RavenPack

</> Quantitative Research

RavenPack Sentiment Data Outperforms During Coronavirus Crisis

April 2020

Key Takeaways

News sentiment can enhance alpha strategies, along with augmenting risk management models for downside protection during periods of crisis. Following a statistical approach, whereby we evaluate thousands of long-short random portfolios as a benchmark, we consider three significant drawdown periods: the Global Financial Crisis, the Chinese market selloff of 2015-16, and the 2020 Coronavirus crisis. We find supporting evidence that:

- Sentiment-based strategies consistently outperform random portfolio strategies during the three crisis periods, showing strong statistical significance.
- A long-short U.S. large-cap strategy buying stocks with extreme positive sentiment, and selling stocks with extreme negative sentiment delivered Information Ratios between 2.6 - 2.8 during the **Global Financial Crisis**.
- A similar strategy delivered Information Ratios between 3.6 - 4.2 during the **Chinese stock market selloff in 2015-16**.
- During the recent **Coronavirus crisis**, the strategy delivered Information Ratios between 5.8 - 6.8.

Table of Contents

The RavenPack Quantitative Research Team:

Europe

Peter Hafez
Chief Data Scientist

Ricard Matas
Head of Quant Research - Europe

Francisco Gomez
Data Scientist

Americas

Marko Kangrga
Head of Quant Research - Americas

Boris Skorodumov
Senior Data Scientist

Alan Liu
Junior Data Scientist

Contact: research@ravenpack.com

Introduction

As the coronavirus outbreak spreads around the world, we have gone far beyond just a health crisis, with people self-isolating at home or complying with state-forced lockdowns. Businesses have suffered, and have had to either close or scale down as a consequence, thus impacting real jobs and the economy. News continues to play a key role in staying informed about the current state of the crisis, influencing both market sentiment and asset prices.

While both negative and positive sentiment has proven predictive for future asset prices, the former tends to have a greater impact. Due to the presence of more negative news during crisis periods, it seems reasonable to assume that news sentiment should work well during such times.

In this paper, we look at three significant drawdown periods: the Global Financial Crisis of 2008-09, the China-driven selloff of 2015-16 including the Greek debt crisis and the devaluation of the Renminbi, and finally, the 2020 Coronavirus health crisis.

We show that sentiment-driven strategies outperform during all of these volatile periods. We validate this by running two flavors of backtest strategies on long-short, market-neutral portfolios, constructed using the RavenPack sentiment signal.

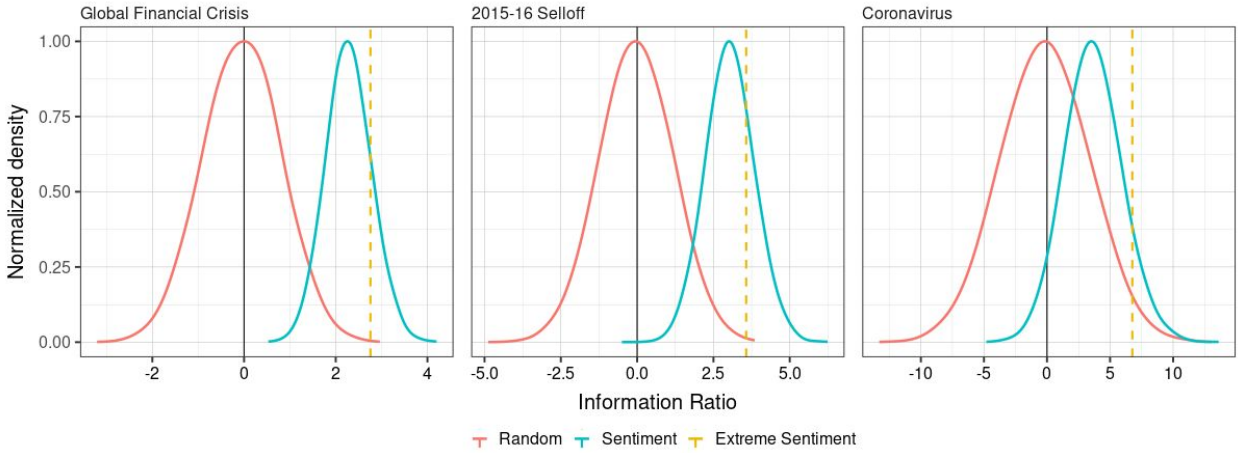

Figure 1: Distribution of Information Ratios based on Long/Short portfolios of 40 stocks covering the Global Financial Crisis, the Chinese 2015-2016 market selloff, and the Coronavirus selloff.

Source: RavenPack, April 2020

Each strategy was separately backtested on close-to-close excess returns relative to the universe, and on portfolios containing 20, 40 and 80 stocks. The extreme sentiment strategy was created using equal-weighted portfolios by selecting top and bottom stocks based on the highest and lowest values of the sentiment indicator.

The random portfolio distribution analysis was performed on 10,000 backtests of distinct portfolios, which were constructed by selecting top and bottom stocks such that the likelihood of selecting a stock was proportional to its sentiment indicator on a given date. The distribution was compared to that of a portfolio sampled at random.

As the basis for the analysis, we focused on highly relevant and novel non-neutral corporate events within the U.S. mid- and large-cap universe of the RavenPack analytics dataset.

For daily sentiment, we used our Sum Excess Sentiment Indicator (SESI), which is based on RavenPack's Event Sentiment Score (ESS), while also taking into account news volume to control for abnormal news volume effects. It is calculated as the daily sum of ESS, after subtracting the daily sentiment bias per universe.[1]

New Sentiment During the Global Financial Crisis (2007-2009)

Starting with the Global Financial Crisis, we looked at the drawdown period from Oct 10, 2007 to September 9, 2009. The below plot shows the distribution of annualized returns and information ratios for the sentiment strategy as compared to the fully random strategy, as described above.

Mean AR and IR of the random strategy was zero, as expected, while the sentiment strategy showed a considerable positive tilt.

The dashed yellow line represents the portfolio strategy created by systematically selecting top and bottom stocks with extreme sentiment for each portfolio size.

[1] For more information on *SESI*, see Effects of Event Sentiment Aggregation: Sum vs. Mean

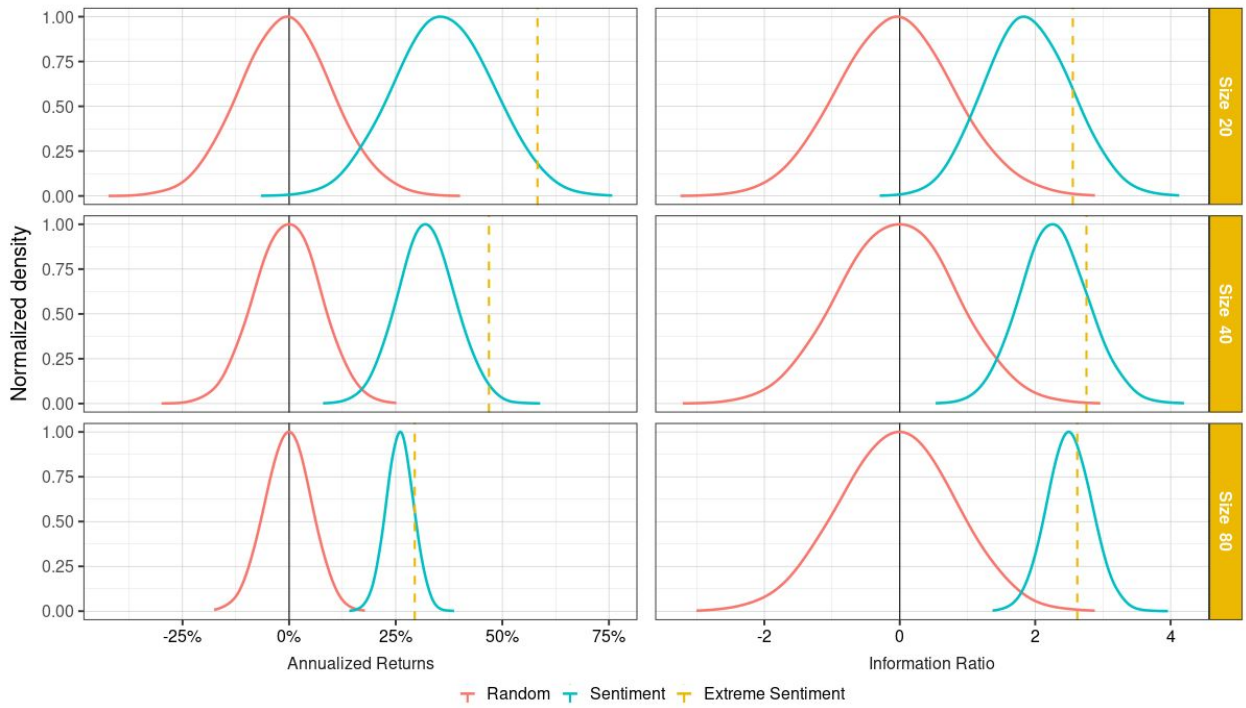

Figure 2: Distribution of Annualized Returns and Information Ratios during the Global Financial Crisis

Source: RavenPack, April 2020

The following plot shows the cumulative excess returns of the extreme sentiment strategies across various portfolio sizes, as depicted by the dashed yellow line in the plots above. These extreme sentiment strategies are found to provide statistically significant outperformance, as they fall into the extreme positive tail of the random portfolio distributions depicted in red.

We also include the performance of an unconstrained SESI-weighted version of the strategy, which creates daily portfolios by weighting all stocks in our universe based on the SESI indicator.[2]

[2] Average portfolio size of the SESI-weighted strategy is 149 stocks.

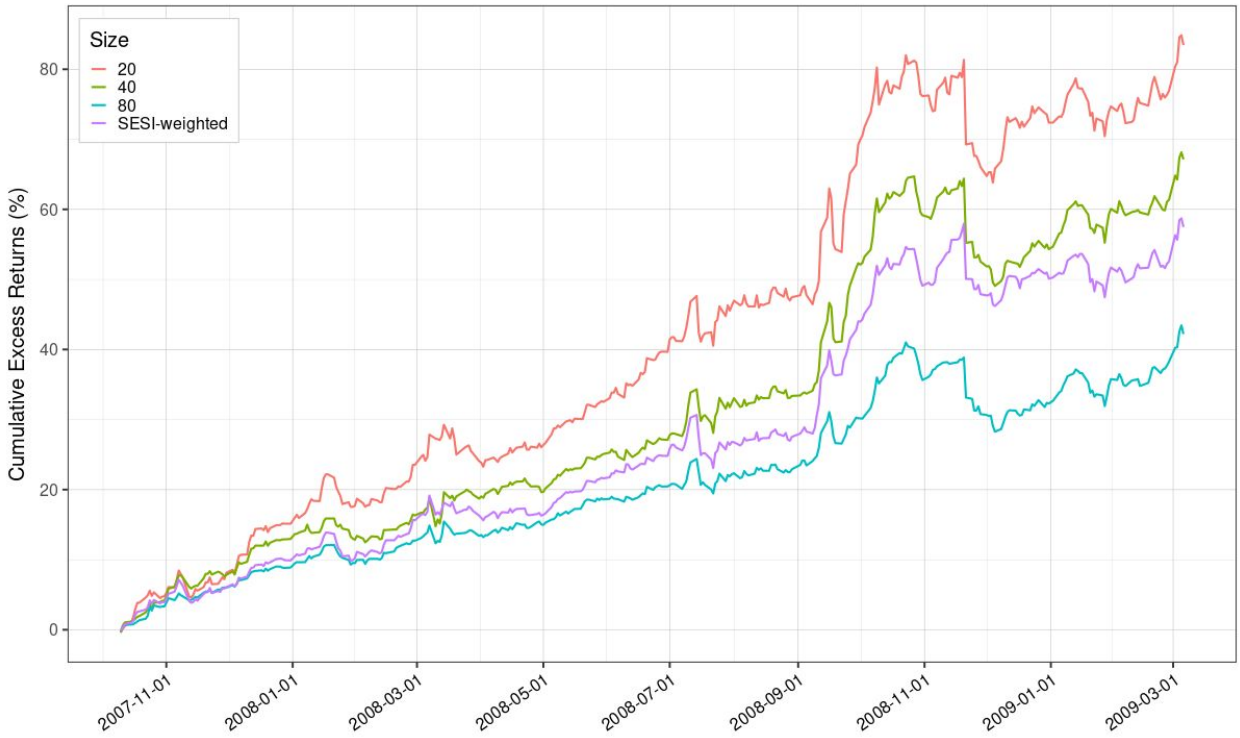

Figure 3: Extreme sentiment portfolio performance during the Global Financial Crisis

Source: RavenPack, April 2020

We can see that a simple strategy that selects stocks based on daily sentiment vastly outperforms the market over a period that saw the S&P 500 trade off more than 50%.

		Annualized Return			Information Ratio		
Size	**Strategy**	**Mean**	**St. Dev.**	**Extreme**	**Mean**	**St. Dev.**	**Extreme**
20	Sentiment	36.2%	11.3%	58.2%	1.90	0.62	2.56
	Random	-0.7%	10.5%	NA	-0.05	0.83	NA
40	Sentiment	32.2%	6.6%	46.9%	2.28	0.49	2.76
	Random	-0.4%	7.5%	NA	-0.04	0.83	NA
80	Sentiment	26.0%	3.2%	29.5%	2.51	0.33	2.62
	Random	-0.3%	5.3%	NA	-0.04	0.83	NA

Table 1: Performance summary during the Global Financial Crisis

Source: RavenPack, April 2020

News Sentiment During the Chinese Stock Market Selloff (2015–2016)

Next, we looked at the volatile period related to the Chinese stock market selloff of 2015-16 that culminated with PBOC's devaluation of the Renminbi on August 11, 2015.

Again, Figure 3 shows the distribution of strategy returns/information ratios, and Figure 4 shows cumulative excess return performance of the extreme sentiment strategy. Similar to the Financial Crisis, we found that trading extreme sentiment provided strong statistically significant outperformance.

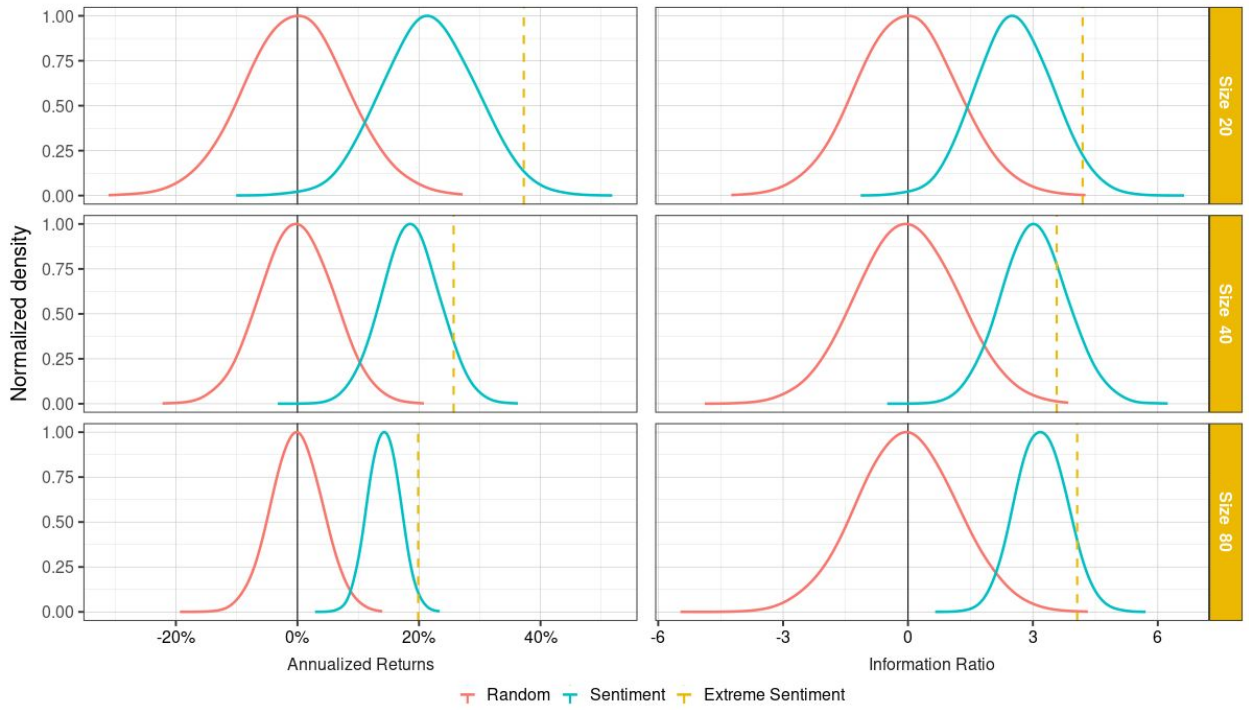

Figure 4: Distribution of Annualized Returns and Information Ratios during the 2015-2016 market selloff

Source: RavenPack, April 2020

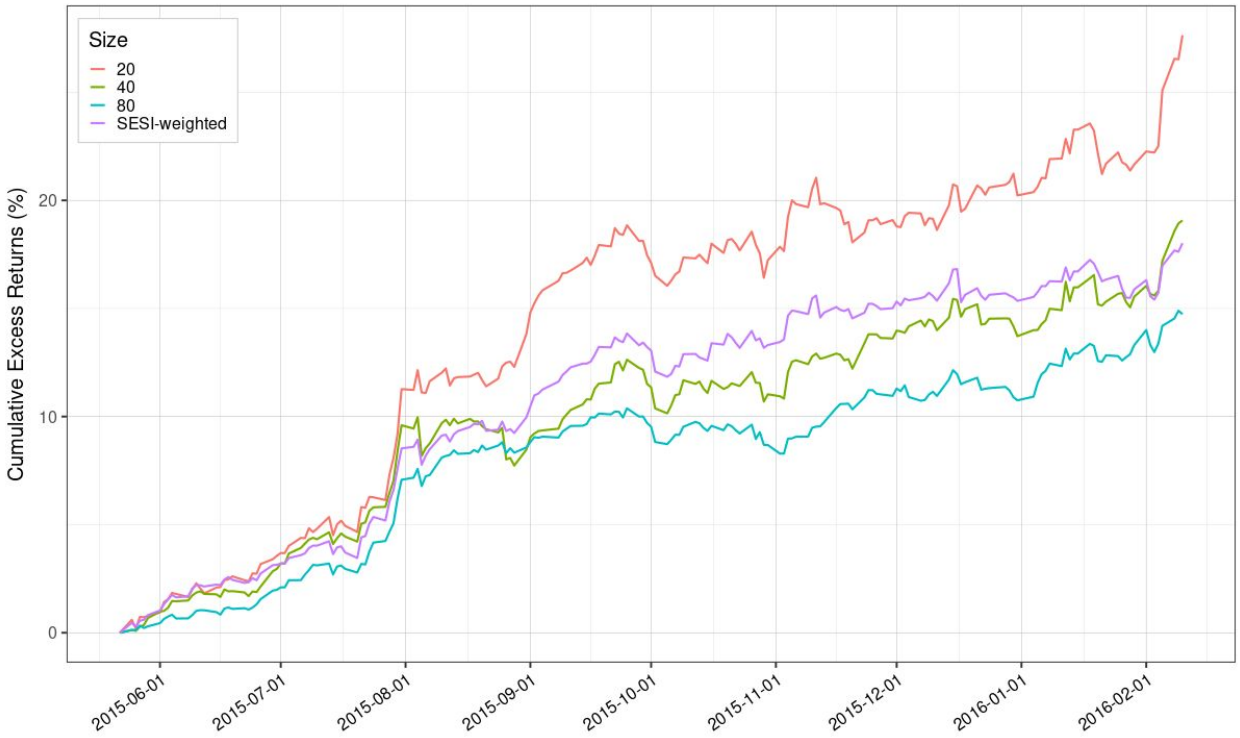

Figure 5: Extreme sentiment portfolio performance during the 2015-2016 market selloff. Average portfolio size of the SESI-weighted strategy is 178 stocks.

Source: RavenPack, April 2020

		Annualized Return			Information Ratio		
Size	**Strategy**	**Mean**	**St. Dev.**	**Extreme**	**Mean**	**St. Dev.**	**Extreme**
20	Sentiment	21.7%	7.5%	37.2%	2.57	0.91	4.19
	Random	-0.3%	8.2%	NA	-0.03	1.18	NA
40	Sentiment	18.6%	4.7%	25.7%	3.04	0.79	3.57
	Random	-0.1%	5.8%	NA	-0.02	1.18	NA
80	Sentiment	14.2%	2.6%	19.9%	3.20	0.60	4.06
	Random	-0.1%	4.1%	NA	-0.03	1.17	NA

Table 2: Performance summary during the 2015-2016 market selloff

Source: RavenPack, April 2020

News Sentiment During the Coronavirus Pandemic (2020-)

Finally, we tested strategy performance during the drawdown period from February 20, 2020 through March 23, 2020 during the ongoing Coronavirus pandemic, which saw record moves across asset classes.

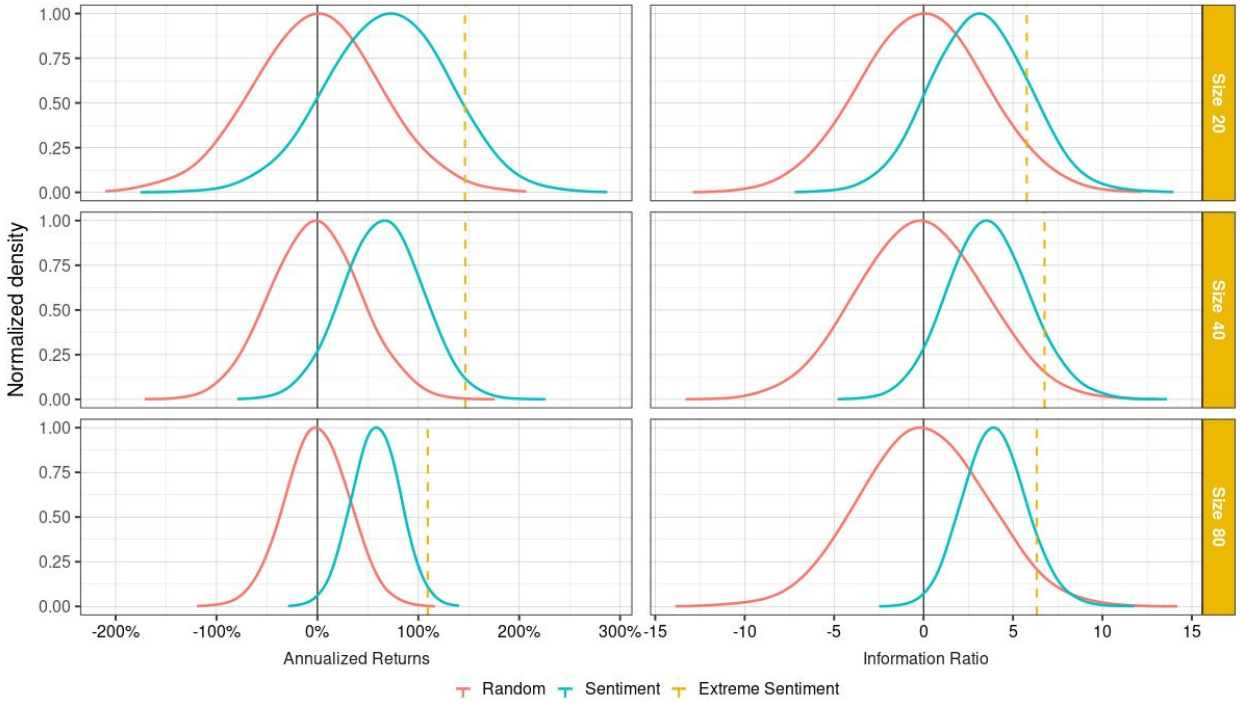

Figure 6: Distribution of Annualized Returns and Information Ratios during the Coronavirus selloff

Source: RavenPack, April 2020

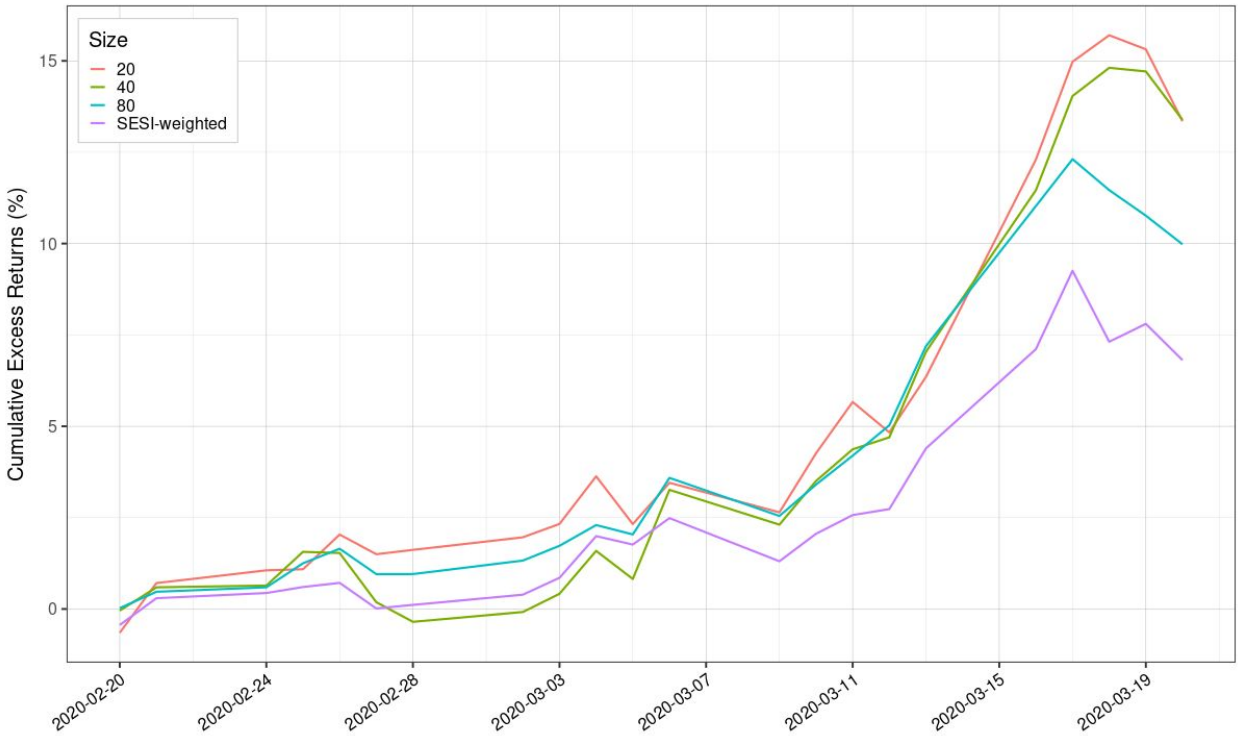

Figure 7: Extreme sentiment portfolio performance during the Coronavirus selloff. Average portfolio size of the SESI-weighted strategy is 263 stocks.

Source: RavenPack, April 2020

		Annualized Return			Information Ratio		
Size	**Strategy**	**Mean**	**St. Dev.**	**Extreme**	**Mean**	**St. Dev.**	**Extreme**
20	Sentiment	69.8%	58.8%	146.3%	3.15	2.69	5.77
	Random	-1.0%	61.6%	NA	-0.04	3.44	NA
40	Sentiment	64.6%	38.5%	146.7%	3.66	2.26	6.76
	Random	-1.9%	43.5%	NA	-0.15	3.44	NA
80	Sentiment	58.1%	23.6%	109.4%	4.00	1.74	6.33
	Random	-0.3%	30.9%	NA	-0.02	3.47	NA

Table 3: Performance summary during the Coronavirus selloff

Source: RavenPack, April 2020

Concluding Remarks

The drawdown study shows that a sentiment-based strategy consistently outperforms random portfolio strategies, and generally performs well during periods of extreme market moves. Even though we decided to focus only on U.S. large-caps, this holds true for other regions as well. In particular, we found that a long-short U.S. large-cap strategy of buying stocks with extreme positive sentiment, and selling stocks with extreme negative sentiment delivered Information Ratios between 2.6 - 2.8 during the Global Financial Crisis, depending on portfolio size. A similar strategy was able to deliver Information Ratios between 3.6 - 4.2 during the Chinese stock market selloff in 2015-16, and 5.8 - 6.8 during the most recent Coronavirus crisis.

The key takeaway from our study is that including a sentiment overlay can enhance alpha strategies, along with augmenting risk management models for downside protection during periods of crisis.

Terms of Use

This White Paper is not intended for trading purposes. The White Paper is not appropriate for the purposes of making a decision to carry out a transaction or trade. Nor does it provide any form of advice (investment, tax, legal) amounting to investment advice, or make any recommendations regarding particular financial instruments, investments or products. RavenPack may discontinue or change the White Paper content at any time, without notice. RavenPack does not guarantee or warrant the accuracy, completeness or timeliness of the White Paper.

You may not post any content from this White Paper to forums, websites, newsgroups, mail lists, electronic bulletin boards, or other services, without the prior written consent of RavenPack. To request consent for this and other matters, you may contact RavenPack at research@ravenpack.com.

THE WHITE PAPER IS PROVIDED "AS IS", WITHOUT ANY WARRANTIES. RAVENPACK AND ITS AFFILIATES, AGENTS AND LICENSORS CANNOT AND DO NOT WARRANT THE ACCURACY, COMPLETENESS, CURRENTNESS, TIMELINESS, NONINFRINGEMENT, TITLE, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE WHITE PAPER, AND RAVENPACK HEREBY DISCLAIMS ANY SUCH EXPRESS OR IMPLIED WARRANTIES. NEITHER RAVENPACK NOR ANY OF ITS AFFILIATES, AGENTS OR LICENSORS SHALL BE LIABLE TO YOU OR ANYONE ELSE FOR ANY LOSS OR INJURY, OTHER THAN DEATH OR PERSONAL INJURY RESULTING DIRECTLY FROM USE OF THE WHITE PAPER, CAUSED IN WHOLE OR PART BY ITS NEGLIGENCE OR CONTINGENCIES BEYOND ITS CONTROL IN PROCURING, COMPILING, INTERPRETING, REPORTING OR DELIVERING THE WHITE PAPER. IN NO EVENT WILL RAVENPACK, ITS AFFILIATES, AGENTS OR LICENSORS BE LIABLE TO YOU OR ANYONE ELSE FOR ANY DECISION MADE OR ACTION TAKEN BY YOU IN RELIANCE ON SUCH WHITE PAPER. RAVENPACK AND ITS AFFILIATES, AGENTS AND LICENSORS SHALL NOT BE LIABLE TO YOU OR ANYONE ELSE FOR ANY DAMAGES (INCLUDING, WITHOUT LIMITATION, CONSEQUENTIAL, SPECIAL, INCIDENTAL, INDIRECT, OR SIMILAR DAMAGES), OTHER THAN DIRECT DAMAGES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE LIABILITY OF RAVENPACK, ITS AFFILIATES, AGENTS AND LICENSORS ARISING OUT OF ANY CLAIM RELATED TO THIS AGREEMENT EXCEED THE AGGREGATE AMOUNT PAID BY YOU FOR THE WHITE PAPER. JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR DAMAGES OR THE EXCLUSION OF CERTAIN TYPES OF WARRANTIES, PARTS OR ALL OF THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

These Terms of Use, your rights and obligations, and all actions contemplated by these Terms of Use will be governed by the laws of New York, NY, USA and You and RavenPack agree to submit to the exclusive jurisdiction of the New York Courts. If any provision in these Terms of Use is invalid or unenforceable under applicable law, the remaining provisions will continue in full force and effect, and the invalid or unenforceable provision will be deemed superseded by a valid, enforceable provision that most closely matches the intent of the original provision.