

# Trend Following and Volatility Regimes

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## Abstract

Trend-following strategies can make money during large market price movements in either upward or downward directions. Because this resembles the payoff of an options straddle strategy, many investors are tempted to characterize trend-following as a long volatility strategy. This short paper finds that, contrary to such an interpretation, trend-following can perform well in both high and low volatility environments. It is the existence of strong trends rather than high volatility that preconditions good trend-following performance.

## Keywords

Trend Following; Volatility; VIX

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## 1. Introduction

Trend-following can perform well when equities do not. This observation has led investors to add trend-following products to their otherwise equities-heavy asset allocation as a source of diversified alpha. It may seem reasonable to consider trend-following as a long-volatility strategy since volatility tends to spike during periods of equity under-performance. Indeed, there is some theoretical rationale that supports this interpretation. However, a more nuanced view suggests that this is not necessarily so. Analysis of trend-following returns and equity volatility puts forward a relationship that is far from direct. As we will show, trend-following can perform well in both very high and very low volatility regimes.

A small thought experiment motivates this discussion. Imagine an asset that goes down 1% every day without fail. Any reasonable implementation of trend-following would short this asset and thereby make a certain gain with no volatility on an asset that itself has no volatility. So as this trivial example demonstrates, having zero-volatility is not in itself a reason for bad trend-following performance.

Likewise, consider another hypothetical asset whose daily returns are +5% followed by -5%. This asset is all volatility. Yet, trend-following on this asset would almost certainly yield terrible performance.

Absurd as it is, this thought experiment suggests that it is not volatility *per se* that matters to trend-following. Ultimately, trend-following strategies need strong trends to perform well. This can happen in high or low volatility regimes.

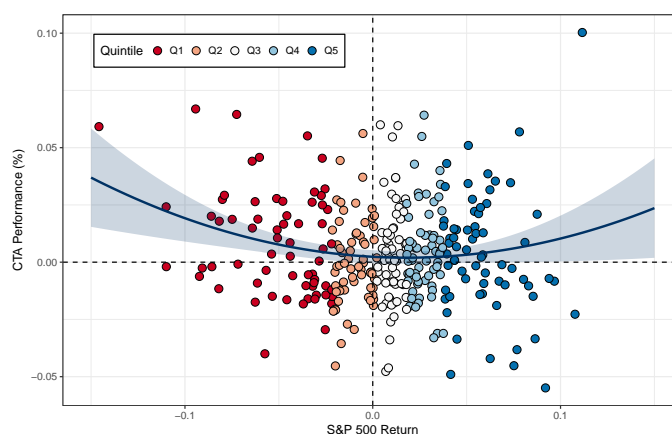
The sections that follow will briefly review the relationship between trend-following returns and equity returns. The analysis will then expand to include equity volatility to show that trend-following can perform well in low as well as high volatility regimes.

## 2. Trend-Following as an Options Strategy

Fung and Hsieh (2001) considered trend-following to be a type of options strategy where the investor simultaneously buys put and

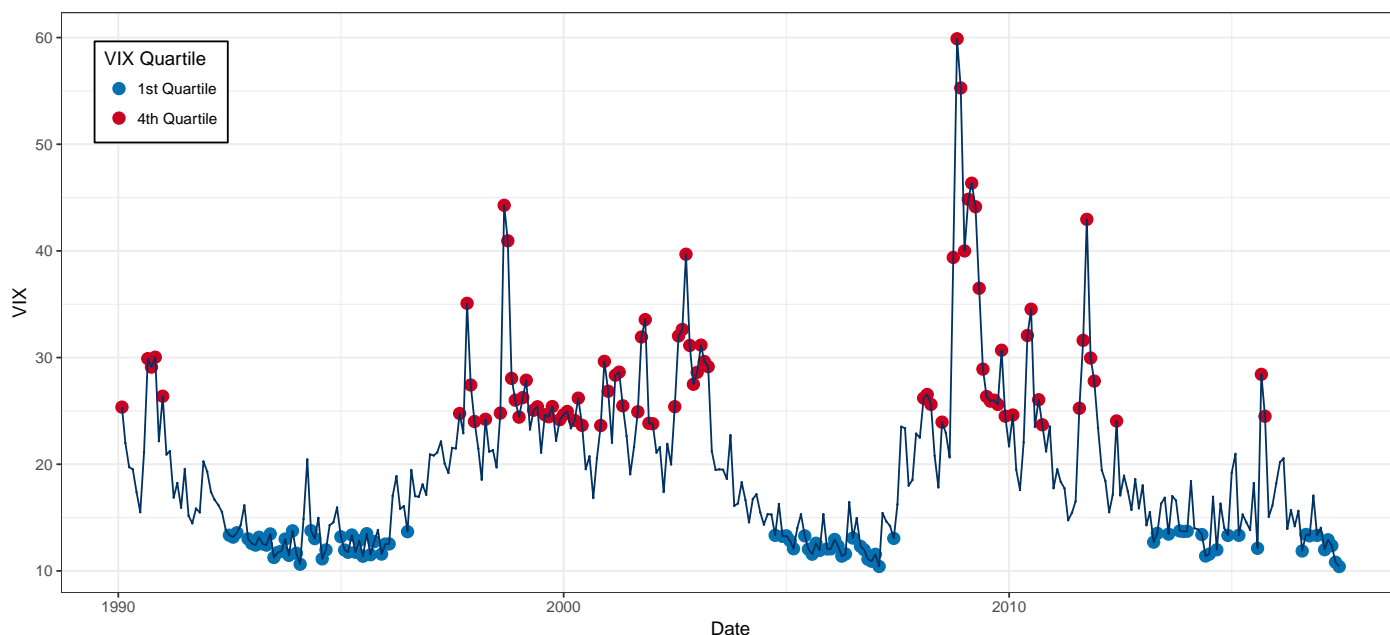
call options on the underlying assets to profit from price trending in both directions. As supporting evidence, they sorted monthly returns of the Morgan Stanley World Equity Index into quintiles. The average performance of large trend-following funds within the lowest and highest quintiles is higher than performance in the middle ones. This phenomenon, typically called the *CTA smile*, suggests to Fung and Hsieh (2001) that trend-following strategies exhibit behavior that is similar to that of a straddle option strategy payoff.

This *CTA smile* is presented in a slightly different form in Figure 1. The monthly returns of the BarclayHedge CTA Index<sup>1</sup> is plotted on the y-axis against the contemporaneous S&P 500 returns on the x-axis. Unsurprisingly, we see the same non-linear relationship between equity and CTA returns that Fung and Hsieh (2001) saw. Trend-following returns are high when equity returns are very high and very low.



**Figure 1.** Monthly Returns of CTA Index vs. S&P 500 Returns. We mark the four quintiles of S&P 500 returns for ease of interpretation.

<sup>1</sup>The BarclayHedge CTA Index is an equally weighted index of CTA fund returns. See <https://www.barclayhedge.com/research/indices/cta/sub/cta.html> for detailed documentation of the index.



**Figure 2.** History of VIX Index with 1st and 4th quartiles marked.

There is a strong resemblance between the smile shape in Figure 1 and the payoff of a long options straddle. This interpretation in fact predates Fung and Hsieh (2001) all the way to Merton (1981). It is then only natural to reason that, since a straddle strategy benefits from high volatility<sup>2</sup> and is harmed by low volatility, then trend-following strategies would behave the same way.

Yet, this reasoning is not necessarily correct. There is a subtlety that is worth pointing out: a strategy that resembles an options strategy does not necessarily mean that it is one. It may not be exposure to volatility that causes trend-following returns *vis-a-vis* equity returns to resemble a straddle strategy payoff. An alternative view is that trend-following requires strong moves to make money. This can happen in both high and low volatility environments, thus inducing the *CTA smile*.

This becomes apparent when trend-following returns are compared against volatility regimes instead of equity returns.

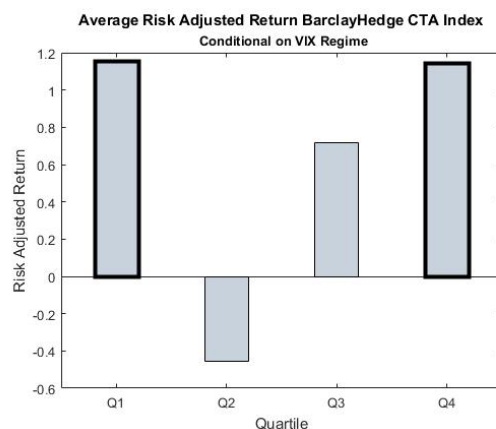
### 3. Volatility Regimes

In this section, we will show that trend-following performance can actually be quite positive in low volatility environments. This rejects the idea that trend-following as a strategy can only do well in high volatility times and supports our notion that it is the strength of directional moves, rather than volatility, that dictates performance.

In the spirit of the *CTA smile*, the BarclayHedge CTA Index continues to serve as a proxy for trend-following performance while the VIX Index represents the market's expectation of near-term volatility. The VIX index is an attractive option for this analysis as it is computed from options traded on the S&P 500 Index, which makes it analogous to the *CTA smile* analysis.

<sup>2</sup>A long options straddle is a long volatility strategy. As implied volatility rises, both the long call and the long put gain in value. This is true regardless of the direction of the underlying market movement.

Four volatility regimes are derived from the four quartiles of VIX Index levels. Figure 2 shows the history of the VIX Index from January 1990 to June 2017. The lowest and highest quartile labels are shown on the figure as colored markers. Since volatility is known to cluster, we see that the high volatility quartiles form two distinct episodes: during 1997-2003 and then again from 2008 to 2012.



**Figure 3.** Average monthly returns of the Barclay Hedge CTA Index vs. VIX quartiles.

The risk-adjusted average CTA performances in these four VIX quartiles are computed and shown in Figure 3. Performance is positive for all but the second VIX quartile. More strikingly, both the highest and lowest quartiles show better performance than the middle quartiles.

The fact that trend-following performs well in the highest VIX quartile is not terribly surprising. Since implied volatility tends to spike during equity crisis periods, the highest VIX quartile is associated with the lowest equity performance quartile. As CTA performance can be quite positive in such an environment, this fact fits well with what is observed from the *CTA smile*.

Contrary to the interpretation of trend-following as a strategy that can only do well in high volatility times, CTA performance is also quite positive in the lowest VIX quartile. Low volatility, especially in equities, does not imply a lack of trends. The experience of the US equity markets in 2006 and early 2017 demonstrates this well. Volatility, both implied and realized, were at are close to all time lows while equity indexes trended strongly upward.

This supports our contention that it is the existence of trends rather than the existence of volatility that dictates trend-following performance.

## 4. Conclusion

Trend-following strategies require strong directional moves in the assets they trade to make money. If there are no trends to follow and markets are rangebound, then the opportunities for trend following are more limited. The actual direction does not matter as trend-followers can short assets. Since equity markets can sustain large negative trends in crisis times that benefit trend-following, the famed *CTA smile* can be empirically observed in historical data.

The fact that trend-following can perform well in both very good and very bad times means it resembles the payoff of an options straddle position. This has led some investors to conclude that trend-following benefits from high volatility and is harmed by low volatility as would be the case for such an options position. This paper disagrees.

Using the VIX Index as a measure of market volatility, trend-following performance can be observed to be very positive in periods of both very high and very low volatility. This rejects the interpretation that trend-following requires volatility to perform. Rather, trend-following requires sustained market movements that can happen in both high and low volatility regimes.

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