

# Technical Attribute Stock Ranking System

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## EXECUTIVE SUMMARY /

The following paper tests Nasdaq Dorsey Wright's technical attribute ranking system for stocks. The study suggests that with the use of a simple set of rules and low turnover, it could potentially enhance performance in a hypothetical portfolio (18.17%/year vs. 10.70%/year for the S&P 500). The portfolio also owns a manageable number of positions (30) meaning a financial advisor could realistically use the rules to manage a client's portfolio over time.

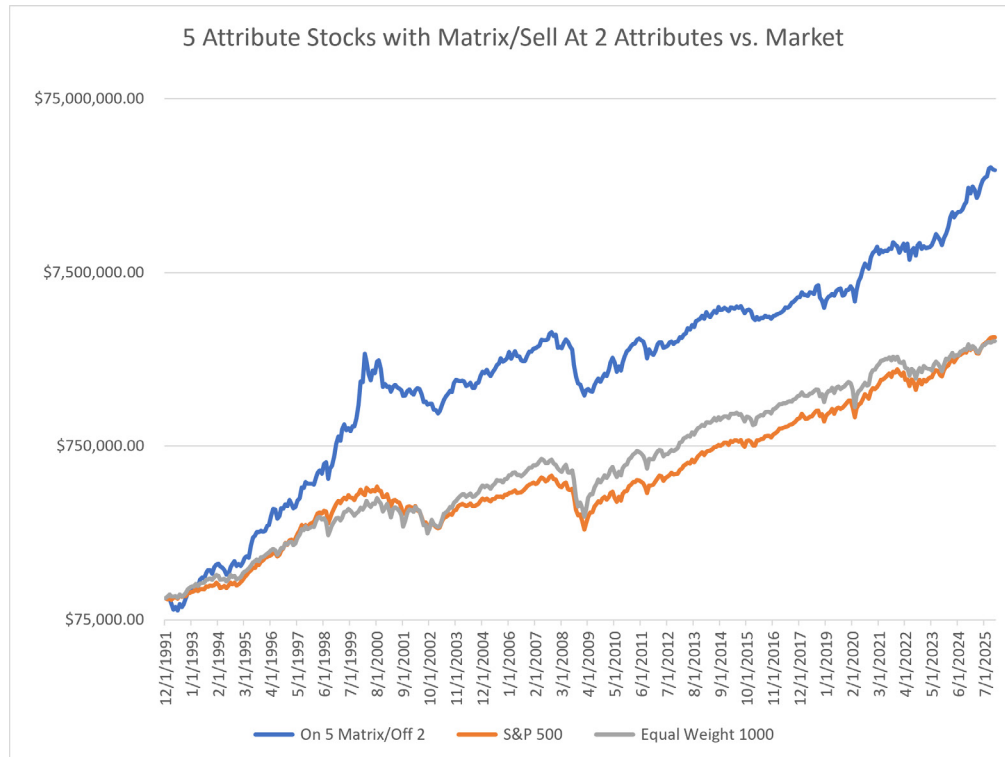
DISCLAIMER—Unless otherwise noted, all references to a portfolio, performance, or returns are based on back tested hypothetical portfolios and are theoretical in nature. The study does not include the results of actual trading. These hypothetical portfolios do not consider the effects of costs, advisory and other fees, trade timing, or execution quality. All these factors will affect actual returns.

## INTRODUCTION /

Over the years, Nasdaq Dorsey Wright has created many innovative technical indicators based on momentum using Point and Figure charting. One of our most popular indicators in this space is the "Technical Attribute" rating we apply to each stock. The rating ranges from 0 (lowest strength) to 5 (highest strength) with values of 3 or higher, generally regarded as investable.

The purpose of this study was to determine how effective technical attributes are from a portfolio management perspective. If we "buy" a portfolio of high attribute stocks, do we outperform the market? Alternatively, what happens if we buy a portfolio of low attribute stocks? We found that high attribute portfolios had a strong propensity to outperform, with the largest outperformance reserved for the highest ratings (5 attribute stocks), while low attribute portfolios had a marked tendency to underperform under most market conditions.

We also took this initial insight and progressively refined the concept to create a portfolio with good performance, manageable portfolio size, reasonable turnover, and simple to understand portfolio construction process. The result is a portfolio which buys 5 attribute stocks ranked highly in Nasdaq Dorsey Wright's matrix system (explained below) and waits to sell them when their attribute rankings fall to 2 or lower.



|                      |             |
|----------------------|-------------|
| On 5 Matrix/Off at 2 | 18.17%/year |
| S&P 500              | 10.70%/year |
| Equal Weight 1000    | 10.55%/year |

*Illustration Only – Does not represent any recommendation or portfolio. Please see important disclosures at end regarding illustrations.*

## WHY USE MOMENTUM? /

Factor investing has attracted substantial research over the last few years and momentum is often cited as the strongest factor. Factors sparked interest not only because they allow you to potentially outperform market cap weighted benchmarks, but also because they are not supposed to exist. The efficient market hypothesis predicts that you should not be able to outperform a random basket of securities after adjusting for risk because security prices reflect all publicly available information. As such, factors have often been called “anomalies” in academic papers. Eugene Fama, the University of Chicago professor who created the efficient markets hypothesis, famously considers momentum to be the “premier anomaly.” Many researchers have tried to understand why momentum exists, but there has yet to be a strong consensus as to its cause. Perhaps the best explanation we have heard is that it is a behavioral bias where investors systematically underreact to good news. This under-reaction could potentially cause the market to price the news in slowly, which may contribute to the security's performance. This is good news for investors, as behavioral biases tend to be rooted in human nature, making them less likely to change over time. In fact, Geczy and Samonov showed in their 2013 paper, “Two Centuries of Price Return Momentum,” that momentum in the US stock market dates back to at least 1801.

## THE NASDAQ DORSEY WRIGHT APPROACH /

Nasdaq Dorsey Wright's technical attribute ratings are composed of five distinct Point and Figure chart attributes. First, we generate a Point and Figure chart relative strength chart of the stock vs. the S&P 500 Equal Weight Index. If the chart is on a Point and Figure buy signal (meaning a column of X's has exceeded the previous column of X's), we give the stock one technical attribute. If it is also in a column of X's we give it another. Next, we generate a Point and Figure relative strength chart of the stock vs. an equal weighted index of the stock's sector. Again, a buy signal adds one technical attribute, and a column of X's adds an additional attribute. Finally, we analyze the trend of the stock based on the stocks' traditional Point and Figure chart. If it's trading above the trendline it receives another attribute. All in all, the rating encompasses four relative attributes (two vs. the market and two vs. the sector) and one absolute attribute (trend). The absolute attribute may seem an odd choice, but momentum is often divided into two categories (relative and absolute). Relative momentum being momentum vs. other securities, and absolute momentum being how it compares to itself along some metric (typically a moving average or some other trend/performance measure). Absolute momentum is typically useful in limiting downside, as a purely relative approach leaves you exposed when everything is moving down at the same time.

| Attribute Description                                      | # of Attributes |
|------------------------------------------------------------|-----------------|
| Relative strength chart vs. the market on a buy signal?    | 1               |
| Relative strength chart vs. the market in a column of X's? | 1               |
| Relative strength chart vs. the sector on a buy signal?    | 1               |
| Relative strength chart vs. the sector in a column of X's? | 1               |
| Point and Figure chart in a positive trend?                | 1               |
| Total                                                      | 5               |

## STUDIES /

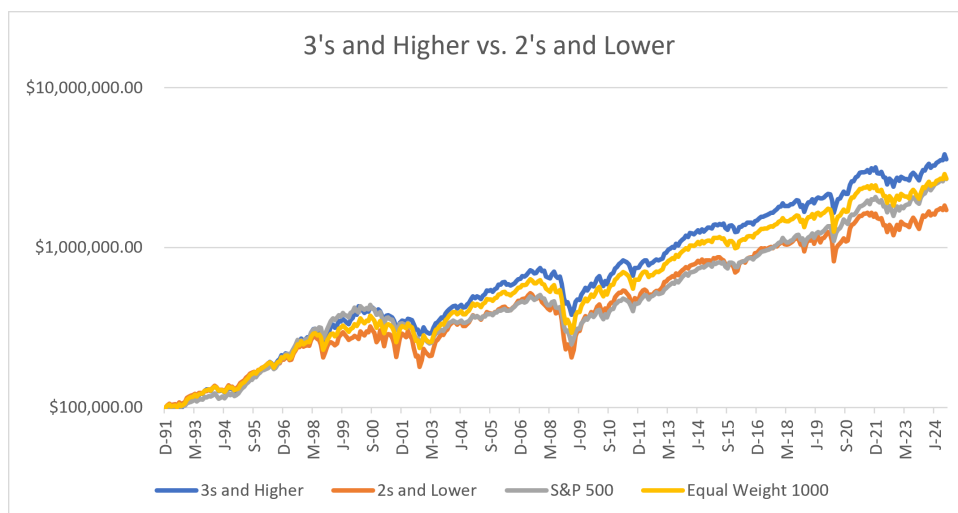
To determine how technical attributes work in a portfolio management context we first calculated technical attributes for the top 1000 market cap stocks every year from 1992-2025. We chose the top 1000 market cap stocks as they're highly liquid and thus more practical for the average financial advisor to buy. Next, we ran five separate tests to analyze the properties of the rankings and their applicability to a hypothetical client's portfolio. Each test provides insights which are then used to inform the following test until we end up (in Test #5) with the portfolio mentioned in the introduction of this paper. Unless otherwise specified, all tests were conducted between 1992 and 2025, utilizing the top 1000 market cap universe. They also buy equal weight positions in all stocks matching the test criteria, rebalance/reconstitute monthly, and update the top 1000 market cap universe at the end of every year.

### TEST #1-3'S AND HIGHER VS 2'S AND LOWER /

For the first test, we chose to "buy" all stocks with 3 or more attributes in one portfolio and compare them to a portfolio owning all stocks with 2 or fewer attributes. The idea is to test whether high attributes perform better than low attributes in general.

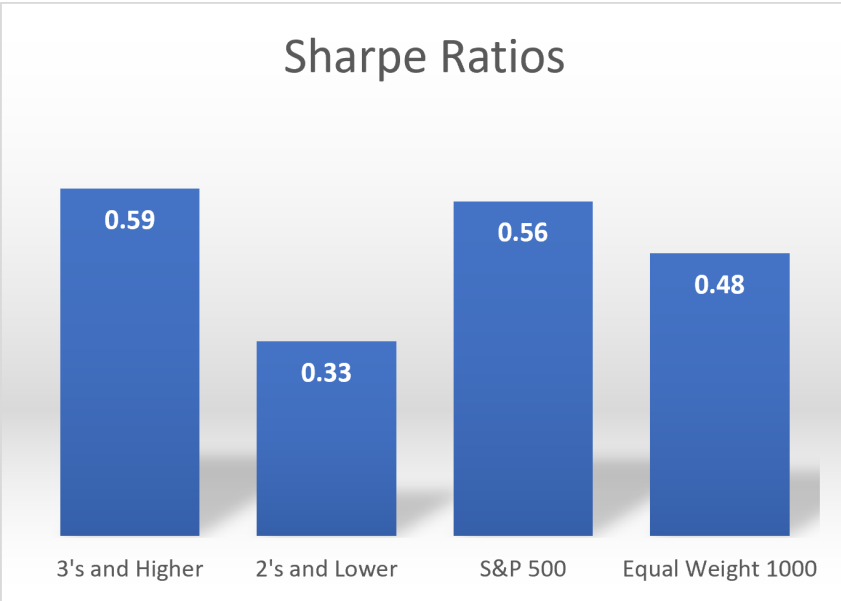
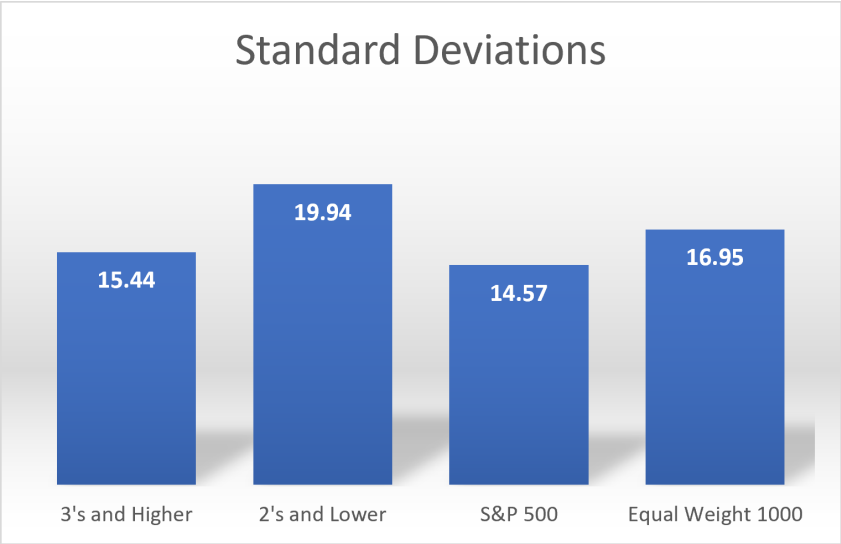
As the graph shows, the "3's and Higher" portfolio outperforms the "2's and Lower" portfolio by 2.50%/year. It also outperforms the S&P 500 and an equal weighted index of the top 1000 market cap stocks (Equal Weight 1000 in the graph) while the "2's and Lower" portfolio underperforms both benchmarks during the study. Interestingly, the typical performance difference is more extreme than shown as, with the benefit of hindsight, low attribute stocks tend to do very well after major bear markets, which makes their returns look better over the entire period than what you may get by holding them for any particular year. If we remove 2003 and 2009 from the analysis (both included the initial moves up off a major bear market) and look at the difference in returns for all other years we find that the average outperformance moves up to 3.53%/year from 2.50%/year. Of course, you can't just ignore the performance that doesn't help you, but it is an interesting data point. We also found that the volatility of the "2's and Lower" portfolio is much higher than the "3's and Higher" portfolio while offering lower returns (meaning its Sharpe ratio is lower as well).

While this test illustrated that higher attributes seem to offer better performance, the next test seeks to understand whether the additional performance is distributed equally amongst the high attribute rankings or whether a particular ranking fares better than others.



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|                   |             |
|-------------------|-------------|
| 3's and Higher    | 11.52%/year |
| 2's and Lower     | 9.02%/year  |
| S&P 500           | 10.70%/year |
| Equal Weight 1000 | 10.55%/year |

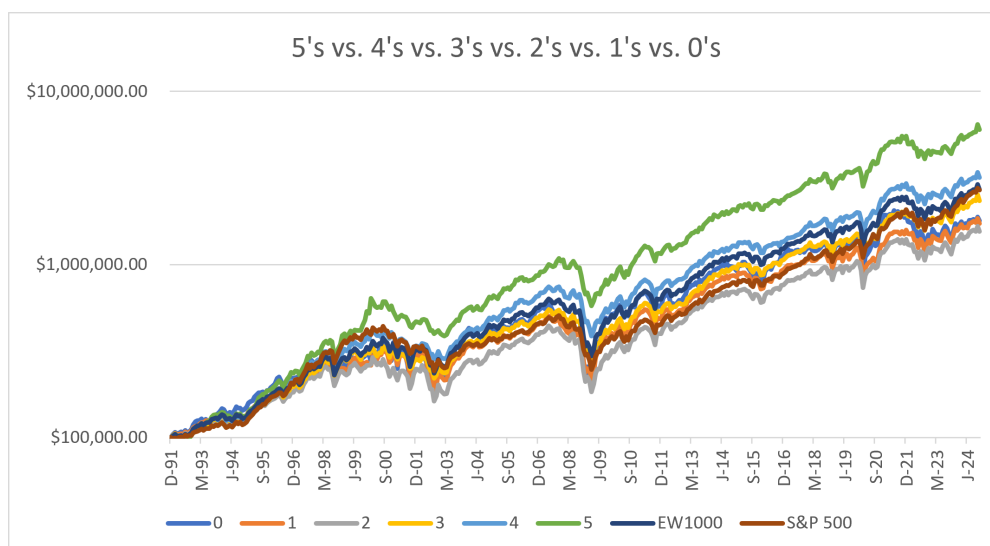


## TEST #2 -INDIVIDUAL ATTRIBUTE RANKINGS /

This test seeks to understand whether it pays to invest in a particular attribute over others. To do this, we created a portfolio for each attribute ranking (0 through 5) and bought all stocks in a top 1000 market cap universe with the specified attribute every month (equal weighted).

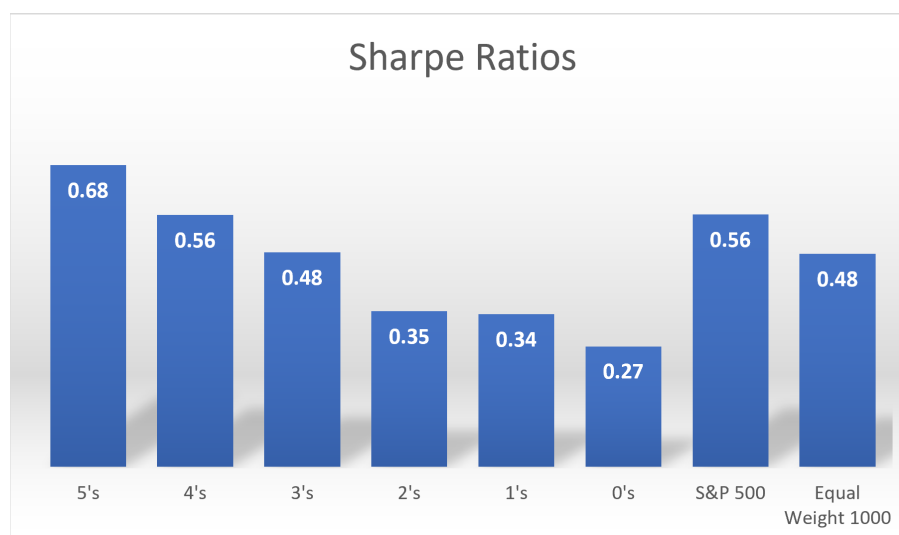
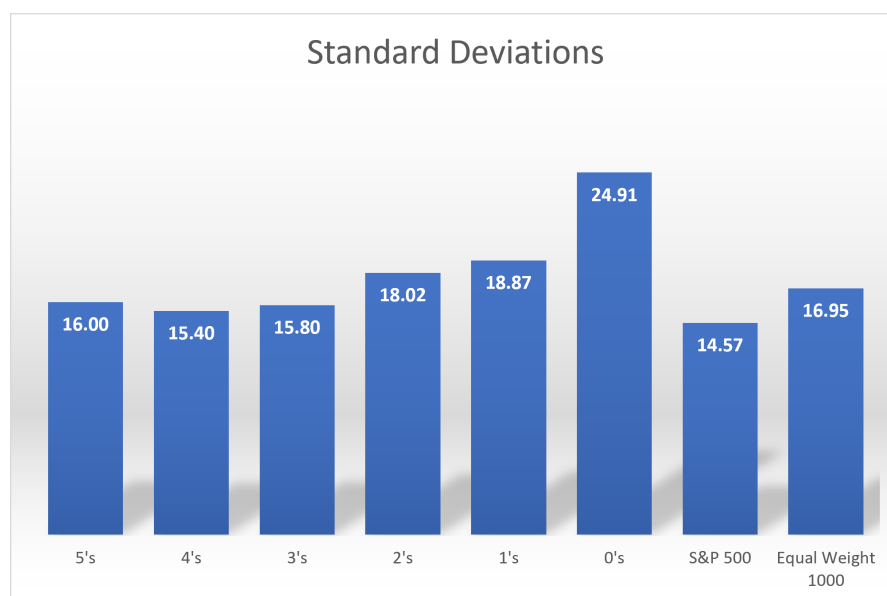
The graph above shows that 5 attribute stocks are the dominant contributor to the "3's and Higher" portfolio in Test #1. In fact, 5's alone outperformed the "3's and Higher" portfolio by 1.76%/year (13.28%/year vs. 11.52%/year). The performance gap between 5's and 4's at 2.13%/year is also larger than the performance gap between any other adjacent attribute rankings. Interestingly, we expected the 0's portfolio to do the worst, but it performs better than the 2's and 1's. However, as mentioned before, low attribute stocks perform well in the initial move off a major bear market bottom (as in 2003 and 2009) and that effect is most pronounced in 0 attribute stocks (up 65% and 102% in 2003 and 2009 respectively). If we remove those 2 years, the average difference in return between 5's and 0's jumps from 4.10%/year to 6.56%/year. Volatility also gets worse as we move into the lower attributes (again with the effect most pronounced in 0 attribute stocks which had a 24.91% standard deviation).

While the 5-attribute portfolio clearly shows promise, a client cannot hold every 5-attribute stock in his/her portfolio. To do so, they would have to hold, on average, around 175 stocks. How does this behave for a more manageable portfolio of 30 stocks?



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|                   |             |
|-------------------|-------------|
| 5's               | 13.28%/year |
| 4's               | 11.15%/year |
| 3's               | 10.05%/year |
| 2's               | 8.74%/year  |
| 1's               | 8.91%/year  |
| 0's               | 9.18%/year  |
| S&P 500           | 10.70%/year |
| Equal Weight 1000 | 10.55%/year |

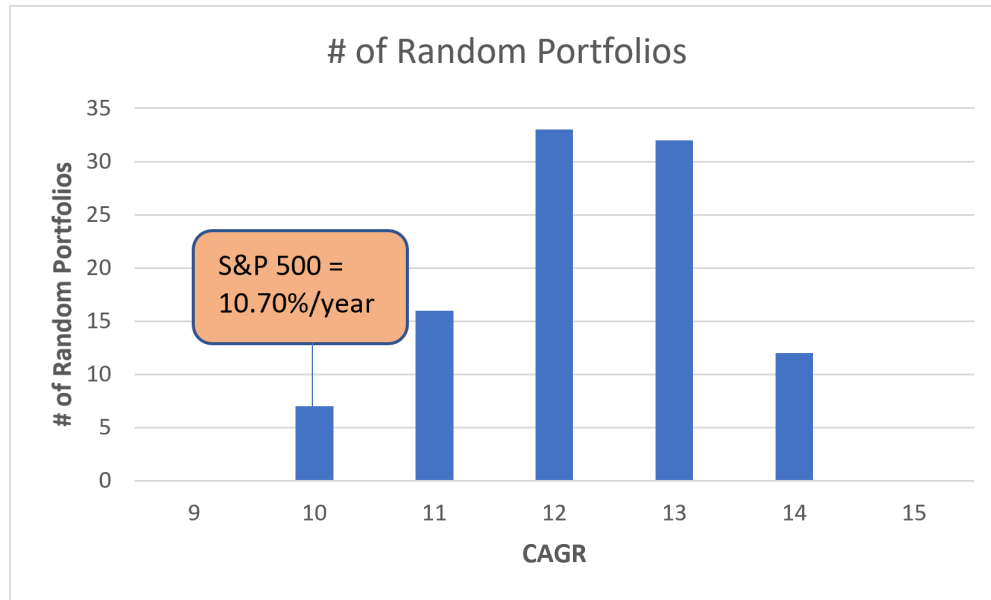


### TEST #3 -RANDOM TESTING FOR 5 ATTRIBUTE STOCKS /

To test this, we created a hypothetical portfolio by buying 30 5-attribute stocks at random every month over the test period (1992-2025). We then ran that simulation 100 times to see how often it outperformed.

The chart below shows the number of random hypothetical portfolio at each CAGR level (grouped into 0.5% increments). As expected, most of the portfolio exhibited returns in or around the average of the “Buy All 5’s” portfolio (13.28%/year). What’s interesting though is that 95% of the random portfolios beat the market. This implies that your stock selection doesn’t have to solely rely on luck to potentially achieve better performance.

The downside though is you can’t allocate your portfolio randomly! How can we take advantage of the power of 5-attribute stocks then with a manageable portfolio size?



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#### TEST #4-BUYING 5 ATTRIBUTE STOCKS IN A MATRIX /

Nasdaq Dorsey Wright's matrix system can potentially help us choose a manageable subset of 5-attribute stocks. The Matrix is a Nasdaq Dorsey Wright tool that has been around nearly as long as our technical attribute rankings (20+ years). It allows you to input a list of symbols (any security or index with historical prices on the NDW Research Platform) and it ranks the symbols from 1 to the number in the list by relative strength/momentum. It does this by creating a Point and Figure relative strength chart for each combination of symbols in the Matrix. A Point and Figure relative strength chart is like a standard Point and Figure chart except we plot the price of one security divided by another. This enables us to measure which security is currently outperforming the other. By creating a relative strength chart for each combination of symbols in the Matrix, we can then aggregate the relative strength charts to see which securities are outperforming overall. For example, imagine a Matrix with three symbols (AAPL, IBM, and HD). The Matrix creates Point and Figure relative strength charts for AAPL vs. IBM, AAPL vs. HD, IBM vs. HD, etc. The actual number of charts created is equal to the number of symbols in the matrix multiplied by the same number minus one. Once all the charts are created, the Matrix then determines which symbols have the most buy signals. As a review, a buy signal on a Point and Figure chart occurs when a column of X's moves above a previous column of X's. On a Point and Figure relative strength chart, this shows the numerator symbol (the first symbol listed in a pair) has superior relative strength vs. the other symbol. Aggregating buy signals like this allows the matrix to rank the symbols in a granular manner. Another important detail of the Matrix is the box size. The box size tells the system what the percentage distance should be between two boxes on the relative strength chart. A small number means the relative strength charts are more sensitive as it doesn't take as large of a move to cause a change in the chart. A large number, on the other hand, means the relative strength charts are less sensitive as it takes a larger relative move to cause a change. A good rule of thumb here is that the less volatile and/or more correlated the securities in the Matrix, the lower the box size should be. Conversely, the more volatile and/or less correlated the securities in the Matrix, the higher the box size should be.

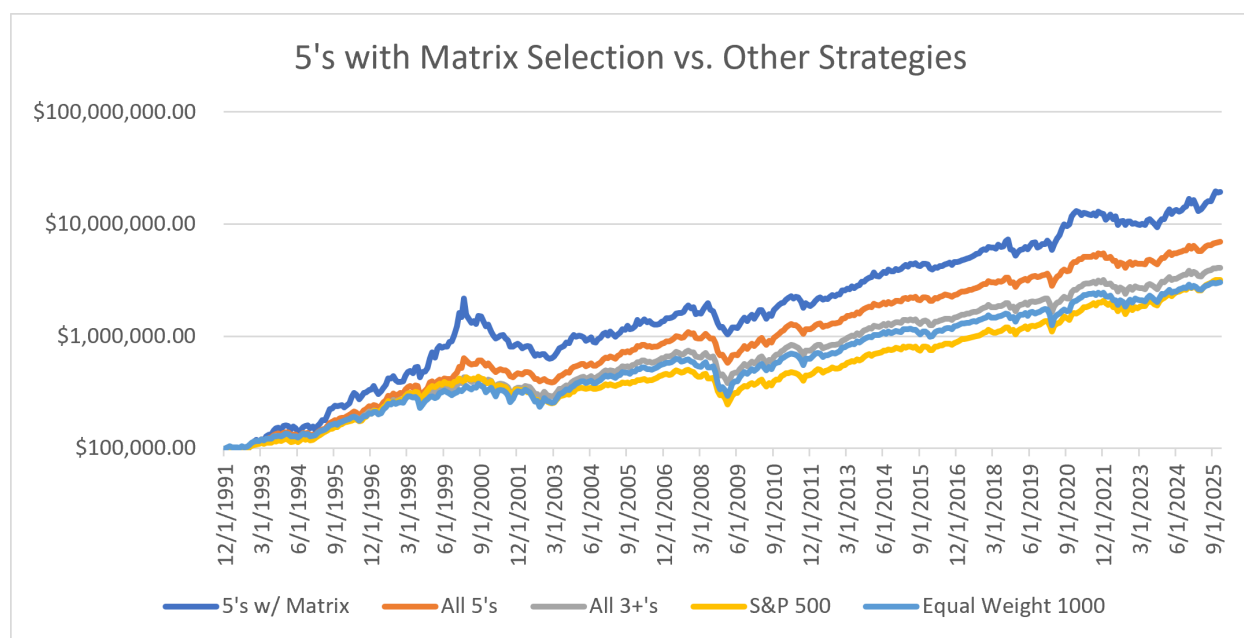
We can use the matrix to lower the # of holdings in our portfolio by placing all 5-attribute stocks in a matrix (which will rank them from 1 to the total number) and selecting the top 30 every month. This way we have a more intelligent way of selecting our 30 holdings vs. choosing at random. Previous research indicates a 6.5% box size is optimal for 5-attribute stocks so that's what we will use here.

The graph above shows the matrix does more than just provide a way to reduce the number of holdings. It also increases the returns by 3.48%/year. This increase isn't just a reflection of the increased concentration either as 0 out



of 100 30-holding random portfolios from Test #3 performed better than the 5-attribute portfolio with matrix selection. This is because we're able to fine tune the ranking and buy the best of the best.

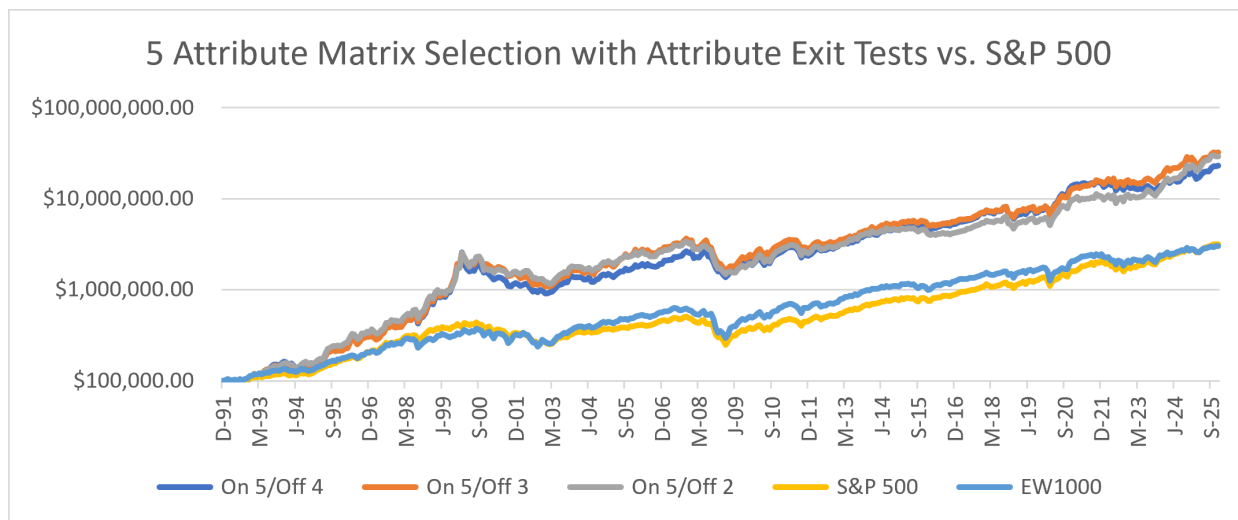
The most impractical part of this portfolio is the high turnover (392.11%/year). The high turnover comes from selling stocks as soon as they fall out of the top 30 of the 5-attribute matrix. Often a stock will move below 30 quickly only to regain strength and return to the top 30. What is needed is a way to loosen the sell threshold. An obvious way to do this is to only sell a stock when it's attribute ranking falls. Though it remains to be seen whether we can do this without sacrificing performance.



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## TEST #5-BUYING 5 ATTRIBUTE STOCKS IN A MATRIX AND ATTRIBUTE EXIT /

The final tests start by buying the top 30 5-attribute stocks in a matrix at the beginning of the test and sells when a stock's attribute falls to predetermined levels. To further reduce turnover, it only rebalances the portfolio back to equal weighted when a stock's weight in the portfolio falls below 1% or rises above 10% of the portfolio's value. In doing this, we hoped to see good performance, manageable portfolio size, and turnover reduction.

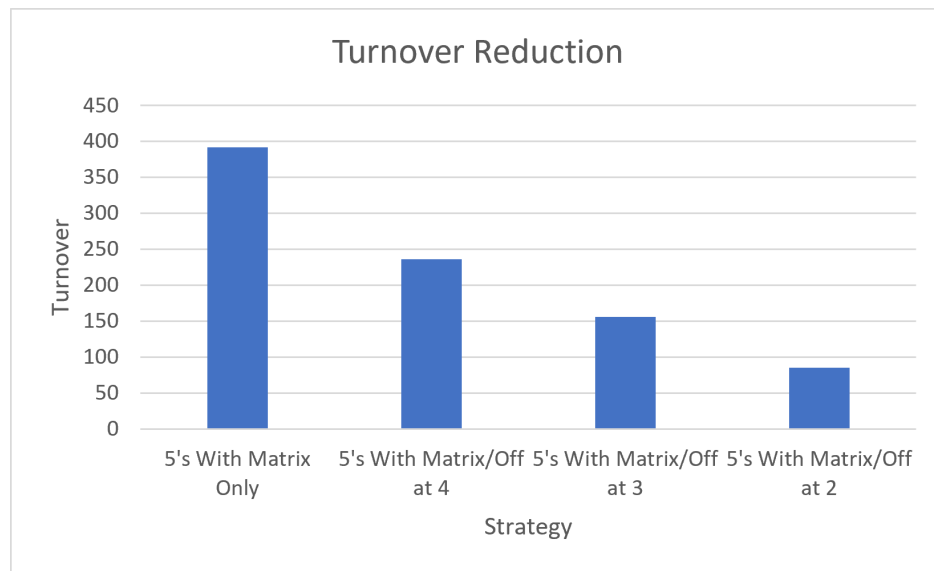


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|                             |             |
|-----------------------------|-------------|
| 5 Attribute Matrix/Off at 2 | 18.17%/year |
| 5's w/Matrix                | 16.76%/year |
| All 5's                     | 13.28%/year |
| All 3+'s                    | 11.52%/year |
| S&P 500                     | 10.70%/year |
| Equal Weight 1000           | 10.55%/year |

| Year               | On 5/Off 4 | On 5/Off 3 | On 5/Off 2 | S&P 500 | EW1000  |
|--------------------|------------|------------|------------|---------|---------|
| 1992               | 12.04      | 13.06      | 10.38      | 7.62    | 14.79   |
| 1993               | 38.27      | 31.75      | 36.83      | 10.08   | 14.90   |
| 1994               | -3.24      | -4.57      | 3.65       | 1.32    | -1.51   |
| 1995               | 53.51      | 49.95      | 54.00      | 37.58   | 33.06   |
| 1996               | 36.68      | 41.98      | 40.38      | 22.96   | 18.32   |
| 1997               | 25.95      | 28.86      | 34.39      | 33.36   | 26.33   |
| 1998               | 66.39      | 75.90      | 70.24      | 28.58   | 11.33   |
| 1999               | 172.51     | 181.31     | 128.39     | 21.04   | 15.36   |
| 2000               | -10.58     | -0.92      | -3.34      | -9.10   | -0.22   |
| 2001               | -26.55     | -20.23     | -6.91      | -11.89  | -2.00   |
| 2002               | -22.37     | -28.44     | -23.73     | -22.10  | -17.92  |
| 2003               | 49.51      | 49.08      | 47.37      | 28.68   | 41.65   |
| 2004               | 7.76       | 15.79      | 12.31      | 10.88   | 18.41   |
| 2005               | 17.48      | 30.35      | 19.77      | 4.91    | 9.03    |
| 2006               | 11.76      | 12.01      | 9.14       | 15.79   | 15.79   |
| 2007               | 35.17      | 28.29      | 24.87      | 5.49    | 4.00    |
| 2008               | -38.21     | -45.69     | -48.04     | -37.00  | -39.61  |
| 2009               | 29.76      | 26.55      | 14.71      | 26.46   | 43.79   |
| 2010               | 21.59      | 28.83      | 38.41      | 15.06   | 23.73   |
| 2011               | -7.24      | -9.44      | -7.11      | 2.11    | 0.04    |
| 2012               | 25.40      | 18.28      | 19.69      | 16.00   | 16.41   |
| 2013               | 35.75      | 35.28      | 40.48      | 32.39   | 35.66   |
| 2014               | 13.30      | 16.19      | 9.45       | 13.69   | 11.49   |
| 2015               | 11.82      | 6.99       | -3.04      | 1.38    | -3.59   |
| 2016               | 4.03       | -0.34      | -5.11      | 11.96   | 15.58   |
| 2017               | 29.38      | 25.83      | 27.09      | 21.83   | 19.02   |
| 2018               | -12.25     | -12.11     | -13.04     | -4.38   | -8.61   |
| 2019               | 23.51      | 26.78      | 27.13      | 31.49   | 30.50   |
| 2020               | 86.05      | 63.92      | 62.87      | 18.40   | 17.14   |
| 2021               | 7.29       | 20.04      | 8.91       | 28.71   | 19.61   |
| 2022               | -12.58     | -3.44      | -3.40      | -18.11  | -18.91  |
| 2023               | 6.43       | 18.06      | 22.53      | 26.29   | 19.84   |
| 2024               | 34.10      | 50.86      | 71.15      | 25.02   | 13.39   |
| 2025               | 24.75      | 21.52      | 35.89      | 17.88   | 11.57   |
| Cumulative Return  | 23044.71   | 32236.45   | 29078.31   | 3073.38 | 2923.87 |
| CAGR               | 17.37      | 18.53      | 18.17      | 10.70   | 10.55   |
| Standard Deviation | 23.58      | 23.40      | 24.31      | 14.57   | 16.95   |
| Sharpe Ratio       | 0.63       | 0.69       | 0.65       | 0.56    | 0.48    |
| Avg Num Holdings   | 30.00      | 30.00      | 30.00      | 500.00  | 1000.00 |
| Turnover           | 235.88     | 155.63     | 85.20      | N/A     | N/A     |

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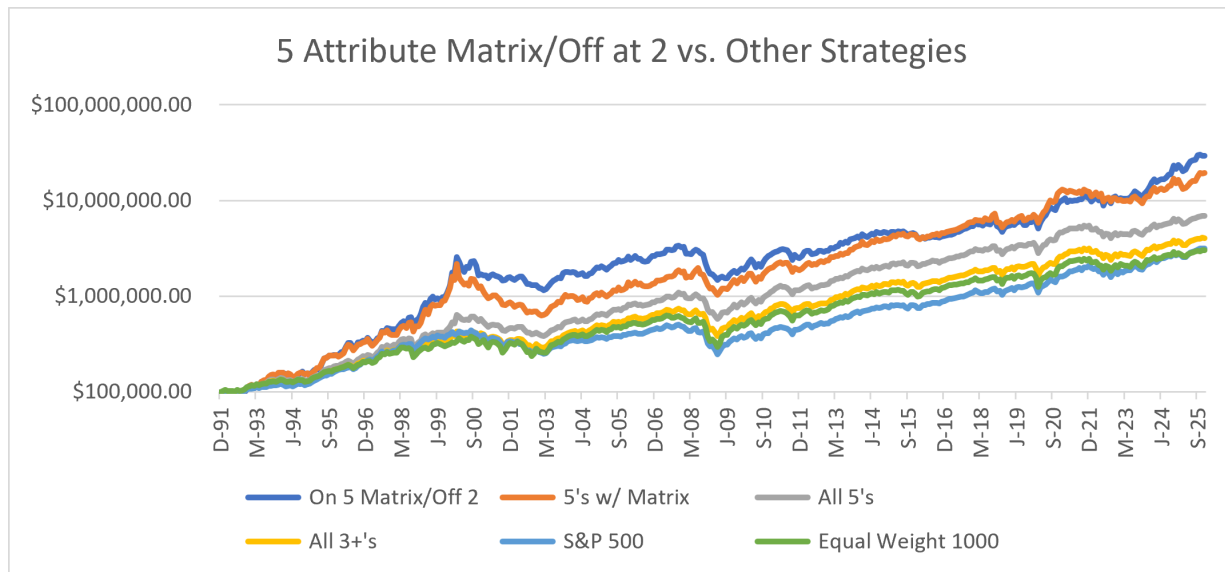


As the table shows, the “On 5/Off 2” version largely satisfies our requirements. Turnover is greatly reduced (from 389.77% to 84.91%), while performance is slightly improved meaning that on paper we’ve largely sidestepped the performance vs. turnover tradeoff we saw in previous attempts. This is likely because we’re now buying the strongest of the 5 attribute stocks meaning when they fall to 3 attributes, they’re still likely to return to form. The On 5/Off 3 version had strong performance, and there may be potential benefits to selling earlier, but it’s important to consider whether the additional return is worth the potential increase in turnover.

The returns of the “On 5/Off 2” portfolio were also good across different time periods. The period from 1992-1999 saw a 1668% return vs. 321% for the S&P 500. 2000-2009 saw a 10.47% return vs. -9.1% return for the S&P 500 and 2010-2024 saw a 1199% return vs. 603% return for the S&P 500. Additionally, a rolling outperformance study showed that the portfolios outperformed in roughly 70% of 3-year, 5-year, and 10-year periods.

## CONCLUSION /

In conclusion, we found that stocks with high attributes tend to outperform low attribute stocks over long periods of time. They also seem to have the potential to outperform the market in hypothetical simulations. This is especially the case when we buy 5-attribute stocks ranked highly in a matrix of all 5-attribute stocks. We also found we could reduce the turnover of a high attribute portfolio while maintaining performance by waiting to sell a position when it reaches a 2-attribute ranking or lower.



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