Back Testing of Target Volatility Strategy

Everestia LLC, August 2022

Disclaimer

This short note is for informational and educational purposes only. It should not be considered as investment advice. Target Volatility is not a part of Everestia's proprietary strategy.

Introduction

The Target Volatility Strategy gained much popularity in recent years. It provides investor choices of clearly defined risk appetite. The strategy moves the capital between risky assets and cash (or other forms of low yield low risk asset). In a volatility period with high realized volatility, more capital will be in cash, and less in risky assets. On the other hand, in a quiet period with low realized volatility, more capital will be in risky assets and less capital in cash. The volatility measure is usually a rolling 20 day realized volatility. The risky asset would be any stocks, and futures. Often, the risky asset tracks a stock index, such as Dow30, SP500, NASDAQ100, Russel2000.

In this short note, we compare the risk return profile of the Target Volatility Strategy on risky asset, Dow30, SP500, NASDAQ100, Russel2000 and at the target level 5%, 10%, 15% and 20%.

Data, Assumption and Model

Data is the adjusted close price of the four exchange traded fund (ETF): SPY, DIA, QQQ, IWM, tracking the four indexes. Data is downloaded from Yahoo finance spanning from August 4 2017 to August 3 2022.

We made some simplifying assumptions, such as no transaction cost, the rebalance is performed every day at close with the closing price and the cash returns no interest.

The volatility is measured with realized volatility of past 20 days where the market is open and data is available. The portion of risk asset at close of everyday is rebalanced to be (Target Volatility) / (realized volatility of past 20 days). We will use a simplified Sharpe ratio definition as one of the performance measures. S = (Annualized return) / (annual STVED of return).

The simulated result

In this section we compare the the Annualized Return, the Simplified Sharpe Ratio and the Realized Volatility of the orginal ETF and the target volatility portfotilio at 5%, 10%, 15% and 20%.

Table 1 Annualized Return

Baseline \ Portfolio	ETF	Target 5%	Target 10%	Target 15%	Target 20%
SPY	13.46%	4.95%	10.15%	15.60%	21.33%
DIA	10.97%	3.81%	7.76%	11.87%	16.13%
QQQ	21.32%	5.55%	11.41%	17.59%	24.12%
IWM	9.88%	1.69%	3.40%	5.15%	6.92%

Remark:

- Higher the target volatility, higher the return
- The baseline ETF is also critical

Table 2 Simplified Sharpe Ratio

Baseline \ Portfolio	ETF	Target 5%	Target 10%	Target 15%	Target 20%
SPY	0.75	0.99	1.01	1.04	1.07
DIA	0.63	0.82	0.84	0.86	0.88
QQQ	0.88	1.02	1.05	1.08	1.11
IWM	0.44	0.37	0.37	0.37	0.38

Remark:

- The Simplified Sharpe Ratio is similar regardless target volatility levels.
- The target volatility strategy produces higher Simplified Sharpe Ratio except IWM.

Table 3 Realized Volatility

Baseline \ Portfolio	ETF	Target 5%	Target 10%	Target 15%	Target 20%
SPY	20.66%	5.72%	11.44%	17.16%	22.88%
DIA	21.16%	5.71%	11.43%	17.14%	22.85%
QQQ	25.08%	5.65%	11.30%	16.95%	22.60%
IWM	25.56%	5.50%	11.01%	16.51%	22.01%

Remark:

- Realized volatility of target volatility strategy is close to the target, slightly higher.