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Visual Stroll Through Non-Correlation Land

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We talk a lot about non-correlation, and specifically non-correlation to traditional assets. This study focuses on non-correlation and how might impact an investment portfolio. Walking through and discussing a few simple data visualizations should help us see characteristics and effects of combining non-correlated strategies.

Correlation implies that a security or strategy moves together or exhibits similar behavior to another security or strategy. Negative correlation implies that a security or strategy moves opposite another security or strategy by comparison. Therefore, non-correlation means a security or strategy is not related to and does not move either parallel or opposite another security or strategy it is being compared to.

We are using the same data used for our study “The Drawdown Paradox”. You might find that study interesting if you have not read it yet. Before you read it, make a guess at what percentage of months the S&P 500 has spent in a state of drawdown since 1950. Write your guess down, then check out our study and find out how close you were.

Data time frame is Jan 2000 - Aug 2017. Data sets are the SG_Trend Index, the S&P 500 Total Return Index, VBINX Balanced Mutual Fund, and two hypothetical portfolio combinations between the SG_Trend and S&P 500 TR. The SG_Trend Index is a hypothetical trend following CTA index with data becoming available in 2000, which is how starting date for both studies was decided. The S&P 500 Total Return Index is the S&P 500 stock market index with dividends reinvested. VBINX is a Vanguard brand mutual fund which combines stocks and bonds in approximately a 60/40 mix. The S&P 500 index and the Vanguard mutual fund represent simplified traditional portfolios. The SG_Trend Index represents an alternative portfolio of trend following CTAs. We are using SG_Trend because ACT does not have a trading history long enough to make for a proper or interesting study of this nature yet –we intend to

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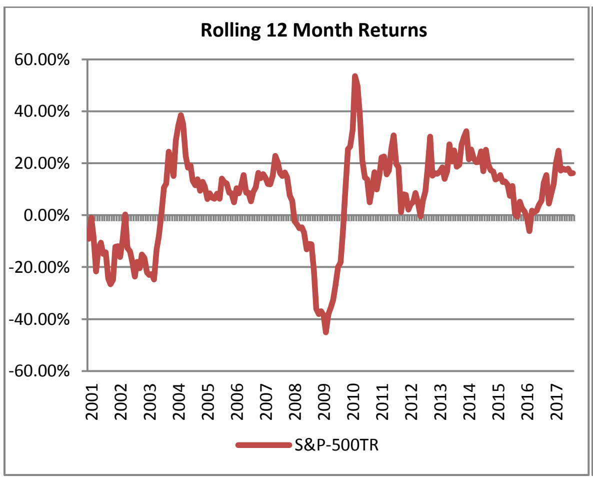
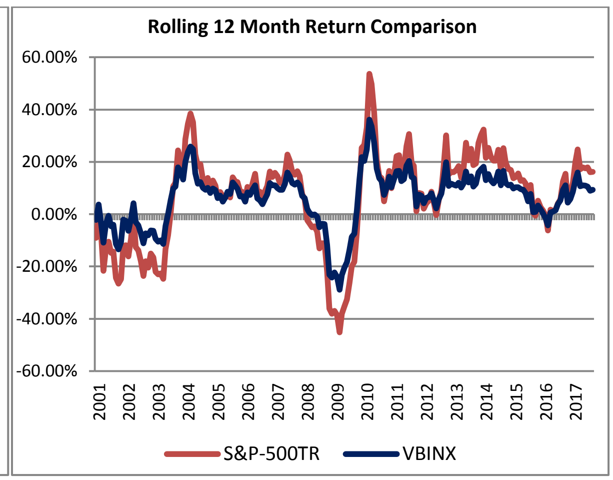
create that history though. We also create a hypothetical portfolio of 50% S&P 500TR / 50% SG_Trend Index. There is one chart including a hypothetical mix of 40% SG_Trend / 60% VBINX.
We are using annual rolling return charts to gain an interesting and hopefully deeper perspective of the data. Rolling return charts simply look at the return over the prior look back period specified, and then roll by repeating this process. In other words, since we are using monthly data, each month in the data set looks back and calculates the return over the number of months specified up to that point. In this case we will be looking at rolling 12 month returns. Therefore, each month in the rolling return data calculates the returns over the past year, and then the next month does the same thing. We often look at return charts from the start to the end of a data set, but I think these rolling return charts will help narrow our focus to the specific factor of non-correlation.

Let's take a quick visual non-correlation tour.





The chart to the left shows rolling 12 month returns for the S&P 500 Total Return Index. To the right we added the VBINX stock / bond mutual fund for comparison. Traditional portfolios commonly combine bonds with stock portfolios in order to diversify the portfolio and reduce volatility. Although a common practice, our charts do not make a very compelling case for using bonds as a diversifier. VBINX shows high correlation to the S&P 500TR Index, reducing rolling drawdowns but also reducing rolling returns. Our charts above indicate the stock / bond mix is still highly correlated to stocks. Based on these charts, the stock/bond portfolio does not actually seem more robust or non-correlated than holding the stock index alone.

Maybe we will get more interesting results with the SG_Trend CTA trend following index.

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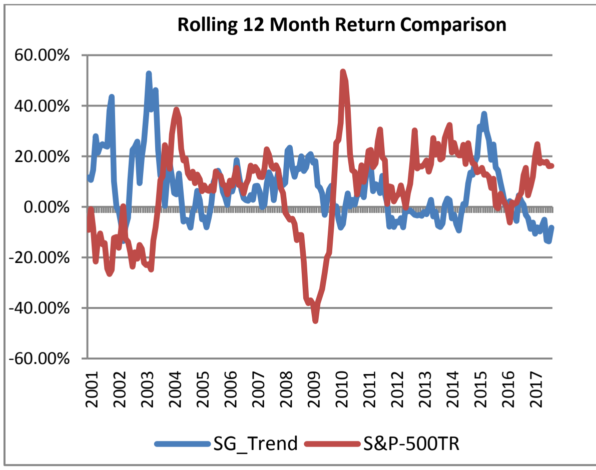

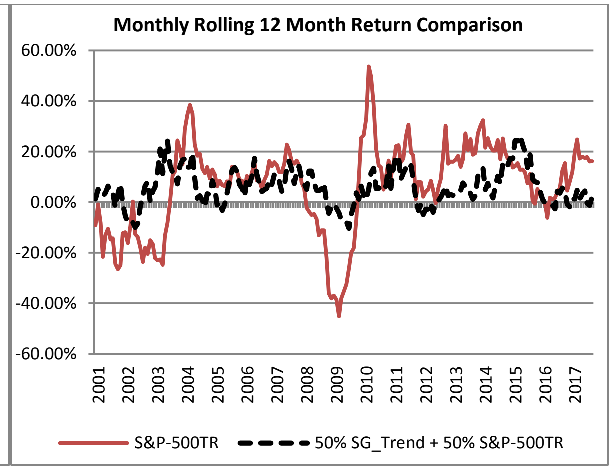

Now we are starting to see some non-correlation. The chart to the left shows a comparison of the SG_Trend Index vs. the S&P 500TR Index. It's easy to see the two indexes are not moving together most of the time or consistently. This is non-correlation visualized. It is a beautiful picture in my opinion.

So what does that mean for a portfolio? To the right we have replaced the SG_Trend Index with a hypothetical portfolio combined of 50% SG_Trend Index and 50% S&P 500TR Index. The S&P 500TR index remains for comparison. Unlike the VBINX mutual fund, we easily see a hypothetical portfolio of 50% SG_Trend and 50% S&P 500TR does indeed improve in the area of non-correlation to the stock index alone.

In preparing this data, I also created charts of rolling 6 and 3 month returns, but chose not to include them because they bring nothing new to what we see above. The 3 month charts in particular are noisier due to the shorter lookback window and would probably just be unpleasant and annoying to look at for the reader. Both the three and six month charts also show non-correlation gains from including SG_Trend with no non-correlation gains to speak of between VBINX and S&P 500TR. Drawdowns in some cases do get deeper with the shorter term charts. I would be more than happy to send the three and six month rolling comparisons to anyone who really wants them.

Below is a regular non-rolling VAMI comparison of the data used above. This chart was also part of our drawdown paradox study. An additional hypothetical portfolio mix of 40% SG_Trend Index and 60% VBINX is also included. While the annual rolling return charts help us see non-correlation from a

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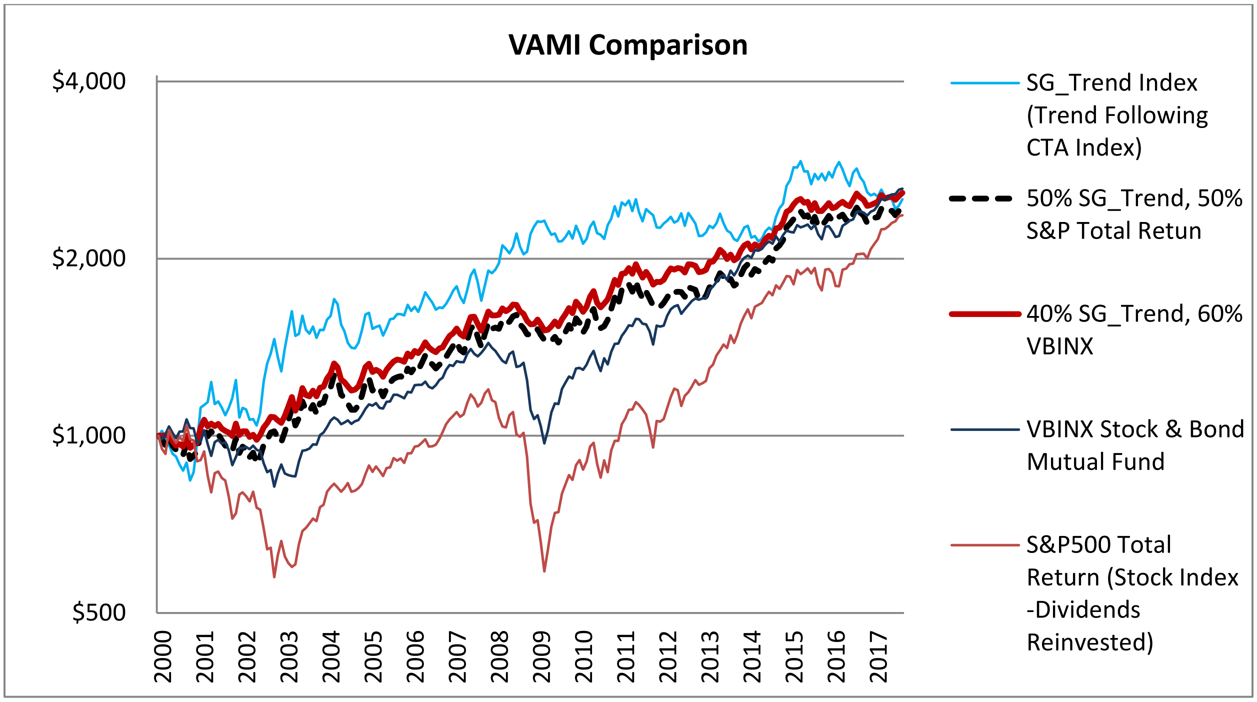
different perspective, VAMI charts help us see more directly what the likely longer term impact on portfolio returns would have been.



SG_Trend Index and combined portfolios are HYPOTHETICAL. Please see Hypothetical performance disclosure at the end of this letter to understand the potential problems and limitations related to hypothetical performance studies. VAMI stands for Value Added Monthly Index, and starts everything out together with $1000 using the monthly returns without deposits or withdrawals to add to and subtract from the equity curve through time.

We can easily see a non-correlated return stream such as the SG_Trend Index would have had a significantly powerful and positive impact on the overall traditional portfolio of stocks or stocks and bonds during this seventeen year stretch. Our annual rolling return charts previously indicated that a traditional bond mix via popular mutual fund was not as robust a diversifier. We can see in the VAMI chart that the stock / bond mutual fund experienced deep drawdowns at the same time stocks experienced drawdown periods. Meanwhile, the hypothetical mix of SG_Trend and S&P-500TR muted drawdowns during those periods. Likewise, the hypothetical mix of SG_Trend with VBINX also significantly reduced the prominent deep stock index drawdowns. Reduction in stock index drawdown through diversifying with the SG_Trend Index did not also result in a reduction of absolute returns for the period.

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To be fair, the mixed hypothetical portfolios also show protection against deep drawdowns in the SG_Trend Index. The SG_Trend Index is in a deep drawdown at the time of this study, and has had prior deep drawdowns. However, we see that when two non-correlated strategies are combined the drawdowns for the overall portfolio in this example would have been reduced and returns enhanced over that of only holding the S&P 500TR Index or only holding VBINX. The hypothetical combined portfolios enhanced both risk adjusted and absolute returns over that of only holding the S&P 500TR index. They would have not have enhanced absolute returns as much when comparing to the 100% SG_Trend Index, but they did smooth out the ride and improve risk adjusted returns.

CONCLUSION

If we knew the future with any sort of accuracy, a highly correlated portfolio bet on one single asset class and one single outcome for that asset class going forward would be the best plan. Call me if you have a crystal ball, because I do not. In fact, we do not forecast anything at Anderson Creek Trading other than expecting price trends to form through history. I believe uncertainty is the rule in markets. If we do not know the future, then we want our investment portfolio to be robust enough to handle multiple outcomes. We definitely should consider the risks of relying on one single outcome in one single asset class as such dependence may create fragility in the portfolio.

One thing I believe to be a sure bet is that each one of these will go through significant drawdowns in the future.

One way to increase the robustness of a portfolio is to combine non-correlated strategies. Another is to combine non-correlated markets. The S&P 500 is a market capitalization momentum strategy that is highly correlated in one asset class and is reliant on one outcome –a bull stock market. The SG_Trend Index represents a hypothetical mix of managers who use a certain type of strategy –quantitative systematic trend following. Systematic trend following is a strategy that is non-correlated to buying and holding stocks, and it expresses itself through markets which are mostly non-correlated to stocks. Trend following across multiple futures markets and multiple sectors is not reliant on one single outcome, but can adapt and potentially benefit from multiple outcomes, including bear market price trends. In our examples we have found that the strategies represented by the SG_Trend Index and the S&P 500TR Index have indeed been non-correlated in the past.

Our data visualizations reveal that combining these two strategies together has the potential to improve both risk adjusted returns (smaller drawdowns) and absolute returns for a portfolio. Also revealed by historical data is the fact that a stock and bond portfolio has been highly correlated to stocks.

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Therefore, I believe trend following with futures to be a better diversifier for the traditional stock portfolio than bonds. I also believe trend following with futures to be a great diversifier to a portfolio that is committed to holding bonds. Our VAMI comparison above indicates the benefits of trend following futures added to a portfolio including bonds and stocks as represented by VBINX remains powerful due to the non-correlation with stocks. I believe trend following with futures should be a core portfolio component for those suitable to using this type of strategy.

Because the future is always uncertain, it might be wise to have a portfolio consisting of non-correlated strategies. At least one of those strategies in my opinion should be designed to handle uncertainty by having the ability to potentially profit from multiple outcomes in multiple and varied markets. Of course the strategies need to be able to stand on their own as well.

Let’s assume all three categories: correlated, negatively correlated, and non-correlated have positive stand along historical performance and are expected to have long-term positive performance in the future. Negatively correlated strategies could help our portfolio at certain times, but would most likely be a drag on performance because of their consistently opposing performance characteristics. Non-correlated strategies might be a drag on overall portfolio performance at certain times, but would not be expected to be a drag on performance as general a rule over the long-term. Under our assumption of expected positive long-term performance into the future for each, combining non-correlated strategies would be expected to help defend a portfolio by making it more robust while also possibly enhancing absolute returns over time.

The SG_Trend Index and the S&P 500TR Indexes are both volatile. By adding the two volatile indexes together in hypothetical portfolios we achieved a reduction in volatility and an improvement over the stock index returns alone. How can adding volatility reduce volatility? This seems paradoxical.

It is the non-correlated relationship between the two volatile indexes which results in less volatility when combined together. Combining non-correlated but volatile strategies in a portfolio has the clear potential to enhance both risk adjusted and absolute returns.

There is a common saying in the investing world that goes something like this: ‘Diversification is the only free lunch’. I don’t know about free lunches, because investing is difficult and learning how to do it well is certainly expensive, but I would say that diversification, as long as it is non-correlated, might be the closest thing to a free lunch available. Diversification without non-correlation might not be

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diversification in the macro sense at all. I wonder how many "diversified" portfolios out there really are diversified.

Bonus Behavioral Investor Idea

Looking over the rolling 12 month charts gives me a thought. We know from numerous external books and writings over the years, and also from personal experience in speaking with investors, that investors can be their own worst enemy. Human biases often get in the way of proper investing. One of the bad behaviors often written about is chasing recent performance. The rolling return charts we have been looking at provide a possible tool to aid investors in flipping the switch to create an objective and rational investor habit.

Let's say an investor has displayed some good behavior by creating a portfolio of two or more non-correlated strategies. Assume also our investor is earning money every month from his/her regular line of work or some other source of income. When should they allocate new cash to these portfolio strategies, and how much should they allocate to each? We often hear people say something along the lines of "it's in cash, so it's not working for me and I need to do something with it". I like to flip the switch on common behavioral patterns which may be maladaptive, replacing them with objective reasoned and goal oriented behavioral habits.

Maybe it would be useful for our investor to keep the savings in cash through the year, or maybe 6 months at the shortest. Then have a time each year or every six months scheduled when they will look at a rolling 12 or 6 month return chart (needs to remove impact of deposits and withdrawals of course – those do not count for returns) for each strategy in their portfolio. Not each instrument, manager, or stock, but just at the strategy level. For stocks, they could use the index or sub index that best matches their stock portfolio. For many this is likely to be the S&P 500. At this point they could then allocate to the strategy that has experienced the worst performance and is in the deepest drawdown for the rolling period. Using the rolling return charts would help our imaginary investor see this quickly. If multiple strategies (assuming non-correlation over long-term) are in deep drawdown relative to their rolling return charts, then the allocation can be split up between them. The investor could even get more quantified with the process and measure drawdown relative to historical drawdown and allocate via a formula related to that. If all strategies are near historic rolling return highs, then they could keep the cash and wait for the next scheduled calendar allocation period.

If allocating every six months rather than every 12, then the investor could also just plan to make a 50% allocation on a rolling six month schedule. The annual calendar is probably just as good, if not better,

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but some people like action. Either way the investor is now using drawdowns for allocating to non-correlated strategies they have previously selected for the portfolio.

Our imaginary investor now has a simple repeatable systematic process replacing the common desire to chase recent performance. They are fighting off any FOMO or other emotional pressures with process. Our investor would be able to turn off CNBC and Mad Money and go on more bike rides, play with the kids, and remove some of the drama around investing all while actually being more objectively and efficiently engaged in their investing process. The only thing that our friend might miss out on in this scenario is water cooler chatter about what investment crushed it recently.

They could even flip the switch on water cooler discussions. Peers are a strong influence. Most people avoid discussion of drawdown and loss but love to discuss gains. Our investor could become a behavioral leader for his/her peers by thinking and speaking differently and objectively. They could repeat a mantra for themselves and their friends that helps reinforce their new behavioral habit: "I have strategies X, Y, and Z which are all non-correlated to each other. I save cash and then allocate at a specified annual time to the strategy(s) which have done the worst for the period. I buy drawdowns in non-correlated strategies and do this over and over again." Bam! Now our investor has replaced drama and stock tips with reason and process for self and for his/her peers!

Just a thought.

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FOR EXAMPLE, WHEN THE MARKET MAKES A "LIMIT MOVE". THE PLACEMENT OF CONTINGENT ORDERS BY YOU OR YOUR TRADING ADVISOR, SUCH AS A "STOP LOSS" OR "STOP LIMIT" ORDER, WILL NOT NECESSARILY LIMIT YOUR LOSSES TO THE INTENDED AMOUNTS, SINCE MARKET CONDITIONS MAY MAKE IT IMPOSSIBLE TO EXECUTE SUCH ORDERS. A "SPREAD" POSITION MAY NOT BE LESS RISKY THAN A SIMPLE "LONG" OR "SHORT" POSITION. THE HIGH DEGREE OF LEVERAGE THAT IS OFTEN OBTAINABLE IN COMMODITY TRADING CAN WORK AGAINST YOU AS WELL AS FOR YOU. THE USE OF LEVERAGE CAN LEAD TO LARGE LOSSES AS WELL AS GAINS. IN SOME CASES, MANAGED COMMODITY ACCOUNTS ARE SUBJECT TO SUBSTANTIAL CHARGES FOR MANAGEMENT AND ADVISORY FEES. IT MAY BE NECESSARY FOR THOSE ACCOUNTS THAT ARE SUBJECT TO THESE CHARGES TO MAKE SUBSTANTIAL TRADING PROFITS TO AVOID DEPLETION OR EXHAUSTION OF THEIR ASSETS. THIS BRIEF STATEMENT CANNOT DISCLOSE ALL THE RISKS AND OTHER SIGNIFICANT ASPECTS OF THE COMMODITY MARKETS.

YOU SHOULD ALSO BE AWARE THAT THIS COMMODITY TRADING ADVISOR MAY ENGAGE IN TRADING FOREIGN FUTURES OR OPTIONS CONTRACTS. TRANSACTIONS ON MARKETS LOCATED OUTSIDE THE UNITED STATES, INCLUDING MARKETS FORMALLY LINKED TO A UNITED STATES MARKET MAY BE SUBJECT TO REGULATIONS WHICH OFFER DIFFERENT OR DIMINISHED PROTECTION. FURTHER, UNITED STATES REGULATORY AUTHORITIES MAY BE UNABLE TO COMPEL THE ENFORCEMENT OF THE RULES OF REGULATORY AUTHORITIES OR MARKETS IN NON-UNITED STATES JURISDICTIONS WHERE YOUR TRANSACTIONS MAY BE EFFECTED. BEFORE YOU TRADE YOU SHOULD INQUIRE ABOUT ANY RULES RELEVANT TO YOUR PARTICULAR CONTEMPLATED TRANSACTIONS AND ASK THE FIRM WITH WHICH YOU INTEND TO TRADE FOR DETAILS ABOUT THE TYPES OF REDRESS AVAILABLE IN BOTH YOUR LOCAL AND OTHER RELEVANT JURISDICTIONS. THIS COMMODITY TRADING ADVISOR IS PROHIBITED BY LAW FROM ACCEPTING FUNDS IN THE TRADING ADVISOR'S NAME FROM A CLIENT FOR TRADING COMMODITY INTERESTS. **YOU MUST PLACE ALL FUNDS FOR TRADING IN THESE TRADING PROGRAMS DIRECTLY WITH A FUTURES COMMISSION MERCHANT.**

Past results are not necessarily indicative of future results.

Hypothetical Performance Disclosure
The study above includes one or more CTA indexes which are a combination of multiple CTAs or managers. Also included are hypothetical portfolio combinations created by weighting CTA indexes, stock indexes, and one or more mutual funds. These weightings and indexes while not exactly simulated trading, are hypothetical or simulated portfolio combinations or composites. The following disclosure therefore applies where CTA indexes or hypothetical portfolio combinations or composites are utilized:

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