# Long-Term Trading Strategy Planning

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Over the past year, I wrote a lot about a freely available trading strategy rebalancing QQQ's 100 stocks on a weekly basis.

It started with **A Trading Strategy Of Interest** (see the 13 related articles listed below). The strategy had nothing going for it in the sense that even if you used it as is, it would not outperform its Buy & Hold equivalent.

In fact, holding QQQ outright for the duration would have produced slightly better results than using that program. Not by much mind you, but still less than buying QQQ and holding. Regardless, the strategy could be improved performance-wise.

The strategy provided a testing ground where general trading principles could be examined. Simulations (44 in all) managed to show CAGRs of $20^{+}\%$ over a 12.4-year period. You could technically choose the strategy's performance level based on the initial preset conditions provided. This should be viewed, at least, as noteworthy.

Each of the cited articles added to the overall understanding of the procedures used and how we could modify them to our benefit.

Math was used to show the program's long-term outlook. Here is the equation again:

$$F(t) = F_0 + \sum_1^N (\mathbf{H} \cdot \Delta\mathbf{P}) = F_0 \cdot (1 + \bar{r}_m + \alpha)^t = F_0 + N \cdot \bar{x} \tag{1}$$

The equation presents 3 ways to express the same thing: a payoff matrix that could contain thousands upon thousands of entries, its compounded return equivalent, and its average profit per trade approach. Without question, the equal sign holds for any stock trading strategy.

The vector of all $N$ trades is reformatted in this simple payoff matrix notation: $\sum_1^N (\mathbf{H}_{(d,\,j)} \cdot \Delta\mathbf{P}_{(d,\,j)})$. In Excel, for instance, this would be a column-wise multiplication where each line would have the number of shares held in each of the 100 stocks in QQQ.

The second part gives the growth rate needed to reach the same value over the same trading interval using the same initial capital.

While the last part resumed it all to its most basic: the number of trades executed ($N$) multiplied by the average profit per trade ($\bar{x}$). Even if the payoff matrix could hold 500,000$^+$ entries, it is all reduced to those two numbers: $N \cdot \bar{x}$, a simple multiplication.

Each equation is making a statement on some aspect of the trading strategy. One part is giving a time limit to reach the outcome, another says that all that profit has a simple origin: $N \cdot \bar{x}$, and therefore, the average profit per trade matters, just as the number of trades over the period. $N$ is just a trade counter and therefore, all the emphasis should be on $\bar{x}$.

In essence, the total result will be an average of all the trades performed. And each trade, from start to finish will impact the average. It enforces a time limitation too since $N \cdot \bar{x}$ has to be executed within the time constraint provided by $t$.

No matter the outcome of the trading strategy, all combinations of the variables have to comply with the equal sign. In the sense that the total profit generated $X$ has for value: $X = \sum_1^N (\mathbf{H} \cdot \Delta \mathbf{P}) = N \cdot \bar{x}$ whatever the strategy's payoff matrix composition.

Even if $t$ is not mentioned in the payoff matrix, it sets an upper time limit on the number of trades $N$ that could be executed during that time interval.

For the same outcome $X$, raising the number of trades would lower the average profit per trade, likewise, increasing the average profit per trade would require fewer trades to achieve the same result. This allows all kinds of trading strategies, and all of them would satisfy equation (1).

**The Expected Number Of Trades**

In the cited articles (see list below), was found we might not know the outcome of the payoff matrix, but we could estimate $N$ the number of trades the strategy might do over its trading interval.

In the case of this "interesting trading strategy" (refer to the last two listed articles), the 100 stocks part of QQQ were rebalanced on the first trading day of each week at exactly 10:01. And since all trades were market orders on some of the most liquid stocks out there, the whole rebalancing process would have taken minutes, if not seconds.

On any given week, the number of trades would approach 100 since very few stocks remain at the same price from one week to the next. Also, some added trades would occur when changes would be made to QQQ's composition. Those 100 trades or about would be the result of price variance, mostly unpredictable, mostly the result of quasi-randomly and continuously evolving price movements. The strategy made money, but by no fault of its own.

A reasonable estimate for the number of trades over a 10-year period would be: $\hat{N}_{10} = 52 \cdot 100 \cdot 10 = 52{,}000$ trades. While over some 20 years, we would have: $\hat{N}_{20} = 52 \cdot 100 \cdot 20 = 104{,}000$ trades. This provides us with an estimate for ($N$) to go in equation (1). All 3 parts of equation (1) will have to live with $\hat{N}$. In the 12.4-year simulation, the estimate was: $\hat{N}_{12.4} = 52 \cdot 100 \cdot 12.4 = 64{,}480$. Test #3 came in at: $N = 63{,}800$.

The historical average market return is about 10$\%$, meaning that the initial capital is expected to grow at that rate. The 10-year scenario: $F_0 \cdot (1 + 0.10)^{10} = 2.593 \cdot F_0$. Therefore, $\hat{x}_{10} = \frac{2.593 \cdot F_0}{52{,}000}$. And $\hat{x}_{20} = \frac{6.727 \cdot F_0}{104{,}000}$ for the 20-year scenario. The part that is missing is the initial capital. But that part ($F_0$) is a decision you make before you even start the trading program, and as such is independent of the trading routines.

Over a 10-year period, with $\$$100,000, we would have: $100{,}000 \cdot (1 + 0.10)^{10} = \$259{,}374$. This would give: $\bar{x} = \frac{\$259{,}374}{52{,}000} = \$4.98$ as average profit per trade. On average, making $\$4.98$ per trade is not a high demand on a trading strategy. This average profit per trade would imply an average $0.5\%$ move from week to week.

**QQQ's Weighing Method**

QQQ's stocks are market cap weighted where the highest valued stocks get the heaviest weights. Currently, the weight is about 0.10 for that one stock at the top, as was shown in the simulations. That would be some 10 times more than an equal weight setting. It makes that stock the highest valued stock of the group. The 20 highest weights could account for some $80\%$ of QQQ.

The simulations performed showed it was much more profitable using market cap than equal weights (see related articles, where 44 different simulations were performed). The following article elaborated further on the difference in weighing method: **Take the Money and Keep it – II**

What makes this "interesting trading strategy" interesting? Its first quality would have to be perseverance, it can last. No matter what might happen next, there will be a list of the top 100 highest valued stocks out of the thousands on NASDAQ.

The list will change over the years, evidently, but there will still be a top 100. No stock goes bankrupt while on that list (none ever has). Stocks can still go bankrupt, but not while they are on the list, only after they were replaced.

QQQ gives a simple solution to the stock selection process. Of all the stocks you will play over the years, none will go bankrupt. So, no need to worry. Should a stock fall off the list, it is liquidated and replaced until it can come back, if it can. QQQ's list is merit-based, stocks have to prove they belong, otherwise, they do not get on it.

Few of the highest 50 most valued stocks in 2000 were still part of the list in 2020.

Most of them faded away and were replaced by newcomers having more potential. During the same period, the value of the highest valued stock was multiplied by a factor of 10. A 100-Billion dollar company in 2000 made number one on the list, while in 2020 the company at the top of the list was worth over 1 Trillion.

Another trait that makes this trading strategy interesting is due to its weighing system. It is made proportional to the total market capitalization of the group. This will favor stocks growing the fastest or the most over time. And since the rebalancing is performed to maintain those weights, the highest valued stocks will get the largest positions percentage-wise. That too is a serious advantage compared to equal weights.

Big bets will be made on the best performers of the group, while small bets on the least performing ones. This will tend to skew average performance higher (as was also demonstrated in the series of cited articles).

Adding alpha to portfolio performance is usually not an easy task. On the tests performed over 12.4 years, you could have had: $\bar{g} = r_m + \alpha = 0.10 + 0.1076 = 20.76\%$ without even trying, and for at most 5 minutes per week of your time.

The strategy can be improved to do even better. You could add your own trading rules to the top half of QQQ's stocks. A thing you cannot do buying QQQ outright. However, as a caveat, I highly recommend, at least, adding some downside protection measures before use. The last few months should have been convincing enough that it is needed.

You could accept a 5$\%$ long-term return, or, and not even push it, do a $20.76\%$ CAGR yourself. The difference in performance is noticeable. $\$100,000 \cdot [(1 + 0.2076)^{20} - (1 + 0.05)^{20}] = \$4,084,398$. Based on an initial portfolio of $\$1,000,000$ the answer would be $\$40,843,981$.

We could contend that the can of goods you were sold at a $5\%$ or less expected long-term return on your retirement fund could have cost you some $\$40,843,981$ in opportunity costs, even more, if you started with a higher initial capital. You were left with a small fraction (in the single digit) of what you could have had with very little effort on your part and requiring very little of your time. Again, it is always a matter of choice, you are the one to choose.

The problem gets even worse if you extend the trading interval. The same formula, over a 30-year period gives: $\$1,000,000 \cdot [(1 + 0.2076)^{30} - (1 + 0.05)^{30}] = \$282,553,340$. That can make quite a difference in someone's retirement fund. It is a long-term kind of game, and you have to plan its outcome.

**Related Articles**:

**Stock Trading Skills**

**Your Stock Trading Game**

**Basic Portfolio Math**

**Recovering After A Bear Market**

**Portfolio Drawdown Protection**

**Compensate For Portfolio Drawdowns**

**Surviving Market Drawdowns**

**QQQ To The Rescue**

**Build Your Own Indexed Retirement Fund**

**Take the Money and Keep it – II**

**Use QQQ - Make the Money and Keep IT**

**A Trading Strategy Of Interest – PartI II**

**A Trading Strategy Of Interest – Part I**

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