Hanging on Every Negative Word: Natural Language Processing Analysis of Credit Rating Action Reports

Authors

Temi Oyeniyi, CFA
S&P Global Market Intelligence
312-233-7151
toyeniyi@spglobal.com

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Credit ratings are opinions about credit risk. When a credit rating changes, the analyst explains why, in a report. The 'why' is important. For an equity investor, a downgrade due to a rapid decline in a company's sales has a negative implication; whereas, a downgrade due to an increase in leverage arising from a share buyback program may be viewed as positive.

Figure 1: Return Comparison of Company Downgrades by Magnitude of Credit Report Sentiment, Russell 3000, 2003 - 2021
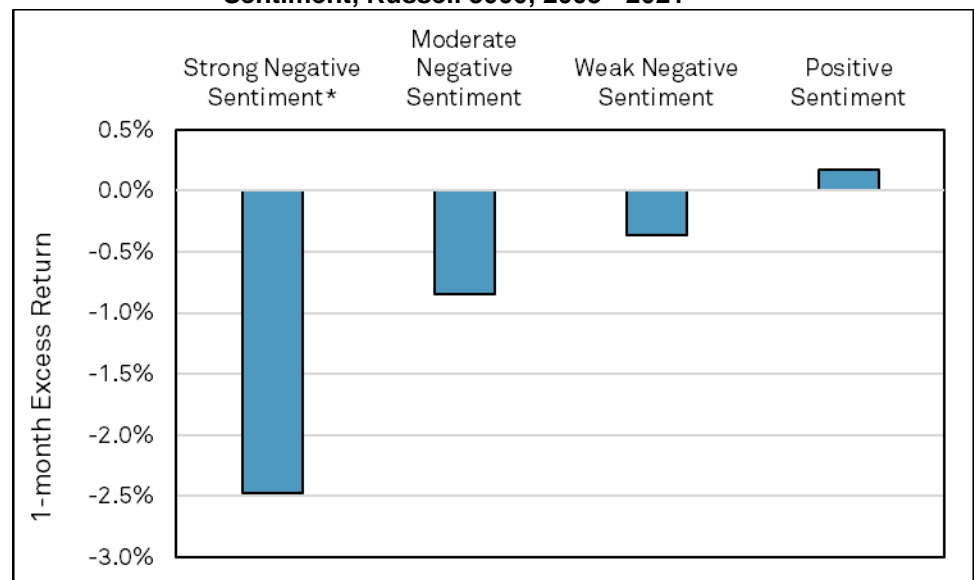
*The return of strong negative sentiment is different from the return of positive sentiment at the 1% level. See
Source: S&P Global Market Intelligence Quantamental Research. For all exhibits, all returns, and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results. Data as at 03/31//2022.

This study finds that the relative size of the price impact following a downgrade is dependent on the magnitude of the tone and the topics of focus in the report (Figure 1).[1] Downgrades with strong negative sentiment underperform downgrades with positive sentiment by 2.7% over the following month.[2] Key findings include:

- **A basket of companies that have been downgraded over the past 3-months (monthly rebalance) with strong negative tone in the accompanying analyst report underperforms the equivalent basket that disregards tone, by 49 bps significant at the 1% level**. (Table 1)

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[1] Net tone calculation is detailed here. See Appendix A for regression results on the relationship between net tone and stock returns.
[2] Returns are adjusted for market, size, value, and momentum risk factors. See here for definition of variables in Figure 1.

- **Analyst reports with strong negative sentiment focus more on the firm's operating performance; whereas reports with less negative tone focus more on the firm's use of capital.** Specifically, strongly negative reports focus more on sales deterioration, default risk and negative cash flows. Less negative reports focus more on share repurchase and a company's use of cash, (Table 3).

1. Introduction

This report is centered on rating action downgrades because, like previous studies, the research found that cuts have a much larger impact on stock returns than upgrades.[3] Net tone or sentiment is calculated as the number of positive words minus number of negative words divided by the total number of words. [4] Net tone values for each company are then standardized at the sector level using a 12-month rolling window:

$$netToneStd_{i,t} = \left(netTone_{i,t} - Mean_{netTone}\right)/SIGMA_{netTone} \qquad \text{Equation 1}$$

$netTone_{it}$ is the raw net tone value for company i at time t, $Mean_{netTone}$ is the mean of raw net tone values over the last 12 months for all stocks in the same sector as company i, and $SIGMA_{netTone}$ is the standard deviation of raw net tone values over the last 12-months for all stocks in the same sector as company i.

Adding to prior work on the value of sentiment in credit reports, this work:

- **analyses the profitability of a strategy that selects downgraded companies based on the magnitude of the negative sentiment in the credit rating report.** Prior research uses regression framework for analysis.

- **only uses sections that capture the rationale of a rating action to determine net tone.** Other studies use the entire credit rating action report which can lead to positive or negative words in irrelevant sections being included in net tone value calculation.[5]

- **ignores all negative and positive words used to describe the rating action itself.** This approach ensures that only the opinion of the rating analyst regarding the reason(s) for the downgrade action is captured in net tone values.[6] For example, the occurrence of the word "positive" when a rating is placed on "CreditWatch with *positive* implications" is ignored.

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[3] Research on the price impact of upgrades is inconclusive. See Ederington (1993) and Jorion, Liu and Shi (2005).
[4] The Loughran-McDonald Dictionary (2017) was used as the source for positive and negative word lists for this research.
[5] See Appendix C for discussion on this topic.
[6] The word "poor", a negative word, was ignored if the word appearing before it was the word "standard". Prior to April 2016, S&P Global Ratings was formerly named Standard & Poor's Rating Services.

Additional preprocessing steps taken before net tone values were calculated are discussed in Appendix B. The universe used for this research was the Russell 3000 and covered the period 2003 – 2021. The credit rating actions report data used in this report is from S&P Global Ratings and the data is was sourced from RatingsXpress. All the returns presented in this report are adjusted for market, size, momentum, and value risk factors.

2. Portfolio Strategy

Gauging the tone or reasoning behind a credit rating downgrade can help in assessing the severity of the issues facing a company. This is borne out by the fact that reports with multiple notch downgrades typically have worse negative net tone readings than reports with just a single notch downgrade.[7] The magnitude of the negative net sentiment is therefore a proxy for the challenges a company is contending with.

The results in Table 1 confirm that a portfolio of downgraded companies filtered on the magnitude of negative sentiment (NEGSENT Port) underperforms a portfolio of all downgraded companies (ALLDOWN Port). The monthly return difference is -0.49%, significant at the 1% level. ALLDOWN Port was constructed by including all the companies that were downgraded in the past three months. This portfolio is then rebalanced monthly. NEGSENT Port was constructed using the same approach, but only including securities with net tone values two standard deviations below the sector mean.[8]

Table 1: Strategy Return Comparison – Russell 3000 (June 2003 – December 2021)

	Average 1-month Return ("COL A")	Average Portfolio Count ("COL B")	Average Utilization ("COL C")	Average Cost to Borrow Score ("COL D")
Downgrades With Strong Negative Sentiment (NEGSENT Port)	-1.11%***	22	36%	1.97
All Downgrades (ALLDOWN Port)	-0.62%***	44	29%	1.68
Return Difference (NEGSENT Port - ALLDOWN Port)	-0.49%***			
Return Difference (Hit Rate)	36%***			

The last two columns in Table 1 indicate the degree of ease or difficulty an investor will face constructing the short portfolios discussed above. Utilization (COL C) is a metric that indicates how much of available inventory has been borrowed by investors. On average, about 64% of inventory is available to be borrowed to implement the NEGSENT strategy. Cost to borrow (COL D) runs from 1 to 10 (cheapest to most expensive to borrow) and is a measure of the

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[7] The mean net tone for one notch downgrades is -0.011 and -0.018 for multiple notch downgrades.
[8] The definition of strong negative sentiment is two standard deviations below the mean. This threshold provided a balance between portfolio performance and portfolio concentration.

cost to short a stock. Both utilization and cost to borrow metrics in Table 1 indicate that the implementation costs of both portfolios are similar and not costly.

2.1. Adjusting Portfolio Returns for Multiple Notch Changes

Companies that are downgraded by multiple notches typically underperform those with single notch changes over the next month.[9] Reports with multiple notch movements also usually have more negative words on average than reports with single notch movements. **To show that the difference in performance between the NEGSENT and ALLDOWN portfolios is not due to the former having more companies with multiple notch downgrades compared to the latter, both strategies were re-run with only companies that were downgraded by a single notch.**

NEGSENT Port underperforms ALLDOWN Port by -0.42% monthly when only one notch downgrades are considered, Table 2. This suggests that the difference in performance between the two portfolios cannot be explained by the number of notch movements.

Table 2: Strategy Return Comparison – Russell 3000 (June 2003 – December 2021) One Notch Downgrades Only

	Average 1-month Return ("COL A")	Average Portfolio Count ("COL B")	Average Utilization ("COL C")	Average Cost to Borrow Score ("COL D")
Downgrades With Strong Negative Sentiment (NEGSENT Port)	-0.86%***	17	33%	1.82
All Downgrades (ALLDOWN Port)	-0.44%***	34	27%	1.59
Return Difference (NEGSENT Port - ALLDOWN Port)	-0.42%***			
Return Difference (Hit Rate)	41%***			

*** statistically significant at 1% level; ** statistically significant at 5% level; * statistically significant at 10% level.

Source: S&P Global Market Intelligence Quantamental Research. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results. Data as at 03/31//2022.

3. The Importance of Topics in Credit Rating Action Reports

Topical analysis of reports of companies with strong negative sentiment indicates that these firms are facing challenging market conditions, experiencing a decline in sales, generating negative cash flows, and seeing margin compression (Figure 2, Panel A). These issues have a negative implication for equity prices and the higher mention of these topics provides additional support for the results shown in Table 1. Reports of companies with strong negative sentiment are also more likely to mention default compared to reports for all downgraded companies.

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[9] The 1-month excess return for companies with single notch downgrades is -0.65%. The 1-month excess return for companies with multiple notch changes is -3.47%. Excess returns were calculated from the date the downgrade action was published.

The topics that are more frequently mentioned in reports of all downgraded companies include leverage, interest coverage, and return of capital (Table 3, Panel B). While an increase in leverage and reduction in interest coverage ratio raises the credit risk profile of a company, it may not have a negative impact on equity prices. Taking on debt to finance a share buyback program (capital return to shareholders) usually has a positive impact on equity prices.[10] A company's weighted average cost of capital, an important input in equity valuation models, will be lower if the cost of debt is lower than the cost of equity. In addition, the reduction in share count from the execution of the buyback program boosts a firm's earnings per share (assuming total net profit is constant).

Table 3: Topic Mention Rate Comparison Between Portfolio of All Downgraded Companies and a Portfolio of Downgraded Companies with Strong Negative Sentiment Russell 3000: June 2003 – December 2021

	Topics	Mentions Per 100 Reports Downgrades with High Negative Sentiment (NEGSENT Port) ("COL A")	Mentions Per 100 Reports All Downgrades (ALLDOWN Port) ("COL B")	Delta Values (NEGSENT Port - ALLDOWN Port) ("COL C")	Delta Values Compared to ALLDOWN Port Values (COL C /COL B) - 1
Panel A	Negative Free Cash Flow	9	7	2	29%
	Default Risk	14	12	2	17%
	Declining Sales	50	43	7	16%
	Operating Margins Compression	46	40	6	15%
	Unfavorable Market Conditions	20	18	2	11%
	Covenants	39	36	3	8%
	Liquidity	185	182	3	2%
Panel B	Revenue Growth	20	21	-1	-5%
	Leverage / Debt	116	122	-6	-5%
	Balance Sheet	19	20	-1	-5%
	Capital Expenditure	78	83	-5	-6%
	Interest Coverage	30	32	-2	-6%
	Cash Sources, Generation and Uses	179	192	-13	-7%
	Financial Risk Profile	30	33	-3	-9%
	Return of Capital	21	30	-9	-30%

Source: S&P Global Market Intelligence Quantamental Research. Data as at 03/31//2022.
The topic mention rate is the number of times a topic is mentioned across all company reports in each portfolio divided by the number of reports in that portfolio.[11] Negative free cash flow is mentioned 7 times in every 100 reports of companies in the ALLDOWN portfolio (Figure 2, Panel A, Row 1). The equivalent number is nine mentions for companies in the NEGSENT portfolio.

4. Data

The data sets used in this research include the following:

S&P Global Ratings Credit Ratings Research Data
The research dataset provides research reports published by S&P Global Ratings. It is available in machine-readable format, along with article meta-tag. The dataset includes nearly 900,000 English-language research articles including the following report types: news, research updates, full analysis, and summary analysis. The data is available by asset class, global issuers (corporations, banks, insurance, utilities), sovereigns, international public finance and government entities, structured finance, and US public finance. History dates to 1994 for some type of reports.

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[10] Fruin, P., and Ma, Li., 2014, "**Buying Outperformance: Do Share Repurchase Announcements Lead to Higher Returns?**"
[11] See Appendix D for topic identification methodology.

S&P Global Ratings Credit Ratings Data
The global credit ratings information is from S&P Global Ratings. This data is updated near real time and provides access to credit ratings on more than 9,000 global issuers; 600 sovereign, international public finance, and government entities; 18,000 structured finance transactions; and nearly a million maturities. The dataset includes information on ratings, CreditWatch and outlook assessments with corresponding dates as well as asset class specific terms and conditions. Historical data dates to 1923.

S&P Global Market Intelligence Securities Finance Data
S&P Global Market Intelligence Securities Finance dataset provides market leading analytics on short seller demand, supply and borrow costs. It delivers comprehensive daily and intraday data on global equity and fixed income securities lending flows to support investment decisions, asset allocation and risk management. With more than $36 trillion of global securities in the lending programs, sourced from 20,000 underlying institutional funds, the Securities Finance dataset provides holistic transparency into short interest dynamics and institutional fund positioning. The daily dataset is sourced directly from industry participants with history from 2006.

5. Conclusion

This research finds that the net tone of credit rating action reports predicts future equity returns. The degree of the price impact also depends on the magnitude of negative net tone values; the more negative the net tone value, the larger the price impact.

This report documents the profitability of a strategy that uses the magnitude of negative sentiment in constructing portfolios. A portfolio that selects companies that have been downgraded over the last 3-month with strong negative sentiment underperforms a portfolio that selects all companies downgraded over the same period by -0.49% monthly. The cost of executing both strategies is also similar.

Finally, the topics that are more mentioned in reports of companies with strong negative sentiment indicate that these firms are facing challenging market conditions, experiencing a decline in sales, generating negative cash flows, and seeing margin compression. The underperformance of a portfolio of companies with strong negative sentiment relative to a portfolio that disregards sentiment indicate that issues such as sales decline and margin compression have a negative impact on equity prices.

APPENDIX A: Panel and Fama-MacBeth Regression Results

The hypothesis of this research is that the net tone of credit rating action reports has an impact on equity prices separate from the price impact of the rating action. A panel regression (Equation 1) was used to prove this hypothesis.

$$Ret_{i,t+1} = \beta_0 + \beta_1 ratingChg_{i,t} + \beta_2 netToneStd_{i,t} + \varepsilon_{i,t} \qquad \text{Equation 2}$$

Where $Ret_{i,t+1}$ is the 1-month forward excess return, $ratingChg_{i,t}$ is the number of notch changes in a company's long-term credit rating, $netToneStd_{i,t}$ is the standardized net tone value for each firm.; i is the index for company; and t is the index for time

The results in Table 4 confirm the importance of net tone as a predictor of 1-month forward excess return. A one standard deviation change in net tone is associated with a 90 basis points change in returns.

Table 4: Panel Regression Coefficients: Russell 3000 (June 2003 – December 2021)

Variable	Coefficient
intercept	-0.011***
ratingChg	0.007**
netToneStd	0.009**

*** statistically significant at 1% level; ** statistically significant at 5% level; * statistically significant at 10% level. T-Stats are calculated based on robust standard errors clustered by year. Regression includes calendar year dummy variables Adjusted R^2 = 0.015. N = 5563.
Source: S&P Global Market Intelligence Quantamental Research. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results. Data as at 03/31//2022.

A Fama-MacBeth regression supports the conclusion reached above regarding the relationship between net tone and forward returns. A one standard deviation change in net tone is associated with an 80 basis points change in 1-month forward returns.

Table 5: Fama-MacBeth Coefficients: Russell 3000 (June 2003 – December 2021)

Variable	Coefficient
intercept	-0.002***
ratingChg	0.006**
netToneStd	0.008**

*** statistically significant at 1% level; ** statistically significant at 5% level; * statistically significant at 10% level.
Source: S&P Global Market Intelligence Quantamental Research. For all exhibits, all returns and indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Such costs would lower performance. It is not possible to invest directly in an index. Past performance is not a guarantee of future results. Data as at 03/31//2022.

APPENDIX B: Preprocessing

Preprocessing is a noise removal process that helps to bring the textual data into an analyzable form. Steps used to prepare the textual data for similarity calculation include the following:

- Removed all line breaks ('\n')
- Removed all punctuations ('!"#$%&\'()*+,-./:;<=>?@[\\]^_`{|}~•"""')
- Converted all words to lowercase
- Removed numbers
- Removed stop words (Loughran McDonald Stop Words General)
- Filter text through Loughran McDonald Master Words List

APPENDIX C: Sections Used for Sentiment Calculation

The most frequently occurring 50 sections across all available credit reports were considered for sentiment calculation. We manually went through each of the 50 sections to determine if the section contains information about an analyst's opinion on the rating action. This step is important as it eliminates sections that contain positive or negative words but are irrelevant to the opinion of the analyst. For example, the "Company Description" section in the credit rating report for SIG PLC published on January 7, 2022, uses the word "strong" to describe the company's market position (Figure 2). Since "strong" is a positive word in the Loughran-McDonald Dictionary it would be counted in the computation of net tone. However, the content of the "Company Description" section is irrelevant to the opinion of the analyst as it relates to the rating action.

Figure 2:Snapshot of Company Description Section of Research Update for SIG PLC. Report Published by S&P Global Ratings on 01/07/2022

Company Description

SIG PLC is headquartered in the U.K. and is a leading supplier of specialist building products and solutions to trade customers in the U.K., Ireland, and mainland Europe.

The company has strong market positions as a specialist distributor of insulation and interiors products (65% of 2020 sales) and as a merchant of roofing and exteriors products (35%). SIG's insulation and interior products include structural and technical insulation, construction accessories and fixing, dry lining, and floor coverings. Exterior products include tiles, slates, membranes, battens, and roofing and cladding systems.

SIG chiefly operates in the U.K., France, and Germany, which collectively represented about 83% of revenue in the 12 months to June 2021. It also operates in Ireland, Poland, and the Benelux area, which accounted for the balance.

As of June 30, 2021, SIG had 6,765 employees and operated a network of 426 trading sites (including shared sites). SIG is listed on the London Stock Exchange, where it had a market capitalization of about £553 million as of Jan. 5, 2022. Private equity firm Clayton Dubilier & Rice (CD&R) became a 29% cornerstone investor in SIG as part of the company's £165 million gross equity raise in 2020.

Source: S&P Global Ratings, Data as at 03/31/2022.

Sections selected for sentiment calculation include rationale, outlook, overview, major rating factors, upside/downside/base case scenarios and liquidity.

APPENDIX D - Topic Identification Methodology

Topics were identified using the following approach after applying the preprocessing steps discussed in Appendix B to all available documents:

- Group all documents into two groups: ALLDOWN or NEGSENT. All reports for companies in the ALLDOWN (NEGSENT) portfolio are assigned to the ALLDOWN (NEGSENT) group.
- Iterate through each document in each group and create a corpus of consecutive two words for each document (bigram).
- For each group, count the number of times each unique bigram exists across all the documents in the group.
- Identify the most frequently occurring bigrams in each group. Combine the most frequently occurring bigrams in both groups into a superset.
- Calculate the frequency of this new superset of bigrams in each group.
- In each group, sum up similar bigrams that relate to the same "topic". For example, bigrams [sales, decline] and [revenue, softness] were summed and assigned to the declining sales topic.
- Topic mention rate is the frequency of each topic divided by the number of reports in each group. The number of reports is 2036 and 1006 for the ALLDOWN and NEGSENT groups respectively.

APPENDIX E – Sentiment Definition for Figure 1

Below is the sentiment definition used for the event study analysis in Figure 1

Strong negative sentiment: Net tone values less than two standard deviations below the sector mean.

Moderate negative sentiment: Net tone values between -1 and -2 standard deviations below the sector mean.

Weak negative sentiment: Net tone values between 0 and -1 standard deviations below the sector mean.

Positive sentiment: Positive net tone values

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Our Recent Research

March 2022: <u>The Sounds of Silence: No Response Speaks Volumes</u>

No simple remedy for gender discrimination exists. But the first step in solving any problem is collecting the data to understand it. This research shows firms that share their data on diversity, equity, and inclusion (DEI) have taken further steps to address gender equity concerns. The S&P Global Corporate Sustainability Assessment (CSA) is a premier benchmarking survey and litmus test for inclusion in the S&P Dow Jones Sustainability Index. Firms that participated in the CSA survey in 2021 had better DEI outcomes.

October 2021: <u>Glass Floors and Ceilings: Why Closing the Median Wage Gap Isn't Fair</u>

The gender wage gap describes the disparity in compensation between women and men doing the same work. Progress on this issue is commonly measured by comparing the median compensation for women to men. This research demonstrates that firms are catering to the focus on median compensation and are paying women in a tighter range around the median, compared to men in equivalent positions. Effectively, women have been given a glass floor as redress for the still-present glass ceiling. This 'Gender-Based Compensation Management' not only undermines the goal of equitable pay; but because the high end of the compensation range can be much farther from the median than the low end, this paradigm is a net disadvantage for women.

September 2021: <u>The Board Matrix: The (ESG) Value of Well-Connected Directors</u>

Corporate boards are responsible for shaping and overseeing environmental, social and governance (ESG) policies for their organizations. This report examines the relationship between companies connected through shared board members and ESG performance. It finds that companies with strong board networks (companies with directors who serve on more than one corporate board or are well-connected) have better certain ESG outcomes than firms with weak board networks. Well-connected directors can utilize their network for information on emerging ESG trends/best practices and share this knowledge with their companies. Given their roles on multiple boards, well-connected directors are also better informed about the needs of different stakeholders (governments, communities, ESG activists) than directors with little or no network. This awareness of stakeholder management translates to better ESG performance for companies with well-connected directors.

August 2021: <u>Technology Momentum: Peer Networks from Patents</u>

Companies with similar patent portfolios exhibit peer group momentum. A strategy that buys (sells) stocks of focal companies in the Russell 3000 with outperforming (underperforming) technology peers produces an annualized risk-adjusted return of 5.23% in a historical backtest. The strategy returns are more pronounced for smaller companies. In the Russell 2000, the strategy demonstrates more efficacy with annualized long-short return of 7.32%. The strategy is distinct from sector momentum strategies. After controlling for sector momentum, 3.60% excess return in the Russell 3000 can be attributed to technology peer group momentum.

July 2021: <u>Branching Out: Graph Theory Fundamentals</u>

Investment analysis has evolved beyond financial data to non-financial, or alternative data. Typically, the focus has been on using alternative datasets that are purely time-series and tabular. Graph networks meanwhile offer investors the ability to gain deeper insights into the connections between economies, industries, and individual corporations.

May 2021: <u>U.S Filings: No News is Good News</u>

Company annual filings are a vital but often under-analyzed source of information for investors. Market moving content is buried within an ever-growing body of text that on average is equivalent to a 240-page novel. The filings contain subtle revisions making a computational linguistic approach imperative. Faced with this voluminous amount of text and the minute number of changes, investors have historically overlooked the newly embedded information and the implications of those additions

March 2021: <u>Hiding in Plain Sight – Risks That Are Overlooked</u>

This report uses three metrics (Minimum Edit Distance, Jaccard Similarity, and Cosine Similarity) to identify companies that made significant changes to the "Risk Factors" section of their filings. These metrics can serve as alpha signals or be used to quickly identify a pool of companies that require further investigation.

January 2021: <u>Leadership Change That Matters: A Value and Momentum Story</u>
December 2020: <u>Warranted Optimism: Sentiment vs. Supply Chain</u>
December 2020: <u>A Dark Winter for REITS: Trouble Brewing</u>
October 2020: <u>Sweet Spots in the C-Suite: Executive Best Practices for Shareholder Friendly Firms</u>
October 2020: <u>Just the (Build)Fax: Property Intelligence from Building Permit Data</u>
August 2020: <u>The Analyst Matrix: Profiting from Sell-Side Analysts' Coverage Networks</u>
June 2020: <u>The Information Supply Chain Begins Recovering From COVID</u>
May 2020: <u>Never Waste a Crisis: Following the Smart Money Through Beneficial Ownership Filings</u>

May 2020: <u>Risky Business: Foot Traffic, Vacancy Rates and Credit Risks</u>

May 2020: <u>Finding the Healthy Stocks in Health Care During Lockdown</u>

May 2020: <u>No More Walks in the (Office) Park: Tying Foot Traffic Data to REITs</u>

May 2020: <u>Do Markets Yearn for the Dog Days of Summer: COVID, Climate and Consternation</u>

April 2020: <u>Cold Turkey - Navigating Guidance Withdrawal Using Supply Chain Data</u>

April 2020: <u>Data North Star - Navigating Through Information Darkness</u>

March 2020: <u>Long Road to Recovery: Coronavirus Lessons from Supply Chain and Financial Data</u>

February 2020: <u>Ship to Shore: Mapping the Global Supply Chain with Panjiva Shipping Data in Xpressfeed™</u>

January 2020: <u>Natural Language Processing – Part III: Feature Engineering Applying NLP Using Domain Knowledge to Capture Alpha from Transcripts</u>

December 2019: <u>The "Trucost" of Climate Investing: Managing Climate Risks in Equity Portfolios</u>

October 2019: <u>#ChangePays: There Were More Male CEOs Named John than Female CEOs</u>

June 2019: <u>Looking Beyond Dividend Yield: Finding Value in Cash Distribution Strategies</u>

June 2019: <u>The Dating Game: Decrypting the Signals in Earnings Report Dates</u>

May 2019: <u>Bridges for Sale: Finding Value in Sell-Side Estimates, Recommendations, and Target Prices</u>

February 2019: <u>U.S Stock Selection Model Performance Review</u>

February 2019: <u>International Small Cap Investing: Unlocking Alpha Opportunities in an Underutilized Asset Class</u>

January 2019: <u>Value and Momentum: Everywhere, But Not All the Time</u>

November 2018: <u>Forging Stronger Links: Using Supply Chain Data in the Investing Process</u>

September 2018: <u>Their Sentiment Exactly: Sentiment Signal Diversity Creates Alpha Opportunity</u>

September 2018: <u>Natural Language Processing – Part II: Stock Selection: Alpha Unscripted: The Message within the Message in Earnings Calls</u>

July 2018: <u>A Case of 'Wag the Dog'? - ETFs and Stock-Level Liquidity</u>

June 2018: <u>The (Gross Profitability) Trend is Your Friend</u>

May 2018: <u>Buying the Dip: Did Your Portfolio Holding Go on Sale?</u>

March 2018: <u>In the Money: What Really Motivates Executive Performance?</u>

February 2018: <u>The Art of the (no) Deal: Identifying the Drivers of Canceled M&A Deals</u>

January 2018: <u>U.S Stock Selection Model Performance Review</u>

September 2017: <u>Natural Language Processing - Part I: Primer</u>

July 2017: <u>Natural Language Processing Literature Survey</u>

June 2017: <u>Research Brief: Four Important Things to Know About Banks in a Rising Rate Environment</u>

April 2017: <u>Banking on Alpha: Uncovering Investing Signals Using SNL Bank Data</u>

March 2017: <u>Capital Market Implications of Spinoffs</u>

January 2017: <u>U.S. Stock Selection Model Performance Review 2016</u>

November 2016: <u>Electrify Stock Returns in U.S. Utilities</u>

October 2016: <u>A League of their Own: Batting for Returns in the REIT Industry - Part 2</u>

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