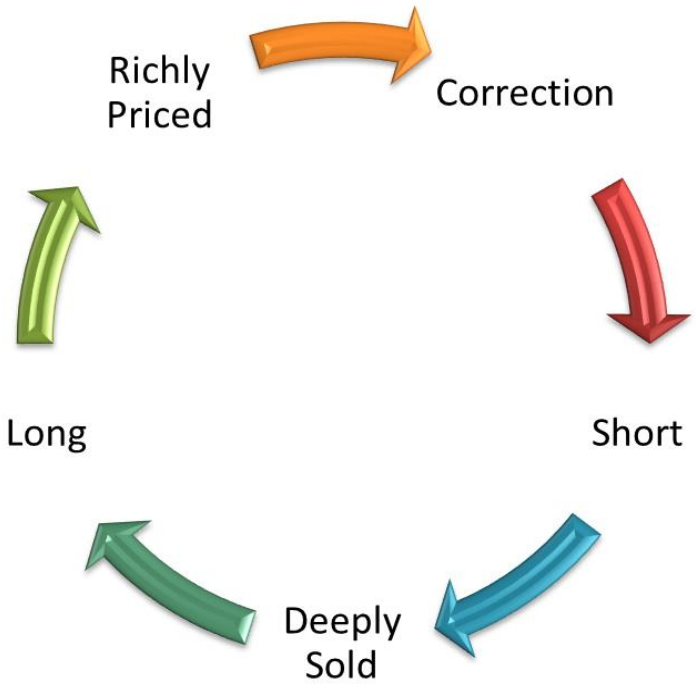
Market Behavior Analysis

White Paper



Timothy Mazanec, CMT

What is the best way to determine trends and the stage of a trend in the global markets? A two pronged question being asked simultaneously for the purpose of helping investors make better investment decisions. The abundance of information at our fingertips and the increasing quantitative nature of our markets are changing how investment decisions are made. It should come as no surprise that as our societal behaviors change our global markets will need to keep pace. Sometimes though when our societal behaviors cross over and impact our investment behaviors it does not serve in our best interest.

Discovering trends and almost more importantly the stage of a trend can add immense value to an investor. In this White Paper I will propose how my Market Behavior Analysis models offer new and valuable information to help identify trend and the stage of trends.

The Market Behavior Analysis models look to fuse the valuable information that technical analysis offers with the key aspects of behavioral analysis. This has been done by developing a proprietary technical indicator that inherently has the traits of behavioral analysis.

Types of Analysis

When looking to discover trend some will state that fundamentals are the driving force, especially over the long term. Others will suggest that economics drive the markets. Why else would traders stare at their screens at 8:30am est. but to see if there is a trend emerging in the economy. As someone who has been involved in the global markets for over 20 years the understanding of politics of a nation certainly plays a role.

Technical analysis is used on every trading desk to varying degrees and often times overlaps with quantitative analysis. Other theories include behavioral analysis which may just be the easiest theory to understand. After all you do not need an advanced degree to understand the repetitive nature of people!

Listed below are some common types of market analysis:

Behavioral	Economic	Flow	Fundamental
Political	Quantitative	Technical	Volatility

Behavioral Analysis

As central banks have responded to asset bubbles the use of behavioral analysis has gained traction up and down Wall Street. The anticipated response from equity markets to the recent round of quantitative easing in developed nations is just one example. If you go back to 1997/1998 and the LTCM hedge fund failure the global markets responded ahead of Greenspan's three rate cuts. Similarly back in 1992 when the markets anticipated Britain's withdrawal from the ERM as the FTSE would hit bottom two weeks ahead of that legendary event.

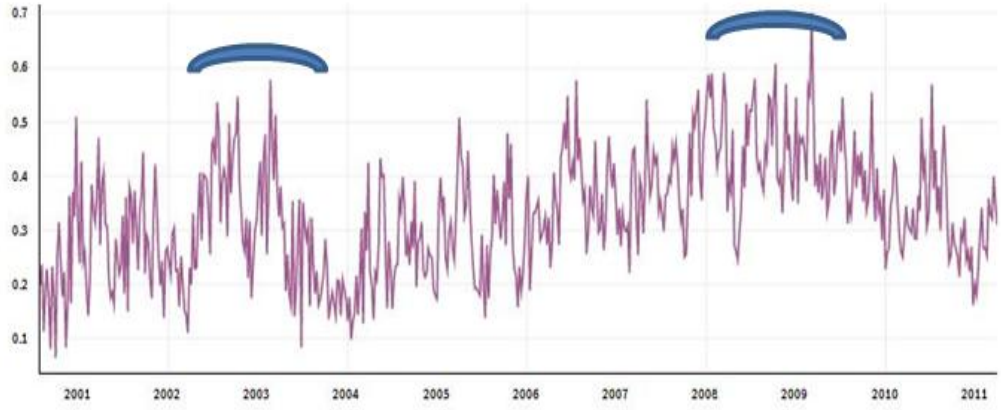
The following chart shows the investor behavior pattern that we see repeated on a frequent basis, especially with the less sophisticated investor. Initially the purchase of a security is made and investors are obviously excited about their new investments. Optimism leads to thrill and eventually to euphoria, but often times this will coincide with the peak in value of an investment.

(Westcore Funds/Denver Investment Advisors LLC, 1998)

From there things often turn for the worse. The investment, which may have been considered a medium term investment, is now a 'long term investment' as their behaviors become more defensive in nature. Anxiety leads to denial, fear and desperation amongst other negative thoughts. Eventually they capitulate and often times this will lead them to sell their positions as 'they know how much money they still have left'.

Of course this is the time that investors should be discovering opportunity. We see this over and over and not just with the less sophisticated investor too.

The following chart from the American Association of Individual Investors shows the bearish readings of individual investors from 2001 to 2011. As you can see the highest fear levels occurred during 2002 - 2003 and also during 2008 - 2009.



Fear levels were at their highest when opportunity was at its greatest

(American Association of Individual Investor, 2012)

Although fear levels were high the data is volatile and it would have been difficult to develop a trend indicator due to this volatility. The same is true when the markets are euphoric and investors are excessively greedy. As the next chart on the NASDAQ shows the demand for technology stocks has been

at it highest when new highs in the tech sector have been made and demand has been at its lowest when bottoms have been put in place.

Flows followed new highs and outflows followed new lows.

Not the reverse!

(Yahoo Finance, 2016)

The following chart in the S&P 500 Index shows that demand by investors has declined nearly in a straight line since 2008. The Federal Reserve may have been trying to generate economic growth through wealth creation but their inability to understand behavioral finance and clearly communicate to Main Street has left many to not participate in the stock market rebound that has occurred since 2009.

FDR was right, you simply have nothing to fear but fear itself and most investors have a low tolerance for fear.

(Bloomberg, 2016)

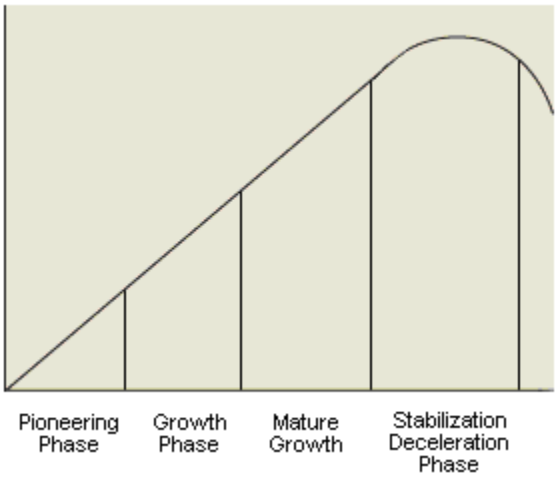
The beauty of behavioral analysis is identifying repeatable patterns of investor behavior. This is especially true at extreme levels.

The weakness is potentially twofold; 1) typically sentiment information is available only for indices and not for individual securities and 2) the lack of valuable information that can be gained from non-extreme readings due to its volatile nature.

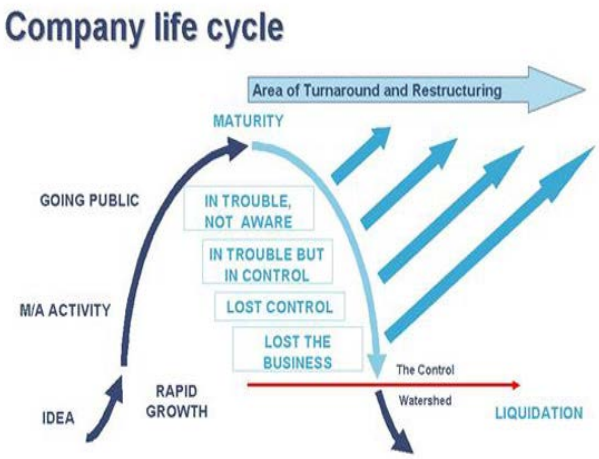
Life Cycle

When looking to identify trends of a company a life cycle pattern is oftentimes used and breaks down the company into 4 phases which are Start-Up, Growth, Maturity and Deceleration. PWC takes this one step further and suggests that the stabilization and/or deceleration phase can be avoided by restructuring the company once a company has hit its maturity level.

Chart 2: Life Cycle Diagram



(Investopedia, 2016).



Source: PricewaterhouseCoopers

An example of a company that was able to move forward despite reaching a Maturity phase is Microsoft. Between 1998 and 2012 the stock price of Microsoft traded around $27/share with minimal gyrations outside of 1999 and 2008.

Fast forward to mid-2012 and it started an upward ascent that has so far peaked at $55 in 2015. This performance wildly outperformed the technology sector (XLK) (by over 30%) and the S&P 500 Index (by nearly 40%). Interesting enough Microsoft didn't have the greatest growth as seen in their financial statements (margins and cash flow were flat to down and EBITDA grew only measurably during this period) but they were still able to create a buzz (new CEO, commitment to the cloud) which propelled their stock to outperform many peers and benchmark indices.

Still most of us want to understand the fundamentals behind a company before we invest in them. For this reason some only like to invest in companies that they are familiar with. For those of us in the finance sector it is usually not hard to understand the concept of other financial companies.

Until that theory doesn't work out so well:

Insurance and reinsurance are not hard concepts to understand yet most pro and novice investors were caught by surprise when AIG's share price fell in 2008.

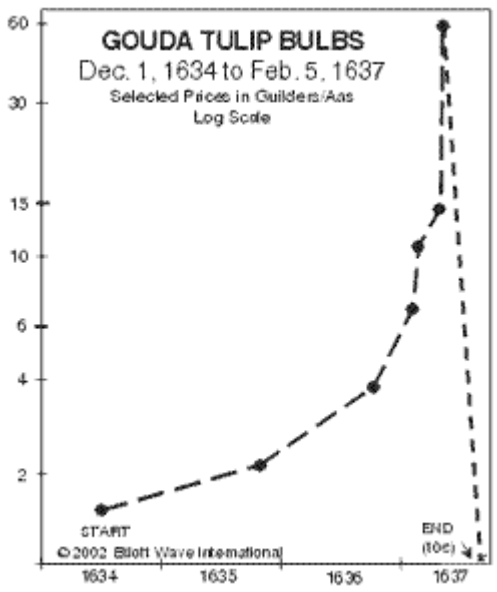
(StockCharts.com, 2016)

Two things stand out from the AIG chart above: 1) Often times when investors change behavior from Euphoric to Panic mode they do so in very short order which can lead to a herd mentality and 2) Take a look at the volume figures! The ultimate 'get me out while we still have some money left'.

Modern Markets

Many people are stating that today's markets are just plain different that those of yesteryear. How much different are they really?

The Amsterdam Exchange dates back to 1602 when it listed The Dutch East India Company. Gold and other commodities predate the stock markets by many hundreds of years. As long as there has been supply and demand there has been debate about markets. Compare the following charts:



(Investopedia, 2012).

(Yahoo Finance, 2016).

There was demand for tulips, until there was not.

There was demand for VRX, until there was not.

The mode of executing trades has changed from screaming trading desks and voice brokers to one that is e-trading centric through the use of quantitative trading algorithms. Yet examples of investor euphoria which later turn to panic before finally capitulation (or bankruptcy in some cases) has been an ongoing phenomenon since markets have been in place.

Technical Analysis

Most indicators used in technical analysis can be broken down into either being trend following or oscillators. According to John Murphy "the concept of trend is absolutely essential" to technical analysis. (Technical Analysis of the Financial Markets).

Trend can be seen in the following chart on IBB. Once IBB broke above its resistance line in 2012 an upward trend was discovered. After a 10 year sideways trading pattern an upward thrust can be expected when higher-highs are being made. The 200 day moving average provides an example of corrective support levels.

(QuantShare, 2016)

Before the breakout occurred in 2012 oscillating indicators would have been necessary to discover opportunities, but they would not have identified the long term trend. Some will criticize this for being too subjective. As compared to analyzing volatility, which measures deviations, it may be. But using technical analysis should not be any more subjective than say economic analysis where wide ranging debates on the health of an economy languish for sustained periods.

Market Behavior Analysis

The goal of Market Behavior Analysis is to identify both trend and the stage of trend. To do this an indicator has been constructed which looks to fuse technical analysis with behavioral analysis. By combining the trend following aspects of technical analysis with the stage identification qualities of behavioral analysis Market Behavior Analysis looks to add significant value to investment decision making.

Market Behavior Analysis breaks down the markets into 5 stages which are:

1) Long, 2) Richly Priced, 3) Correction, 4) Short and 5) Deeply Sold.

Construction was initially inspired by the Advance/Decline Line which is a market breadth measure that nets advancing securities versus declining securities. Typically it has been done for stocks listed on the NYSE. The accumulated line shows the trend in place and it is said to judge the participation of a trend. A lack of participation or divergence may provide corrective warnings.

For the S&P 500 Index the Advance/Decline Accumulation Line provided direction when taking a centered approach as seen in the next chart (sub-window). Meaning when the Line crossed above zero upside opportunities were identified. The issue lies when taking a banded approach and attempting to identify Richly Priced or Deeply Sold stages.

The chart is from 2000 – 2010.

(Bloomberg, 2016)

Identifying participation is a key component of measuring supply and demand. P.N. Haurlan, who was a NASA scientist in the '60s, took this one step further and developed the Haurlan Index which looks to identify short, medium and long term trends. Using the Haurlan Index and his system of analysis provided a systematic method for identifying trends.

Market Behavior Analysis or the "MBA Indicator" looks to improve on both the Advance/Decline Line and Peter Haurlan's work while incorporating in behavioral analysis. It can be broken down into 3 parts:

1) Daily performance, 2) Trend value and 3) Analysis

The daily performance figure is not the daily change of price of a security but a best efforts attempt to systematically create a performance figure for the day. For example: Assume that an index starts the trading session strong, is up by more than 2% by lunchtime, then starts to give up those gains and by 3pm the index is down at some point. It may end up unchanged but would an unchanged value fully reflect the behavior or the true performance of the market that day? No.

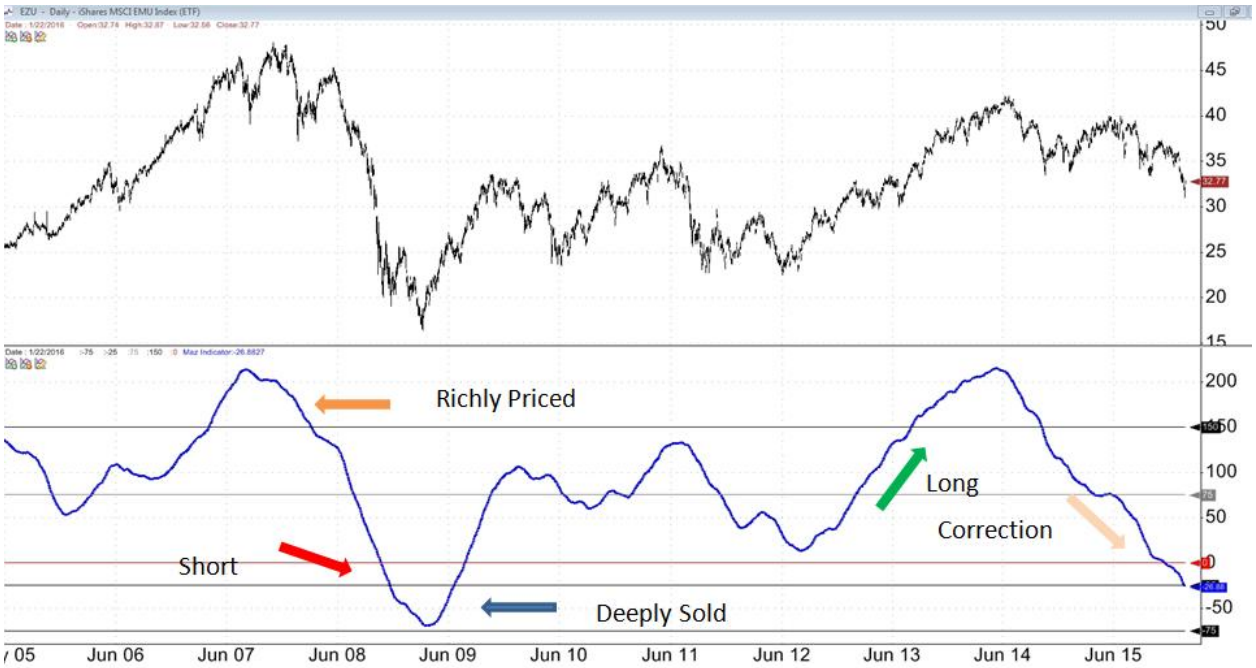
If you want a bias-free performance figure of the scenario just mentioned then the only reasonable value would be one that reflects the behavior of the market.

The next step is to discover the Trend Value. Instead of simply taking a cumulative tally of say the last 200 days the Trend Value is determined by oscillating the daily performance figure on a multi-layered basis. The cumulate tally is then discovered which prevents over fitting of correlation which is what we

saw in the Advance/Decline Accumulation Line above. Oscillating on a multilayered basis allows divergence to automatically change the direction of the MBA Indicator.

The following chart on EZU (iShares MSCI EMU Index) shows how the MBA Indicator changes direction and stages by incorporating divergence.

EZU – iShares MSCI EMU ETF 2005 - 2016

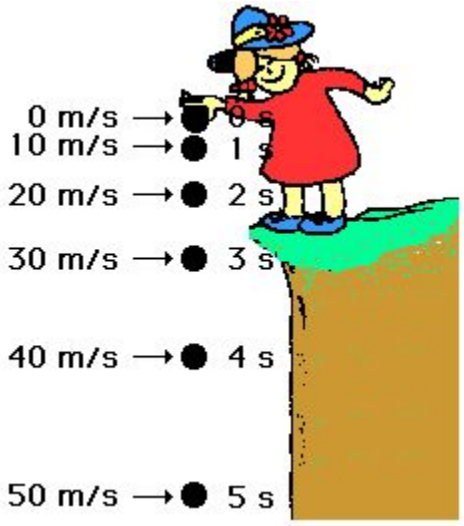


(QuantShare, 2016)

In terms of valuable information this compares favorably to the Advance/Decline Accumulation Line (chart on previous page). As you can see with Market Behavior Analysis trends can be identified, the stage of a trend can be identified and the MBA Indicator has been created without any bias for identifying upward or downward trends.

Finally some form of analysis is needed to identify the stage of trend. As mentioned there are 5 stages to the models. Long, Richly Priced, Correction, Short and Deeply Sold. The MBA Indicator utilizes the principles of both a Banded and a Centered Oscillator. Meaning Richly Priced and Deeply Sold stages follow the principles of a banded oscillator while the centered oscillator is normally used for determining Corrective and Short stages. Since there is no bias to the MBA Indicator the zero line would be the centered line. A Long stage occurs once a security exits a Deeply Sold stage.

Typically the speed of an upward trend is far slower than the speed of a downward move. The herd mentality that exists means that downward trends occur at much faster speeds. This repeatable pattern should be accounted for in our indicators. In the markets this would be similar to an investor going from anxiety and fear to capitulation and despondency stages.

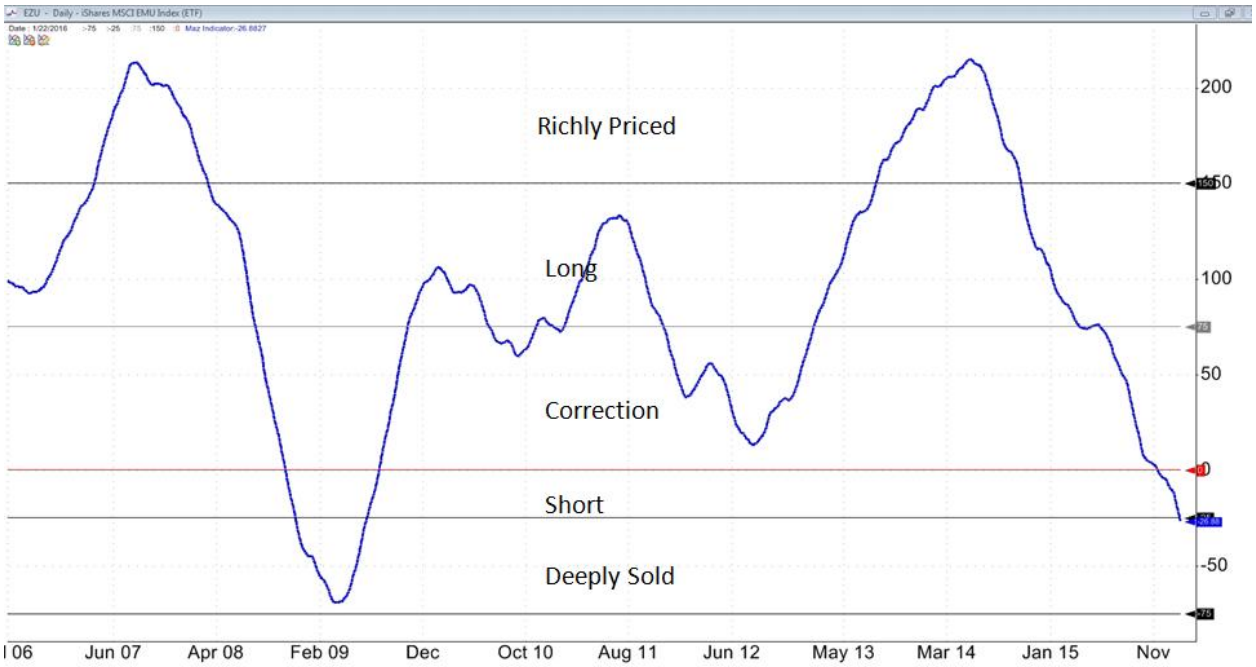


(Artinaid.com, 2016)

This is why the Short and Deeply Sold stages are potentially shorter than Long or Correction stages, especially when considering indices or benchmark securities. This is not a bias but when factoring in behavioral analysis it is known that these repeatable patterns can exhibit shorter durations.

The sub-window from the EZU chart shows the MBA Indicator with the stage levels in the next chart. Ultimately the stage levels are not the most critical factor for analysis or this White Paper. For straight forward investment decisions or portfolio development further quantitative testing could always improve results but using a simple theory of crossover to key levels and/or directional change to the MBA Indicator is an important starting point (assuming that the goal is to discover long term appreciation).

MBA Indicator with Trend Stages



(QuantShare, 2016)

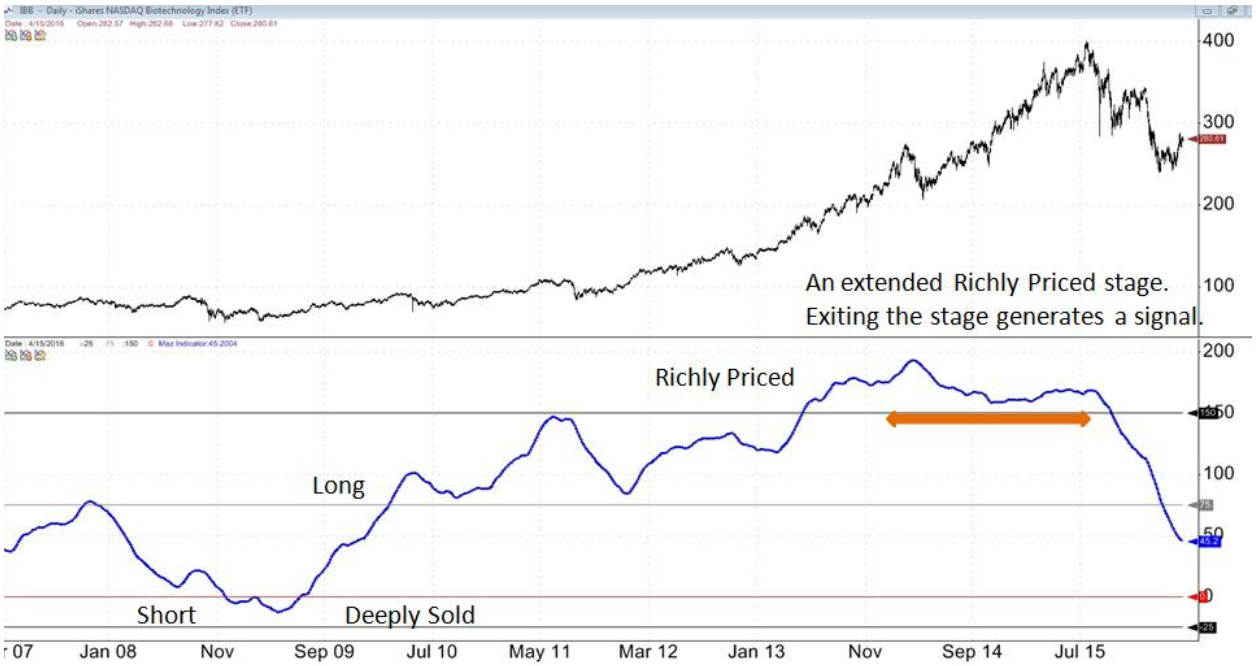
Potentially the two most important stages to identify are the Deeply Sold stage and the Richly Priced stage. Both of these stages represent extreme behavioral readings by the markets. Statistically they represent one standard deviation moves with the speed of a downward trend being taken into account.

To be in either stage does not suggest that positions should be immediately entered into or closed out of. My work points to entering a new position once a security has left a Deeply Sold stage. A security leaving a Deeply Sold stage would then move into a Long stage. Knowing that it is leaving an era where demand was depressed and price levels were cheaply valued then a forecast of a sustained Long stage can be envisioned.

Assuming that a security has enjoyed a long sustained period of upward price movement then it may reach the Richly Priced stage. Again just because a security is in a Richly Priced stage does not suggest that the position should be closed. I would suggest that the position be closed out once the security exits the Richly Priced stage.

The following chart on the IBB ETF shows why you may not want to pick a top but to wait until a security exits a Richly Priced stage:

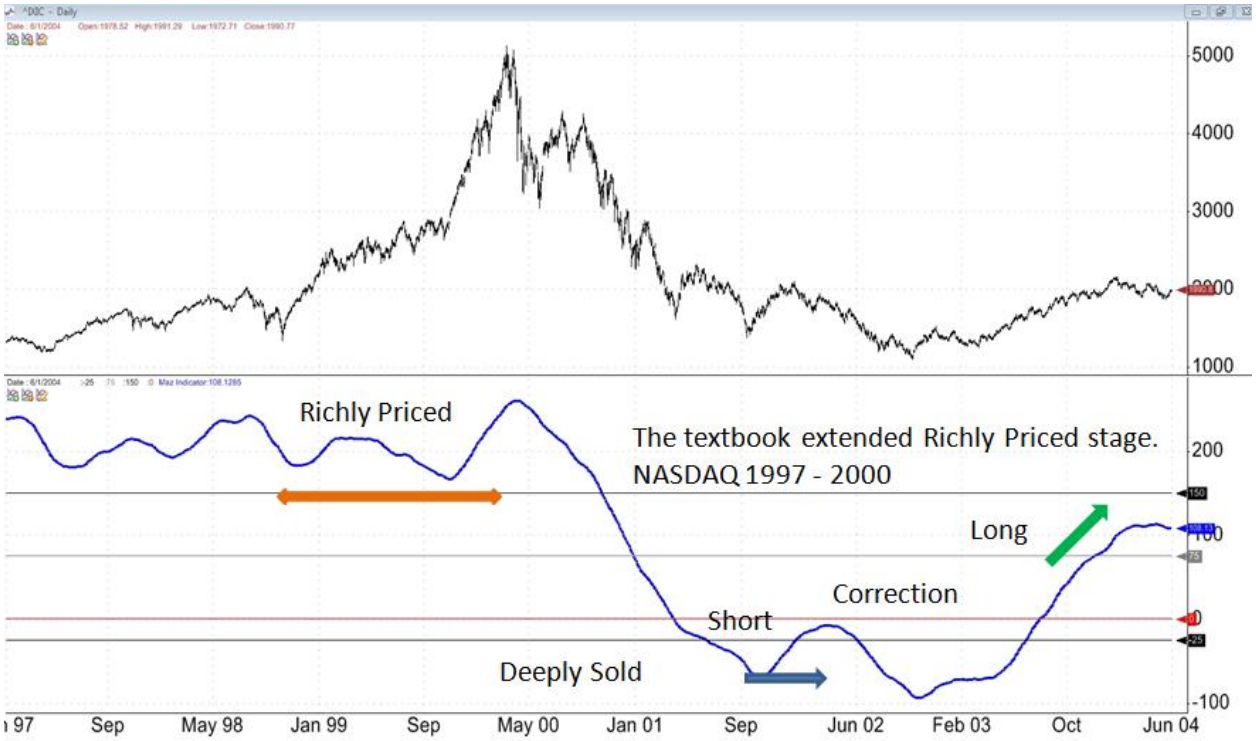
<u>IBB – iShares Nasdaq Biotechnology 2007 - 2016</u>



(QuantShare, 2016)

Another example of an extended Richly Priced stage would be the NASDAQ during the .com bubble. Close a Long position once the MBA Indicator exits the stage.

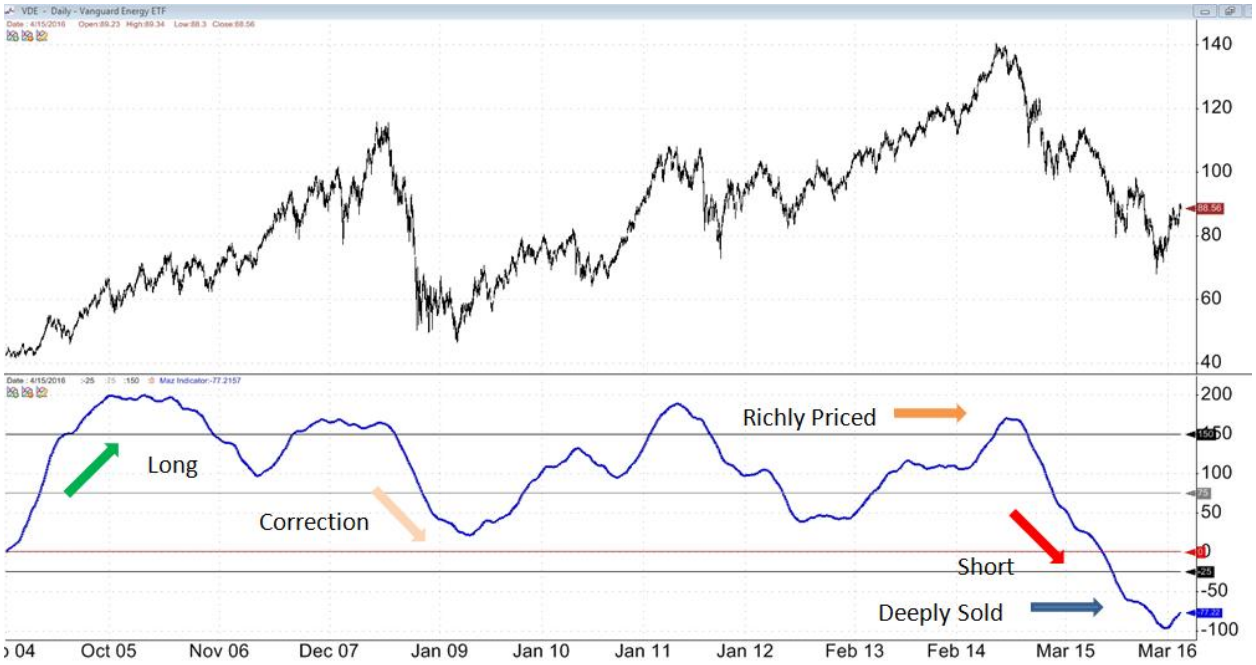
NASDAQ Composite 1997 - 2004



(QuantShare, 2016)

The goal though is to discover all 5 stages. The energy markets are generally considered one of the more volatile markets and hardest to forecast given all the international variables in place. As the following chart on VDE (Vanguard Energy) shows the MBA Indicator does a fine job of identifying each of the stages.

VDE –Vanguard Energy ETF 2004 - 2016



(QuantShare, 2016)

The chart below is the S&P 500 Index from 1965 – 1975. This was a period when the bears had the upper hand and as you can see the MBA Indicator does not assume an upward bias.

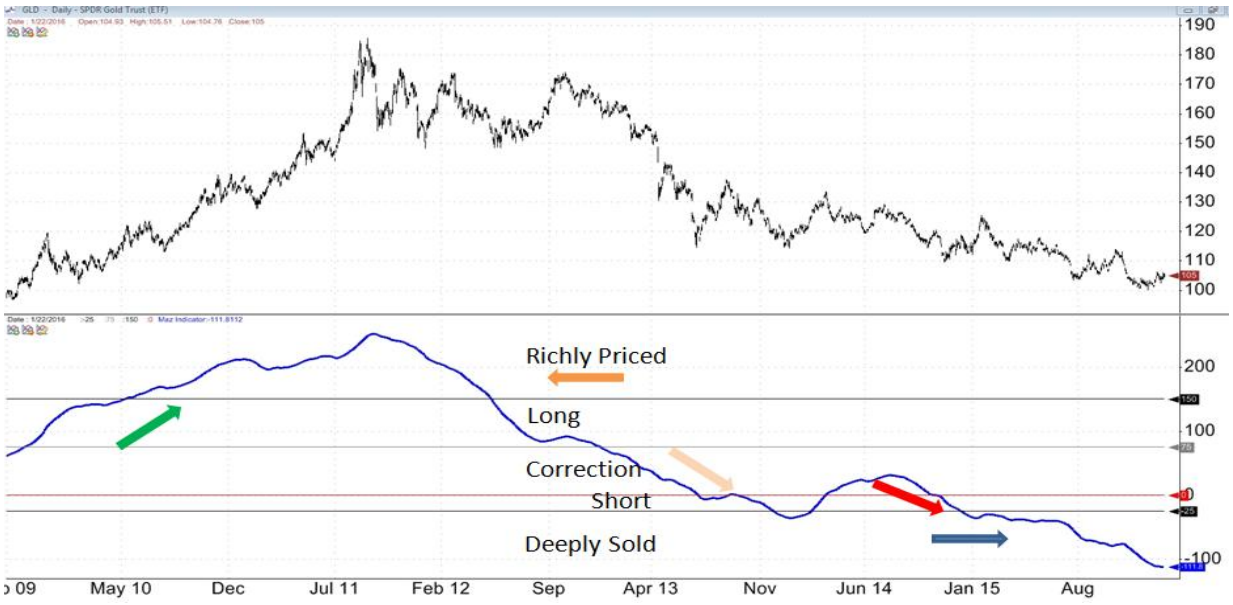
S&P 500 Index 1965 - 1975

QuantShare, 2016)

The MBA Indicator provides a powerful tool to not only identify potential long term appreciation opportunities but to also preserve capital when identifying securities that are exiting a Richly Priced stage and may be entering Correction, Short or Deeply Sold stages.

As most of the charts presented have focused on equity based ETFs the last chart will cover Gold. As you can see the MBA Indicator provides strong directional guidance across markets.

GLD – SPDR Gold Trust ETF 2009 - 2016



(QuantShare, 2016)

Summary

In this paper I have shown by adopting a strategy that fuses the trend-following nature of technical analysis and the stage identification features of behavioral analysis investment decisions can be enhanced. We see that there are repeatable behavioral tendencies that have existed since exchanges were first put in place.

My Market Behavior Analysis models look to identify trend and the stage of trend. In general people prefer to have fundamental knowledge of the security when they are making an investment although at the same time security prices may diverge with those fundamentals. Applying one form of analysis may not be enough to capture the full opportunity which is why applying Market Behavior Analysis provides valuable information to investment decision making.

Tim Mazanec Bio:

Business development executive with a successful record of building effective financial services businesses. Tim has shown a superior ability to identify client needs and to expertly formulate strategies that are narrowly tailored to meet or exceed those needs.

At Merrill Lynch Tim orchestrated a new socially responsible investment strategy that has the ultimate goal of combining sound investments with real social impact. Previously he was the Managing Principal at HedgeForward LLC which was awarded a 2014 International Fund Award for his Market Behavior Analysis models.

In 2007 Tim joined the Global Markets division of State Street Bank; during his time there the income level of the department grew by 50% to over $1b.

At Investors Bank Tim was a lead participant in the development of the Foreign Exchange team which grew from one member to over 20 strong. He became the Sr. Foreign Exchange Strategist and was a regular commentator with the financial news services including Bloomberg TV.

He is a graduate of Northeastern University and is a Chartered Market Technician.

Tim can be reached at 617-835-0708.