MOODY'S ANALYTICS

Credit Sentiment Score: An Overview

Background

Credit analysts have always used news to help understand and monitor their borrowers. But news volume has exploded in recent years, leaving many organizations complaining of information overload. Today, stakeholders can use artificial intelligence (AI) methods to help identify which articles are worth reading and why. This option frees up time for deeper investigations and allows more names to be monitored.

The award-winning Credit Sentiment Score™ uses Moody's Analytics NewsEdge real-time newsfeeds with state-of-the-art AI techniques such as natural language processing, text analytics, and machine learning established by Moody's Analytics MLFabric™ to derive credit-relevant sentiment from news articles. It is available across Moody's Analytics solutions including NewsEdge™ Credit, CreditEdge™ and CreditCatalyst.

What is a Credit Sentiment Score?

Moody's Analytics Credit Sentiment Scores are the culmination of many years of intensive research and investment.

We have been collecting and labelling news articles that describe company distress since the mid-1990s. We started an internal project to assist with the search and collection of news and used this existing data to train our models. We quickly became aware that many of our clients would find a solution based on the same technology useful during credit assessment and monitoring. This unique data source, combined with our analytical expertise and deep knowledge of credit, allowed us to develop innovative techniques such as MLFabric™, a custom-designed modular, reusable, cloud-based platform that operationalizes deep learning and machine learning models, allowing users to deploy and reuse AI models and AI workflows at scale.

A Credit Sentiment Score is a simple concept; it rates the negative credit sentiment in a news article. A high score indicates the presence of severe negative credit sentiment (such as default or bankruptcy), while a low score indicates less severe negative credit sentiment (such as compliance issues or profit warning). This is achieved by detecting the credit related events in the news article. The Credit Sentiment Score currently identifies five credit relevant categories.

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Table 1: Credit Risk Categories

ARTICLE SENTENCE	CREDIT RISK CATEGORY
US retail giant, files for bankruptcy.	Bankruptcy / Insolvency
In December 2012, the company stopped making payments and defaulted on all its loans.	Default / Missed Payment
The company fell into junk in May after Moody's downgraded the unsecured debt rating to Ba2.	Credit Rating Downgrade
The automaker's profit has plummeted, and questions are growing about the future of its alliance with French partner Renault.	Profit Warning
The lawsuit filed in Clark County, Nevada, claimed, based on press reports, that a board representative was notified of an alleged misconduct in 2009.	Compliance Issue

The Credit Sentiment Score can be used at origination, for portfolio risk monitoring, and adverse media tracking, delivering the following benefits:

- **Identify credit-relevant news:** If a Credit Sentiment Score is high, then the article contains negative credit sentiment and deserves further investigation. High scores capture negative news such as default, bankruptcy, covenant default, debt restructuring, rating downgrades, lawsuits, downsizing, and fraud events.
- **Efficiency:** Credit analysts can significantly reduce time spent on company research and monitoring activities. Our results show that Credit Sentiment Scores help filter out between 75–99% of articles from an initial search.
- **Early warning:** Credit Sentiment Scores rise before major credit events. Our research indicates that scores are more than three times higher than normal and continue to rise starting five months before such an event.
- **Explainable:** Credit Sentiment Scores help users assesses the negative credit sentiment of news stories. This news story can easily be read to understand its impact on the company in question.
- **Comprehensive view:** Using the Credit Sentiment Score alongside other quantitative metrics, such as our industry-leading public firm Expected Default Frequency (EDF™) model, gives additional context for why changes in credit quality may occur.

Information Overload

News stories have always been used to help monitor companies' strengths by offering an extra point of view and a chance to understand a company and its credit quality. The news reflects the perception of the company—which can itself be a leading indicator of performance and credit quality. It plays an important role during monitoring by delivering information outside the reporting cycle.

However, monitoring news is costly. People are required to read, understand, and consider the relevance of an article. The number of accessible news sources has expanded since the advent of the internet. What used to take a few minutes skimming a newspaper's business pages now takes all morning downloading and digesting news from multiple online sources.

With reduced margins in the lending space, lenders must manage this cost to acceptable levels. Recent advances in applying AI techniques have enabled automation of many tasks—but bringing this technology to bear introduces new challenges, including:

- **Finding, or creating, a well-labelled data source:** Machine learning algorithms require a large training set on which to learn language patterns and groupings. The model must know which of the training set articles are examples of bad news. Creating such trainings take time and resources.

» **Investing in data science knowledge:** Using the latest techniques to build machine learning models requires access to skills that are not traditionally found in a lender. These skills are often expensive and, if not carefully deployed, will reduce the desired cost savings.

» **Understanding credit:** Spotting credit-relevant stories is a different skill than simply noting the general sentiment of a company. Organizations must capture credit expertise to ensure the creation of a credit-relevant model.

We have found that it can be challenging for technology-focused firms to source relevant data or expertise to build a solution that works. Even lenders with the largest resources struggle to bring these elements together in a cost-effective way.

Methodology

Deriving a company level Credit Sentiment Score involves the following steps:

Step 1: Collect Articles
We use NewsEdge as our news provider to collect and process all available news articles.

Step 2: Filter Articles
We filter articles that are not relevant from a financial and credit perspective using a domain relevance model built using our credit risk expertise.

Step 3: Label Articles
Each article is labeled using our risk category model that recognizes the following five credit risk events:

» Bankruptcy / Insolvency
» Default / Missed Payment
» Credit Rating Downgrade
» Profit Warning
» Compliance Issue

Step 4: Identify Companies in Articles
We use a custom-built sentiment model developed specifically for recognizing company level sentiment at the sentence level. This identifies companies in news articles, as well as the sentiment (positive, negative, and neutral) associated with the mentions.

Step 5: Calculate Daily Company Score
Each company is scored using credit adverse news articles for the company, as tagged by the risk categories model. Since each credit risk category has its own severity, it also has its own weight in the entity scoring formula, as shown in table 2.

Table 2: Credit Risk Events and Weights

CREDIT RISK CATEGORY	WEIGHT
Bankruptcy / Insolvency	100
Default / Missed Payment	75
Credit Rating Downgrade	30
Profit Warning	20
Compliance Issue	2.5

The scoring scheme recognizes the following points:

» It provides a daily score that is calculated based on historic news. It is reactive to new news and weights recent news more highly than older news.

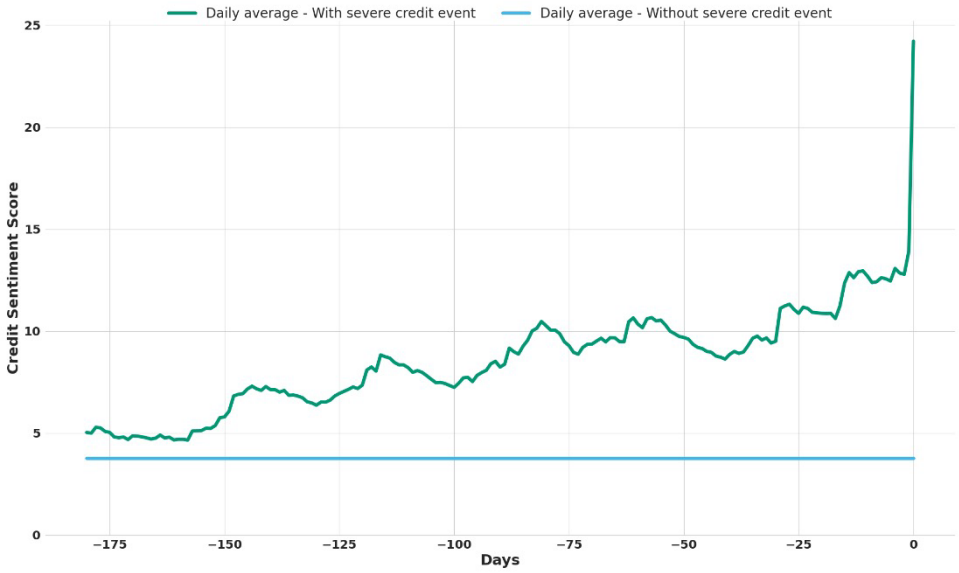
» It reflects the credit events that the company has, each one with its own severity. But it also considers the volume of news for each credit risk event.

Does it Work?

We completed a validation study to confirm that the model identifies credit risk events with accuracy and early warning. More than 40,000 negative articles were collected for more than 6,000 companies during a one-year period between 2016 -2018. Of these companies, 1,192 experienced a severe credit event (bankruptcy, default, distressed exchange offer) and the remaining became our control group.

Figure 1 shows the daily average Credit Sentiment Score of companies experiencing a severe credit in the days before this event (green line). For comparison, we also show the long-term average score for the control group (blue line). We see that the average Credit Sentiment Score moves away from the long-term average as it moves toward the severe credit event. At around five months before the credit event, the score is already around three times the long run average.

Figure 1: Results of Validation Study



Credit Sentiment Score in Action: Carillion

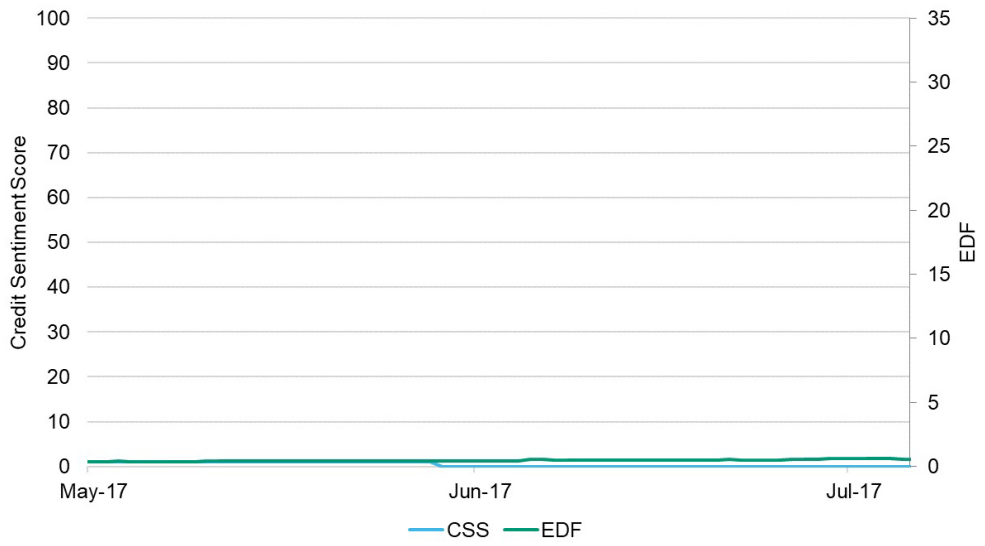
The easiest way to appreciate the benefits of Credit Sentiment Scores is by looking at an example.

Carillion was a British multinational facilities management and construction services company that ran into financial trouble in early 2018. It became the largest-ever trading liquidation in the United Kingdom and generated a lot of news in the traditional media at the time.

Figure 2 shows the EDF[1] generated by Moody's Analytics CreditEdge. We see that the EDF is low—less than 0.5%—and although rising a little during the period, there is nothing of major concern.

[1] An EDF is a probability of default measure derived from daily equity market prices and company reported debt information found in annual reports and market disclosures. For more information, see https://www.moodysanalytics.com/product-list/creditedge.

Figure 2: Carillion's Credit Sentiment Score and EDF: May-July 2017



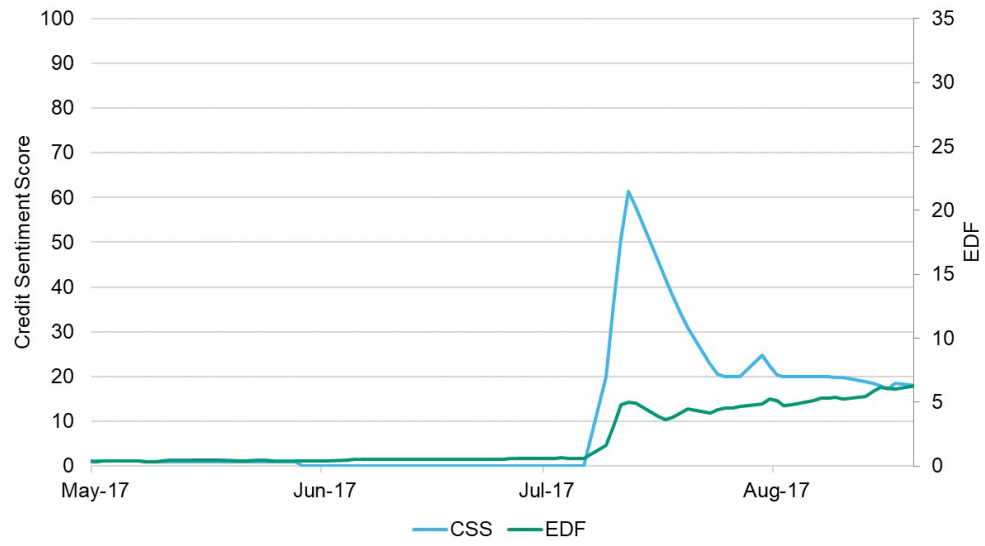
Move forward a month; and we see that the credit risk—as measured by EDF—has jumped to around 5% (Figure 3). We have also identified some bad news stories clustered around this event:

"KPMG, which unearthed many of the problems with its contracts, has been retained to support the company in its negotiations with lenders."[2]

Date: July 14, 2017
Credit Sentiment Score: 100

The Credit Sentiment Score keeps track of the deterioration of credit risk and calls out interesting articles.

Figure 3: Carillion's Credit Sentiment Score and EDF: May-August 2017



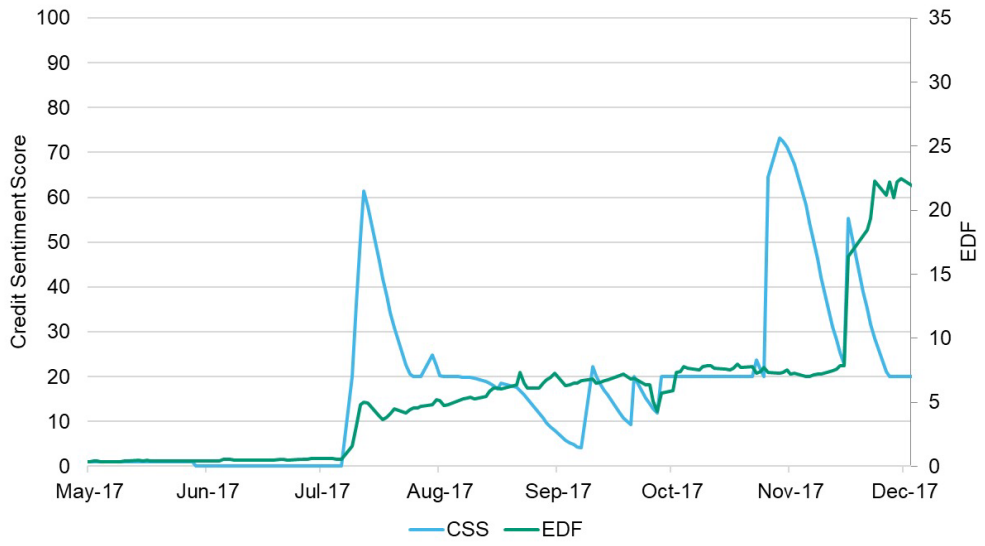
Moving through 2017, we see a continued run of bad news and another massive jump in credit risk in November (Figure 4). The Credit Sentiment Score highlights news stories which quickly explain why:

"Carillion warns on profits and says it will breach banking covenant."[3]

Date: November 17, 2017
Credit Sentiment Score: 98

[2] http://www.reuters.com/article/carillion-broker-idUSL8N1K50ZX

Figure 4: Carillion's Credit Sentiment Score and EDF: May-November 2017

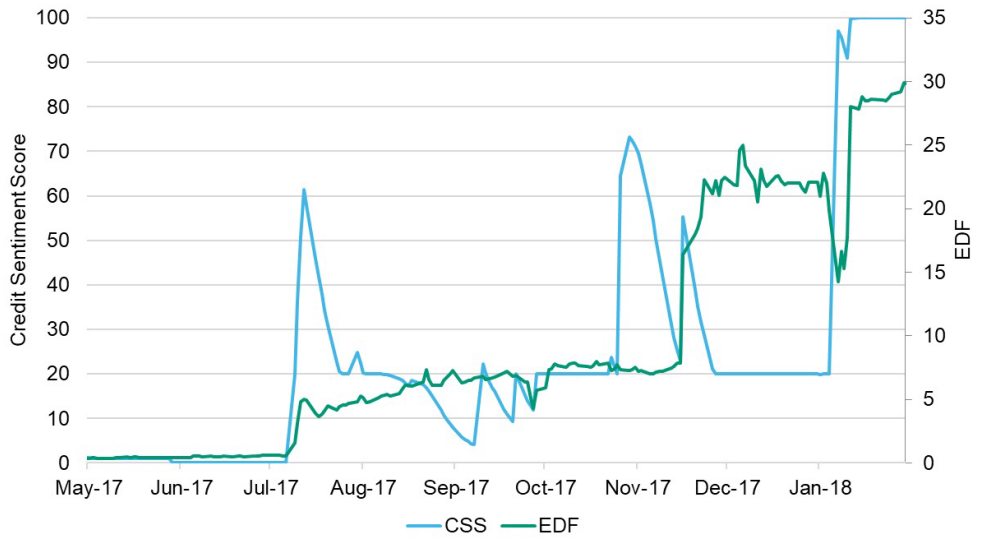


Following the profit warning, the bad news keeps coming and eventually the company fails (Figure 5).

"Construction giant Carillion goes into administration."[4]

Date: January 15, 2018
Credit Sentiment Score: 100

Figure 5: Carillion's Credit Sentiment Score and EDF: May 2017–January 2018



Conclusion

Our clients use Credit Sentiment Scores to help them gain efficiencies in their early warning and monitoring processes. Where existing quantitative measures are available, the Credit Sentiment Score works in tandem, helping to explain sharp increases in risk measures. Where information is scarce, but news is available, Credit Sentiment Scores deliver much needed insight.

[3] http://www.independent.co.uk/news/business/news/carillion-shares-plummet-profits-warning-covenants-breach-loan-restructure-construction-contracts-a8059851.html

[4] https://eu.usatoday.com/story/money/business/2018/01/15/construction-giant-carillion-goes-into-administration/1033378001/