Investment Theory HW2

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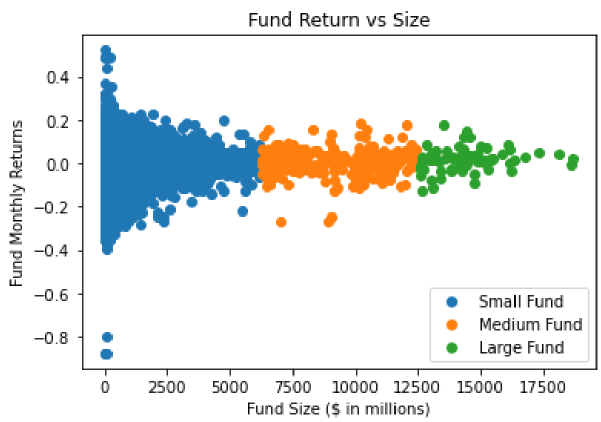
Assumptions:

- Evaluating Monthly returns of all Small-Cap mutual funds from January 1991 - December 2020
- Divided Funds into 3 equal-buckets based on fund NAV, and considered positive returns only.

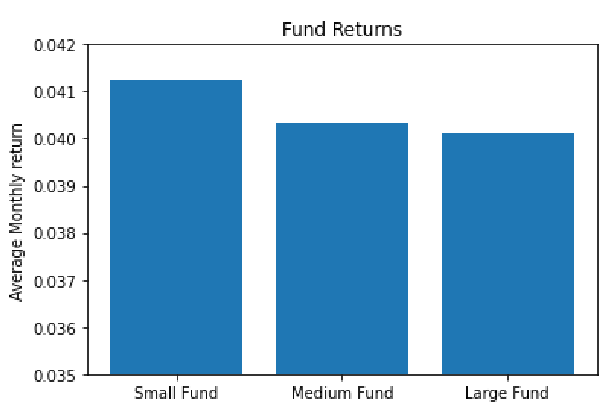
In this assignment, we are looking at the impact of size on performance of small cap mutual funds. To start, we take monthly returns data of mutual funds from WRDS and then filter it for small cap mutual funds. The data included *ticker name*, *monthly returns*, *net asset value per share*, and *total net asset value of the fund*. We cleaned the data by removing entries with missing returns, duplicates, or fund size. Once our data cleaning was complete, we started our exploratory data analysis.

Initially, we grouped the data frame by ticker and looked at the average fund size and average total net asset value for each fund. Afterwards, we were able to create a scatter plot of fund returns vs fund size as seen below.



From the plot, we are able to see that the **smaller funds have much more variance in their monthly returns than the larger funds.** As the funds get larger, that variance reduces, and it seems that the largest funds are all receiving an average monthly return of just slightly more than zero. The smaller funds have the ability to achieve higher returns than the larger funds, but as you can see, that is not always the case. This is because smaller funds enjoy the flexibility to invest in whichever small cap companies they want, but as a fund gets larger, it loses the ability to do this. **A large fund cannot invest in the exact small cap stock that it would want to because it invests in such large quantities that would put it at risk of price changes from block trades.** Therefore, many of the large funds have to start investing in companies that are not small caps, and if it grows too large, it may not even be able to keep a large enough proportion of small cap stocks to be considered a small cap fund and that will hurt returns.

We grouped the funds into three equal categories and labeled them small, medium and large funds. We filtered out entries with negative returns since they would cancel out the positive returns when averaging. The results can be seen to the left. While there is not much difference in returns between funds, the plot shows that as fund size grows, returns shrink on average.



It seems smaller funds have larger returns, but larger funds are less risky. It appears that fund size and performance are inversely related for the US small cap mutual funds. Large funds miss out from the positive exposure, negatively impacting their portfolio and how it is allocated.