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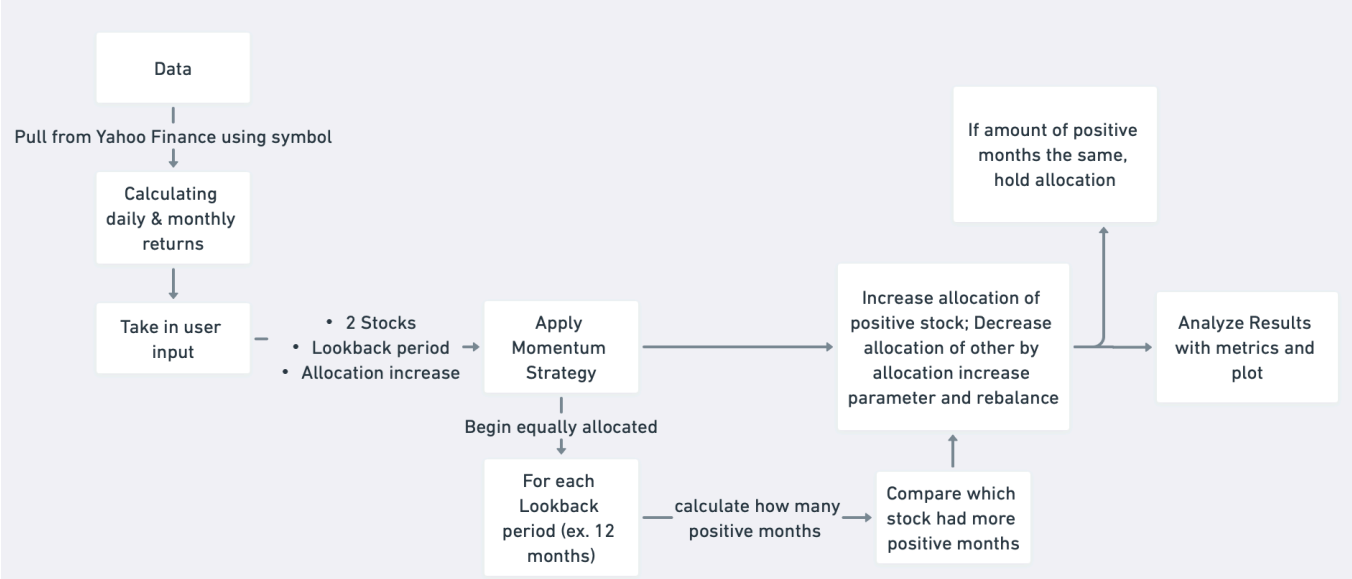
May 24, 2024

Momentum Investment Strategy

Momentum Investing is a historically common investing approach which aims to make money by riding rising trends and avoiding assets that are headed downward. When markets are bullish and trends are strong and long-lasting, this strategy can produce significant gains. Momentum investors believe that once a trend begins, it will probably continue for a while, regardless of how high or low it goes. There are multiple different formats of employing momentum trading in your portfolio including moving averages or lookback periods to find the optimal timeframe to consider a trend.

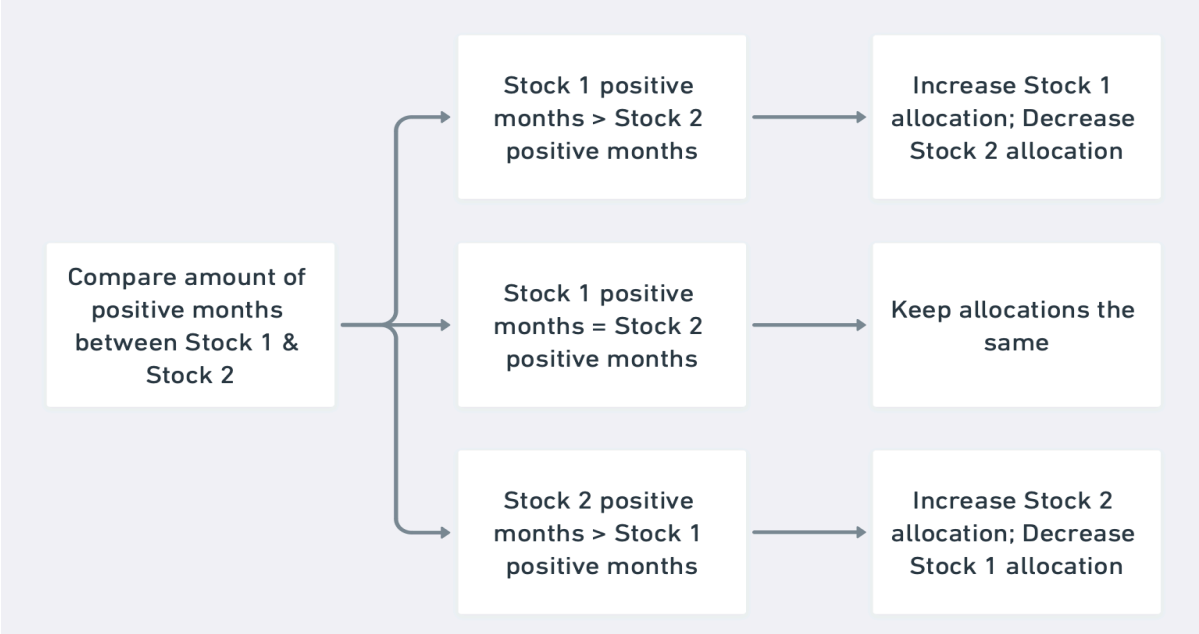
The common pitfalls when falling into momentum investing is the obvious overlook of drastic market turnaround or entering highly volatile markets without dispersing the risk correctly since this strategy doesn't focus on risk. This is because active trading, or quickly entering and exiting positions to take advantage of short-term trends, is a common component of momentum strategies. Such actions may cause significant swings in the value of a portfolio, which would be stressful for investors who would prefer a more steady investing path. Momentum Strategies are also very prone to herds of investors buying and selling at the same time which can throw off your moving averages and overall strategy potentially.

To try and combat these issues and account for a more robust, consistent trend I had a different idea on the momentum investing strategy.



To walk you through my workflow I begin by taking in 6 parameters from the user: 2 tickers for stocks they would like to perform the strategy on, a start and end date, a lookback period, and an allocation increase. Now the 2 stocks are initially taken from yahoo finance and converted to monthly returns within the start and end date. Then the lookback period chosen by the user (6 months, 12 months, etc.) is the time period the strategy is considering as a trend. Then using the lookback period, for every cycle it takes the previous lookback (For example if a 12 month lookback then looks at previous 12 months) and for each month it considers if it was a positive or negative month overall. After that for the current lookback period the amount of positive months are totalled and compared between the two stocks to determine which stock had a more consistent increase over the lookback period.

For each lookback period within the start and end date it rebalances after each lookback period by comparing the positive months of the 2 stocks.



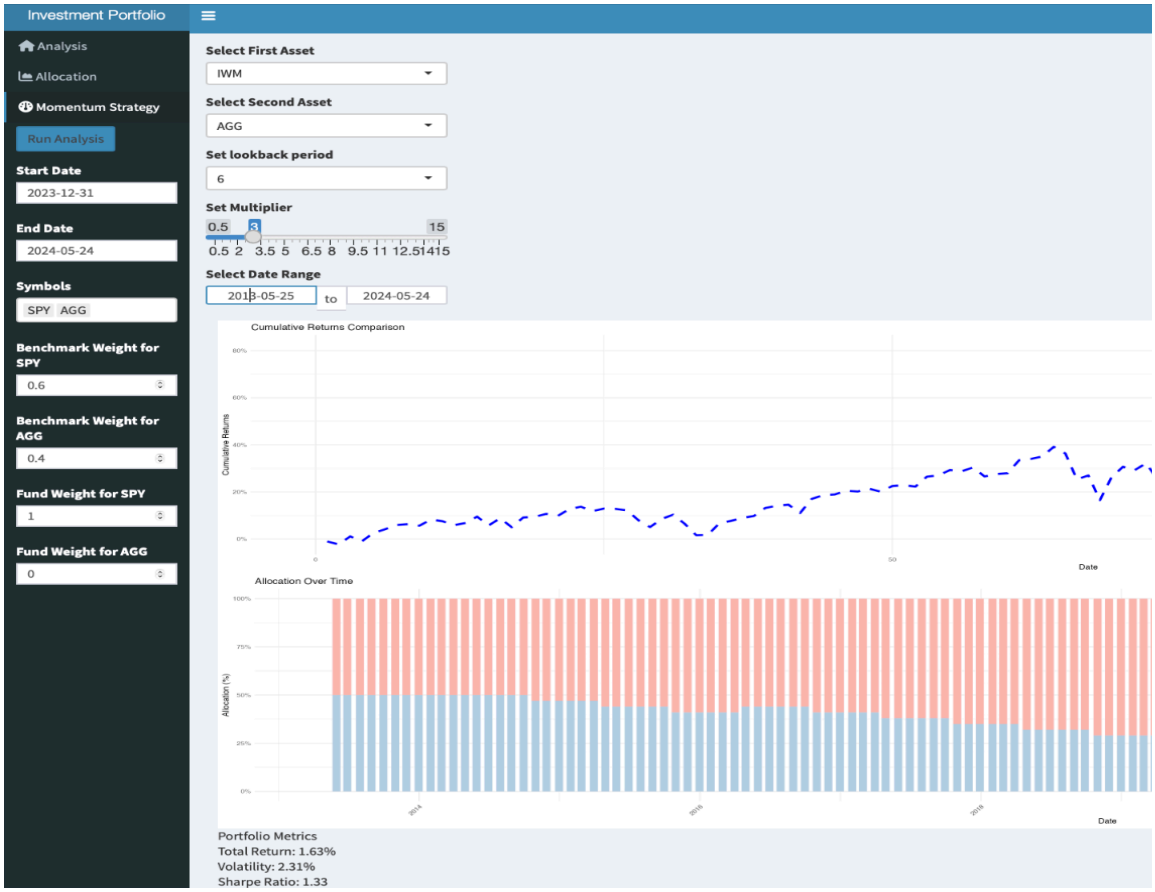
After comparing the better trending stock over the lookback period this is where the allocation percentage increase comes into play. Users can then choose how much allocation to add to the trending stock and how much to decrease the losing stock on a scale from 1-15%. There is a check in the strategy that accounts for stocks not being able to go under 5% allocation at any point in the dataset. This process is completed for each complete lookback period within the dataframes original time period.

This strategy is more advantageous toward the risk of trend reversal due to the accumulation of positive months ensuring a more consistent trend rather than shorter trends. Although herd mentality influences stock prices whether we like it or not, this method tries to stray away from looking at huge influxes in price and instead looks at the overall positive impact over the lookback period. This is brought up in the Frog in the pan theory: If the frog is put into boiling water, it will immediately jump out. If it's placed, however, in cold water that is slowly warming up, it won't be aware of the gradual heat change, and it will be cooked to death. A series of frequent gradual changes attracts less attention than infrequent dramatic changes.

Investors therefore underreact to continuous information. This momentum strategy defy's normal herd following and instead tries to identify underlying, longer term trends and to increase allocation to the more consistent of trends.

From an Economic standpoint this strategy definitely applies a more long term view on traditional momentum strategies and is better deployed in more stable markets where trends are more long term. Sudden market turns and crashes could hinder this strategy's ability due to the slow turn around and fixed rebalance periods as well as fixed allocation increase and decrease. So for example if a massive crash happened for one stock while the other flourishes it would take multiple lookback periods to correct the allocations over time, and depending on your lookback period length that could take a while.

This introduces the question of what is the optimal lookback period and optimal allocation increase/decrease. The app allows users to test different time frames, stocks, lookbacks, and allocation increase and how it affects the metrics and plot to find the optimal combination of parameters. Underneath the cumulative returns chart is an allocation chart over time to see how the strategy reacts to different parameters and how it may change the allocation changes. Here is a snapshot below of what the app looks like in action.



To save users from countless attempts at trial and error in order to determine the robustness of the strategy I employed some k fold verification as my backtesting method. However, due to the emphasis on user input and how the different parameters can make or break the strategy I deployed the 5 k fold on a few different situations to try and find consistency within my answers. One difference in parameters I am keen on testing is the changing of lookback period compared to changing the allocation percentage change and how it affects the overall metrics and fund. I began by choosing a time frame which I determined 2005-2020 to include some market crashes along with the build up and initial downturn of covid in the dataset. Then I planned on testing SPY and AGG with a 6, 12, and 24 month lookback, along with 5%, 10%, and 15% allocation percent change to see how the differences would affect my findings.

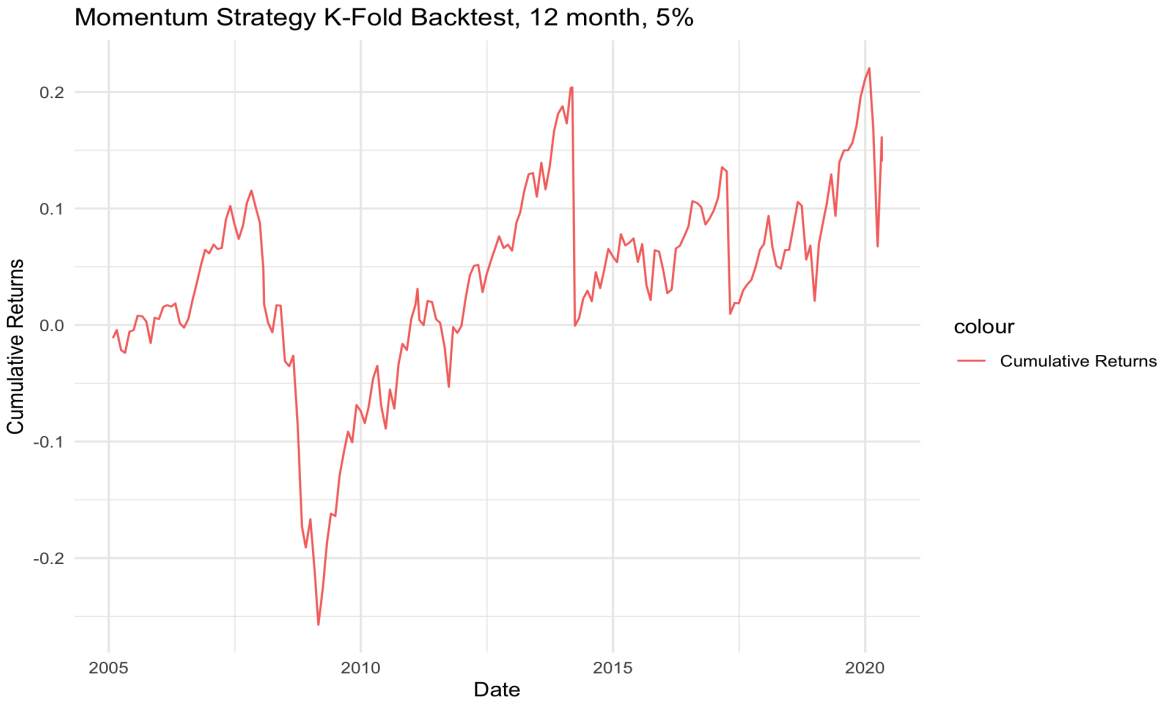
Fold	6 month, 5%	6 month, 10%	6 month, 15%
1	SR: 0.0843 Annual Return: 0.0132	SR: 0.0574 Annual Return: 0.0091	SR: 0.0337 Annual Return: 0.0050
2	SR: 0.0108 Annual Return: -0.0023	SR: -0.0126 Annual Return: -0.0121	SR: -0.0352 Annual Return: -0.0218
3	SR: 0.3165 Annual Return: 0.0630	SR: 0.3297 Annual Return: 0.0636	SR: 0.3353 Annual Return: 0.0642
4	SR: 0.2127 Annual Return: 0.0405	SR: 0.2074 Annual Return: 0.0416	SR: 0.2020 Annual Return: 0.0426
5	SR: 0.1194 Annual Return: 0.0415	SR: 0.0956 Annual Return: 0.0376	SR: 0.0923 Annual Return: 0.0380

After looking over the results you don't see much of a difference between the changes in allocation percentage change so moving on to changing lookback period I will only be using 5% and just changing the lookback time frame.

Fold	6 month, 5%	12 month, 5%	24 month, 5%
1	SR: 0.0843 Annual Return: 0.0132	SR: 0.1043 Annual Return: 0.0156	SR: 0.1009 Annual Return: 0.0161
2	SR: 0.0108 Annual Return: -0.0023	SR: 0.0407 Annual Return: 0.0097	SR: 0.0350 Annual Return: 0.0074
3	SR: 0.3165	SR: 0.2923	SR: 0.2978

	Annual Return: 0.0630	Annual Return: 0.0603	Annual Return: 0.0623
4	SR: 0.2127 Annual Return: 0.0405	SR: 0.2195 Annual Return: 0.0399	SR: 0.2177 Annual Return: 0.0394
5	SR: 0.1194 Annual Return: 0.0415	SR: 0.1342 Annual Return: 0.0423	SR: 0.1530 Annual Return: 0.0441

After analyzing the results I realized I probably should have used different stocks as SPY and AGG have a pretty similar pattern throughout each possible scenario and how the allocations change over time, so one with more fluctuation could have been better to test. However, we can see an inconsistent trend in multiple folds despite the difference in parameters showing a non robust approach that doesn't work in most environments, without considering obvious downturns at financial crisis'. Yet, it is important to note these sharpe ratios back our hypothesis that this strategy does not focus on risk-adjusted returns and that is displayed in the woeful sharpe ratio scores throughout the backtests. The momentum strategy seems to capitalize on uptrending bull markets and hinders its ability to produce alpha on bear markets.



Ultimately, given more time I would love to adjust this strategy a little more as I feel like with a few more tweaks or working in pair with another strategy it could deploy a good way to identify more consistent, longer term trends. Perhaps instead of the amount of positive months you could just look at total return during the lookback period which also brings things like recency bias into the mix but could still be beneficial to our model. Incorporating the app with the code and building an investment strategy on top of that making sure it translates correctly to a UI was a tough challenge and imposed some new skills learned along the way. Even though we ended up with not the best strategy I believe this is still a great tool for people like me who may need a more visual and trial & error sort of example that they can deploy time frames they may be more familiar with to compare and see how the strategy works.