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Market Breadth Trend Following

By David Schassler, Head of Quantitative Investment Solutions and Joseph Schafer, Quantitative Analyst

Trend following is a simple, yet effective, approach that can both allow portfolios to participate in the returns of the equity market *and* protect them from significant market corrections. Trend followers aim to be invested during the good times, when the market is going up, and to sit it out during the bad times, when the market is falling.

A strategy based on market breadth, a form of trend following, may improve performance by better differentiating between small and large market corrections.

Good Times Versus Bad Times

Separating the good times from the bad is hard: unless there is something wrong, historically, the natural bias of the U.S. stock market is upwards. Downward trending prices are a big red flag that something is amiss! How often you get it right can sometimes make the difference between good and bad performance. Trend followers would rather take small losses when they occur in order to protect against bigger losses.

Trend following strategies are wrong often. However, the losses averted during bear markets can make up for the mistakes along the way. Trend following provides a game plan for when the next bear market comes. For that reason, trend following is appealing. For many, experiencing a major drawdown is not palatable.

The key to successful trend following is the ability to differentiate between bumps in the road (dips and moderate corrections) and systemic risk-off events (severe corrections and bear markets). Trend followers want to ignore the small corrections, because they typically recover quickly, and protect against the big corrections.

	Ignore		Protect Against	
	Dip (5% to 10%)	Moderate Correction (10% to 15%)	Severe Correction (15% to 20%)	Bear Market (20% or more)
Mean Number of Occurrences Per Year	3.4	1.1	0.5	0.3
Mean Number of Days	36	101	189	299
Mean Decline (%)	10.8	19.4	28	35.7
Chances of Decline Moving to Next Stage (%)	32	45	57	N/A

Source: Ned Davis Research, Inc. as of 10/24/2019. Analysis compiled using daily data for the S&P 500® Index from 1/03/1928 – 10/24/2019.

The above table is the Ned Davis Research Anatomy of the S&P 500 Index Declines, dating back to 1928. It shows that market dips happen frequently, at 3.4 times per year, and typically recover quickly (in 36 days). On the other hand, bear markets happen infrequently, at 0.3 times per year, but take an average of 299 days to recover!

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## Moving Averages: Filtering the Noise to Identify the Trend

Trend followers use moving averages ("MA") to filter out the noise created by volatility in order to make trends easier to identify. An MA is an average of prices over a predetermined time horizon and compares recent prices (i.e., a short-term average) to historical prices (i.e., a long-term average), to determine if the market is rising or falling.

Let us consider the 50 x 200 MA because of its popularity. It is calculated by taking an average of the prices over the past 50 days and, separately, an average of the prices over the past 200 days. It is considered to be a moving average because, each day, as time moves forward, the data moves with it. This means dropping off the last day and adding a new day as you move forward. Positive market trends occur when the short MA is above the long MA, and vice versa for negative trends.

We tested the 50 x 200 MA using the following trading strategy:

- Invest in the S&P 500 Index when trends are positive (50 MA > 200 MA).

- Sell the S&P 500 Index and purchase U.S. Treasury bills when trends are negative (50 MA < 200 MA).

- A signal must last for 5 trading days before implementing to avoid unnecessary trading.

Here is a long-term drawdown (loss) chart comparison of the S&P 500 Index versus the 50 x 200 MA trading strategy. The 1955 start date was selected due to the availability of U.S. Treasury bill data.
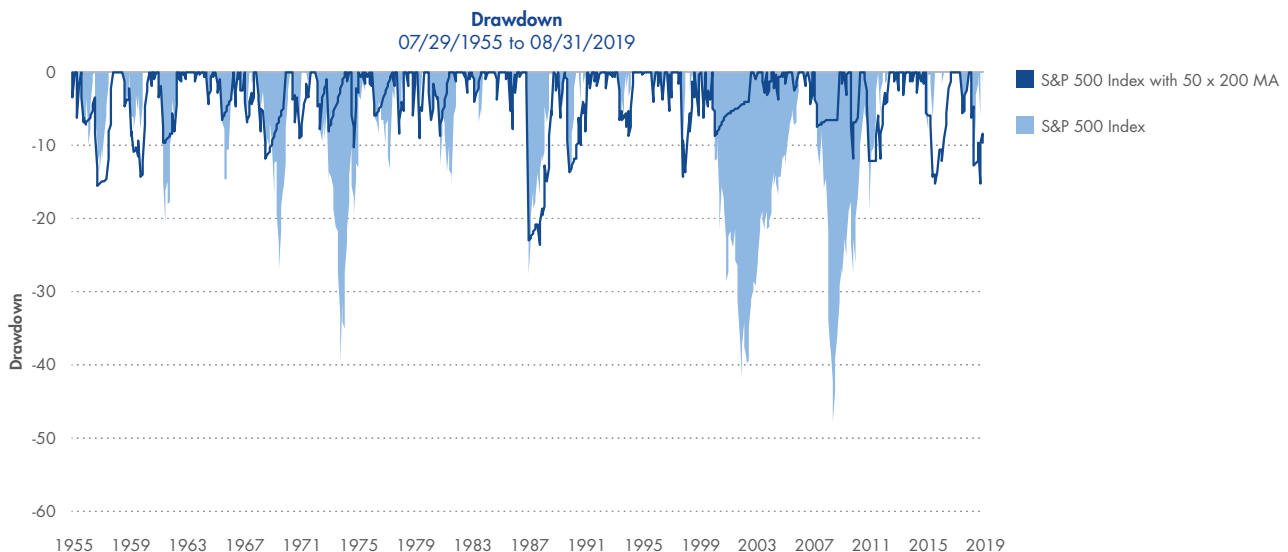
Drawdown
07/29/1955 to 08/31/2019

Legend: ■ S&P 500 Index with 50 x 200 MA   ■ S&P 500 Index

Source: VanEck as of 8/31/2019. Analysis compiled using monthly data for the S&P 500 Index from 7/29/1955 to 8/31/2019. Total returns were used for the S&P 500 Index and the 50 x 200 MA strategy from January 5, 1988 to August 31, 2019. Prior to that, price returns were used due to the availability of data. The 50 x 200 MA strategy invested in 3-Month U.S. Treasury Bills when defensively positioned.

As seen in the chart, the 50 x 200 MA strategy historically has been effective at protecting against bear market corrections, as defined by a loss of 20% or greater. In fact, this strategy was able to keep market drawdowns from reaching 20% in all but one event!

The only bear market that trend following did not protect against was Black Monday, which occurred on October 19, 1987, when the S&P 500 Index fell just over 20% in one day. Black Monday is widely viewed as a technical event caused by computerized trading. The market was overwhelmed by sell orders from portfolio insurance hedges. Because price trends were generally strong leading up to this market break, there was not enough time for trend following strategies to react. Going forward, trend followers may gain some comfort from knowing that regulators have since added circuit breakers to halt trading when prices decline by significant predetermined daily thresholds.

### Predicting All the Bear Markets That Never Happened

The primary issue for trend following has not been its ability to protect against bear markets. It has been what investors "pay" for the downside protection. The market collects its dues in a whipsaw-like fashion. The term whipsaw refers to a double-handled saw used by lumberjacks. In investing, a whipsaw occurs when an investor takes a directional position only to have the markets abruptly turn in the opposite direction. This can result in the investor taking the loss, missing the rebound and, as a result, lagging the market. This happens a majority of the time.

To measure this, let us look at the success rate of the 50 x 200 MA strategy. Batting averages track the number of correct attempts divided by the total number of attempts. In this case, the attempts are each time the 50 x 200 MA sold stocks and bought Treasuries. Correct attempts, or signal wins, are when this resulted in performance that exceeded a buy-and-hold investment in the S&P 500 Index. The table below provides batting average statistics for the 50 x 200 MA strategy. As you can see, there were 36 total attempts to sidestep market corrections. Of those 36, only 20% outperformed buy-and-hold investments in the S&P 500 Index.

	# of Attempts to Time Market Corrections	Batting Average
50 x 200 MA	36	20%

Source: VanEck as of 8/31/2019. Analysis compiled using daily data for the S&P 500 Index from 8/3/1955 – 8/31/2019.

Another way to view this data is in the rolling five-year return chart below. The dark gray bars are the successful market timing events and the lighter gray bars are all of the unsuccessful market timing events.

Rolling 5-Year Returns
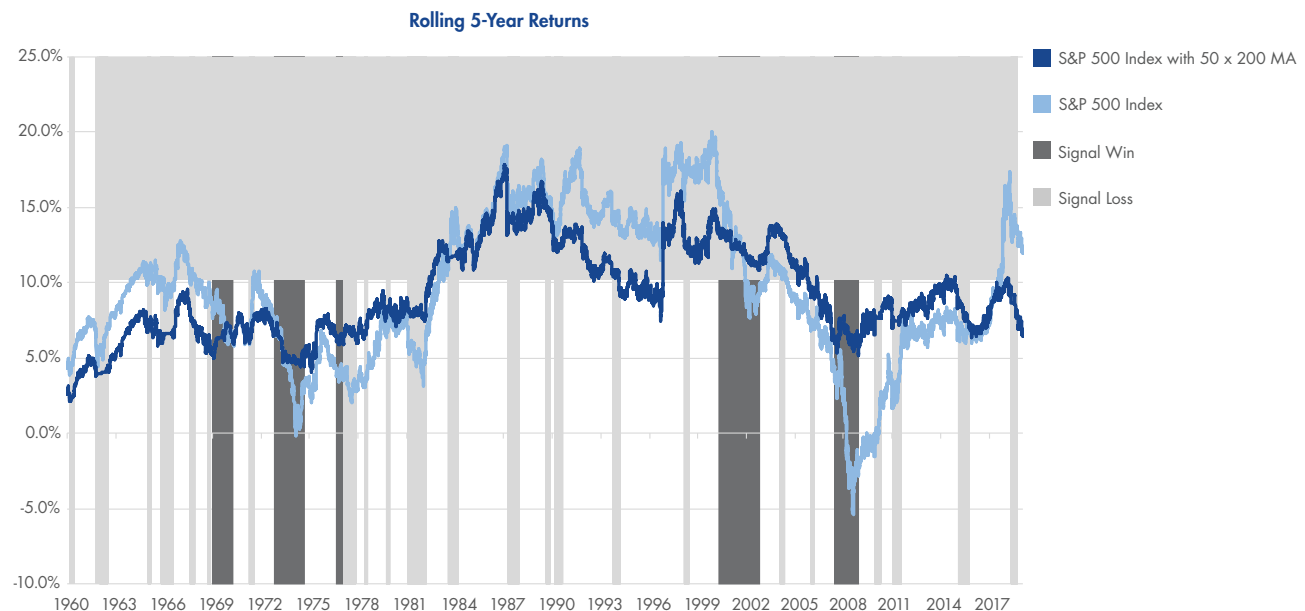
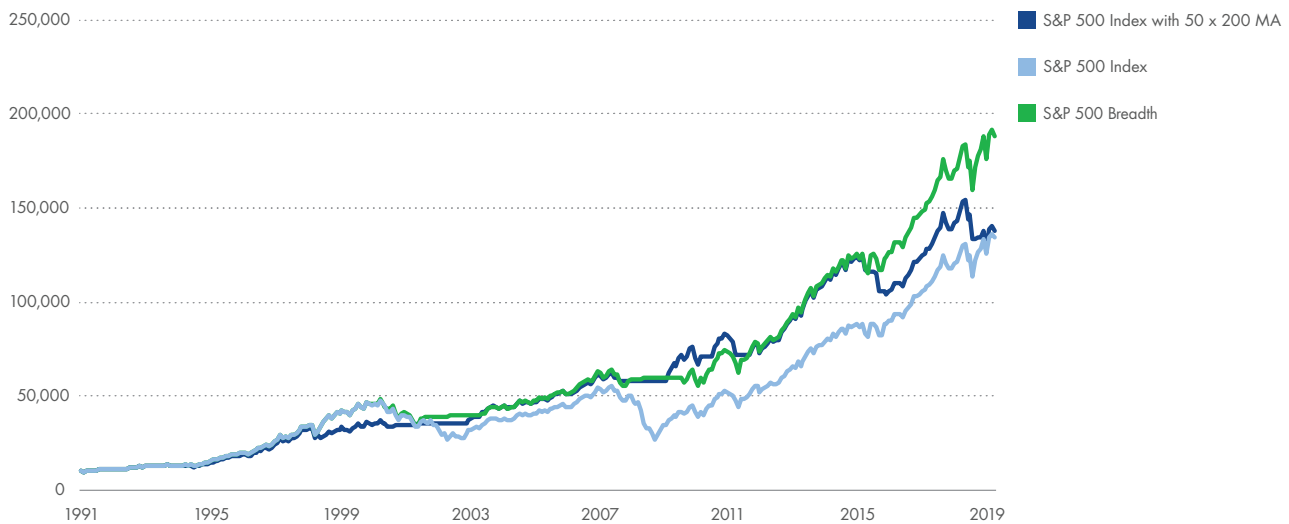Source: VanEck as of 8/31/2019. Analysis compiled using daily data for the S&P 500 Index from 8/1/1960 – 8/31/2019.

The line chart on the previous page demonstrates that, although trend following gets it wrong frequently, it is very effective at limiting drawdowns and providing a consistent return profile. Signal wins are cases where a signal resulted in performance that exceeded a buy-and-hold investment in the S&P 500 Index. Signal losses are cases where a signal resulted in performance that underperformed a buy-and-hold investment in the S&P 500 Index.

Is an Investor Better Off with a Buy-and-Hold Approach?

The answer to that question depends on the investor. Below is a comparison of a 50 x 200 MA strategy versus a buy-and-hold investment in the S&P 500 Index.

Multi-Statistic
07/29/1955 to 08/31/2019

Description	Annualized Return	Annualized Sample Standard Deviation	Sharpe Ratio	Average Drawdown	Maximum Drawdown
S&P 500 Index with 50 x 200 MA	9.40	11.07	0.49	-4.86	-25.21
S&P 500 Index	10.12	14.44	0.42	-6.32	-50.95

Source: VanEck as of 8/31/2019. Analysis compiled using monthly data for the S&P 500 Index from 7/29/1955 to 8/31/2019.

The table above demonstrates that over a very long time horizon, the 50 x 200 MA strategy offered a higher Sharpe Ratio (risk-adjusted return) and a significantly lower drawdown. If risk is not a consideration, then the buy-and-hold investment won.

For many, a big market crash may be a life altering event. Unfortunately, bear markets can occur at any time. Trend following offers one solution to this problem by providing a game plan for when the next crisis occurs.

Comparison to Low Volatility Equities

Low volatility equity strategies have become very popular due to their historical ability to provide downside protection. For that reason, we compare the S&P Low Volatility Index to both the 50 x 200 MA strategy and the S&P 500 Index. The S&P 500 Low Volatility Index measures the performance of the 100 least volatile stocks in the S&P 500 Index, as defined by standard deviation, using the trailing 252 days, or rolling one-year periods.

The table below compares the annualized returns, annualized standard deviation and maximum drawdown of the S&P 500 Low Volatility Index to both the 50 x 200 MA strategy and the S&P 500 Index. The 1972 start date was selected due to the availability of S&P 500 Low Volatility Index data.

Multi-Statistic
3/31/1972 – 8/31/2019

Description	Annualized Return	Annualized Sample Standard Deviation	Maximum Drawdown
S&P 500 Index with 50 x 200 MA	10.32	11.59	-25.21
S&P 500 Index	10.43	15.04	-50.95
S&P 500 Low Volatility Index	10.33	12.25	-44.75

Due to the availability of data, price returns were used from 1971 to 1986, and total returns were used from 1987 to 2019.
Sources: FactSet, Bloomberg and VanEck.

The table on the previous page demonstrates that both the 50 x 200 MA strategy and the S&P 500 Low Volatility Index are effective at reducing volatility and minimizing drawdowns, while reducing performance only minimally. However, the 50 x 200 MA strategy was much more effective at reducing the maximum drawdown.

Another way to view this data is in the rolling five-year return chart below.

Rolling 5-Year Returns

Source: VanEck as of 8/31/2019. Analysis compiled using daily data for the S&P 500 Index from 8/3/1955 – 8/31/2019.

The chart above demonstrates that, over rolling five-year windows, the 50 x 200 MA strategy is effective at providing a consistently positive return profile while the S&P 500 Low Volatility Index and the S&P 500 Index were not.

Identifying Trends with Market Breadth

Breadth is another form of trend following. It provides investors with additional information, by measuring the trends of the underlying index components in an attempt to more accurately differentiate between small and large market corrections. Breadth does this by requiring confirmation from a significant portion of the index's components. Market breadth can be measured in many different ways. It can be measured using individual stocks, sectors, industries and even market capitalization. In our example, we use the 24 industries in the S&P 500 Index.

On the following page is a cumulative return comparison of the 50 x 200 MA versus the market breadth strategy. The test starts in 1991 because of the availability of return data on the industries in the S&P 500 Index. As you can see, over the observed period, the breadth strategy generated a higher cumulative return than both the 50 x 200 MA strategy and the S&P 500 Index.

Growth of $10,000
05/31/1991 to 08/31/2019

Source: VanEck as of 8/31/2019. Analysis compiled using monthly data for the S&P 500 Index from 5/31/1991 – 8/31/2019

We tested using the following strategy:

- Trends were measured on each of the 24 industries in the S&P 500 Index.

- The S&P 500 Index was sold and U.S. Treasury bills were purchased when the majority, or 13 out of 24 industry trends or more, were bearish.

- Industry trends were measured using the 150-day MA and the 400-day MA (these parameters, i.e. the number of days, were selected using a proprietary statistical process). While a common parameter set was used for each industry in order to simplify the analysis, it is possible to further refine the parameters based on the unique risk and return characteristics of each industry.

- The market breadth signal must persist for five trading days before implementing to protect against overtrading.

Looking at batting averages again, the table below shows that the market breadth strategy was more effective at identifying falling market prices.

	# of Attempts to Time Market Corrections	Batting Average
50 x 200 MA	12	25%
Market Breadth	6	50%

Source: VanEck as of 8/31/2019. Analysis compiled using monthly data for the S&P 500 Index from 5/31/1991 – 8/31/2019.

Another important metric to look at is the percentage of time invested. Historically, the S&P 500 Index has generated a strong annualized return for investors. Therefore, not being invested could come with significant opportunity costs.

	% of Time Invested
50 x 200 MA	78.20
Market Breadth	92.50

Source: VanEck as of 8/31/2019. Analysis compiled using monthly data for the S&P 500 Index from 5/31/1991 – 8/31/2019.

Since the breadth strategy requires a substantial amount of confirmation before getting defensive, it was invested 92.50% of the time versus 78.20% of the time for the 50 x 200 MA strategy.

Multi-Statistic
05/31/1991 to 08/31/2019

Description	Annualized Return	Annualized Sample Standard Deviation	Sharpe Ratio	Average Drawdown	Maximum Drawdown
S&P 500 Breadth	10.95	11.82	0.71	-4.77	-28.67
S&P 500 Index with 50 x 200 MA	9.74	10.71	0.67	-4.62	-16.30
S&P 500 Index	9.62	14.15	0.50	-5.89	-50.95

Source: VanEck as of 8/31/2019. Analysis compiled using monthly data for the S&P 500 Index from 5/31/1991 – 8/31/2019.

The table above shows that the breadth strategy outperformed the S&P 500 Index on each of the metrics listed. It generated a higher return, lower volatility, a higher risk-adjusted return and significant downside protection.

Compared to the 50 x 200 MA strategy, the breadth strategy also generated higher absolute and risk-adjusted returns. The volatility of breadth was higher because it was invested much more often in the S&P 500 Index.

While the maximum drawdown was higher for the breadth strategy, the additional downside protection of the 50 x 200 MA strategy came at a big cost. Trying to catch more drawdowns resulted in more whipsaws for the 50 x 200 MA strategy and, as a result, it underperformed the breadth strategy by over 1% on an annualized basis.

The end result was that the breadth strategy provided a more optimal balance between performance and risk management.

Conclusion

Trend following has historically been an effective way to participate in the returns of the equity market while potentially limiting large market drawdowns and reducing volatility. Given the market's historical bias to the upside, however, the frequent whipsaws that can occur with these strategies may cause investors to underperform over the long term. Market breadth has the potential to address these issues by requiring greater confirmation among the underlying index components to help distinguish between the small blips in the market and the major drawdown events that investors really want to avoid.

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