

White Paper:
Capturing Alpha with Sentiment Analysis
Large Cap Domestic Equities

ETFGlobal®

Understand More, Invest Better

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Chris Romano, CFA
Director of Research - ETF Global

cromano@etfg.com
(412) 407-4444

Chris Romano is the Director of Research at ETF Global, where he leads the development of the proprietary research models and analytics. Chris is the Chairman of the ETFG Research Advisory Board and manages the firm's team of research analysts. Chris plays an integral role in developing custom solutions for all of ETFG's client segments.

Chris has extensive experience within investment research having previously served as the Director of Research and Trading Strategies for a successful institutional money management firm. As part of this experience, Chris led the design of quantitative models and the development of trading processes and systems.

Additionally, Chris served as a member of the Investment Advisory Committee providing insight and analytical information used for a large tactical asset management firm. Chris began his career in the systems administration and brokerage support areas.

Chris obtained his Bachelor of Science degree in Information Science with a minor in Business from the University of Pittsburgh, where he graduated Magna Cum Laude. Chris has earned the Chartered Financial Analyst (CFA) designation, is a member of the CFA Institute and the CFA Society of Pittsburgh and is the founder of the Pittsburgh Chapter of QWAFEFW.

Joey Gelin
Research Associate - ETF Global

jgelin@etfg.com
(212) 223-3834

Joey Gelin is a Research Associate with ETF Global having joined the firm in June 2014. Mr. Gelin has been an integral part of developing the firm's overall research and analysis platform into what it is today. His responsibilities include the maintenance and audit of the firm's Red Diamond Risk Ratings, Green Diamond Reward Ratings and the ETFG Dynamic Model Portfolio performance, as well as, the mapping and integrating of the firm's comprehensive data sources.

Joey received his BBA from Baruch College's Zicklin School of Finance where he graduated Cum Laude majoring in Finance with a minor in Mathematics.

Introduction:

In today's world of advanced automation, it is easy to develop a system that pivots on tens if not hundreds of various points to test any combination that you could and sometimes could not imagine. The problem is that as you add more degrees of freedom, you add more fragility to the system. We are strong believers in doing simple yet robust testing to understand the actual story within the data rather than trying to confirm specific beliefs within the data. If the results of the first stage of testing fit into a logical economic theory, further testing is performed.

The purpose of this study is to test RavenPack's 91 day Sentiment Index within the world of US Listed, Equity ETFs for this question: Given that most ETFs are generally diversified in terms of underlying equity exposure, does sentiment within the media provide any ability to capture alpha?

For our initial testing, we start with a well understood universe based on a set of sector specific products that hold stocks within the S&P 500 Index. These are US Listed, Large Cap equities which should provide a sample size of more than enough news flow (both positive and negative) to generate statistically significant results.

To reduce the effects of an outsized holding within an ETF, we chose to test the S&P 500 Equal Weighted Sector products by Guggenheim Investments. For example, the SPDR Technology Select Sector ETF has Apple weighted over 16% where as the Guggenheim S&P 500 Equal Weight Technology ETF has Apple weighted around 1.40%. This provides the benefit of our testing being more broad-based than a pseudo test on Apple within the Technology sector which in turn should provide more robust results that can be more consistently applied within the ETF space.

Data Sources:

For this study we combined data from 3 different sources:

1. **Guggenheim Investments:** Guggenheim provided daily holding information for their funds from inception (11/01/2006)
2. **RavenPack:** RavenPack aggregated their 91 day Sentiment Index¹ equity scores up to the ETF level using the data provided by Guggenheim Investments
3. **ETF Global:** The study used ETFG pricing data for daily adjusted closing prices

We would especially like to thank Guggenheim Investments and RavenPack for their significant contributions to this research project.

¹ RavenPack's Sentiment Strength 91D indicator represents the aggregated sentiment strength for a given company over the previous 91 days. Specifically, we consider the Dow Jones Edition indicator, which analyzes relevant information from Dow Jones Newswires, regional editions of the Wall Street Journal, Barron's and MarketWatch.

Portfolio Construction:

This study follows a standard and straightforward methodology for constructing portfolios. Each portfolio is reconstituted on the last trading day of every calendar month. The allocation to each product within the portfolio is equally distributed. In a broad sense, the portfolios are equally weighted, sector rotation strategies.

The strategies are broken into two groups:

1. The first group allocates based on the highest scoring ETFs as indicated by the product's RavenPack sentiment score
2. The second group allocates based on the lowest scoring ETFs as indicated by the product's RavenPack sentiment score

For example, in the first group (the highest scoring products) there are 8 model portfolios, one portfolio for holding the highest X scoring products where X = 1 through 8. When X = 1, the portfolio owns the single highest scoring ETF for that month, when X = 2 the portfolio holds the two highest scoring products for that month. When X = 8 the portfolio holds all 8 products equally weighted. When additional conditions are added, then X indicates the maximum number of positions not the number of positions held. Please note that trading costs are not factored into the returns.

Each group is then tested with each of the three following conditions:

1. A minimum sentiment score criteria
2. A sentiment score with a positive 5 day Rate of Change
3. A sentiment score with a positive 5 day Rate of Change and a minimum sentiment score

The table below illustrates the various strategies with the number of test portfolios.

Table 1	Highest Scoring ETFs	Lowest Scoring ETFs
No additional Conditions	8	8
Minimum Sentiment Scores	40	40
Positive 5d ROC	8	8
Minimum Score and Positive 5d ROC	8	8

Source: ETF Global

Portfolio Analysis:

The easiest way to compare the 128 model portfolios is through a number of graphs. It's easy to focus upon pure returns but that only shows part of the picture, which is why looking at risk-adjusted returns is a superior approach.

In this section, we will chart two ratios that factor risk into the return picture. The first is the Sharpe Ratio where the risk free rate is set to 0%. The second statistic is the annualized return divided by the maximum drawdown (RoMad). This is an interesting ratio because drawdowns are an important factor that clients use to determine whether to maintain a strategy or not. While standard deviation is a valuable volatility statistic to review, it treats upside volatility the same as downside volatility. Investors have a bias towards being risk averse therefore downside volatility has a much larger impact than upside volatility. This is why maximum drawdown provides valuable insight.

For all the charts that follow, they reflect the same order as **Table 1** which outlines the structure of the portfolios and their variations.

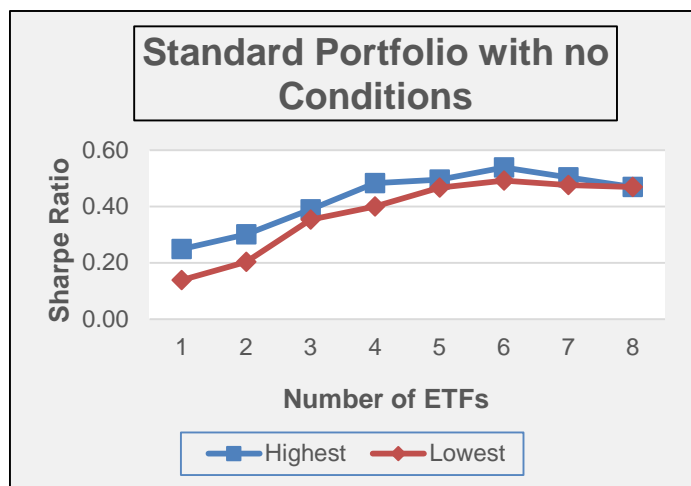
In **Chart Series A**, we illustrate the first set of portfolios that have no additional conditions. The only variation is the number of ETFs held during the holding period.

In reviewing the charts, two commonalities emerge:

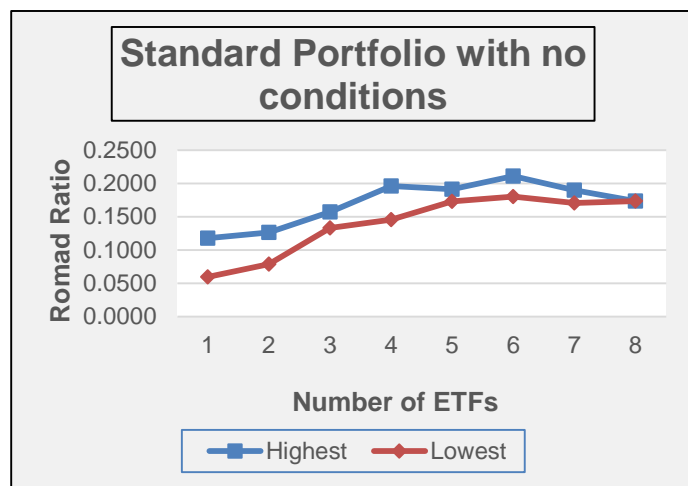
1. First, owning the products with the highest sentiment scores produce better risk-adjusted returns than owning the lowest sentiment scoring products.
2. Secondly, owning a somewhat more diversified portfolio outperforms owning the highest/lowest sentiment scoring products in addition to just owning all 8 products on an equally weighted basis.

Chart Series A

Standard Portfolios: Show the Sharpe Ratios and RoMad Ratios of the standard portfolios split out by the number of maximum ETFs they can own.



Source: ETF Global



Source: ETF Global

The next chart series, **Chart Series B**, illustrates the requirement of a product meeting a minimum sentiment score in order to be included within the portfolios. To better visualize the results, the graphs below isolate the Highest and Lowest portfolios. Unlike **Chart Series A**, the charts of the Highest and Lowest portfolios do not follow the same pattern, though both generally exhibit better performance as the minimum sentiment score threshold is increased.

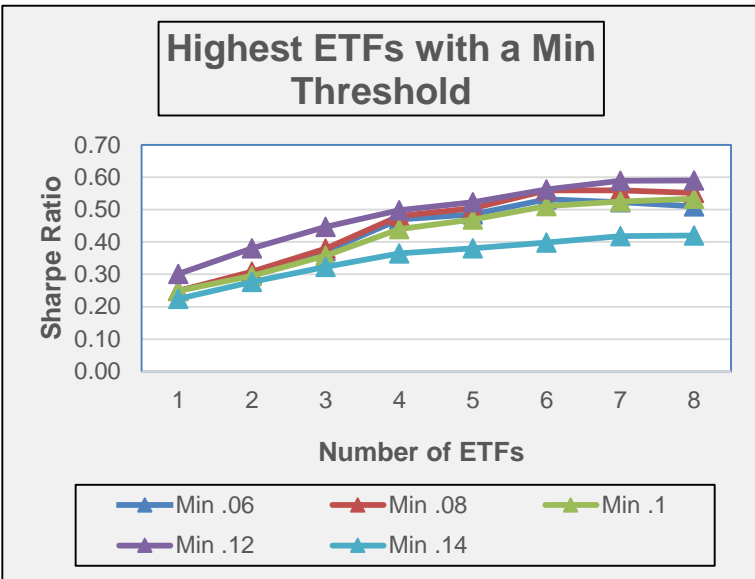
In the first set of portfolios, adding additional potential products increases performance of the portfolios in most cases. Note that because of the minimum threshold, the portfolios with larger number of holdings don't always hold their maximum number of ETFs. For example, the portfolios that have a maximum number of 7 and 8 ETFs on average only hold 4 ETFs at a time during any single month.

The second set of charts in **Chart Series B** reflect owning the lowest sentiment scoring products. This is where we see a bifurcation for the first time.

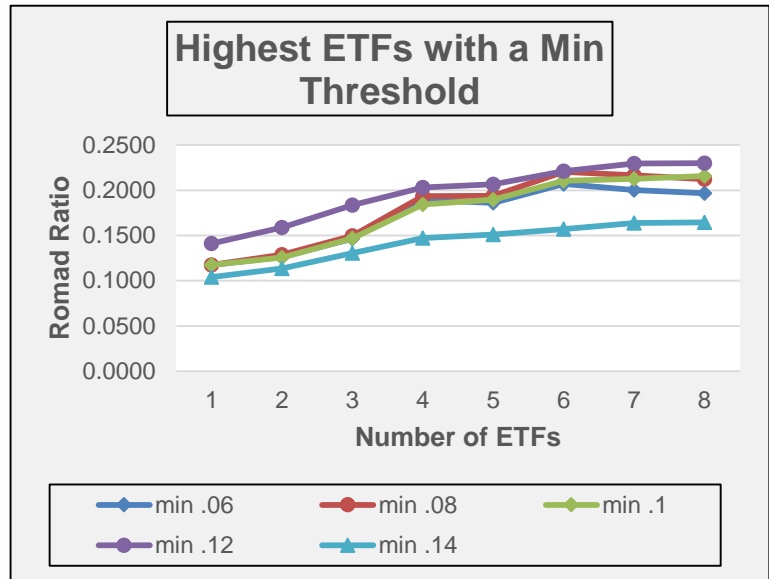
When building portfolios of lowest sentiment scoring products, owning a less diversified portfolio within a higher range of sentiment scores outperforms a more diversified portfolio. It's important to note that this isn't consistent across all threshold values. When choosing a threshold that is too high like 0.14, there is actually a decrease in performance. Selecting a too restrictive threshold carries an adverse impact in causing the strategies to buy products toward their peaks before a move down as sentiment starts to wane.

Chart Series B

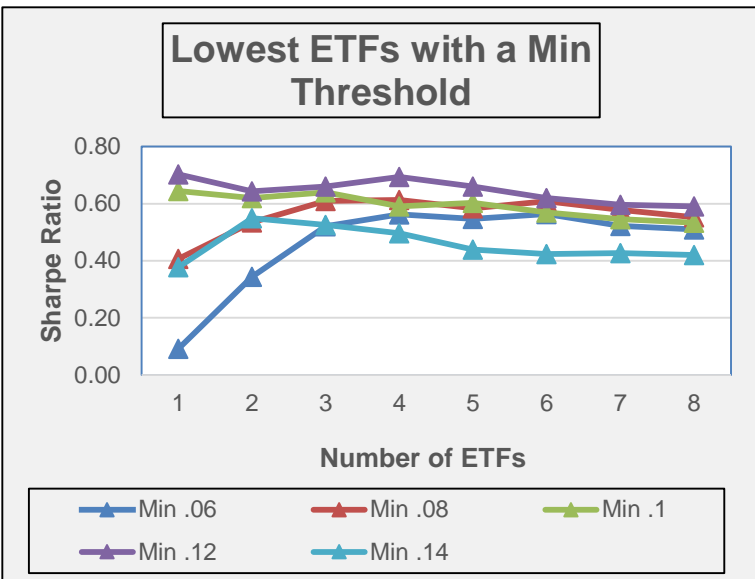
Standard Portfolios with Minimum Sentiment Threshold: Shows the Sharpe Ratios and RoMad Ratios of the standard portfolios split out by the number of maximum ETFs they can own.



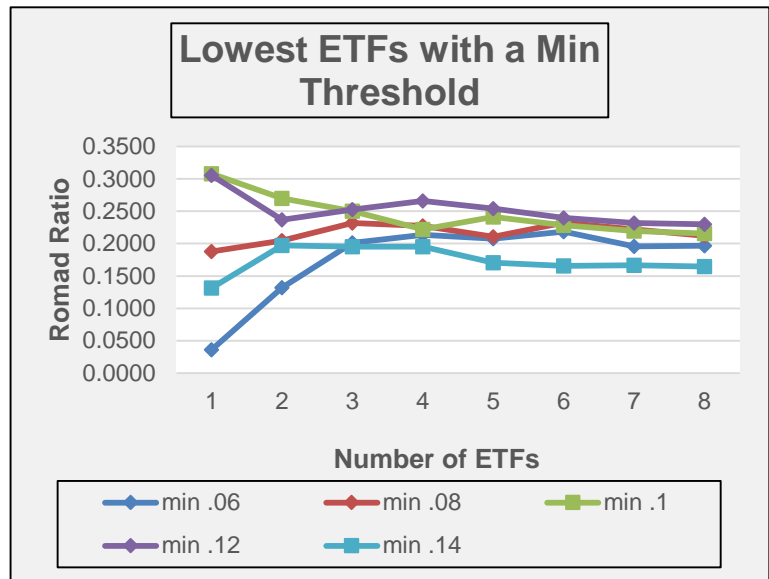
Source: ETF Global



Source: ETF Global



Source: ETF Global



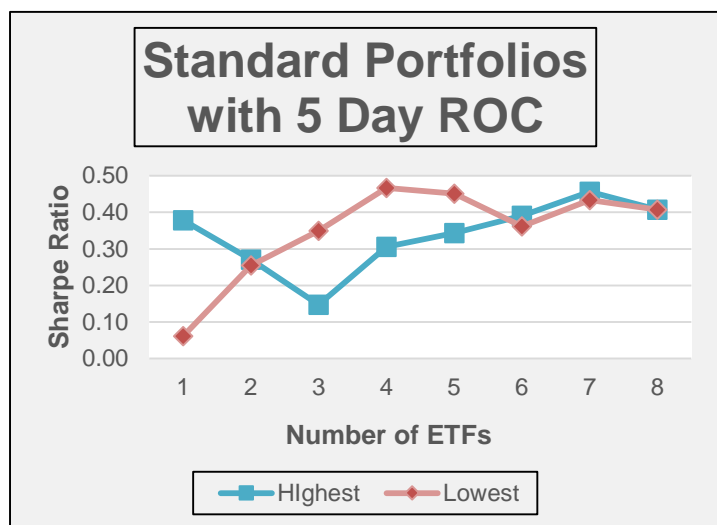
Source: ETF Global

Chart Series C below reflects those portfolios that include only products with a positive 5 Day Rate of Change (ROC) of their sentiment scores. By adding the requirement of a positive 5 Day ROC to the standard portfolios, the risk-adjusted returns of the portfolios that own the highest scoring ETFs dropped except when owning just the single highest sentiment scoring ETF. The portfolios affected the most are the ones with 2 to 4 maximum holdings. Just like the portfolios in **Chart Series B**, the average number of holdings within the portfolios is generally less than their maximum number of holdings.

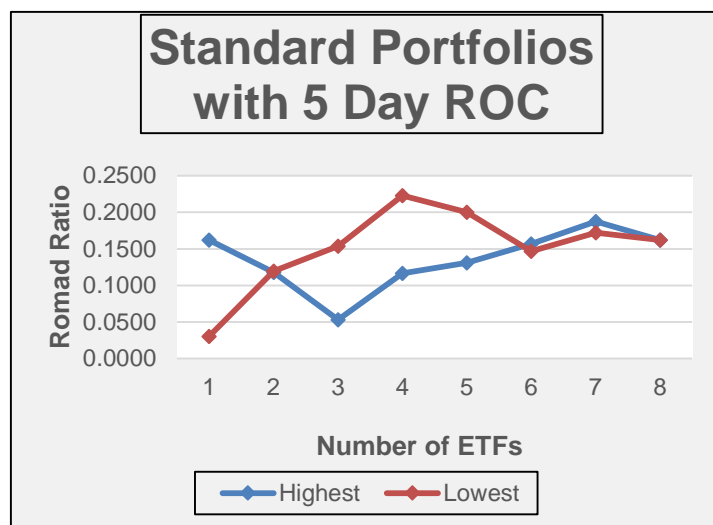
Reviewing the portfolios that buy the lowest sentiment scoring products, the ratios are lower than those in the standard portfolio with no ROC requirement. The portfolio owning the single lowest sentiment scoring product is affected the most. Being that the sentiment score is already a “smoothed” index, adding the positive ROC criteria doesn't add much value when looking at risk-adjusted returns. Adding the positive ROC does increase the returns on a number of the portfolios that own the lowest sentiment scoring products, sometimes significantly, though the increase in return comes at the cost of increased volatility and drawdowns.

Chart Series C

Standard Portfolios with 5 Day ROC: Shows the Sharpe Ratios and RoMad Ratios of the portfolios split out by the number of maximum ETFs they can own.



Source: ETF Global



Source: ETF Global

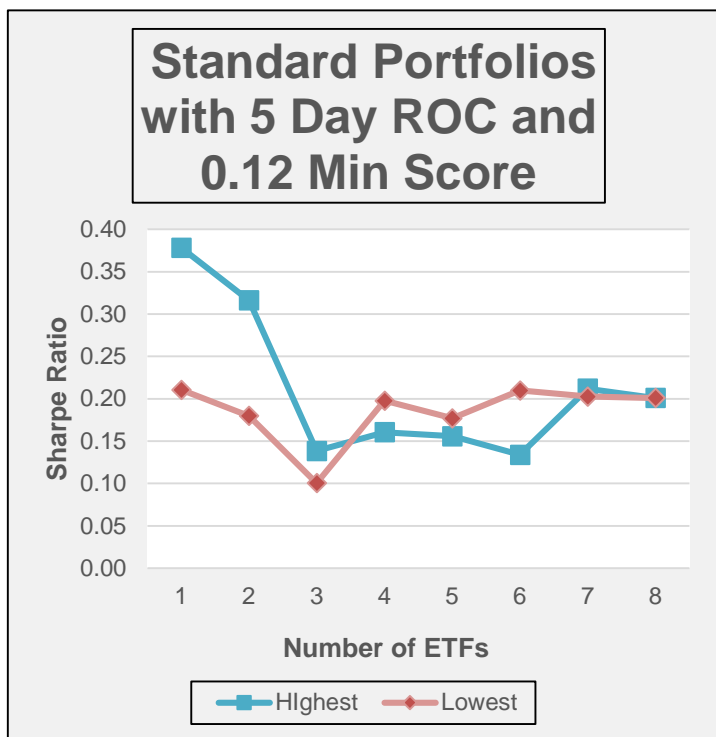
The final set of charts, **Chart Series D**, illustrates the last set of portfolios. These portfolios combine the positive 5 Day ROC and a 0.12 minimum Sentiment score threshold. Ignoring the values, the charts appear to show exactly what you might expect; as you increase the maximum number of ETFs within the portfolios, the ratios decrease.

This is more pronounced when selecting from the highest scoring products but it shows the highest/lowest scoring product within that group is the best one to own when it meets the 0.12 threshold. While it doesn't produce the best Sharpe and RoMad ratios within all the groups, they are an improvement over the standard portfolios without additional conditions. As you start increasing the number of maximum positions, the outperformance quickly dissipates. This data set is a relatively small set and to be comfortable using 0.12 as a threshold, more testing needs to be completed.

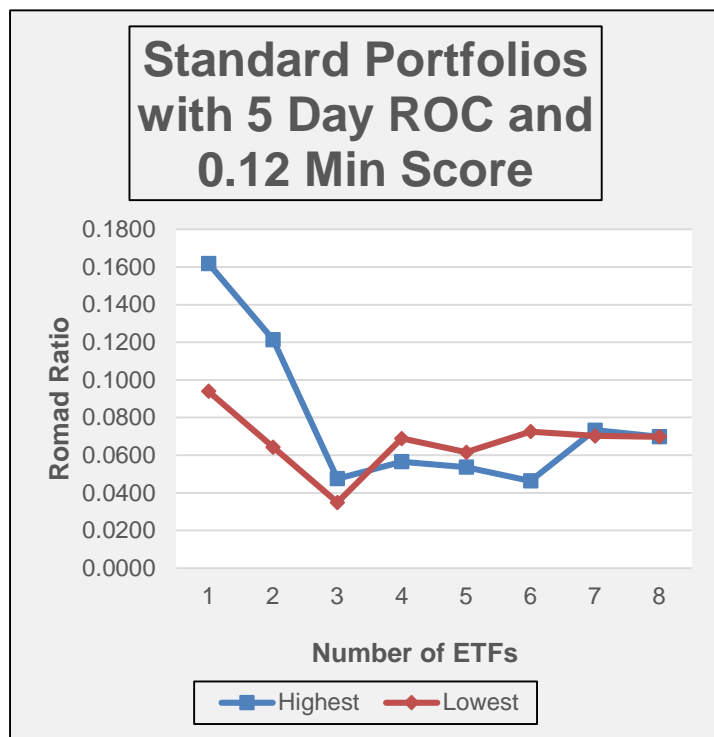
Please note, these strategies, along with the previous two carrying additional constraints, are more tactical in nature. They can, and do, sit in cash from time to time while the standard portfolios are fully vested strategies.

Chart Series D

Standard Portfolios with 5 Day ROC and Min Threshold of 0.12: Shows the Sharpe Ratios and RoMad Ratios of the portfolios split out by the number of maximum ETFs they can own.



Source: ETF Global



Source: ETF Global

Conclusion:

Over the past few years, a number of studies have reviewed the relationship between performance and sentiment as defined by news flows. However, most of these studies have focused on individual equities. With this analysis, we are attempting to build upon this previous research by extending our findings to equity based, US Listed, ETFs which are essentially diversified equity portfolios.

We examined 128 different model portfolios by testing 4 distinct strategies while varying each portfolio's number of allowed maximum holdings. Using two sets of risk-adjusted ratios, Sharpe ratio and RoMad, we sought to determine if any Alpha could be added through the use of sentiment analysis versus holding all products on an equally weighted basis.

The primary finding for diversified equity products uncovered within this study is that sentiment analysis may be better suited to identify and avoid underperformers than to identify and take advantage of outperformers. That is to say that in the majority of cases, one is more well served by avoiding those products with the lowest sentiment score than you are in owning those products with the highest sentiment score.

We also found that outperformance can be achieved in building a concentrated portfolio of ETFs by selecting those products with the lowest sentiment scores and from this sample selecting either the products with a minimum sentiment score threshold or the products with a positive 5 Day ROC. The latter appears to help find products that have had bad news flow but are now on a positive upswing.

We plan to further study the effects of sentiment as defined by news flow by expanding the universe to include Small Cap domestic equities and international equities. As you move to smaller companies and those in smaller countries, you would expect absolute news flow to decline with any news producing a more pronounced effect. We would also expect products that own a large number of securities to be less effected by company specific sentiment; macro based news sentiment may be a more suitable way to test those products.

Appendix A

Sentiment_Strength_91D

RavenPack's Sentiment_Strength_91D indicator is a nullable numeric value between -1 and +1 with up to 5 decimal points representing the aggregated sentiment strength for a given company over the previous 91 days. A value of -1 is highly negative, a value of +1 is highly positive and a value of 0 is neutral. An empty value means that there was no news events over the last 91 days and therefore no sentiment associated with the company. Only novel news items that have non-neutral sentiment are included in this computation. Certain types of news stories categorized as "Order Imbalance", "Insider Trading" and "Technical Analysis" are excluded as they tend to add noise given their lack of sentiment, high volume and frequency. To allow for more recent events to have a greater impact on the company's sentiment, an exponential sentiment decay and a time weight function are incorporated. Both are based on the company's event volume, and hence sentiment will decay more rapidly with additional company events.

Appendix B

Portfolios with No Additional Conditions

Strategy	Top 1	Top 2	Top 3	Top 4	Top 5	Top 6	Top 7	Top 8
Cumulative Return	68.98%	72.68%	96.68%	123.33%	125.05%	137.19%	128.33%	120.28%
Annualized Return	6.39%	6.67%	8.32%	9.96%	10.06%	10.74%	10.25%	9.78%
Daily St. Dev	1.63%	1.40%	1.35%	1.31%	1.29%	1.26%	1.29%	1.32%
Annualized St Dev	25.72%	22.12%	21.36%	20.65%	20.32%	19.96%	20.38%	20.83%
Return/Risk	0.2486	0.3014	0.3895	0.4822	0.4948	0.5381	0.5028	0.4696
Max Positions	1	2	3	4	5	6	7	8
Min Positions	1	2	3	4	5	6	7	8
Ave Positions	1	2	3	4	5	6	7	8
Median Positions	1	2	3	4	5	6	7	8
Max Drawdown	-0.5443	-0.5285	-0.5290	-0.5078	-0.5263	-0.5096	-0.5404	-0.5644
Return/Max DD	0.1175	0.1261	0.1573	0.1961	0.1911	0.2108	0.1896	0.1733
Ave Turnover	69.00%	50.50%	36.67%	29.00%	22.40%	14.50%	10.57%	0.00%

Strategy	Bottom 1	Bottom 2	Bottom 3	Bottom 4	Bottom 5	Bottom 6	Bottom 7	Bottom 8
Cumulative Return	43.73%	59.53%	101.57%	109.84%	129.28%	134.24%	124.66%	120.28%
Annualized Return	4.38%	5.67%	8.63%	9.15%	10.30%	10.58%	10.04%	9.78%
Daily St. Dev	1.99%	1.77%	1.54%	1.45%	1.39%	1.36%	1.33%	1.32%
Annualized St Dev	31.52%	27.98%	24.41%	22.89%	22.05%	21.49%	21.07%	20.83%
Return/Risk	0.1389	0.2028	0.3537	0.3997	0.4671	0.4923	0.4763	0.4696
Max Positions	1	2	3	4	5	6	7	8
Min Positions	1	2	3	4	5	6	7	8
Ave Positions	1	2	3	4	5	6	7	8
Median Positions	1	2	3	4	5	6	7	8
Max Drawdown	-0.7376	-0.7212	-0.6485	-0.6294	-0.5962	-0.5877	-0.5883	-0.5644
Return/Max DD	0.0594	0.0787	0.1332	0.1454	0.1728	0.1800	0.1706	0.1733
Ave Turnover	74.00%	43.50%	37.33%	29.00%	22.00%	16.83%	9.86%	0.00%

.06 Min Sentiment Score Condition

	Top 1	Top 2	Top 3	Top 4	Top 5	Top 6	Top 7	Top 8
Conditional Level	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Cumulative Return	68.98%	72.68%	90.95%	117.91%	118.67%	131.25%	129.01%	125.61%
Annualized Return	6.39%	6.67%	7.94%	9.64%	9.68%	10.41%	10.29%	10.09%
Daily St. Dev	1.63%	1.40%	1.35%	1.30%	1.26%	1.24%	1.24%	1.25%
Annualized St.Dev	25.72%	22.12%	21.38%	20.53%	19.96%	19.57%	19.65%	19.79%
Return/Risk	0.2486	0.3014	0.3714	0.4697	0.4851	0.5322	0.5235	0.5099
Max Positions	1	2	3	4	5	6	7	8
Min Positions	1	2	2	2	2	2	2	2
Ave Positions	1	2	3.0	3.9	4.9	5.8	6.7	7.4
Median Positions	1	2	3	4	5	6	7	8
Max Drawdown	-0.5443	-0.5285	-0.5428	-0.5094	-0.5208	-0.5035	-0.5141	-0.5134
Return/Max DD	0.1175	0.1261	0.1463	0.1892	0.1859	0.2068	0.2000	0.1965
Ave Turnover	69.00%	50.50%	36.67%	29.25%	22.47%	15.23%	11.54%	4.30%

	Bottom 1	Bottom 2	Bottom 3	Bottom 4	Bottom 5	Bottom 6	Bottom 7	Bottom 8
Conditional Level	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Cumulative Return	23.58%	91.99%	144.62%	150.55%	141.73%	143.59%	129.25%	125.61%
Annualized Return	2.53%	8.01%	11.15%	11.46%	10.99%	11.09%	10.30%	10.09%
Daily St. Dev	1.74%	1.47%	1.35%	1.29%	1.27%	1.24%	1.25%	1.25%
Annualized St.Dev	27.54%	23.31%	21.38%	20.39%	20.10%	19.67%	19.72%	19.79%
Return/Risk	0.0920	0.3436	0.5213	0.5622	0.5468	0.5640	0.5223	0.5099
Max Positions	1	2	3	4	5	6	7	8
Min Positions	1	2	2	2	2	2	2	2
Ave Positions	1.0	2.0	3.0	3.9	4.9	5.8	6.7	7.4
Median Positions	1	2	3	4	5	6	7	8
Max Drawdown	-0.6986	-0.6074	-0.5542	-0.5370	-0.5295	-0.5080	-0.5254	-0.5134
Return/Max DD	0.0363	0.1319	0.2012	0.2135	0.2076	0.2184	0.1960	0.1965
Ave Turnover	74.00%	54.50%	44.17%	36.17%	28.13%	20.97%	12.48%	4.30%

.08 Min Sentiment Score Condition

	Top 1	Top 2	Top 3	Top 4	Top 5	Top 6	Top 7	Top 8
Conditional Level	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Cumulative Return	68.98%	74.71%	93.78%	123.00%	126.98%	142.88%	141.41%	138.11%
Annualized Return	6.39%	6.81%	8.13%	9.94%	10.17%	11.05%	10.97%	10.79%
Daily St. Dev	1.63%	1.40%	1.35%	1.31%	1.28%	1.25%	1.24%	1.24%
Annualized St. Dev	25.72%	22.10%	21.41%	20.67%	20.18%	19.76%	19.62%	19.55%
Return/Risk	0.2486	0.3084	0.3797	0.4808	0.5039	0.5595	0.5595	0.5522
Max Positions	1	2	3	4	5	6	7	8
Min Positions	1	1	1	1	1	1	1	1
Ave Positions	1	2.0	3.0	3.9	4.8	5.7	6.5	7.0
Median Positions	1	2	3	4	5	6	7	8
Max Drawdown	-0.5443	-0.5285	-0.5428	-0.5136	-0.5250	-0.5016	-0.5072	-0.5087
Return/Max DD	0.1175	0.1289	0.1498	0.1935	0.1937	0.2204	0.2163	0.2122
Ave Turnover	69.00%	51.00%	36.67%	28.92%	22.62%	15.35%	11.01%	5.00%

	Bottom 1	Bottom 2	Bottom 3	Bottom 4	Bottom 5	Bottom 6	Bottom 7	Bottom 8
Conditional Level	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Cumulative Return	115.62%	139.54%	159.74%	158.64%	145.55%	156.73%	146.98%	138.11%
Annualized Return	9.50%	10.87%	11.94%	11.88%	11.20%	11.78%	11.27%	10.79%
Daily St. Dev	1.48%	1.29%	1.24%	1.23%	1.21%	1.22%	1.23%	1.24%
Annualized St. Dev	23.39%	20.34%	19.59%	19.37%	19.19%	19.36%	19.50%	19.55%
Return/Risk	0.4063	0.5346	0.6093	0.6134	0.5834	0.6086	0.5782	0.5522
Max Positions	1	2	3	4	5	6	7	8
Min Positions	1	1	1	1	1	1	1	1
Ave Positions	1.0	2.0	3.0	3.9	4.8	5.7	6.5	7.0
Median Positions	1	2	3	4	5	6	7	8
Max Drawdown	-0.5056	-0.5307	-0.5146	-0.5229	-0.5312	-0.5073	-0.5081	-0.5087
Return/Max DD	0.1880	0.2049	0.2320	0.2272	0.2108	0.2323	0.2219	0.2122
Ave Turnover	79.00%	54.50%	43.00%	35.67%	27.77%	20.38%	11.89%	5.00%

.10 Min Sentiment Score Condition

	Top 1	Top 2	Top 3	Top 4	Top 5	Top 6	Top 7	Top 8
Conditional Level	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cumulative Return	68.98%	71.12%	87.19%	108.99%	116.19%	128.14%	131.14%	133.70%
Annualized Return	6.39%	6.55%	7.69%	9.10%	9.54%	10.24%	10.41%	10.55%
Daily St. Dev	1.63%	1.40%	1.36%	1.31%	1.28%	1.27%	1.25%	1.25%
Annualized St. Dev	25.72%	22.15%	21.49%	20.68%	20.29%	20.03%	19.84%	19.78%
Return/Risk	0.2486	0.2959	0.3578	0.4399	0.4700	0.5109	0.5245	0.5334
Max Positions	1	2	3	4	5	6	7	8
Min Positions	1	1	1	1	1	1	1	1
Ave Positions	1	2.0	2.9	3.8	4.7	5.5	6.1	6.5
Median Positions	1	2	3	4	5	6	7	7
Max Drawdown	-0.5443	-0.5219	-0.5241	-0.4938	-0.5029	-0.4860	-0.4893	-0.4893
Return/Max DD	0.1175	0.1256	0.1467	0.1843	0.1896	0.2106	0.2127	0.2156
Ave Turnover	69.00%	50.50%	36.67%	28.83%	22.50%	15.97%	13.35%	8.88%

	Bottom 1	Bottom 2	Bottom 3	Bottom 4	Bottom 5	Bottom 6	Bottom 7	Bottom 8
Conditional Level	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cumulative Return	222.78%	177.44%	173.31%	150.31%	154.28%	145.46%	137.35%	133.70%
Annualized Return	14.85%	12.81%	12.61%	11.45%	11.66%	11.19%	10.75%	10.55%
Daily St. Dev	1.46%	1.31%	1.25%	1.23%	1.22%	1.24%	1.25%	1.25%
Annualized St. Dev	23.04%	20.68%	19.70%	19.37%	19.32%	19.67%	19.72%	19.78%
Return/Risk	0.6444	0.6195	0.6401	0.5910	0.6034	0.5690	0.5452	0.5334
Max Positions	1	2	3	4	5	6	7	8
Min Positions	1	1	1	1	1	1	1	1
Ave Positions	1.0	2.0	2.9	3.8	4.7	5.5	6.1	6.5
Median Positions	1	2	3	4	5	6	7	7
Max Drawdown	-0.4821	-0.4746	-0.5038	-0.5162	-0.4827	-0.4904	-0.4893	-0.4893
Return/Max DD	0.3080	0.2700	0.2503	0.2218	0.2415	0.2282	0.2198	0.2156
Ave Turnover	71.00%	59.00%	49.17%	39.17%	30.47%	21.37%	14.17%	8.88%

.12 Min Sentiment Score Condition

	Top 1	Top 2	Top 3	Top 4	Top 5	Top 6	Top 7	Top 8
Conditional Level	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Cumulative Return	87.18%	95.86%	114.11%	127.54%	132.86%	145.78%	154.16%	154.62%
Annualized Return	7.69%	8.27%	9.41%	10.20%	10.50%	11.21%	11.65%	11.67%
Daily St. Dev	1.62%	1.37%	1.33%	1.29%	1.27%	1.26%	1.25%	1.25%
Annualized St. Dev	25.54%	21.73%	21.05%	20.46%	20.08%	19.93%	19.77%	19.78%
Return/Risk	0.3010	0.3804	0.4471	0.4986	0.5231	0.5623	0.5893	0.5904
Max Positions	1	2	3	4	5	6	7	8
Min Positions	0	0	0	0	0	0	0	0
Ave Positions	1.0	1.9	2.8	3.7	4.5	5.0	5.4	5.6
Median Positions	1	2	3	4	5	6	6	6
Max Drawdown	-0.5443	-0.5210	-0.5127	-0.5021	-0.5083	-0.5075	-0.5075	-0.5075
Return/Max DD	0.1412	0.1587	0.1836	0.2032	0.2066	0.2209	0.2296	0.2300
Ave Turnover	70.00%	51.50%	36.83%	29.42%	23.65%	19.57%	17.95%	16.66%

	Bottom 1	Bottom 2	Bottom 3	Bottom 4	Bottom 5	Bottom 6	Bottom 7	Bottom 8
Conditional Level	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Cumulative Return	267.43%	178.96%	179.57%	191.00%	180.70%	164.44%	156.30%	154.62%
Annualized Return	16.62%	12.89%	12.92%	13.45%	12.97%	12.18%	11.76%	11.67%
Daily St. Dev	1.50%	1.27%	1.24%	1.23%	1.24%	1.24%	1.25%	1.25%
Annualized St. Dev	23.65%	20.05%	19.56%	19.40%	19.64%	19.65%	19.73%	19.78%
Return/Risk	0.7029	0.6428	0.6604	0.6932	0.6603	0.6197	0.5962	0.5904
Max Positions	1	2	3	4	5	6	7	8
Min Positions	0	0	0	0	0	0	0	0
Ave Positions	1.0	1.9	2.8	3.7	4.5	5.0	5.4	5.6
Median Positions	1	2	3	4	5	6	6	6
Max Drawdown	-0.5436	-0.5436	-0.5109	-0.5054	-0.5101	-0.5075	-0.5075	-0.5075
Return/Max DD	0.3057	0.2370	0.2528	0.2661	0.2542	0.2399	0.2318	0.2300
Ave Turnover	85.00%	71.00%	55.17%	43.08%	31.68%	25.25%	20.18%	16.66%

.14 Min Sentiment Score Condition

	Top 1	Top 2	Top 3	Top 4	Top 5	Top 6	Top 7	Top 8
Conditional Level	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Cumulative Return	59.35%	62.64%	72.59%	81.83%	85.47%	89.89%	94.92%	95.51%
Annualized Return	5.66%	5.91%	6.66%	7.32%	7.57%	7.87%	8.20%	8.24%
Daily St. Dev	1.60%	1.35%	1.30%	1.27%	1.26%	1.25%	1.24%	1.24%
Annualized St Dev	25.26%	21.41%	20.63%	20.09%	19.87%	19.75%	19.62%	19.63%
Return/Risk	0.2241	0.2762	0.3229	0.3643	0.3810	0.3985	0.4182	0.4198
Max Positions	1	2	3	4	5	6	7	8
Min Positions	0	0	0	0	0	0	0	0
Ave Positions	1.0	1.8	2.6	3.2	3.6	3.9	4.0	4.1
Median Positions	1	2	3	4	4	4	4	4
Max Drawdown	-0.5443	-0.5210	-0.5095	-0.4976	-0.5014	-0.5014	-0.5014	-0.5014
Return/Max DD	0.1040	0.1135	0.1307	0.1471	0.1510	0.1570	0.1636	0.1644
Ave Turnover	68.00%	52.50%	39.50%	33.42%	29.60%	27.53%	27.61%	27.49%

	Bottom 1	Bottom 2	Bottom 3	Bottom 4	Bottom 5	Bottom 6	Bottom 7	Bottom 8
Conditional Level	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Cumulative Return	92.59%	137.84%	125.78%	117.65%	100.27%	96.32%	97.35%	95.51%
Annualized Return	8.05%	10.78%	10.10%	9.62%	8.55%	8.30%	8.36%	8.24%
Daily St. Dev	1.35%	1.24%	1.22%	1.23%	1.23%	1.24%	1.24%	1.24%
Annualized St Dev	21.32%	19.63%	19.23%	19.40%	19.47%	19.57%	19.57%	19.63%
Return/Risk	0.3777	0.5490	0.5252	0.4961	0.4393	0.4239	0.4274	0.4198
Max Positions	1	2	3	4	5	6	7	8
Min Positions	0	0	0	0	0	0	0	0
Ave Positions	1.0	1.8	2.6	3.2	3.6	3.9	4.0	4.1
Median Positions	1	2	3	4	4	4	4	4
Max Drawdown	-0.6114	-0.5467	-0.5172	-0.4932	-0.5014	-0.5014	-0.5014	-0.5014
Return/Max DD	0.1317	0.1972	0.1953	0.1951	0.1706	0.1655	0.1668	0.1644
Ave Turnover	82.00%	68.50%	52.67%	44.08%	37.43%	32.63%	28.38%	27.49%

5 Day Sentiment

	Based on the Top X products w/ Positive 5 Rate of Change on Sentiment							
Max Positions	1	2	3	4	5	6	7	8
Cumulative Return	73.38%	60.03%	33.48%	79.92%	92.69%	109.60%	141.32%	122.23%
Annualized Return	6.72%	5.72%	3.47%	7.19%	8.06%	9.14%	10.97%	9.90%
Daily St. Dev	1.12%	1.34%	1.49%	1.49%	1.48%	1.48%	1.52%	1.54%
Annualized St Dev	17.77%	21.14%	23.62%	23.55%	23.45%	23.42%	24.05%	24.33%
Return/Risk	0.3783	0.2704	0.1471	0.3053	0.3437	0.3903	0.4564	0.4068
Max Drawdown	-0.4152	-0.4855	-0.6515	-0.6178	-0.6159	-0.5838	-0.5861	-0.6105
Return/Max DD	0.1619	0.1177	0.0533	0.1164	0.1309	0.1566	0.1873	0.1621
Max Positions	1	2	3	4	5	6	7	8
Min Positions	0	0	0	0	0	0	0	0
Ave Positions	0.5	1.1	1.6	2.1	2.6	3.1	3.6	3.9
Median Positions	1	1	2	2	2	3	3	4
Ave Monthly Turnover	97.00%	92.00%	84.33%	80.75%	79.22%	76.43%	74.31%	72.91%

	Based on the Bottom X products w/ Positive 5 Rate of Change on Sentiment							
Max Positions	1	2	3	4	5	6	7	8
Cumulative Return	12.22%	63.21%	92.68%	145.34%	138.61%	106.67%	134.41%	122.23%
Annualized Return	1.37%	5.96%	8.06%	11.19%	10.83%	8.96%	10.59%	9.90%
Daily St. Dev	1.40%	1.48%	1.46%	1.52%	1.52%	1.57%	1.54%	1.54%
Annualized St Dev	22.19%	23.39%	23.09%	23.96%	24.00%	24.78%	24.42%	24.33%
Return/Risk	0.0618	0.2549	0.3491	0.4671	0.4512	0.3616	0.4339	0.4068
Max Drawdown	-0.4547	-0.4991	-0.5245	-0.5020	-0.5408	-0.6100	-0.6160	-0.6105
Return/Max DD	0.0302	0.1194	0.1537	0.2229	0.2002	0.1469	0.1720	0.1621
Max Positions	1	2	3	4	5	6	7	8
Min Positions	0	0	0	0	0	0	0	0
Ave Positions	0.4	0.9	1.3	1.8	2.3	2.8	3.4	3.9
Median Positions	0	1	1	2	2	3	3	4
Ave Monthly Turnover	97.00%	90.00%	86.50%	83.17%	81.37%	77.75%	75.47%	72.91%

.12 Min Sentiment Score Condition 5 Day Sentiment

	Based on the Top X products w/ Positive 5 Rate of Change on Sentiment							
Max Positions	1	2	3	4	5	6	7	8
Cumulative Return	73.38%	62.37%	29.11%	33.75%	32.04%	27.32%	45.99%	43.43%
Annualized Return	6.72%	5.90%	3.07%	3.50%	3.34%	2.90%	4.57%	4.36%
Daily St. Dev	1.12%	1.18%	1.40%	1.38%	1.36%	1.37%	1.37%	1.37%
Annualized St Dev	17.77%	18.66%	22.15%	21.78%	21.43%	21.63%	21.58%	21.67%
Return/Risk	0.3783	0.3160	0.1384	0.1605	0.1558	0.1339	0.2119	0.2010
Max Drawdown	-0.4152	-0.4855	-0.6440	-0.6178	-0.6224	-0.6240	-0.6240	-0.6240
Return/Max DD	0.1619	0.1215	0.0476	0.0566	0.0537	0.0464	0.0733	0.0698
Max Positions	1	2	3	4	5	6	7	8
Min Positions	0	0	0	0	0	0	0	0
Ave Positions	0.534653	1.039604	1.574257	1.970297	2.326733	2.624	2.851485	2.950495
Median Positions	1	1	2	2	2	2	2	2
Ave Monthly Turnover	97.00%	92.50%	85.83%	82.92%	82.28%	81.03%	80.47%	80.47%

	Based on the Bottom X products w/ Positive 5 Rate of Change on Sentiment							
Max Positions	1	2	3	4	5	6	7	8
Cumulative Return	39.01%	35.38%	19.69%	41.46%	37.48%	45.44%	43.78%	43.43%
Annualized Return	3.97%	3.65%	2.15%	4.18%	3.83%	4.53%	4.39%	4.36%
Daily St. Dev	1.19%	1.28%	1.35%	1.34%	1.37%	1.37%	1.37%	1.37%
Annualized St Dev	18.86%	20.29%	21.37%	21.16%	21.67%	21.59%	21.64%	21.67%
Return/Risk	0.2105	0.1797	0.1005	0.1977	0.1769	0.2097	0.2027	0.2010
Max Drawdown	-0.4224	-0.5671	-0.6158	-0.6070	-0.6222	-0.6240	-0.6240	-0.6240
Return/Max DD	0.0940	0.0643	0.0349	0.0689	0.0616	0.0726	0.0703	0.0698
Max Positions	1	2	3	4	5	6	7	8
Min Positions	0	0	0	0	0	0	0	0
Ave Positions	0.465347	0.950495	1.405941	1.841584	2.247525	2.594059	2.80198	2.950
Median Positions	0	1	1	2	2	2	2	2
Ave Monthly Turnover	98.00%	95.50%	89.67%	87.00%	83.05%	81.73%	81.18%	80.47%

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