A Trading Strategy Of Interest

Recently on QuantConnect.com, a trading strategy dealing with the QQQ ETF was published. You can find it **HERE**, where you can clone it and then test it for yourself if you want to.

The strategy caught my interest since all it did was rebalance QQQ on a weekly basis. It represented an opportunity to study the trade mechanics of a pure-play rebalancing in motion, something I wanted to revisit for some time.

QQQ is composed of the top 100 NASDAQ stocks by market cap. What could be the interest when you could just have bought QQQ and held on over the same time interval? Higher returns? Lower drawdowns? Something to do?

It might sound trivial. But QQQ is just an index tracker. It is designed to generate returns that try to mimic the NASDAQ 100 index. Why should continuously rebalancing the QQQ's constituents be better than buying it outright and holding it over the same time period?

The first thing to realize is that QQQ is already a market-cap-weighted average of those 100 stocks. Implying that individual price variations, both on the positive and negative side, could be much larger than QQQ's own price variations since QQQ is averaging things out. Also, the largest companies will weigh in the most. The 10 largest stocks account for 55% of the total. The other 90 stocks make up the remaining 45% of this tracker. QQQ is definitely biased toward the highest valued stocks. It has also a bias toward technology: 45%. Note that those numbers change with time, but you get the idea, and you knew all that.

Holding on to QQQ for those 12.16 years would have produced a 21.37%

CAGR due to QQQ's rise from 35.13 to 370.16 over the period. And, therefore, holding QQQ all by itself would not have been that bad an idea. At least, it would have done much better than having your money in a bank account earning low interests, or in bonds, or in some other fund averaging close to the secular market trend of about 10% or so.

The difference can be considerable. Based on your initial capital F_0, a 2% return would have been: $F(t) = F_0 \cdot (1+0.02)^{12.16} = 1.27 \cdot F_0$. While a 10% rate would have produces:$F(t) = F_0 \cdot (1+0.10)^{12.16} = 3.18 \cdot F_0$. The 21.37% QQQ CAGR would have generated: $F(t) = F_0 \cdot (1+0.2137)^{12.16} = 10.05 \cdot F_0$, or 3.3 times more than the 10% scenario. This is turning \$100,000 into \$1,005,000. So, there was an incentive to just buy and hold QQQ for the duration. A single investment decision and you would have beaten market averages just by buying this index surrogate, a simple index tracker.

The above-mentioned strategy over the same period generated a 19.01% CAGR. Is this reasonable? You have a tracker tracking an index tracker, what should you expect? Your portfolio should have about the same weighted distribution as QQQ since it was rebalanced every week to make sure it did. Those portfolio weights do not change that fast.

What I found interesting in this strategy was the ability to study the impact of rebalancing alone. The strategy made 28,856 trades vs the 1 trade if having bought QQQ outright and held. For the strategy, you had to monitor weekly what it did, put time and resources for the just in case something went wrong scenario. While, buying QQQ was a one-shot decision, no need for any computer or software. You just bought and went along for the ride for those 12.16 years.

> This is reminiscent of Mr. Buffett's million-dollar bet (which he won BTW). The bet was that an active fund manager would not beat the S&P500 over a 10-year period. There was one taker, and he lost. No other money manager was confident enough in his/her trading skills to take on the bet and make what should have been considered easy money. In itself, it does say something...

Most of the trading except the initial purchases and the occasional stock change were partial trades, small adjustments to the weights when rebalancing. Let's reduce the total trades by 200 to account for the 100 initial trades and for the removal and addition of stock to the list. We are left with 28,656 partial trades due to the rebalancing procedure alone. However, a partial trade could occur only if the price variation was sufficient to buy or sell at least one share. Otherwise, no trade.

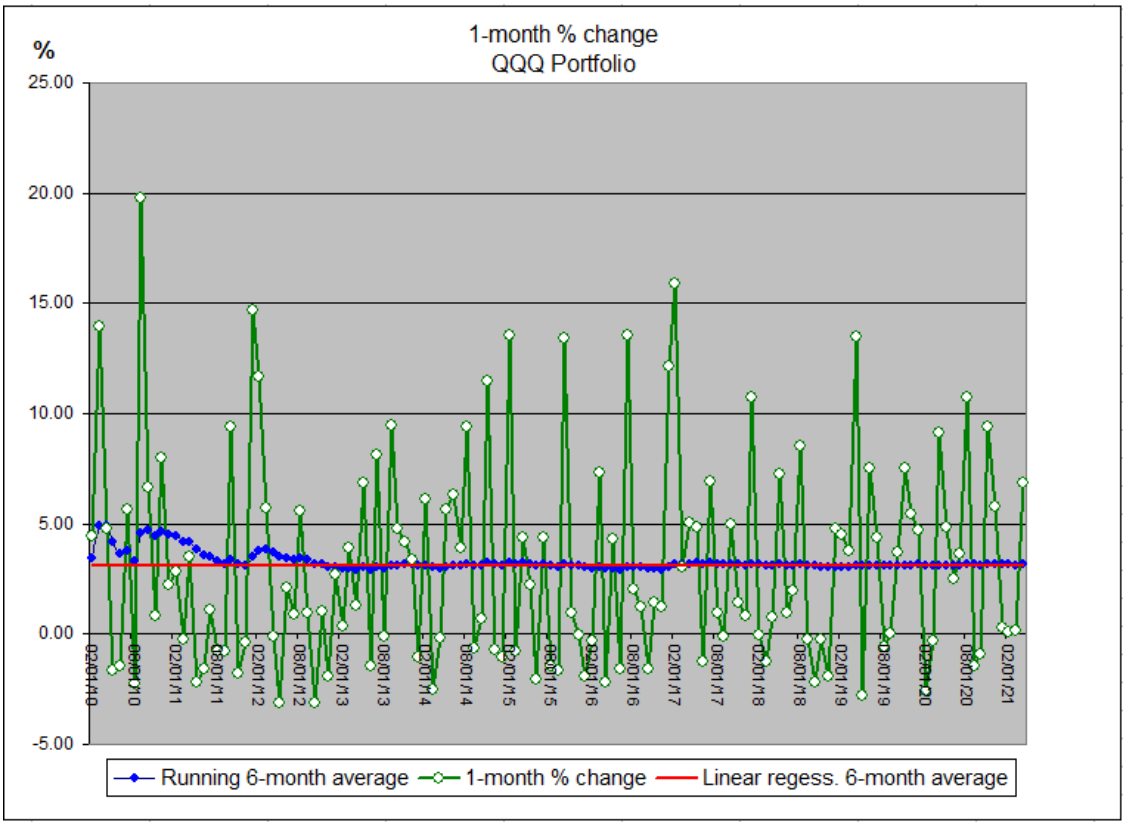
For example, with a 100k as starting capital with say an initial weight of 0.01, a single position in a 100-dollar stock would give you 10 shares. To buy or sell one more share would require the price to move by at least 10%. Often, even if the weights changed, it would not be sufficient to execute the weight reset. Turned out that, on average, some 45.27 partial trades per week were executed.

You had 28,656 trades that were executed with no trading logic other than the rebalancing procedure ($633 \cdot 45.27 = 28,656$). All these trades were not done on purpose meaning that they were planned in any way. They were just executed because the stock prices somehow changed for whatever reason. The strategy did not predict what was going to happen, it only reacted to the price change.

The following chart shows the monthly return for this trading strategy. As can be observed, it is rather erratic and could be considered short-term unpredictable, saying that month-to-month predictions would be far from predictive. The red line is the linear regression on the total period. It could be known only after all the data is in. Its correlation coefficient R2 is about 0.00001, saying that there is practically zero correlation over time. Nonetheless, there is a slight positive upside bias of 0.0004x, again something saying that the curve is almost flat. The red line, nonetheless, is an expression for the average long-term upward bias.

The blue line represents the cumulative running 6-month average of those monthly returns. It can be observed that the blue line tends to the red line rather quickly (within 3 years) and then hugs the red line for most of the duration. This would hint at the notion that after some accumulated data we could have a relatively clear image of where it is all going.

QQQ Monthly Percent Change



The QQQ, by its very composition, is a bet on America all by itself. Its constituents are the 100 most prosperous and most highly valued stocks out there. The cream of what the market has to offer. A lot of wise choices are made for you by the QQQ's changing composition. Stocks that cannot keep pace with the best are removed while newcomers are added to the existing mix. No one is asking your advice on this, it is just internally executed. There is no second-guessing, your input is not requested or even considered in any way.

$$F(t) = F_0 + \sum(H_{QQQ} \cdot \Delta P) \rightarrow F_0 + \sum(h_Q \cdot \Delta p_Q)$$

The above equation is trying to convey that trading the 100 stocks in the QQQ ETF should tend to the same result as trading QQQ alone. Here, H_{QQQ}, is the ongoing holding matrix for the 100 stocks, whereas, h_Q is holding QQQ. This should be implicit. You are tracking an index tracker after all. The strategy's return should tend to QQQ's overall return.

Should you buy and hold DIA instead of QQQ, you would get a 14.15% return. While rebalancing the DIA's constituents would generate something like a 13.83% CAGR over the same interval. Holding DIA for the duration would have generated $499,763; less than half of QQQ. Again saying that it would be better to buy and hold DIA than rebalance every week to execute some 13,497 trades. One should not be surprised if the equation below holds.

$$F(t) = F_0 + \sum(H_{DIA} \cdot \Delta P) \rightarrow F_0 + \sum(h_D \cdot \Delta p_D)$$

There would appear to be no strict advantage in tracking an index tracker. Technically, that is what this strategy's pure-play rebalancing demonstrated. Rebalancing alone, without any other trading logic, might not be sufficient to outperform an index tracker ETF.

Buying DIA or QQQ was just one decision. Both are index trackers. Both deal with some of the most valuable stocks out there. Both representing Mr. Buffett's bet on America, and yet, simply selecting QQQ over DIA for the duration would have generated twice as much. Also, this might mark what a trading strategy should do as a bare minimum before being considered. If a strategy cannot exceed QQQ's overall return, its intrinsic value should seriously be put in doubt.

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