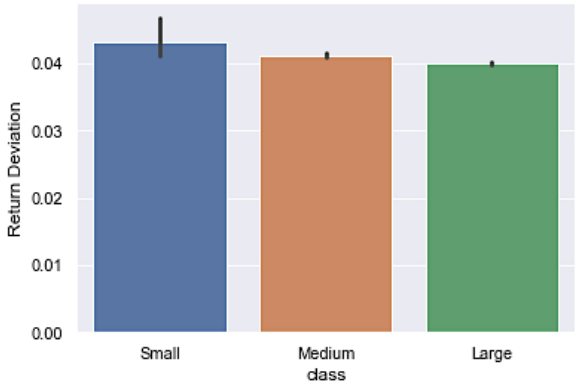


Figure 2: Average Return Deviation (MAD)



Sharpe ratios continue to favor small-cap funds, even when performance is risk-adjusted. Recognize that a 0.1 percent monthly return increase is enhanced and reflected in the cumulative return with a longer holding time.

Figure 3: Cumulative Return of US$1 dollar Investment

Thus, we investigate the cumulative returns of each fund size by estimating the investment return created by putting $1 in the average fund for each fund size from 1975; the plot on the left illustrates the result. Small funds consistently outperform medium and large funds. From 1975 to 2021 (as of June), $1 invested consistently in the average **small fund would yield an additional $300.08 in returns compared to $1 invested in the average large fund.**

Finally, we ran a linear regression using dummy variables for fund size. Regardless of how we massaged this model we could not achieve an r^2 value of higher than .001. We believe this shows that while small funds likely have higher returns you should base your choice on small fund on risk factor and not returns.

Conclusion and Limitation: Small size value funds tend to perform better. Data selection and assumptions including how to define small cap value funds are crucial in our research. Different methods and assumptions can lead to variations in results.