Assessing the Relationship Between Adverse News Information and Credit Ratings Movements

Introduction

The objective of this project is to assess the impact of adverse news information on the movement of credit ratings of companies. The analysis utilizes data extracted from various sources, including Bloomberg terminal data for credit ratings and a custom Google Search API for news articles. The goal is to determine if public adverse news events have a measurable effect on credit ratings changes.

Data Sources

1. Credit Ratings Data:

- Source: Bloomberg Terminal at UT Austin

- File: `ratings_raw_data.csv`

- Description: This dataset captures monthly changes in S&P credit ratings for S&P 500 companies. It includes detailed records of each company's credit rating over time, allowing for the analysis of rating migrations.

2. Adverse News Data:

- Source: Custom Google Search API

- Description: The API, configured with a unique engine ID and API key, retrieves news articles related to each company and date from the credit ratings dataset. The content of these articles is then analyzed for sentiment. (Note that the CX id and API key have been removed from the notebook.)

- Restriction: This data source comes with some restrictions given it is an unpaid service. There are limitation on number of requestions per day and per minute. This makes the process of extracting large number of news articles very slow. This restriction is emphasized upon much more in the conclusions section

3. Sentiment Analysis:

- Tool: FinBERT from Hugging Face

- Description: FinBERT, a specialized version of the BERT model fine-tuned for financial sentiment analysis, is used to classify the news articles into positive, negative, or neutral sentiments. This model provides insights into the sentiment expressed in the news articles related to each company.

Data Cleaning and Preparation

Several steps were undertaken to clean and prepare the data for analysis:

1. Loading and Merging Data:

- The `ratings_raw_data.csv` file was read into a pandas DataFrame.

- Google Search API was utilized to gather relevant news articles for each company and date listed in the credit ratings dataset. The resulting data was combined into a comprehensive DataFrame, `merged_news_filtered`.

2. Sentiment Analysis:

- FinBERT was employed to assess the sentiment of each news article. The resulting sentiment labels were appended to the `merged_news_filtered` DataFrame.

3. Rating Mapping:

- A mapping was created to convert alphanumeric credit ratings into ordinal values for easier comparison:

```python
rating_map = {
    'AAA': 1, 'AA+': 2, 'AA': 3, 'AA-': 4, 'AA *-': 5, 'AA *': 6,
    'A+': 7, 'A': 8, 'A-': 9, 'A- *-': 10,
    'BBB+': 11, 'BBB *+': 12, 'BBB': 13, 'BBB-': 14, 'BBB- *+': 15,
    'BB+': 16, 'BB': 17, 'BB-': 18,
    'B+': 19, 'B': 20, 'B-': 21
```

}

```

- This mapping was used to create numerical representations of both the base rating (`BASE_RATING_NUM`) and the new rating (`RATING_NUM`).

4. Migration Indicators:

- Two indicators were created to measure rating changes:

  - `migration_ind`: 0 if the base rating and new rating are the same, 1 otherwise.

  - `direct_mig_ind`: +1 for a positive rating change, -1 for a negative change, and 0 if there is no change.

- These indicators facilitate the analysis of the direction and significance of credit rating migrations in relation to adverse news events.

**Key Observations**

Based on the data analysis and visualizations performed, several key observations were made:

1. Sensitivity of High Credit Ratings:

- Companies with high initial credit ratings (AA+ and beyond) exhibit more sensitivity to credit rating migrations. These migrations are more predictable compared to companies with lower base ratings.

2. Overall Migration Trends:

- Analysis of the overall migration trends indicated that adverse news events might have a measurable impact on credit rating changes. However, the limited sample size and availability of public information pose challenges for definitive conclusions.

3. Positive Migration:

- No news item, positive, negative or neutral, lead to an improvement in the credit rating.
```

4. FinBERT Performance:

- FinBERT does a good job on classifying the positive news. None of the instances of a positive classification lead to a credit rating deterioration

Conclusion

This project highlights the potential impact of adverse news on credit ratings using a sample of S&P 500 companies. While initial findings suggest a correlation between public news sentiment and credit rating migrations, the limitations in data availability necessitate further research. Expanding the dataset and incorporating additional sources of public information could provide more comprehensive insights into the relationship between adverse news events and credit ratings movements.

Future Work

Future work can focus on:

- Using a less restricted API response for custom search, thus increasing the sample size of news parsed

- Expanding the dataset to include more companies and a longer time horizon.

- Integrating additional sentiment analysis tools to cross-validate FinBERT results.