Strategy 3 – Rotational Strategy with Diverse ETF Basket

1. Summary of Strategy

The strategy evaluates each security in the basket by weighing the 1-month, 3-month, and 6-month return performance and the 6-month volatility performance. Based on that, the current position is revised once a month with the possibility to sell the current position and buy a different security. Every week the position is evaluated to determine if it should be terminated, but not with the possibility to buy a different security.

2. Choice of parameters

There are several parameters:

- **Weighing factor** between the 1-month, 3-month, and 6-month return performance and the 6-month return volatility. The weight was chosen to be [1, 1, 1, -1], meaning that each of the return performances are weighed equally, while the volatility has a negative weighing. This ensures that stocks that are less volatile are preferred.
- **Top in**: how many of the top ranking securities are bought. In this case it is set to 1, meaning only the best security will be bought.
- **Top out**: when the current position will be sold. In this case it is set to 1, meaning that if – upon reevaluation – the current security is no longer the top ranking, it will be sold.
- **Maximum draw down** of the security. When – upon evaluation, monthly or weekly – the security price drops below this percentage, the security will be sold. The draw down is compared to the latest peak measured in the time when the security was held. The maximum draw down is set to 5%.
- **Start day**: the day of the month to reevaluate the strategy. This parameter was optimized. The strategy returns over the past 7 years were computed for each starting day. There was a clear maximum around day 25, and a clear minimum around day 10-15. Therefore, it was determined that the starting day will be day 25.

3. Type of securities that are traded

The securities that are traded are long ETF's.

4. List of securities that are traded

1. **IWM** – iShares Russell 2000

Index composed of small-capitalization U.S. equities

2. **SPY** – SPDR S&P 500

Corresponds to the price and yield performance of the S&P 500 Index

3. **DBC** – PowerShares DB Commodity

Tracks changes in the level of the DBIQ Optimum Yield Diversified Commodity Index Excess Return, which is a rules-based index composed of futures contracts on 14 of the most heavily-traded and important physical commodities in the world.

4. **EFA** – iShares MSCI EAFE

Index composed of large- and mid-capitalization developed market equities, excluding the U.S. and Canada.

5. **ICF** – iShares Cohen & Steers REIT

Index composed of U.S. real estate investment trusts ("REIT's")

6. **VWO** – Vanguard FTSE Emerging Markets

Index that measures the investment return of stocks issues by companies located in emerging markets.

7. **IAU** – iShares Gold Trust

Reflects the performance of the price of gold

8. **TLT** – iShares 20+ Year Treasury Bond

Tracks investment results of the Barclays U.S. 20+ Year Treasury Bond Index

9. **SHY** – iShares 1-3 Year Treasury Bond

Tracks the investment results of the Barclays U.S. 1-3 Year Treasury Bond Index

5. Thorough explanation of strategy

The strategy consists of two parts:

1. Monthly check, during which a position can be bought or sold
2. Weekly check, during which a position can only be sold

In both cases the draw down of the current position will be checked, by determining the highest price (peak) the security reached since it was bought, and comparing that to the current closing price. If this draw down is lower than X%, the position will be sold. In case of a monthly check, a new position will be determined.

Which position should be bought is determined by ranking the securities based on four factors:

- **1-month performance:** monthly performance of last month, multiplied by the average of the annual volatility of all securities, divided by the annual volatility of the security being ranked
- **3-month performances:** sum of the monthly performance of the past 3 months
- **6-month performances:** sum of the monthly performance of the past 6 months
- **6-month volatility:** standard deviation of monthly performance of the past 6 months

The monthly performance is calculated as follows: natural logarithm of (price/price_1_month_earlier + 1).

The annual volatility is calculated as follows: standard deviation of all past monthly performances, multiplied by the square root of 12.

These four factors are weighed via parameter [w1, w2, w3, w4], which results in a single value per security. These single values are ranked, with the higher the better.

If no security is being held, the top ranking ETF will be bought. If the top ETF is already being held, nothing will be done.

If the security that is being held is not the top ETF, that security will be sold. The transaction value of selling the security is then used to buy the top ETF.

6. Sources

http://seekingalpha.com/article/2045483-developing-a-rotation-strategy-using-highly-diversified-etfs