Home Assignment #2

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1. Download the data

2. Historical returns Visualization

I tried to make these graphs as convenient as possible and added interactive features.

We can observe that Vanguard 500 Index is quite volatile on the all x-axis compared with FAGOX or PSGAX. For example, during The Great Recession crisis (2008 -2009) in Sep 2008 the value of the fund fell to - 0.24, which was the lowest value in the period from 1990 to 2020. In Aug 1998 the value was -0.13. However we cannot see extremely high returns.

But generally, most of the returns fall within the interval between -0.1 and 0.1.

PSGAX also has an interesting performance. We see that it was dramatically unstable during 1997 - 2002 and then followed by pretty normal performance. However, the lowest value was in Nov 2000 and it was equal to -0.29, which was then period of bursting of the Dot-com bubble (caused by excessive speculation of the Internet related companies: Between 1995 and its peak in March 2000, the Nasdaq index rose 400% only to fall 78% from its peak by October 2002, giving up all its gains during the bubble.) So, we can really conclude now that PSGAX was also really sensitive during the period.

We have the smallest time period of the data available for FAGOX but we can still highlight some historical behaviour. For example, as in the case of VFIAX, the lowest return was in Oct 2008, namely -0.08. Although, it didn't have such a big decline like VFIAX but still it is an extreme value on the timeline. Generally, the rest of the data also follows the corridor between -0.1 and 0.1.

3. Information about the funds

VFIAX. Fund family : Vanguard Admiral. Category: S&P 500. Investment strategy: "The fund employs a "passive management"—or indexing—investment approach designed to track the performance of the Standard & Poor's 500 Index, a widely recognized benchmark of U.S. stock market performance that is dominated by the stocks of large U.S. companies. The fund

attempts to replicate the target index by investing all, or substantially all, of its assets in the stocks that make up the index, holding each stock in approximately the same proportion as its weighting in the index."

PSGAX. Fund family: VirtusFunds CI A. Category: Mid-Cap Growth. Investment strategy: "Under normal circumstances, the fund invests at least 80% of its assets in common stocks of small market capitalization companies. It pursues long-term capital appreciation in the small capitalization market while seeking to incur less risk than the small capitalization growth market. The fund invests in a select group of small market capitalization companies believed by the fund's subadviser to possess sustainable competitive advantages at prices the subadviser deems attractive."

FAGOX. Fund family: Fidelity Advisor M. Category: Mid-Cap Growth. Investment strategy: "The fund normally invests primarily in common stocks. It invests in companies that the advisor believes have above-average growth potential (stocks of these companies are often called "growth" stocks). The fund invests in domestic and foreign issuers. It uses fundamental analysis of factors such as each issuer's financial condition and industry position, as well as market and economic conditions to select investments."

4. Descriptive Statistics

Conclusions of descriptive statistics are the following: generally the mean of all funds is around zero, but the lowest value has VFIAX (~ 0.009). Also we can see that all of our funds are slightly negatively skewed which means that the mean the most frequent returns are above zero. Kurtosis value is around 5 in all of the funds which describes the narrow curve.

FAGOX has the highest Sharpe Ratio value (0,77) which is a representative measure because it takes into account both mean and standard deviation.

From these numbers we can already see the risk-return trade off situation, but I also made histograms for a better picture and understanding. See next page.
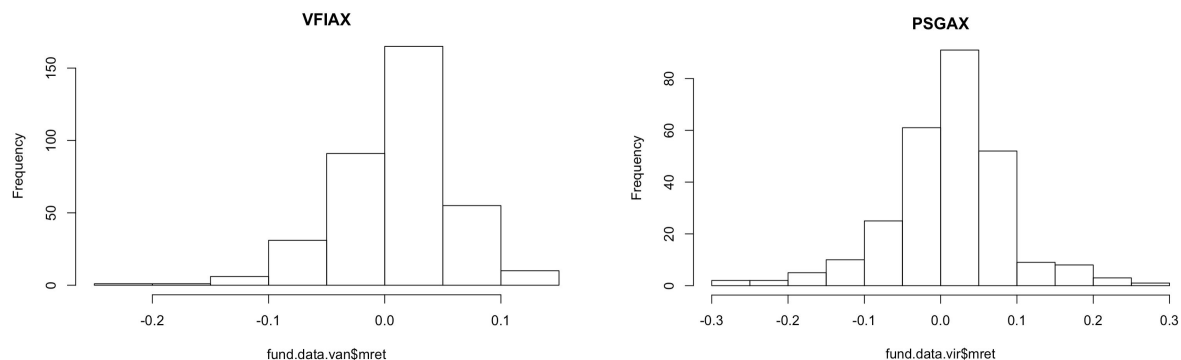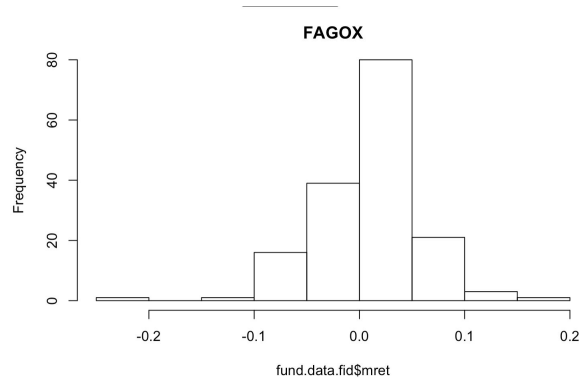
FAGOX

In this case, FAGOX has the highest risk-return trade off based on the highest skewness, kurtosis and SR values.

5. Fama and French 3 factors constructed.

6. Regressions

For VFIAX we see that all the variables are significant except SMB factor, because it has very high p-value. The estimates of market return and HML are negative.

Regression of PSGAX showed that all the regressors are significant, however HML also has a negative slope coefficient here.

For FAGOX the regressions summarize that Mkt and SMB are the most significant variables, while HML is significant only at 0.05 significance level, because its p-value is not very impressive and the estimate is negative as well.

Generally, all three funds have market return as a very significant regressor based on the lowest p-values and the highest t-statistics.

All of the funds have positive alpha coefficient, however it is insignificant for all the funds, so we can conclude that managers don't really provide additional value to the investors.