Pitch: Trading Portfolio of Tanker Shipping Companies Based on Signals from Baltic Indexes

Overview of Baltic Dirty Tanker Index, Baltic Clean Indexes, an d Baltic Dry Index

On a high level, the Baltic indices track how much it costs to move materials by sea. They are widely used global benchmarks that indicate the state of the world economy. There are three indices which I utilize– Baltic Dirty Tanker Index which tracks rates for crude oil and other unrefined condensates, the Baltic Clean Tanker Index for petroleum products, or refined products without much residual components and the Baltic Dry index which tracks rates for major raw materials like cement, iron, grain.

Data Selection

I chose to analyze the following shipping companies that trade on the NYSE. DHT Holding, Teekay, and Tsakos Energy Nav companies, Scorpio Tankers, and Frontline. The way I arrived at the following companies was choosing them based on if around 50% of their fleet was tankers.

Overview of Strat

1. The underlying thesis of the strategy is that freight rates are one of the main determinants in the price movement of shipping companies' stocks. This makes sense intuitively because the rates end up telling us how much in revenue any given shipping company makes. Moreover, freight rates already take into account a range of other factors that could affect supply and demand of tanker shipping companies. For example: currency fluctuations, environmental regulations, political events etc.

2. Before continuing with the strategy, we will average the weekly prices of the Baltic Dirty Clean Index and Dry index to make a holistic set of data, which I'll refer to as the Baltic Tanker index. Then we need to establish a cointegrating relationship between the Baltic Tanker Index and each of the trading shipping companies on the portfolio, thereby proving the underlying thesis of the trade. Cointegration is basically when we take two time series data and see if a linear combination of them gives us a stationary time series. A stationary time series basically means that the time series data moves in the same direction. If the data is stationary then the time series are cointegrated. After we prove that they are related, we can then trade based of a signal that takes the spread between the prices of the index and the portfolio of stocks.

3. In order to check Cointegration relationships I will use the Johansen Test because we want to test cointegrating relationships between several non-stationary time series data (each company in the portfolio we are looking at). Moreover, there are multiple cointegrating relationships that can be made, so we want to pick the best one, which we do through the use of eigenvalues and eigenvectors.

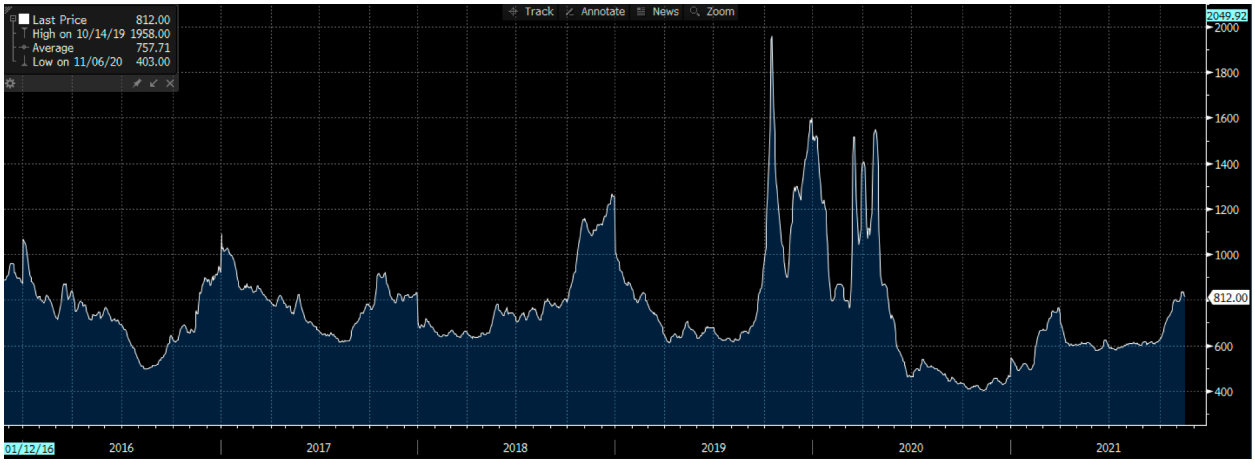
4. To generate a signal I will first get a six-week long run moving average from the Cointegration equation and then a lag of the relationship for the short term over one week. The buy signal would be when the short run moving average exceeds the long run moving average because it means that prices are moving now then before. The opposite case is for a sell signal. When both moving averages aren't crossing we simply stick with the last trade, ie, we hold until we get a sell signal and vice versa.

Considering Risks

1. One of the risks with this trade has to do with tanker shipping companies passing on the higher freight rates to consumers. If they did this and there was an inelastic demand from consumers for the goods they were shipping, then, the revenues of the tanker shipping companies wouldn't change much. But, the problem is that tanker shipping companies deliver and procure goods for businesses. These businesses won't be able to afford as much because tanker shipping companies pass down the higher prices. Businesses aren't able to buy and are turning to other closer places for materials. This affects the shipping companies top line because there are fewer consumers. That's why there were supply shortages during COVID, although countries were importing a lot of oil because of the cheap prices, transport demand declined in the long run. This can be seen in the graphs below.

Baltic Clean Tanker

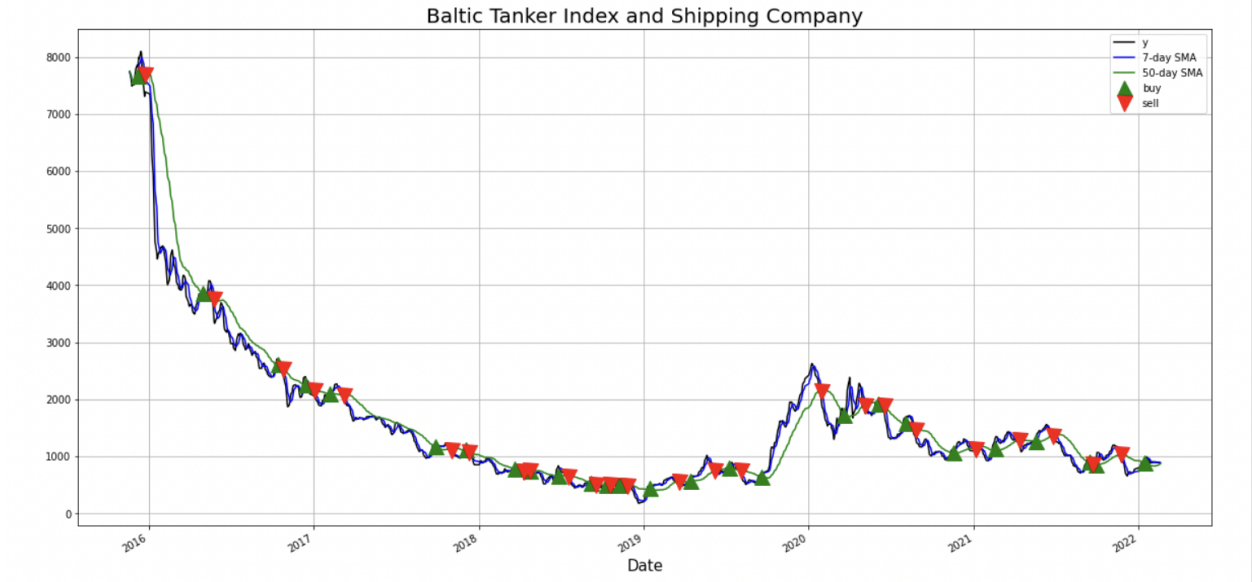
Baltic Dirty Tanker Index



Conclusion

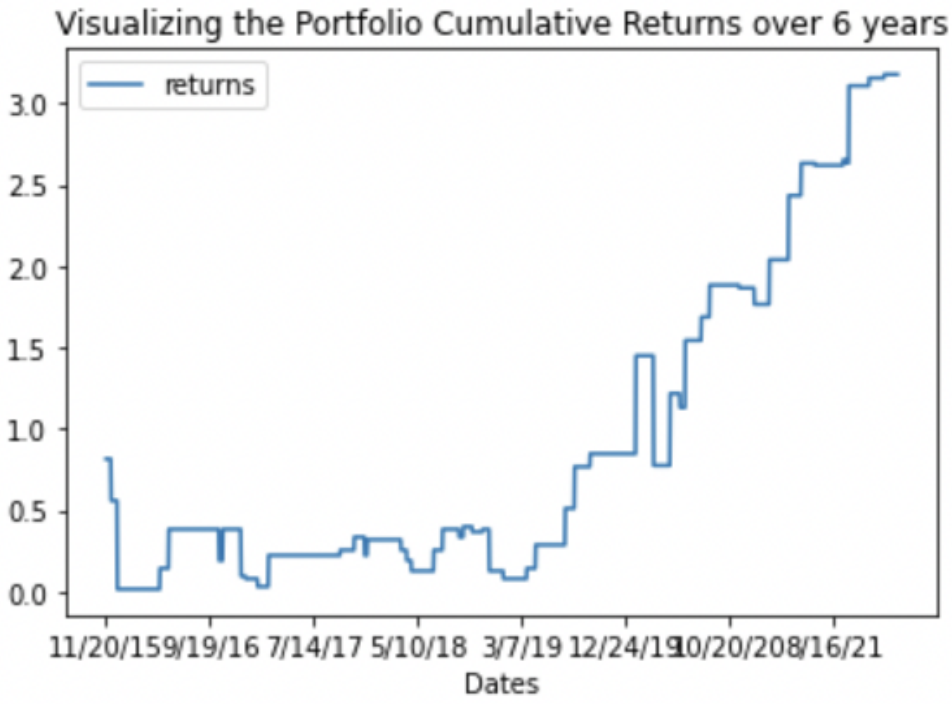
Teekay Tankers

The following is the buy and sell signals from the TNK stock. There are 51 trades over the 6 years. This is a pretty low number of trades considering the time frame, but I'll get more into this in the improvements section.

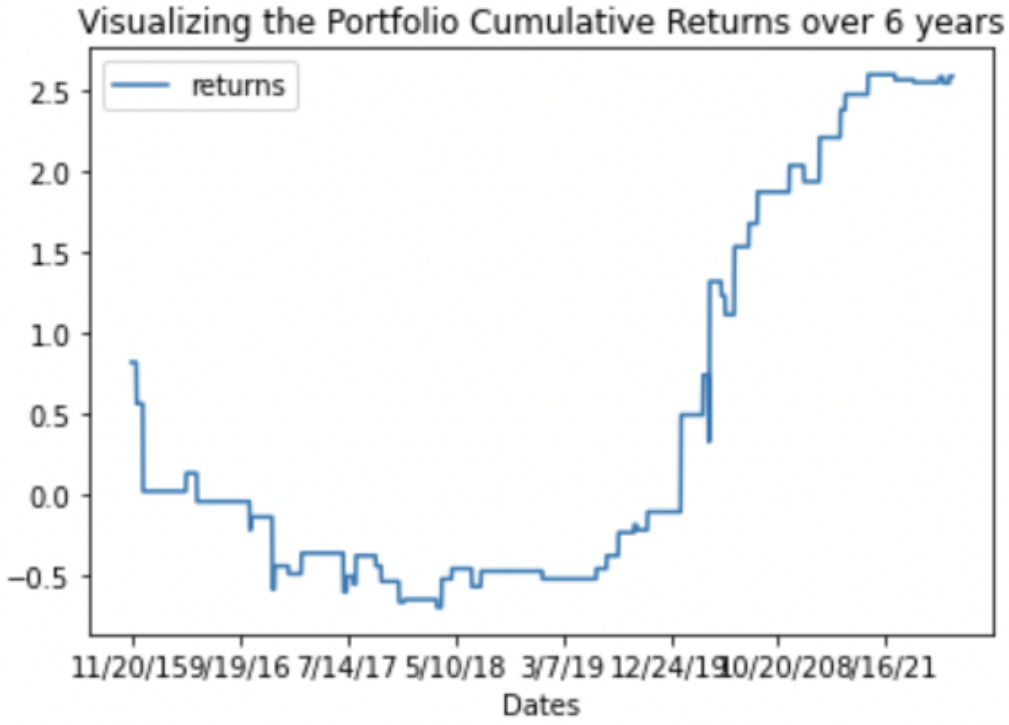


The following is the cumulative returns of TNK over the 6 years. As you can can, ever since COVID, the returns have just gone up a lot more because the trade is benefitting from positive volatility. AS TNK primarily has crude petroleum products, it benefited from lower oil price

during COVID and higher exports from major producers. The Sharpe ratio was also 0.67 for this trade.



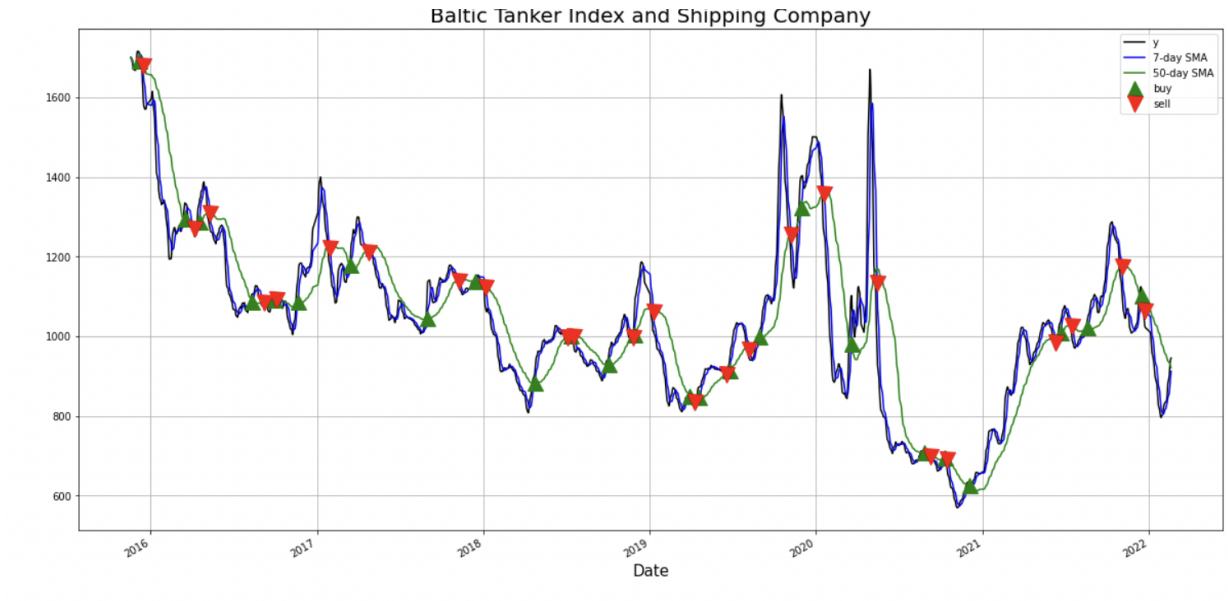
Since I am using three different indexes, not all of which have to do with crude petroleum, I thought it would be interesting to see how the returns and Sharpe would be affected if I removed the indexes that don't have to do with crude petroleum (ie, removing having clean tanker index and the dry index). The following shows the results of that



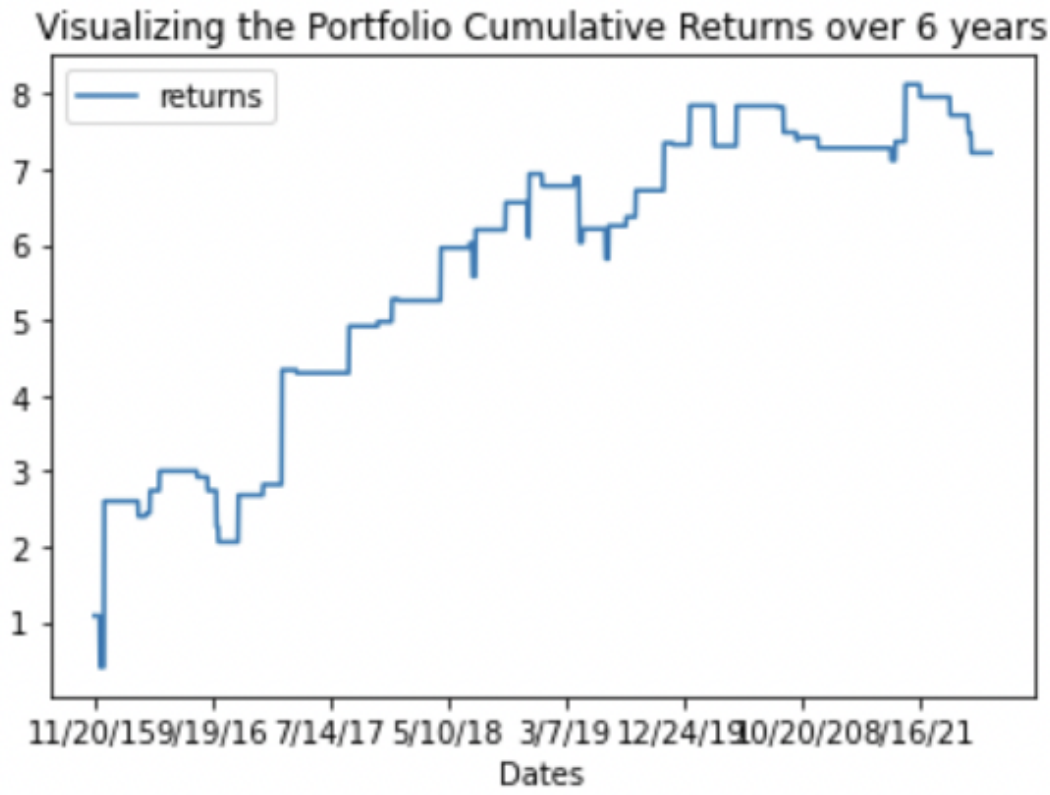
As can be seen above, the trend post COVID was the same, but before, the stock was giving negative returns if we looked at data just from the Dirty index. This indicates that even though the other indexes don't track rates for the goods that TNK majorly works with, they still impact the direction of the tanker company. There would need to be more research into why this is the case. It's true that the extra data might just create some idiosyncrasies in the market, but it could also reveal market sentiment for shipping goods which thus affects if people want to ship goods or not. I thought it was out of scope of this project, but it's definitely something that can be explored more.

Scorpio Tankers

The following is the buy and sell signals from the STNG stock. There are 50 trades over the 6 years.



The following is the cumulative returns of STNG over the 6 years. As you can can, in this trade, the returns have been increasing before COVID as well and after too (albeit at a slower pace, which could have something to do with the fact that they deal mostly with clean goods)..The Sharpe ratio was also 1.28 for this trade.



Next Steps

1. I randomly searched companies that fit under the requirements I had for my shipping tanker companies like firms with more than 50% of their fleet for shipping tanking. This can be optimized by running a script through the NYSE or any other major exchange to give me a list of names directly that fit under those requirements. That'll allow me to then just run my also on all those companies and find out in seconds what companies have the best Sharpe ratios/cum returns and then I can trade on those.

2. I could also think about better entry signals. I used the 42 and 7 day moving averages because that was the setup in one of the research papers I read which was also trading tankers. In that paper though they built a cointegrating relationship between earnings and price. But then I tried another assortment of random MA, like 6 day and 1 day, and Sharpe ratio shot up even more and so did cum returns. The number of trades over the 6 years also went up to like 150, which makes sense because our new moving averages make it so that we are checking a lot more if there are any trade signals. So this is something that needs to be more investigated and optimized, I think one way of doing it would be I split the data into training and test data sets and apply different moving

averages on the training set and for each one calculate the average return after N days and choose the average length that maximizes such average return. Then I use this moving average to calculate the return on the test set, if the return is statistically similar to the average return on the training set, then I should use this moving average data. This would involve a lot more trial and error, but this might be one way of doing it.