Now we’re gonna talk about part 2

Part 2 is mainly taking the sector weighting data from Part 1, generating daily portfolio value by putting them together with daily index ETF’s closing price. In this way, we have weighted daily return with rebalancing it every quarter by quarter. Then, we are good to calculate the weighted cumulative portfolio returns to see whether the portfolio can outperform the market return, proxied by S&P 500.

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In this slide you may see the cumulative returns of 11 different index ETF’s over the last two years. You can see the brown line which is XLK is representing IT and it especially performs well since the 3Q2019 while the green line XLE is from Energy sector that performed poorly in the time frame. We’re creating a portfolio using only these 11 ETFs with different weightings to find out whether we can follow up the outperforming hedge funds.

This slide shows the approach made in Part 2. Starting with the one of the most famous funds in the world, Berkshire Hathaway, We made 3 different scenarios in implementing portfolios with sector weightings- two theoretical and one real world: ‘A portfolio without rebalancing’, ‘ with rebalancing quarterly’ and finally, ‘a real world portfolio with rebalancing quarterly, but lagging at least 45 days because of the time gap between the day 13F quarterly filings is published and the actual quarter end date. So we assumed we execute rebalancing upon we are able to have the most recent data.

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You can see the portfolio returns in comparison to the market return. We clearly found that portfolio with rebalancing performs best out of others. But Berkshire couldn’t beat the market return most of the times. So what we did from here was to use the best rebalancing method, which is actively rebalancing with quarterly data, for all other candidate portfolio with optimized weightings. Next slide please.

There were 6 different weightings; 4 from individual funds like Berkshire, GGHC, Soros and Cypress, while we created 2 optimized weightings by using methods like taking the average of 10 renowned funds quarterly weightings by sector, and pulling out the best quarterly weighting from a fund that performs well in the given quarter by using Whale score.

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Here are the result, we plotted out each of portfolio return against market return. We didn’t find one portfolio that beat the market return all the time in the given period of time, but found out 4 out of 6 portfolios that performed well enough over the market in our observation. The best one is Cypress followed by Best\_quarterly, GGHC and Average. Cypress is heavily weighted at IT so we cannot just follow what they did in general, so we picked best\_quarterly portfolio gives a certain intuition for getting the optimized sector weightings. I will hand it over to Connor.

Next part is using machine learning to forecast the performance after 30 days from now to make sure the optimized portfolio can have sustainable performance over market down the road. We used Linear Regression, ARIMA and SARIMAX and RNN LSTM model as our data is time-series. All the models predicted well enough with given test data. But the problem we had was how to forecast portfolio returns 30 days from now on.

The only model can give an answer to this was ARIMA and SARIMAX, cuz they do not need a certain test data to predict the future. So here’s the prediction from ARIMA. The implication is that we can expect our portfolio keep outperforming over market predicted return in the next 30 days, according to ARIMA model.

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