

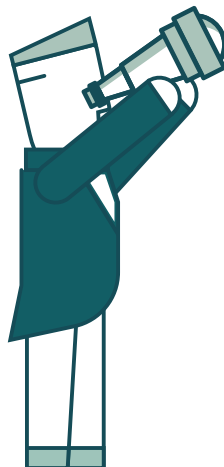
## 2019 CHARLES H. DOW AWARD



### Charles H. Dow Award Winner

#### Chris Diodato, CMT, CFA

Chris Diodato, CMT, CFA became a student of technical analysis at a young age, enrolling in the CMT program during his freshman year of college. Since then, he attained his CMT and CFA charters and worked in various research and portfolio management roles. Currently, Chris is the Senior Portfolio Manager at Cantilever Wealth Management in Pittsburgh, PA where he leads the development and implementation of cutting-edge investment offerings. He maintains a holistic investment philosophy, incorporating technical, fundamental, and quantitative methods in his work and is always hungry to learn more about financial markets. He is especially appreciative of his mentors, family, and friends who have supported him on his journey to become a financial professional.



# Making The Most Of Panic – Exploring The Value Of Combining Price & Supply/Demand Indicators

by **Christopher Diodato, CMT, CFA**

Since the dawn of investing, practitioners understood the value of contrarianism. All too often, emotions, not fundamentals, become the driving force in stock and cause dislocations. Extremes in sentiment – whether that be excessive optimism or pessimism – have been associated with market dislocations such as the housing bubble, Bitcoin’s behavior in 2017, and the stock market crash of 1987 (known as Black Monday). For those willing to buck the herded animal spirits associated with investors’ mentality during extreme events, there are profits, and often very large profits, to be had.

Technical analysts, many of whom are contrarian by nature, understand this and have endeavored to identify periods of panic and capitulation in an effort to buy securities at deeply discounted prices. In the Far East, candlestick charting tried to identify panic over three-hundred years ago. In the early 1900s, Richard Wyckoff had helped coin the phrase “selling climax” while conceptualizing the idealized “market bottom” price pattern.

The quest to profit from panic continued. In the spirit of contrarian thinking, analysts

created oscillators to uncover “overbought” and “oversold” conditions in the 1950s onward to help determine if an issue had moved too far, too fast. Shortly following the rise of the various “price oscillators,” some analysts chose to look at supply and demand factors – namely volume and breadth. Some of the latest successful attempts to identify periods of panic and major reversals using supply and demand came in the form of “90% upside and downside days” from Paul Desmond and Martin Zweig’s “breadth thrust indicator.”

Supply/demand analysts had worked under a generally unfamiliar, but important premise –panic can be measured using breadth and volume instead of price momentum (oscillators). Additionally, one could use such indicators to identify buying opportunities which price momentum indicators may not have found. In this report, we will quickly examine the track record of one of the oldest oscillators, and then propose some new methods to use jointly with price oscillators to identify periods of panic.

## Part I

# Short-Term Indicators

### Price-Only Oscillators

With the proliferation of oscillators over the past seventy years, it comes as little surprise that many charting software packages include well over 100 oscillators to help identify overbought and oversold conditions. For our purposes here, we will study just one of the most well-known oscillators – the “slow stochastic,” popularized by George Lane. The slow stochastic, like many price momentum indicators, compares a security’s current price to past prices over a pre-specified time period. Overbought readings occur when the current price is near the top of that range over that time period, and oversold readings appear when the current price is near the bottom of that range. One can see an example of the slow stochastic in the appendix. For this paper, oversold conditions will correspond to indicator readings of 20 or lower, and overbought conditions will be associated with readings of 80 or higher. Below, we’ll see if buying an oversold issue delivers better returns than a non-oversold issue. The tests will be run across daily data for the following data sets:

- The S&P 500 Index and NASDAQ Composite
- The current five largest stocks by market capitalization in the Dow Jones Industrial Average (Apple, Microsoft, JPMorgan Chase, Johnson & Johnson, and ExxonMobil)
- The continuous commodity futures price indexes for gold, crude oil, and copper

**FIGURE 1. Stochastic Test #1: Returns Following Overbought/Neutral Readings**  
(1/1990-10/2018)

Asset	# of Overbought/ Neutral Readings	5-Day Return	10-Day Return	20-Day Return
S&P 500	6372	0.12%	0.30%	0.58%
NASDAQ Composite	6234	0.22%	0.49%	0.96%
Apple	6025	0.62%	1.22%	2.46%
Microsoft	6118	0.38%	0.87%	1.70%
JP Morgan	6078	0.18%	0.43%	0.79%
Johnson & Johnson	6167	0.19%	0.41%	0.87%
ExxonMobile	6197	0.07%	0.23%	0.46%
Gold Futures	5622	0.10%	0.17%	0.34%
Crude Oil Futures	5825	0.11%	0.26%	0.74%
Copper Futures	5527	0.07%	0.32%	0.38%

Now, we can look at returns following oversold readings to determine if buying oversold issues is a more profitable strategy.

**FIGURE 2. Stochastic Test #2: Returns Following Oversold Readings (1/1990-10/2018)**

Asset	# of Oversold Readings	5-Day Return	10-Day Return	20-Day Return
S&P 500	840	0.62%	0.71%	1.57%
NASDAQ Composite	978	0.47%	0.58%	1.01%
Apple	1187	0.24%	0.67%	1.39%
Microsoft	1084	0.85%	0.98%	2.28%
JP Morgan	1134	0.78%	1.10%	2.43%
Johnson & Johnson	1045	0.62%	0.98%	1.60%
ExxonMobile	1014	0.80%	1.01%	1.88%
Gold Futures	1589	0.12%	0.31%	0.64%
Crude Oil Futures	1398	0.64%	0.72%	0.66%
Copper Futures	1623	0.17%	0.05%	0.44%

As conventional wisdom would dictate, purchasing an oversold security will generally deliver better returns versus buying a non-oversold security over a four-week period. In about 17% of cases illustrated here, this was not true, and purchasing a non-oversold security led to superior performance vs. making purchases when oversold conditions were present. This begs the question as to what are the key strengths and weaknesses of price oscillators. Below are a few.

**FIGURE 3. Price Oscillator Strengths & Weaknesses**

Strengths	Weaknesses
Can be applied to any security with price data	Signals are very dependent on time period used in calculation
Can be tailored to different market conditions	Signals perform poorly in strongly trending markets
	Signals may not occur during panics due to price-dependency and the lagging nature of moving averages

We'll focus on the last weakness - an oversold signal may not register during a market panic, leading to missed opportunities. With this in mind, using supply/demand indicators could help identify opportunities which would have otherwise been missed.

## Supply/Demand Indicators – Short Term

The first supply/demand indicator I'll propose is based on the 3-DMA of declining issues (as a % of total issues traded) for the NYSE. Prior to the removal of fractional share pricing in April 2001, such an indicator would be unsuitable, as a relatively high number of unchanged issues would skew the data. With this in mind, we run our tests from 2001 onward. The results of these tests showed that when the 3-DMA of NYSE declining issues exceeded 65%, returns over the next four weeks were significantly higher relative to the historical average. These returns would generally continue to improve as the percentage increased further above the 65% mark. See below for test results from April 2001 to October 2018 using the S&P 500.

**FIGURE 4. S&P 500 Average Returns Following 3-DMA % Decline Triggers:  
4/2001-10/2018**

3-DMA % Declines Threshold	# of Signals	5-Day	10-Day	20-Day
65%	218	0.87%	1.07%	1.97%
70%	94	1.36%	0.75%	2.66%
75%	34	2.07%	1.15%	3.04%
80%	11	3.76%	1.05%	1.98%
Benchmark	4442	0.11%	0.24%	0.48%

As evident in the table above, using such a simple indicator could greatly help investors identify periods of panic in which to execute purchases. This indicator could also help identify periods of panic and short-term oversold conditions at times when traditional price oscillators would not.

**A Short-Term Capitulation Oscillator**

Continuing to find methods of identifying investor capitulation, one can create an oscillator of % up volume and % advancing issues to fish for market bottoms. I propose the following formulas.

**Short Term Capitulation Oscillator = 100\*(Short Term Volume Band + Short Term Breadth Band)**

**Short Term Volume Band =** 
$$\frac{10DMA\ Up\ Volume}{(10DMA\ Total\ Volume - 10DMA\ Unchanged\ Volume)}$$

**Short Term Breadth Band =** 
$$\frac{10DMA\ Advancing\ Issues}{(10DMA\ Total\ Issues - 10DMA\ Unchanged\ Issues)}$$

The average value of this indicator since April 2001 is 103, and the first quintile of indicator values corresponds roughly to 90. We'll call that an oversold threshold. Again, we can plot the average S&P 500 return following a reading of 90 or below and compare it against all returns.

**FIGURE 5. Short-Term Capitulation Oscillator Returns Following Declines Below Trigger Levels: 4/2001-10/2018**

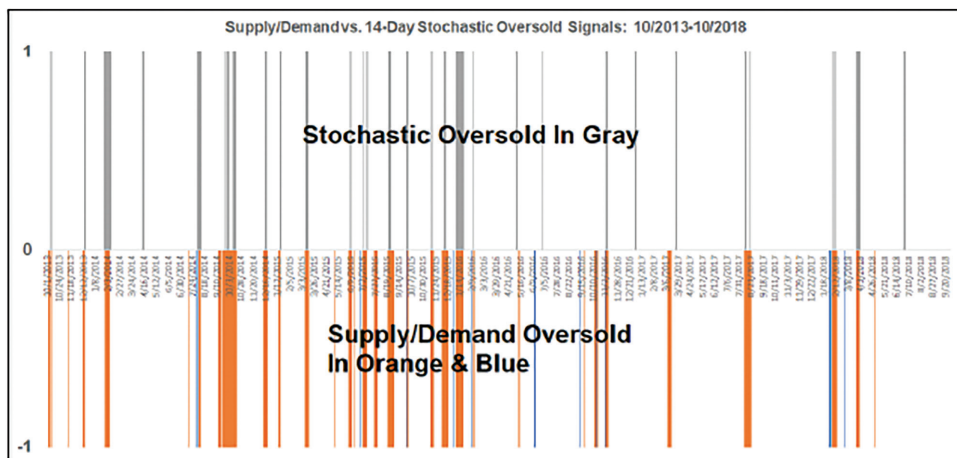
Capitulation Oscillator Threshold	# of Signals	5-Day	10-Day	20-Day
90	679	0.21%	0.38%	0.83%
85	392	0.39%	0.60%	1.44%
80	207	0.80%	1.11%	2.37%
75	95	1.38%	1.29%	3.31%
70	33	1.64%	2.34%	4.81%
Benchmark	4442	0.11%	0.24%	0.48%

As one can see, depressed readings in the short-term capitulation oscillator are generally followed by a period of strong market performance. In the next section, we will extend this indicator's use to longer-term timeframes.

## Don't Leave Money On The Table

The objective of this paper was not to propose a suite of indicators which is “better” than traditional price oscillators in use today – it was to address a key weakness of price oscillators. Namely, the weakness is that oversold conditions are often not reached prior to a significant low, meaning no buy signal is registered. Incorporating supply/demand indicators can help prevent investors from missing out on points for new purchases. To drive this point home, here’s a slightly confusing chart.

**FIGURE 6. Supply/Demand vs. 14-Day Stochastic Oversold Signals: 10/2013-10/2018**



This graph notes when oversold signals occurred over the last five years from the 14-day stochastic (gray), the short-term capitulation oscillator (orange), and the 3-DMA declining issues (blue). Notice that signals from the 14-day slow stochastic are often not accompanied by signals from our supply/demand indicators. This again shows the value in using both price oscillators and supply/demand indicators together to identify market bottoms.

**When All The Stars Align – Short Term**

One might argue that the best buying opportunities could exist when both a price oscillator and a supply/demand indicator register an oversold condition. Let’s test this idea out. For a buy signal to be registered, the 14-day stochastic needs to be oversold and there needs to be at least one of the two supply/demand indicators we covered at an oversold level. See the results below.

	# of Signals	5-Day	10-Day	20-Day
Stochastic + Supply/Demand Signal	111	1.33%	1.84%	3.35%
Benchmark	4442	0.11%	0.24%	0.48%

Again, another profitable result – albeit relatively few signals to take advantage of.

## Part II

# Long-Term Capitulation Oscillator

For those curious about modifying the short-term capitulation oscillator for longer-term uses, read below. We could simply extend the time periods used in the formula presented previously (shown below again for reference), but this will cause significant lags in signals because of the nature of moving averages.

**Short Term Capitulation Oscillator =  $100 * (\text{Short Term Volume Band} + \text{Short Term Breadth Band})$**

**Short Term Volume Band =  $\frac{10\text{DMA Up Volume}}{(10\text{DMA Total Volume} - 10\text{DMA Unchanged Volume})}$**

**Short Term Breadth Band =  $\frac{10\text{DMA Advancing Issues}}{(10\text{DMA Total Issues} - 10\text{DMA Unchanged Issues})}$**

Over the years, this issue has been remedied using a variety of methods. Exponential moving averages are probably the most ubiquitous solution. I propose something different, if only for the reason of being easier to explain – an average of averages.

How does this work? Here's an example. We'll take a 10-day moving average (DMA) of say, closing prices, and front weight it by adding the 6- and 4-DMA's to it. Once we add those averages together, we'll take the average of those averages.

**Front Weighted 10DMA =  $\frac{10\text{DMA} + 6\text{DMA} + 4\text{DMA}}{3}$**

This way, the most recent prices in the DMA are weighted three times – once in the 4-DMA, once in the 6-DMA, and once in the 10-DMA. In contrast, the oldest four values are only weighted once – in the calculation of the 10-DMA.

We apply this concept to create the formula for our long-term capitulation oscillator.

**Long Term Capitulation Oscillator = 100\*(Long Term Volume Band + Long Term Breadth Band)**

**34DMA + 55DMA + 89DMA + 144DMA + 233DMA Up Volume**

**Long Term  
Volume Band =**

(

(34DMA + 55DMA + 89DMA +  
144DMA + 233DMA Total Volume

5)

+

(34DMA + 55DMA + 89DMA +  
144DMA + 233DMA Unchanged Volume)

5

)

**(34DMA + 55DMA + 89DMA + 144DMA + 233DMA Advancing Issues) / 5**

**Long Term  
Breadth Band =**

(

(34DMA + 55DMA + 89DMA +  
144DMA + 233DMA Total Issues

5)

-

(34DMA + 55DMA + 89DMA +  
144DMA + 233DMA Unchanged Issues)

5

)

Because this is a very long-term indicator meant to help identify major bottoms, we will test back to 1961 for the S&P 500. The test will be to see if making purchases at various levels below the tenth percentile of indicator values (roughly 950 and below) give outsized 6-month (125 days), 12-month (250 days), and 24-month (500 days) forward returns.

**FIGURE 7. Long-Term Capitulation Oscillator - S&P 500 Returns Following Declines Below Trigger Levels: 1/1961-10/2018**

Capitulation Oscillator Threshold	# of Signals	6-Month	12-Month	24-Month
950	1277	4.9%	10.2%	22.5%
925	712	5.8%	12.1%	24.9%
900	587	6.5%	14.8%	28.9%
875	104	15.5%	27.8%	45.6%
850	37	20.9%	32.3%	52.6%
825	12	17.9%	36.9%	48.7%
Benchmark	14422	3.9%	7.9%	16.5%

Low readings in this indicator during a bull market identify attractive intermediate-term buying opportunities. For instance, levels of 931 and 918 corresponded with the correction lows in October 2011 and February 2016. Similarly, one can use this indicator to identify periods of extreme panic during bear markets and potential bear market bottoms. See below for indicator levels at prior bear market lows.

**FIGURE 8. Indicator Levels at Prior Bear Market Lows**

<b>Bear Market Low Date</b>	<b>Long-Term Capitulation Oscillator Level</b>
<b>6/26/1962</b>	<b>846</b>
<b>10/7/1966</b>	<b>887</b>
<b>5/26/1970</b>	<b>788</b>
<b>12/6/1974</b>	<b>910</b>
<b>2/28/1978</b>	<b>977</b>
<b>4/21/1980</b>	<b>916</b>
<b>8/12/1982</b>	<b>943</b>
<b>12/4/1989</b>	<b>1035</b>
<b>10/9/2002</b>	<b>914</b>
<b>3/9/2009</b>	<b>902</b>

There are two ways an investor can approach this indicator. Longer-term investors may be best served buying below certain threshold levels, understanding they may need to endure additional market volatility and losses before a sustainable low is in place. Investors wishing to take a more tactical approach can use 90% days and/or breadth thrusts to fine-tune their entry.

On a final note, a topic which deserves further research is whether the breadth and volume bands should be weighted according to their relative value. For instance, in some cases the breadth band failed to drop as sharply at market bottoms as the volume band, suggesting it may be less useful than its volume counterpart. One example of this occurrence includes

the 3/11/2003 market bottom (often considered the “test” of the 10/9/2002 bear market low). At this market trough, the raw long term volume band value was at the 5th percentile of all values since 1960, which can be handily considered a panic level. The long term breadth band, however, was closer to the 30th percentile, which is quite a distance from levels associated with panic (relatively strong small cap breadth in much of 2002 likely caused this). This topic deserves further research for both the long and short term capitulation oscillators, and I invite others to experiment with the optimal weights to assign to each band.

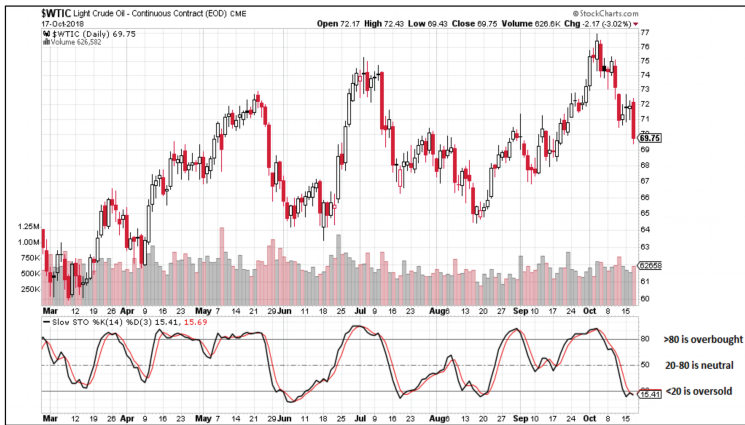
### **Bringing It All Together**

Buying during periods of investor panic has been an established tenet of not only technical analysis, but of investing for centuries. Technical analysts were some of the first to try to quantify investor panic – first with price patterns, then oscillators, and then supply/demand indicators. This paper establishes that using a set of price-based indicators alone will inevitably lead to missed opportunities, and proposes a more holistic approach to identify periods of market panic. The studies in this report apply to both shorter-term and longer-term timeframes. Armed with this knowledge, missing out on profit opportunities should be significantly lessened, and the accuracy of identifying new uptrends enhanced.

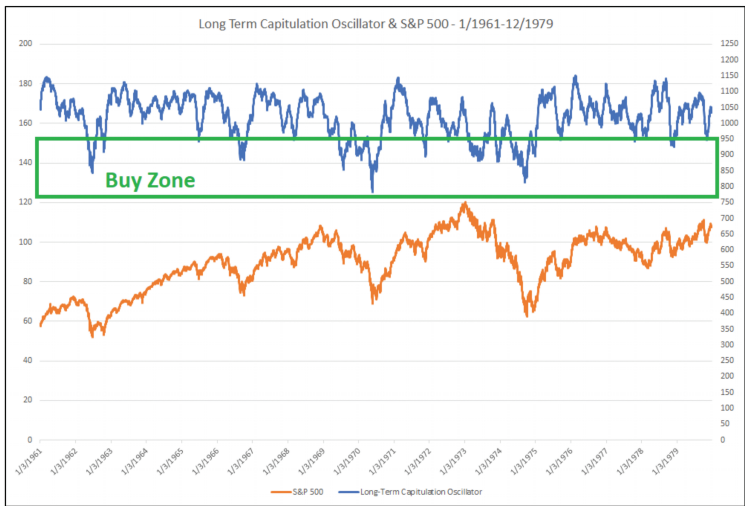
**Appendix**

# Charts of Various Indicators

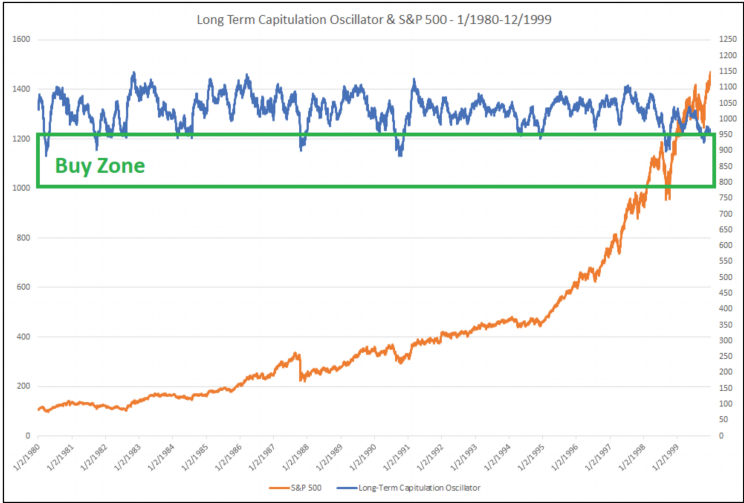
**FIGURE 9. Crude Oil (\$WTIC) Plotted with its 14-Day Slow Stochastic**



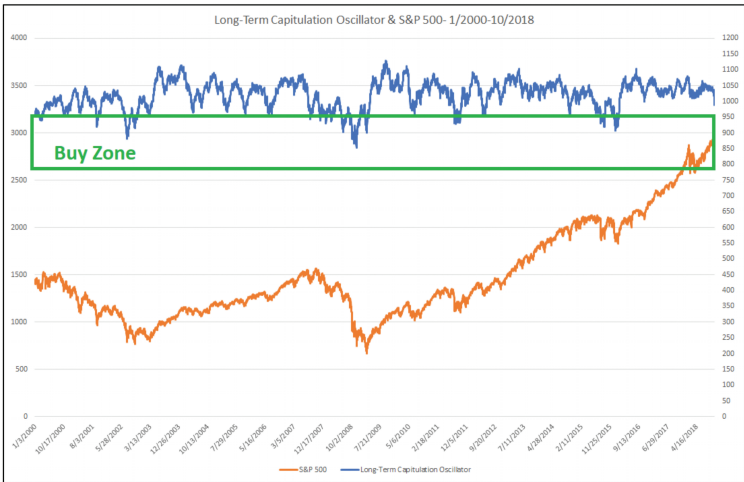
**FIGURE 10. Long-Term Capitulation Oscillator from 1961-1979**



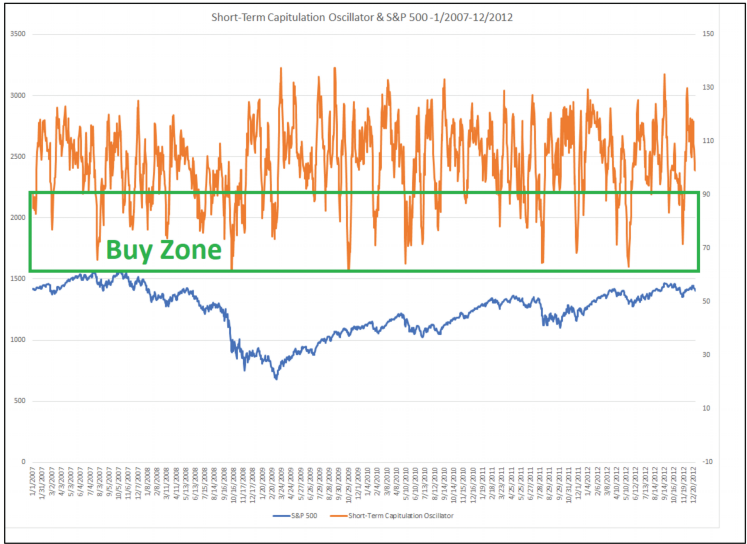
**FIGURE 11. Long-Term Capitulation Oscillator from 1980-2000**



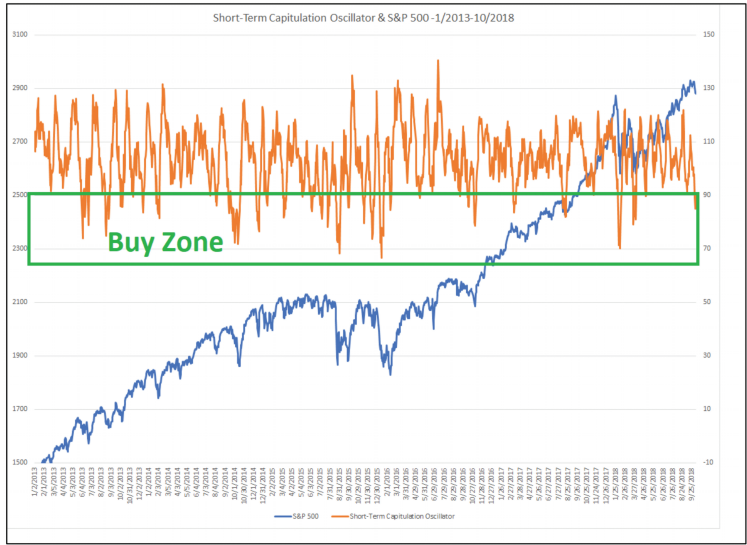
**FIGURE 12. Long-Term Capitulation Oscillator from 2000-2018**



**FIGURE 13. Short-Term Capitulation Oscillator from 2007-2012**



**FIGURE 14. Short-Term Capitulation Oscillator from 2013-2018**



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