Portfolio Write-up

Group 18

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1. Our Objectives and Strategy

The portfolio objective is to successfully hedge oil for November, without taking margin or shorting any securities. Our strategy to determine this was to find securities that were historically negatively correlated to the price of oil. The objective was measured by 3 potential cases by the end of the month. Base, better and a very unlikely but high goal of the best case. Our base case was to finish the month with a negative correlation (monthly correlation is calculated with a correlation proxy). Which was achieved since the portfolio finished at -0.187. We did not reach out better case. And the daily correlation was 0.567.

By analyzing 2,500 stocks from the Russel 2000 and the S&P 500, the quantitative strategy displayed which 50 stocks were the most negatively correlated to our benchmark (over a minimum of 50 trading weeks and a maximum of 250 trading weeks). The top 50 most negatively correlated stocks to oil were mostly in healthcare, which put our portfolio at risk of being under-diversified. To mitigate this risk, we included 3 qualitatively selected stocks in transportation, airlines, and REITs. Our benchmark was created with 4 oil funds & 1 gasoline fund to spread geographical risks and attempt to reach the entire market. Upon looking at this we realized that the weight of biotech would be 63.04% of the overall portfolio. From this, our group reflected and wanted to reduce our exposure risk. This led us to split our focus. We Spilt the portfolio 55/45 favoring the quantitative model. The other 45% of the portfolio we based on our own qualitative selection. This was done by researching stocks based on input costs to their business based on oil pricing. This qualitative approach is what allowed us to finish a net negative correlation for the month. A pure play qualitative strategy given our selections would have resulted in a -0.941 correlation to our benchmark.

2. What does the Data tell us?

The approach for historical data was to look at each of the 2500 individual security's correlation compared to the benchmark. From here isolated on the 50 companies with the most negative correlation and optimized using solver to minimize the companies' correlations over 3 separate timeframes (daily, weekly, monthly) at varying time intervals (200 days, 50 weeks, 36 months). These selections and weights made up our quantitative portion of our portfolio. For our qualitative portfolio we looked at sectors that the input costs of oil were the highest. Companies with high underlying oil input costs are inversely subject to oil price movements. We concluded that the transportation, real estate, airways sub industries met this criterion. From here we went through each of the leaders in the sectors to determine our selection. Within Airlines we compared, United, American, Delta, and Southwest airways. We settled on Southwest airways as they are a low-cost carrier whose model runs on increased efficiency and passing on savings to the customers. With this low margin we concluded Southwest Airways would have the greatest impact from an increase price of oil which would have an inverse relationship with the price of oil.

The results leading up to the 18th of November were the reason behind completing a rebalancing for our portfolio currently. The portfolio was down 8.2% and the quantitative portion was down 9.5%. We thought to ourselves. Was our quantitative model incorrect? We dug deeper and discovered an overweight within small caps. This then drove our decision to rebalance our portfolio into additional qualitative, and large cap stocks.

3. Rebalancing strategy

Upon reviewing the performance of our portfolio leading up to the rebalance date, it was clear to our group that our qualitatively selected stocks were significantly outperforming our quantitatively selected stocks relative to our benchmark. Therefore, our rebalancing strategy consisted of replacing a portion of our quantitatively selected stocks with more qualitatively selected stocks.

In practice, this strategy was executed by removing all quantitively selected stocks with a daily correlation greater than 0.5; this resulted in the removal of 11 stocks from our portfolio. Resulting of the sale, we had $215,691 in cash in our account, which we then allocated in equal amounts buying 224 shares of Lockheed Martin Corp., and 3154 shares of Delta Air Lines Inc.

Our primary reason for purchasing shares in Lockheed Martin Corp is because they are a leader in the aerospace defense industry. The aerospace defense industry is widely known to inversely reflect the price of oil for reasons like that of airline stocks; being the simple requirement of oil for these aircraft to operate. Increases in oil price means that companies operating with aircraft must pay more for this necessity, causing their stock price to fall. The opposite of this scenario is true for the decline in the price of oil. The same logic can be applied to the Investment decision into Delta Air Lines Inc., however, we specifically chose to invest in Delta Air Line Inc., as it performed similarly to Southwest Airlines. The reasoning was that oil and airlines do not mix. Jet fuel is the number 1 cost for airlines, so they should not increase at the same time. The increase in oil price leads to an increase in variable costs which will then decrease the operational leverage and the profit margin of the company, decreasing stock price.

4. Major Events or News Affecting our Portfolio During the Investment Period

During the span of our investment period, we saw several trends take place, leading to an overall drop in oil prices and our benchmark, and a slight increase in our hedging portfolio. WTI began the month of November at $88.37 after a surge in October, due to overall supply uncertainty. This uncertainty was caused in part by previous OPEC production cuts on October 5, as well as increased uncertainty stemming from Russia's invasion of Ukraine, among other factors. After a month of steady declines, we entered December with WTI down significantly, at $81.22. This was partly due to an overall lessening of supply uncertainty during November, as well as a strong U.S. dollar, which made U.S. oil more expensive to foreign buyers and push prices down. These trends impacted on our oil pricing benchmark quite significantly over the span of our investment period, dropping it over 8%.

On November 10, U.S. CPI data was released for the month of October, which showed that inflation had eased to only a 7.7% rate during October, lower than the expected 8%, and the slowest pace since January. Investors reacted to this rapidly, as they expected that this news would lead to lower rate hikes by the Federal Reserve and greater reason for optimism going forward. As a result, the S&P500 rose 5.5% and the Nasdaq rose 7.5% that day. This translated into a price jump for all our holdings, as major active holdings such as United Parcel Service (NYSE: UPS), Southwest Airlines (NYSE: LUV), and Realty Income Corp. (NYSE: O) jumped 6.1%, 4.4%, and 3.4% respectively that day, while oil prices experienced negligible changes. Later in the month, on November 30, Jerome Powell, Chairman of the Fed, gave a speech suggesting rate hikes would be "moderated", and the market responded again, with the S&P500 increasing 3%, as well as most of our portfolio holdings increasing.

Aside from the news from November 10 and November 30, the changes in our portfolio are exceedingly difficult to link to independent events and news reports. Along with the lessening of supply uncertainty and the strong U.S. dollar, other trends have potentially allowed oil prices to decline. One of these factors may have been the ongoing anticipation of the $60-per-barrel price cap on Russian oil by G7 countries. Effective December 5, this cap will limit Russia's revenues while maintaining supply and keeping prices down. Another factor may have been OPEC's decision not to further cut supply, after their initial cut in October, which kept pricing more predictable. Overall, there have been many factors impacting the energy industry, which makes it challenging to pinpoint any specific dates impacting prices but understanding these major storylines can provide some context for the longer-term monthly decline in oil prices and the minor increase in our holdings.

5. Market Anomalies

Biotechnology stocks have historically been negatively correlated to the price of oil, primarily due to the lack of requirement of oil as an input of production of these biotechnology outputs. Therefore, during the creation of the quantitative portion of our portfolio data suggested a heavyweight into the biotechnology industry. The result was that our portfolio to begin the month had a weight of 29.62% in biotechnology stocks.

During the actual month of November, biotechnology stocks had a significantly positive correlation to the price of oil. Given that our portfolio objective was to create a portfolio that was negatively correlated to the price of oil, this market anomaly had a significant impact on the performance of our portfolio relative to our benchmark.

6. Oversights

We have a few oversights during the creation of this portfolio that we would correct. Firstly, with our benchmark. 20% of it was ARCX: UGA which is an ETF that tracks the price of gasoline. Our initial intention was to get the most accurate will oil prices. What we realized is that Crude oil prices and gasoline prices are not 100% correlated. So, this has a built-in inaccuracy for it.

Secondly, our largest oversight was an overlook of large cap vs small cap weights. During the month there was a large exposure to small cap equities. This is the primary reason our quantitative portfolio did not perform well. The reasoning is that most bio-tech stocks fall within small caps as well as our other negatively correlated securities. Our group did not look at the correlation between raising interest rates and the negative impact on these stocks. We realized this after the impact of rates rising on Nov 2nd. This downward effect was what led us to rebalancing the portfolio midway through the month.

7. Success or not?

There were three objectives for our portfolio. These cases we created were "base", "better", and "best". The base case had a monthly correlation of below zero. The better case the monthly correlation was between –0.5 to –1.0. and finally, in the best case a daily correlation is near zero. The overall portfolio was only able to perform the first base case by achieving a monthly negative correlation of -0.194%. With that said a pure play qualitative portfolio (given our selections) was able to achieve the better case with a monthly correlation of -0.941%

Overall, we were able to meet our base case. This is a success in the metrics of this portfolio due to the time constraint that we had. In addition to this, we were able to demonstrate that you can have a negative correlation with oil pricing without shorting or using margin. There is room to improve from this portfolio and oversights that we do believe should be addressed.