**The Measurement of Intial Public Offering (IPO) Sentiment Based on News Article**

A Comprehensive Analysis Using Finbert Model

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8. **Introduction**

The measurement of sentiment surrounding Initial Public Offerings (IPOs) has become increasingly important as companies strive to understand how market perceptions are shaped before going public. An IPO represents a critical milestone in a company’s lifecycle, providing opportunities to access new capital, enhance market visibility, and establish credibility within the industry. However, the success of an IPO is not solely dependent on financial metrics; it is also significantly influenced by the sentiment conveyed through media coverage leading up to the offering.

An IPO marks a company's transition from private ownership to being publicly traded on the stock market—a process that is both complex and strategic. Key decisions during this process, particularly regarding the pricing of the company’s shares, are influenced by various factors such as market conditions, investor demand, and broader economic indicators. However, beyond these tangible elements, the intangible factor of investor sentiment plays a crucial role in shaping IPO outcomes. Understanding how sentiment is formed and its impact on market behavior is essential for companies, investors, and regulators alike.

Investor sentiment refers to the collective attitude of investors toward a particular security or financial market. It is a powerful driver of market behavior, influencing stock prices, trading volumes, and overall market dynamics. In the context of IPOs, investor sentiment can determine the market’s reception of a company’s shares on the first day of trading. Positive sentiment can drive higher demand and better pricing, while negative sentiment may result in subdued market performance. Measuring this sentiment, especially as it is reflected in media coverage, provides valuable insights into the forces that shape IPO success.

Sentiment analysis has emerged as a vital tool for quantifying investor sentiment by analyzing textual data from news articles, social media, and financial reports. This analytical technique leverages natural language processing (NLP) to classify text as positive, negative, or neutral, providing a measurable indicator of sentiment. By applying sentiment analysis to news articles related to IPOs, researchers can explore the relationship between media sentiment and market outcomes. This approach offers a deeper understanding of how news coverage influences investor perceptions and, consequently, the pricing and performance of IPOs.

The development of advanced models like FinBERT, a specialized variant of the BERT (Bidirectional Encoder Representations from Transformers) model, has significantly enhanced sentiment analysis in the financial domain. FinBERT is tailored for financial text, providing more accurate and context-aware sentiment classifications. This model captures the nuances of financial language, making it a powerful tool for analyzing news articles, earnings calls, and other financial documents. In this study, FinBERT is employed to analyze a comprehensive dataset of news articles related to various IPOs. By classifying the sentiment of these articles and correlating them with the initial pricing data of IPOs, the study aims to shed light on the mechanisms by which media sentiment affects IPO performance.

This report delves into the relationship between media sentiment and IPO pricing, with a focus on understanding how news coverage influences market outcomes. The findings have practical implications for investors, companies, and regulators. For investors, insights into media sentiment can enhance decision-making during the IPO process. Companies can better manage their public image leading up to an IPO, while regulators might consider the role of media sentiment in ensuring fair and efficient markets. Ultimately, this study aims to provide a nuanced perspective on the interplay between media coverage and IPO sentiment, contributing to the broader understanding of financial markets.

1. **Background**

Initial Public Offerings (IPOs) are pivotal events in a company’s lifecycle, marking the transition from private ownership to a public entity. This process allows companies to raise capital, broaden their investor base, and enhance their visibility within the market. However, the journey to becoming a publicly-traded company is complex, involving multiple strategic decisions that can significantly impact the company’s future. Among these, understanding and managing investor sentiment has emerged as a crucial factor that can influence the success of an IPO.

**2.1 Investor Sentiment**

Investor sentiment refers to the collective emotions and attitudes of investors toward a particular security, market, or economic condition. It is a powerful driver of financial markets, often influencing trading behavior, stock prices, and overall market dynamics. In the context of IPOs, investor sentiment plays a critical role in shaping market perceptions and determining the initial demand for a company’s shares. Positive investor sentiment can lead to higher demand, resulting in favorable pricing and strong market performance, while negative sentiment can suppress interest, leading to lower valuations and potentially unfavorable market outcomes.

Investor sentiment is shaped by a variety of factors, including macroeconomic indicators, industry trends, company-specific news, and broader market conditions. However, one of the most influential factors in shaping sentiment is media coverage. The way news outlets portray an IPO can significantly affect how potential investors perceive the offering. Favorable coverage can boost confidence and attract more interest, while negative or skeptical reporting can lead to caution and reduced demand. Therefore, understanding how investor sentiment is formed and how it impacts IPO outcomes is essential for issuers, underwriters, and market participants.

The importance of investor sentiment extends beyond the initial pricing of an IPO. It also influences post-IPO performance, as the market’s ongoing perception of the company can affect its stock price, trading volume, and overall market stability. As a result, accurately gauging and managing investor sentiment is not only important for the success of the IPO but also for the long-term success of the company in the public market.

**2.2 Relevance of Sentiment Analysis**

In recent years, the rise of big data and advancements in natural language processing (NLP) have given rise to sentiment analysis, a powerful tool for measuring investor sentiment through textual data. Sentiment analysis involves the computational evaluation of the emotional tone embedded in text, allowing researchers to classify sentiments as positive, negative, or neutral. This technique is particularly valuable in financial markets, where the sentiment expressed in news articles, analyst reports, and social media can have a significant impact on investor behavior and market outcomes.

For IPOs, sentiment analysis offers a novel way to quantify the impact of media coverage on investor sentiment. By analyzing the tone of news articles leading up to an IPO, sentiment analysis can provide insights into how the media’s portrayal of the offering influences investor perceptions and market behavior. This is particularly important in the days and weeks before an IPO, when media coverage can create a narrative that shapes investor expectations and drives demand for the company’s shares.

The FinBERT model, a specialized variant of the BERT (Bidirectional Encoder Representations from Transformers) model, has emerged as one of the most effective tools for sentiment analysis in the financial domain. FinBERT is specifically trained on financial texts, making it adept at capturing the nuances of financial language and providing accurate sentiment classifications. By applying FinBERT to a dataset of news articles related to IPOs, researchers can gain a deeper understanding of how media sentiment affects investor behavior and IPO outcomes.

Empirical studies have shown that media sentiment can have a significant impact on IPO performance. Positive sentiment in the media can enhance investor confidence, leading to higher demand and better pricing on the first day of trading. Conversely, negative sentiment can increase perceived risks, resulting in lower demand and potentially higher levels of underpricing. Understanding these dynamics is critical for issuers, who must manage their public image and communication strategies to ensure a successful IPO.

This study builds on the existing body of research by using FinBERT to analyze a comprehensive dataset of news articles related to various IPOs. The goal is to explore the relationship between media sentiment and IPO outcomes, providing new insights into the factors that drive investor sentiment and influence market behavior. By examining the sentiment of news coverage leading up to an IPO, this study aims to shed light on the complex interplay between media narratives and investor decision-making.

Understanding the influence of media sentiment on IPO performance has significant implications for a wide range of stakeholders. For investors, sentiment analysis can offer a valuable tool for making more informed decisions during the IPO process, helping to identify potential risks and opportunities. For issuers, insights into media sentiment can inform strategies for managing public relations and investor communications, ultimately contributing to the success of the offering. Regulators, too, can benefit from understanding how media sentiment influences market dynamics, as this knowledge can help ensure that markets remain fair, transparent, and efficient.

In conclusion, this study seeks to contribute to the broader understanding of how sentiment analysis can be used to measure and predict the outcomes of IPOs. By leveraging advanced NLP tools like FinBERT, this research aims to provide a deeper perspective on the role of media sentiment in financial markets, offering practical insights for investors, issuers, and regulators alike.

1. **Literature Review**

The study of Initial Public Offerings (IPOs) and their underpricing has been a focal point in financial research, generating a vast array of theoretical and empirical studies. This section provides an overview of key theories explaining IPO underpricing, the role of media sentiment in financial markets, and the application of sentiment analysis in financial research. The literature reviewed here not only highlights the foundational work in these areas but also emphasizes recent advancements and their implications for understanding IPO dynamics.

**3.1 Sentiment Analysis**

Sentiment analysis, particularly within the financial domain, has emerged as an indispensable tool for understanding market dynamics. It involves the computational study of opinions, sentiments, and emotions expressed in text, often applied to financial news, reports, social media, and other textual data. The primary objective of sentiment analysis is to convert qualitative textual data into quantitative indicators that can be analyzed to understand market trends and investor behavior.

Early techniques in sentiment analysis relied heavily on dictionary-based approaches, where predefined word lists (e.g., positive and negative words) were used to classify text. These methods, while foundational, often lacked context sensitivity and struggled with the nuances of financial language. The advent of machine learning models, particularly those using supervised learning, allowed for more sophisticated sentiment classification by training algorithms on labeled datasets.

The introduction of deep learning models marked a significant leap forward. Models like Long Short-Term Memory (LSTM) networks and Convolutional Neural Networks (CNNs) provided better performance by capturing more complex patterns in textual data. However, the most notable advancement has been the development of transformer-based models like BERT (Bidirectional Encoder Representations from Transformers) and its financial domain-specific variant, FinBERT.

FinBERT, developed by Yang, Jiang, and Liu (2020), has been particularly influential in financial research. It leverages the vast pre-training on general text provided by BERT and fine-tunes it using financial data, allowing it to capture the unique vocabulary, syntax, and semantics of financial discourse. This model's ability to accurately classify sentiment in financial texts has opened new avenues for analyzing the relationship between news sentiment and market outcomes, including IPO performance. The precision of FinBERT in understanding context-specific sentiments has made it a preferred tool for researchers exploring the intricate dynamics of financial markets.

**3.2 Investor Sentiment: Earlier Measures**

Before the development of sophisticated sentiment analysis tools, investor sentiment was primarily measured using indirect methods. Surveys were one of the earliest tools used to gauge investor sentiment, often asking participants about their market outlook, risk tolerance, and economic expectations. While useful, surveys were limited by their subjective nature and the delay between data collection and analysis.

Market-based indicators provided another approach. The VIX (Volatility Index), often referred to as the "fear gauge," became a popular measure of market sentiment, reflecting investors' expectations of future market volatility. High levels of the VIX typically indicate increased market fear, while low levels suggest investor confidence. Other proxies, such as trading volumes, put-call ratios, and mutual fund flows, were also used to infer investor sentiment indirectly.

Baker and Wurgler's (2006) work was seminal in this area, as they developed a composite index of investor sentiment using a combination of these proxies. Their research demonstrated that investor sentiment significantly influences asset pricing and can lead to market anomalies, such as bubbles and crashes. These early measures, while lacking the granularity of modern sentiment analysis, were crucial in establishing the importance of sentiment in financial markets.

With the advancement of technology, these traditional measures have been complemented and, in some cases, supplanted by more direct measures of sentiment derived from textual data. The shift towards using real-time data from news articles, social media, and other sources has provided researchers with more timely and accurate indicators of investor sentiment, facilitating a deeper understanding of its impact on market behavior.

**3.3 Empirical Literature**

Empirical studies have consistently demonstrated the significant impact of media sentiment on financial markets. The pioneering work by Tetlock (2007) established a strong link between media sentiment and stock market behavior, showing that negative sentiment in major newspapers could predict downward movements in the stock market. This finding underscored the influence of media narratives on investor behavior and market outcomes.

Garcia's (2013) research further extended this understanding by analyzing sentiment during recessions. He found that during economic downturns, the predictive power of negative sentiment on market volatility increases, highlighting the heightened sensitivity of markets to media during periods of economic stress. This research was instrumental in demonstrating that sentiment not only influences markets in general but also plays a critical role during specific economic conditions.

In the realm of IPOs, the role of media sentiment has been explored with increasing sophistication. Cookson and Niessner (2020) conducted an extensive study on the impact of media sentiment on IPO underpricing. Their findings indicated that positive sentiment in media coverage before an IPO is strongly associated with higher initial returns, suggesting that media narratives can significantly influence investor demand and pricing decisions. This study, along with others like Bajo and Raimondo (2017), has highlighted the importance of monitoring media sentiment as part of the IPO process.

More recent research has focused on the application of sentiment analysis tools to quantify the impact of media sentiment on IPO performance. Liu, Sherman, and Zhang (2014) utilized machine learning techniques to analyze the sentiment of media articles and investor discussions, finding that positive sentiment leads to higher IPO prices and better post-IPO performance. This line of research has been further advanced by the use of models like FinBERT, which have improved the accuracy of sentiment analysis in financial texts.

Overall, the empirical literature strongly supports the notion that media sentiment is a powerful predictor of market outcomes, particularly in the context of IPOs. The ability to quantify sentiment through advanced analytical tools has provided researchers and practitioners with valuable insights into the dynamics of market behavior, offering practical implications for investors, companies, and regulators alike.

**3.4 Media Sentiment and Financial Markets**

**Impact of Media Sentiment**

The role of media sentiment in financial markets has been extensively documented. Tetlock (2007) highlighted how negative media tone can significantly impact stock prices, revealing the media’s power in shaping investor perceptions. This was further explored by Tetlock, Saar-Tsechansky, and Macskassy (2008), who demonstrated that the sentiment in financial news could predict future stock returns and trading volumes, establishing media sentiment as a critical market influencer.

In the context of IPOs, media sentiment has been shown to directly affect pricing and performance. Liu et al. (2014) found that media coverage significantly influences IPO pricing and post-IPO performance, with positive sentiment leading to higher initial returns. Similarly, Bajo and Raimondo (2017) concluded that favorable media sentiment before an IPO can reduce underpricing by enhancing investor confidence and lowering perceived risk.

**3.5 Sentiment Analysis in Financial Research**

**Techniques and Applications**

Sentiment analysis has become a pivotal tool in financial research, especially within natural language processing (NLP). Early methods, such as those by Loughran and McDonald (2011), utilized predefined dictionaries to assess the tone of financial texts. However, these approaches were limited in their ability to capture the nuanced context of language.

The development of more advanced models like BERT, and specifically FinBERT, has significantly enhanced sentiment analysis. FinBERT, tailored for financial texts, provides more accurate and context-aware sentiment classifications, making it a powerful tool for analyzing news articles, earnings calls, and other financial documents (Yang et al., 2020).

**3.6 Empirical Evidence**

Empirical studies consistently support the impact of media sentiment on financial markets. For instance, Garcia (2013) demonstrated that newspaper sentiment could predict stock market volatility, while Heston and Sinha (2017) found that news sentiment could explain a substantial portion of the variation in daily stock returns.

In IPO contexts, sentiment analysis has been effectively used to understand the influence of media coverage on underpricing and post-IPO performance. Cookson and Niessner (2020) showed that positive news sentiment before an IPO is associated with higher initial returns, reinforcing the importance of monitoring media sentiment during the IPO process.

1. **Research Methodology**

This section details the methodology employed to explore the relationship between news sentiment and IPO underpricing. The study was conducted using a Jupyter Notebook environment and encompassed data collection, preprocessing, sentiment analysis, and visualization.

**4.1 Data Source**

This section outlines the methodology used to explore the relationship between news sentiment and IPO underpricing. The study was conducted in a Jupyter Notebook environment, encompassing data collection, preprocessing, sentiment analysis, and visualization. The data for this study was obtained from ProQuest, a comprehensive database that provides access to a wide range of financial news articles and IPO-related information.

**4.2 Data Period**

The data covers a period of one year, ensuring a sufficient time frame to analyze the impact of news sentiment on IPO underpricing. This one-year period was selected to capture a broad range of IPOs and associated news coverage, providing a robust dataset for analysis.

### 4.3 Data Sample

### A convenient sampling method was used to select 10 companies for the analysis. This approach was chosen to focus on companies that had a significant amount of news coverage and clear IPO performance metrics.

### 4.4 Data Scope

### The scope of this study is limited to analyzing the impact of news sentiment on the first-day performance of IPOs. It does not consider long-term performance or other external factors that may influence IPO pricing. The findings are specific to the selected companies and the timeframe of the study.

### 4.5 Data Collection

**News Articles**

A comprehensive dataset of news articles related to IPOs was compiled from various financial news sources. The dataset spans a specific timeframe and includes critical details such as the issuer company, publication date, and article content.

### 4.6 Data Preprocessing

**Cleaning and Merging**

The news articles dataset was cleaned to remove duplicates and irrelevant entries. Text data was standardized by converting it to lowercase and eliminating punctuation and stopwords. Subsequently, this cleaned dataset was merged with the IPO data to align the sentiment of news articles with the respective IPOs.

### 4.7 Sentiment Analysis

The FinBERT model, a financial domain-specific variant of BERT, was employed to conduct sentiment analysis on the news articles. Each article’s sentiment was classified into one of three categories: positive, negative, or neutral. To manage long texts exceeding the model’s token limit, articles were split into chunks of 510 tokens, and each chunk was analyzed individually. Sentiment scores from these chunks were then aggregated to yield an overall sentiment score and label for each article.

**Weighted Aggregation**

In the sentiment analysis, the sentiment scores for each chunk of text were weighted to ensure that stronger sentiments had a more significant influence on the overall sentiment score. The process involved the following steps:

1. **Chunk Analysis:** Each news article was divided into 510-token chunks to comply with the model’s input constraints.
2. **Sentiment Scoring:** The FinBERT model assigned sentiment labels (positive, negative, or neutral) and corresponding scores to each chunk.
3. **Score Weighting:** Sentiment scores were squared to emphasize stronger sentiments. Positive scores were squared and added to a list of positive scores, negative scores were squared and added to a list of negative scores, and neutral scores were squared and added to a list of neutral scores.
4. **Final Sentiment Score:** The final sentiment label for each article was determined by comparing the aggregated and normalized positive, negative, and neutral scores. The final sentiment score was based on the most dominant sentiment, with the corresponding score being selected.

This approach ensures that the final sentiment label and score for each article reflect the most dominant sentiment, with stronger sentiments having a more significant influence.

### 4.8 Feature Importance Evaluation

The average sentiment score for each company was calculated to determine overall sentiment. Based on the average score, companies were categorized as follows:

* **Positive Sentiment:** Scores above 0.05.
* **Negative Sentiment:** Scores below -0.05.
* **Neutral Sentiment:** Scores between -0.05 and 0.05.

### 4.9 Visualization

To effectively illustrate the findings, several visualizations were generated:

1. **Number of Companies by Overall Sentiment:** A count plot showing the distribution of companies based on their overall sentiment labels.
2. **Distribution of Average Sentiment Scores by Overall Sentiment:** A box plot displaying the distribution of average sentiment scores for each sentiment category.
3. **Average Sentiment Scores by Overall Sentiment:** A bar plot presenting the mean sentiment scores for each overall sentiment category.

**5. Data Analysis and Interpretation**

**5.1 Dataset Overview**

The dataset comprises news articles related to companies preparing for their Initial Public Offerings (IPOs). The primary objective is to analyze the sentiment of these articles and assess its impact on IPO performance.

**Steps Performed**

1. **Data Preprocessing**

The text data in the "News Article" column was cleaned using a custom preprocessing function. This function removed unwanted characters, converted the text to lowercase, and eliminated line breaks, URLs, emails, numbers, and punctuation.

1. **Sentiment Analysis**

Sentiment analysis was conducted on the cleaned text data using the FinBERT model. The sentiment scores generated from this analysis were then added to the dataset.

1. **Calculating Average Sentiment Scores**

The average sentiment score for each company was calculated by grouping the data by "Issuer Company" and computing the mean of the sentiment scores.

**5.2 Interpretation**

**Negative Sentiment**

None of the companies displayed negative sentiment scores, indicating that the news articles generally did not convey negative perceptions for these companies.

**Positive Sentiment**

Companies such as Chemcon Speciality Chemicals Limited, Indigo Paints Limited, Mazagon Dock Shipbuilders Limited, and Route Mobile Ltd exhibited positive sentiment scores. This suggests that the news articles related to these companies were predominantly positive, reflecting a favorable market perception.

**Neutral Sentiment**

Companies like Indian Railway Finance Corporation Limited and Likhitha Infrastructure Ltd had sentiment scores of zero, indicating a neutral market perception based on the news articles. Additionally, companies such as Equitas Small Finance Bank Ltd, Happiest Minds Technologies Ltd, Rossari Biotech Ltd, and SBI Cards and Payment Services Ltd had moderately positive sentiment scores, indicating a slightly positive yet relatively neutral perception.

**5.3 Average Sentiment Scores**  
The following table summarizes the average sentiment scores for each company:

| **Issuer Company** | **Sentiment Score** |
| --- | --- |
| Chemcon Speciality Chemicals Limited | 0.356859 |
| Equitas Small Finance Bank Ltd | 0.074702 |
| Happiest Minds Technologies Ltd | 0.248430 |
| Indian Railway Finance Corporation Limited | 0.000000 |
| Indigo Paints Limited | 0.389314 |
| Likhitha Infrastructure Ltd | 0.000000 |
| Mazagon Dock Shipbuilders Limited | 0.273268 |
| Rossari Biotech Ltd | 0.213045 |
| Route Mobile Ltd | 0.287292 |
| SBI Cards and Payment Services Ltd | 0.122131 |

These sentiment scores provide insights into the market's perception of the companies based on the sentiment of news articles related to their IPOs. Companies with higher positive sentiment scores are likely viewed more favorably by the market, while neutral scores suggest a balanced perception.

**6. Conclusion**

This sentiment analysis of news articles related to companies preparing for Initial Public Offerings (IPOs) offers valuable insights into how market perceptions can influence IPO performance. By employing the FinBERT model, sentiment scores were derived for each company based on the content of related news articles.

**Key Findings:**

1. **High Positive Sentiment:** Companies such as Chemcon Speciality Chemicals Limited (0.356859), Indigo Paints Limited (0.389314), Mazagon Dock Shipbuilders Limited (0.273268), and Route Mobile Ltd (0.287292) exhibited strong positive sentiment scores. This suggests favorable media coverage, which could lead to positive market perceptions and a reduced risk of underpricing.
2. **Moderate Positive Sentiment:** Equitas Small Finance Bank Ltd (0.074702), Happiest Minds Technologies Ltd (0.248430), Rossari Biotech Ltd (0.213045), and SBI Cards and Payment Services Ltd (0.122131) showed moderate positive sentiment scores. These scores indicate a generally favorable outlook, though not as pronounced as those with higher positive sentiment.
3. **Neutral Sentiment:** Indian Railway Finance Corporation Limited (0.000000) and Likhitha Infrastructure Ltd (0.000000) registered neutral sentiment scores, suggesting a balanced market perception with neither strong positive nor negative sentiment.

**Implications:**

The analysis underscores the critical role of media sentiment in shaping investor perceptions and influencing IPO performance. Positive sentiment in news coverage can enhance market confidence and potentially reduce the need for underpricing, while neutral sentiment reflects a balanced view that neither significantly boosts nor detracts from investor confidence.

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