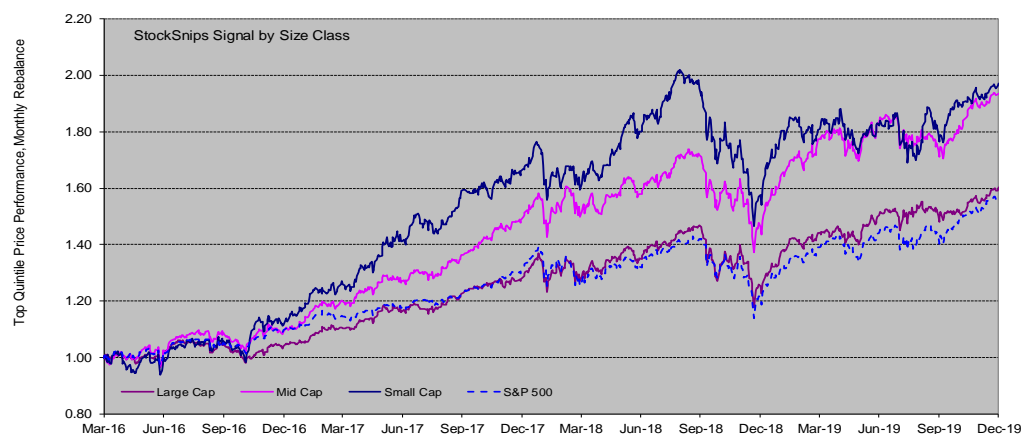


Model Behavior: AI/Big Data effort on Sentiment offers competitive factor alternative.

This issue of Model Behavior takes a closer look at alternative data, specially focusing on sentiment data. The bifurcation of asset flows favoring passive management through ETFs underscores the challenging environment for active management, and more importantly the fierce hunt to build a better mousetrap. Poor performance in active management can only exacerbate such challenges. AQR's Cliff Asness comments on how quant strategies can have good and bad times, but this can be applied to active management more broadly including fundamentally based processes. He states that while many quantitative strategies are likely to be outperform in the long term, they can be accompanied with severe droughts. In his commentary in July 2019, the "Quant Cassandra"*, he laments that quant strategies "do go through unforecastable bad times, like most real life strategies do." In short, the motivation to find superior methods, processes and signals has launched an arms race that is firmly underway. In the spirit of searching out improved signals, we examine a new data series from [StockSnips](#), a firm that delivers real-time news sentiment analytics taking advantage of Natural Language Processing, AI and advanced machine learning tool kits. In this report, we run sample tests to examine the alpha generating abilities of their approach as compared to traditional sentiment models such as relative strength and earnings revisions. Finally, we demonstrate the effectiveness of this tool in swapping out traditional measures for the StockSnips sampling in an effort to enhance our Cirrus Aggressive Growth model.

- **Big Data sentiment offers constructive portfolios gains.** Our analysis examines the sample period from April 2016 through 2019. Applying the StockSnips signal to our Mid Cap universe led to a gain of 93.3% vs. 69.2% for the Mid Cap benchmark over the sample period. Similarly, applying the signal to our Small Cap universe gained 96.3% vs. 56.0% for the Small Cap benchmark over the sample period.
- **The real-time sentiment signal appears more closely aligned with price trending variables, not analyst trends.** A somewhat surprising result of our analysis is that StockSnips real time sentiment approach appears more closely tied to price trending signals than earnings revisions. See Figs. 8 and 9.
- **Sentiment data appears to reflect market efficiency.** Consistent with other market studies, the sentiment signals appear to generate superior excess gains when applied to less efficiently priced asset such as Small & Mid Caps. In contrast, the Large Cap signal only performed broadly in line with its benchmark.

Fig 1: Big Data/AI sentiment signal nicely outperformed in the strong trending-driven market over the past few years.



Source: Cirrus Research

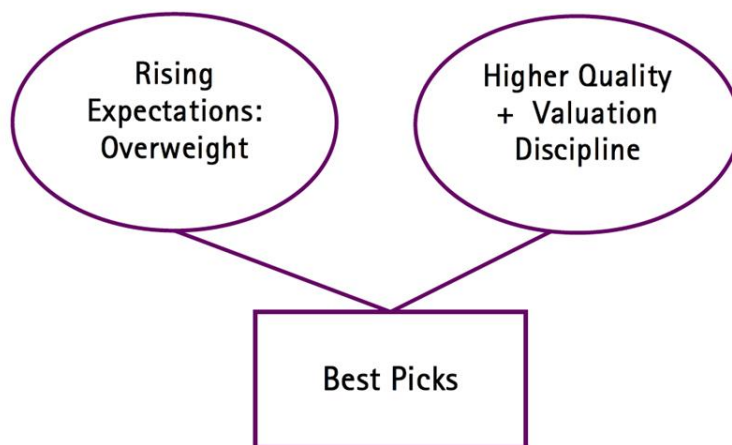
*Cliff Asness, Quant Cassandra, July 2nd, 2019
<https://www.aqr.com/Insights/Perspectives/Quant-Cassandra>

Please see Analyst Certification and Important Disclosures at the end of this report

Cirrus Active Blends Approach – Mimic Fundamentals

In the spirit of a classic multi factor approach, the Cirrus Active Blends, frames the investment model on the premise that combining exceptional variables with a valuation framework adds value. This approach mimics fundamental managers' approach to stock picking as they meet management, sample the product, look at the competitive space and ultimately price the asset. By using data, one can mimic this approach using forecasts for growth, after all, assessing the business outlook is not just determining if the business effort/offering or product is compelling, but more importantly, if its effort to offer growth is above and beyond the consensus outlook.

Fig 2: Our multi factor portfolios are driven by modeling expectations and valuing assets.



Source: Cirrus Research

Sentiment-Based Models Overview.

Traditional tried and tested sentiment factors have evolved around two primary channels. One is the path that positions based on shifts in consensus earnings estimates for some forward period. Another approach borrows from the efficient markets hypothesis and assumes that all pertinent information is embedded in the share price; as a result, rising price trends are a forecast for superior growth.

The Cirrus Blends have borrowed from this area of theory for over a decade. Our white papers have tested many channels of market trend signals and a separate business momentum channel for guidance. Our original papers conclude that utilizing competitive price trending and business trending models can sharply improve one's ability to outperform.

With the onslaught of big data and AI tools applied to all industries across the economy, the obvious question arises of how to apply such tools and datasets to finance and specifically portfolio management. Can some of these newfangled non-linear approaches provide the end all solution? While there are significant problems with non-linear systems applied to a system in which relationships are less fixed, nonetheless capturing sentiment can be powerful and should be applied. The initial tests applied to big data sentiment (BDS) appear to be quite constructive.

Fig 3: Cirrus Pillar Factors

Quality	Price Momentum	Business Momentum	Value
Earnings Predictability	Short Term	Direct Growth	Income Statement Ratios
Balance Sheet Quality	Intermediate Term	Indirect Growth	Balance Sheet Measures
Productivity	Average Momentum	Revisions Models	Cycle-Adjusted Measures
Size/Mkt Characteristics	Trendline/OLS		Sector-Adjusted Ratios
↓	↓	↓	↓
Earnings Predictability	Intermediate-term Price Momentum	Direct Growth	Sector-Adjusted Ratios
Earn Stability	1Yr Chg	YoY EPS Grwth	EV/S
Earn Consistency	1Yr Chg – 1Mo Chg	YoY NI Grwth	EV/EBITDA
Estim. Dispersion	9Mos Chg – 1Mo Chg	YoY CashFlow Grwth	P/E
Estim. Range	6 Mos Chg	YoY Sales Grwth	P/S

Efficacy of the Sentiment Signals

Our initial tests indicate that BDS data can generate superior backtest results compared to standard earnings revisions and relative strength models. In fact, the results appear to be most effective as one leaves the blue chip arena and delves into the mid and small cap segment of equities in the US.

The StockSnips data transforms unstructured textual data to quantified real-time sentiment signal using news articles from established sources and asserts the sentiment of each financially “oriented” sentence within an article.

The chart below is a simple multiyear series generated in standard quintiled baskets. The results below suggest that the BDS sentiment data outperformed our Relative Strength model consistently across size segments (Large, Mid, and Small Caps).

Fig 4: The StockSnips sentiment measure outperform trending factors, but lags traditional earnings revisions models among Large Cap samples.

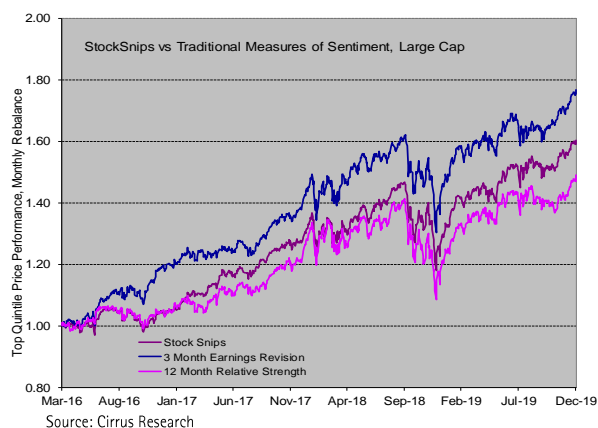


Fig 5: The new sentiment measure appears especially compelling in the Mid Cap landscape.

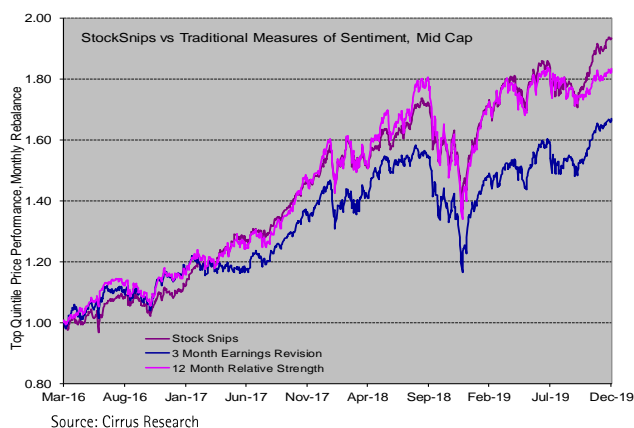


Fig 6: The StockSnips estimates when applied to Small Caps also appear to be competitive.

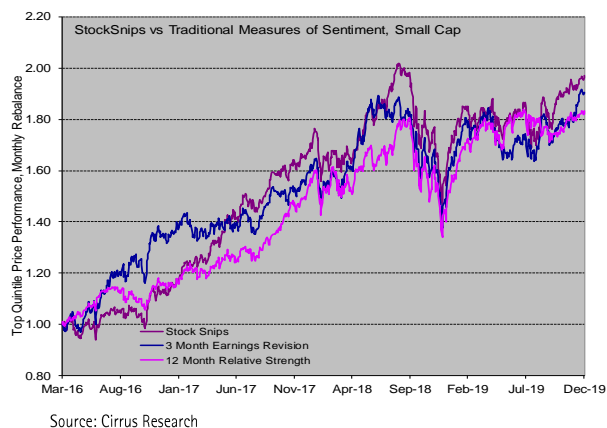
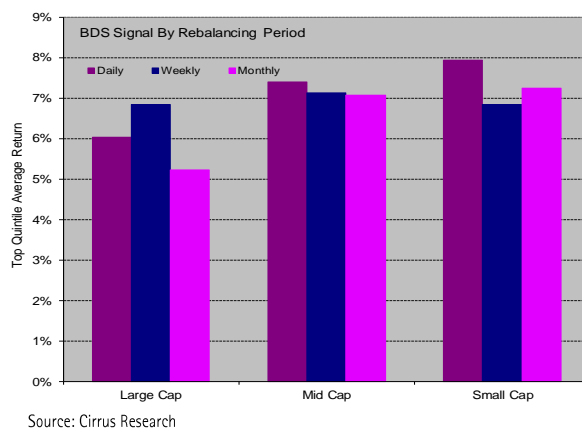


Fig 7: Signal Decay is most pronounced in Large Caps.



The charts represent the performance of the first quintile of the BDS signal versus the more traditional Earning Revisions and Relative Strength signals. The baskets are rebalanced monthly.

Efficacy of the Sentiment Signals

On absolute basis, the highest quintile stratified by sentiment signal tends to have a high correlation to higher earnings revisions based on analyst estimates. Curiously, the BDS sample results were less compelling compared to the classic earnings revision model after examining excess returns. This points to the possibility of the importance of the human element involved in the creation and dispersion of knowledge through analysts on the street.

Importantly, the correlation comparisons further indicate that that the BDS samples are more correlated to trending signals. From a multi factor design stance, the results suggest that BDS could effectively replace a standard relative strength factor.

Fig 8. Returns are highly correlated to the BDS signal.

Return Correlation: Stocksnips vs Traditional Sentiment Factors		
	Relative Strength	Earnings Revisions
Large Cap	0.93	0.93
Mid Cap	0.92	0.92
Small Cap	0.91	0.88

Source: Cirrus Research

Fig 9. Looking at Excess Returns, the BDS signal is most correlated to trending signals.

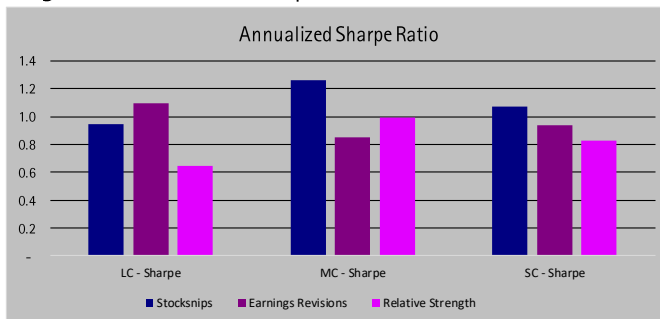
Excess Return Correlation: Stocksnips vs Traditional Sentiment Factors		
	Relative Strength	Earnings Revisions
Large Cap	0.62	0.29
Mid Cap	0.64	0.31
Small Cap	0.53	0.07

Source: Cirrus Research

The following charts compare risk-adjusted returns for the first quintile by sentiment signal across our three size groups. Small caps tend to have a higher Information Ratio and Sharpe Ratio compared to their large cap counterparts.

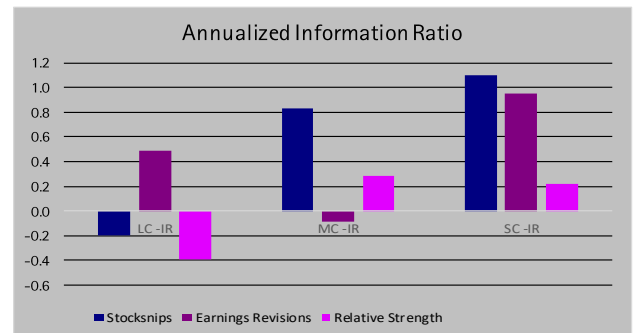
The Sharpe and IR ratios are based on the annualized returns of monthly-rebalanced baskets.

Fig 10: Annualized Sharpe Ratio of Sentiment Factors



Source: Cirrus Research

Fig 11: Annualized Information Ratio of Sentiment Factors

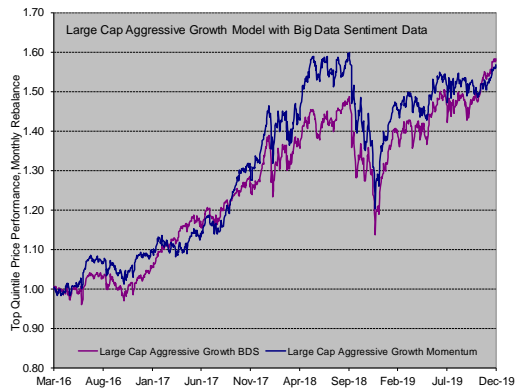


Source: Cirrus Research

Application: Multifactor Aggressive Growth Blend

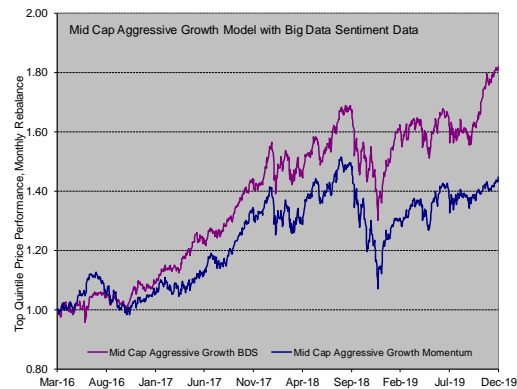
The charts below integrate the StockSnips BDS signal into our traditional multifactor Aggressive Growth blend. The traditional Aggressive Growth blend utilizes our four factor pillars, Quality, Value, Price Momentum and Business Momentum, placing higher weights on Price and Business Momentum, and less emphasis on the Valuation and Quality pillars. In this exercise we replaced the Price Momentum pillar with the StockSnips BDS signal. We can see that the Mid Cap and Small Cap models had substantially higher returns over baseline Aggressive Growth models over the sample period.

Fig 12: For the Large Cap Blend, the BDS Signal is broadly in line with the Price Momentum Pillar.



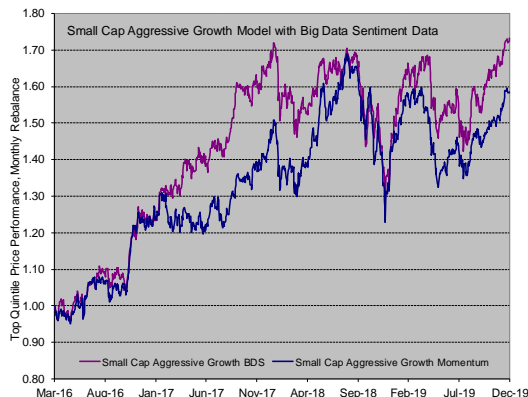
Source: Cirrus Research

Fig 13: The BDS signal substantially outperformed the Price Momentum Pillar in Mid Caps.



Source: Cirrus Research

Fig 14: Small Cap Aggressive Growth benefited from the BDS signal as well.



Source: Cirrus Research

Next Steps

Since the availability of the BDS data is still limited, we should proceed with care constructing a new portfolio design replacing traditional price trending signals. Running the results in parallel over the months to come becomes more valuable as we shift to out of sample efforts.

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Cirrus Global Benchmarks

Size Class	Market Cap Range
US:	
SMID	\$1.2 bn - \$20.3 bn
Large Cap	>\$20.3 bn

Analyst Certification

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