DECODING THE IMPACT OF INFORMATION EMBEDDED IN THE HINDENBURG RESEARCH REPORT ON ADANI ENTERPRISES

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Abstract

This case tries to analyse and uncover the sentiment expressed in a report published dated 24 January 2023 by Hindenburg Research on Adani Enterprises. The study emphasizes the significance of qualitative data (textual data) by employing the novel empirical textual sentiment analysis technique to quantify the information present in a voluminous report with the intention of studying its impact on Adani Enterprises stock prices. It introduces a novel dimension of examining a qualitative aspect of the report rather than the conventional event study approach with numerical figures. The case elucidates that the negative sentiment expressed via the research report resulted in a decrease in stock prices. It portrays the power of qualitative data to change the perceptions and beliefs of investors. However, the more pronounced effect of a decrease in the stock price over days shows that the information embedded in the report took time to be incorporated into the stock price which pertains to the inefficiency of the semi-strong form of market efficiency.

Discussion and Case Questions

How did the report published by Hindenburg research on January 24, 2023, impact the belief and perception of investors and hence the share price of Adani Enterprises? Does the information embedded in a report take time to be incorporated into Adani's share price?

Keywords: Behavioral Finance, Textual Sentiment Analysis, Stock Market, Hindenburg research report, Adani Enterprises.

JEL Classification: G41, G10

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1. Introduction

Investors vigorously seek information available in the public domain regarding the companies. Textual information which is hard to quantify is quintessential to the overall financial market condition, industries, and firms (Kearney & Liu, 2014). Researchers over the decades have intensified their efforts to examine the effect of sentiment embedded in textual information on stock price returns. One of the ways to study sentiment is through textual sentiment analysis. Textual Analysis can be perceived as a component of qualitative analysis and can be defined as an approach to measure qualitative information systematically into quantitative measures. It is used to infer the sentiment of the context. Kearney and Liu (2014) suggested three sources of sentiment analysis in finance where major work by academicians has been done: Corporation public disclosure (includes official releases done internally), Media (news stories, in-depth commentaries, or analyst reports), and Internet posting. This case emphasized somewhere between media-based information and corporate disclosure (Kearney &Liu, 2014). The hard-to-quantify information content from a reputable and authentic source like a research firm can change the perception and behaviour of individual investors. The arrival of new information can potentially change investors' beliefs (Huberman & Regev, 2001). There are myriads of evidence that elucidates that qualitative information can shape the perception and behaviour of individual investors (Bajo & Raimondo, 2017; Tetlock, 2007; Tetlock et al., 2008).

In emerging countries like India, various studies have been conducted using event study methodology to analyse the impact of particular events such as announcements of scams, fraud, earnings, etc on the stock price (Ahmad et al., 2022; Mallesha & Archana, 2023). Recently Mallesha and Archana (2023) investigated the impact of the Hindenburg report on the Adani Group's stock prices using event study methodology. This case broadens the scope with a distinctive method, notably the textual sentiment analysis approach to analyse and interpret the text (positive sentiment or negative sentiment) of the 106-page Hindenburg report and subsequently its impact on the stock price. The event study focuses on the financial data (quantitative) while sentiment analysis deals with the textual information (qualitative data).

This case tries to answer: How a report published by Hindenburg Research on January 24, 2023, impact the belief and perception of investors and hence the share price of Adani enterprises afterward? Moreover, whether the impact on share price was immediate or it took time to be incorporated into the Adani enterprise share price.

The report consists of 106 pages, which is voluminous, and investors may face difficulty autonomously understanding complex information stated in the report. Hence, we have used

Hindenburg's published report as a research object and deployed textual sentiment analysis to measure abundant information in the report using a pysentiment 2 package on Python software.

1.1 Hindenburg Research

Hindenburg Research is a US-based research and analysis firm that focuses on forensic financial research. Founded by Nathan Anderson, it acts as a short seller (Volodarsky, 2022). The Hindenburg Research has gathered attention since 2018 for its critical report on various companies. For instance, Hindenburg's report on Nikola and Clover Health Investments resulted in a significant decline in the stock price of the firms and a fraud investigation by the Securities and Exchange Commission (Singh, 2023; Volodarsky, 2022). Further, Hindenburg Research as a short seller has encountered criticism for its bold strategy of making potential profits out of the decline in the share price of targeted firms. Short selling is a phenomenon where investors borrow and sell shares in the open market and make a profit by buying the share later when the price reduces. The firm takes a short position in the stocks it perceives as overvalued or involved in fraudulent activities and publishes reports based on its extensive examination and analysis. On January 24, a report on Adani Group was published claiming their two-year investigation and made allegations of stock manipulation, lack of transparency, and accounting fraud schemes over the period. We used this report as a research object in our case.

1.2 Textual sentiment analysis

The usage of textual analysis in finance has been evolving and emerging at an accelerated pace. Textual Analysis can be perceived as a component of qualitative analysis and can be defined as an approach to measure qualitative information systematically into quantitative measures. In the finance domain, it is used to infer the sentiment of the context that conveys information or views about financial markets. For instance, Engelberg (2008) found that qualitative information about firms earning in the news stories has additional predictability of future returns than quantitative information. In parallel, Henry (2006) found that verbal variables can predict accurately over the financial information. Melvin and Yin (2000) also found that readers focus more on financial news headlines. Tetlock (2007) discovered that the pessimistic tone of media decreases the share price. Henry (2008) found the positive tone of press releases increases the abnormal positive return. Hence, textual sentiment analysis helps to delve beyond the quantitative figures.

The two most standard methods employed for textual sentiment analysis are the dictionary-based method and the machine-learning method. The dictionary-based method uses the "mapping" mechanism in which a computer program analyses the text and categorizes each word (or phrase) in a text into multiple groups according to a set of predefined dictionaries. The other method which

is the machine learning method developed by computer scientists and mathematicians makes use of statistical approaches to infer text content and categorize documents based on statistical inferences (Li, 2010). The dictionary-based approach is simple and better suited to researchers without a programming background. Finance researchers have commonly used dictionary-based methods over machine learning methods in the prior literature (Loughran & McDonald, 2016). In the finance domain, the extensively used dictionaries for sentiment analysis are "Henry (2008), Harvard's General Inquirer, DICTION, and Loughran and McDonald (2011)" (Loughran & McDonald, 2016). Henry [2008] was the initial word list framed primarily for financial text. It gathered the words by reviewing earning press releases of telecommunication and computer services industries. However, it contained only 85 negative words in the list which is less comprehensive to gauge the sentiment of the document. The other dictionaries Diction and Harvard General Inquirer dictionary are not framed for a financial perspective, they are designed for sociology and psychology studies. The Harvard General Inquirer consists of 182 tag categories and in the finance and accounting context, Harvard IV-4 negative and positive word categories are used predominantly. Even though the Harvard IV dictionary was used in one of the influential papers (Tetlock, 2007), Loughran and McDonald (2011) proclaimed that 75% of negative words that appear in the Harvard dictionary are not negative from the perspective of the finance domain. The two authors find that the classification of words as per the Harvard dictionary creates noise and such misclassification gives relevance to nontonal words which may unintentionally capture other impacts.

Hence, the most popular and comprehensive dictionary especially made to gauge the sentiment in financial documents is Loughran and McDonald (2011) dictionary precisely called LM (2011) (Bajo & Raimondo, 2017; Loughran & McDonald, 2016). Hence, we have utilised the dictionary-based approach and LM (2011) dictionary. Moreover, we have used the fundamental language model in NLP, i.e., the bag of word approach. The bag of words is a statistical approach in which each element is represented by a normalized number of occurrences of a basic term in the document. It divides the whole sentence into a unigram model (gram represents composition of words) and each word is given a subjective score available in a sentiment dictionary. It precisely implements effective word matching from the dictionary list.

2.   Methodology

2.1 Data Source

The published research report has been fetched from the Hindenburg research website and the data regarding the stock price of Adani Enterprise has been gathered from the NSE website. Further, we have used Loughran and McDonald (2011) dictionary to detect sentiment-carrying words in the Hindenburg report.

2.2 Tools and techniques employed

We have deployed the textual sentiment analysis (bag of words) approach to measure the qualitative information, which is otherwise hard to quantify, in quantitative terms using the pysentiment2 package in Python software. Textual sentiment analysis (analyses text only) has its roots in content analysis (analyses text and video) (Cook & Ahmad, 2015).

The research report was converted into a .txt file and then into a .csv file to be supervised via pandas in Python. To acquire the sentiment score, we appended the report into text or character string. Then the foremost step in sentiment analysis is tokenisation. Along with tokenisation, other crucial steps were also performed, for instance, stopword removal, punctuation removal, case transformation, and stemming. The Pysentiment2 package has an inbuilt function called lm.tokenize() that splits the text into tokens and a method called lm.get_score maps the tokens to the LM dictionary words. It gives positive and negative sentiment scores and hence net sentiment score can be calculated as deducting negative sentiment from positive sentiment. Figure 1 displays the flow of sentiment analysis used in our research methodology.

Table 1: Sentiment Score of Hindenburg Report

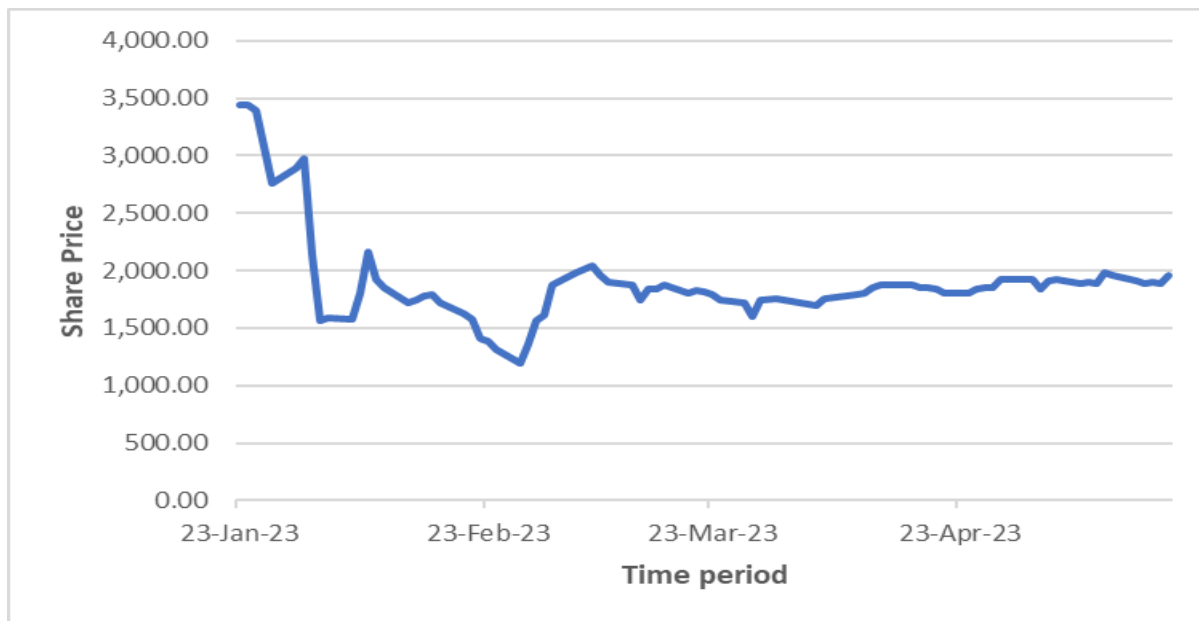| Positive Sentiment	217
Negative Sentiment	1095
Net Sentiment Score	-878

Source: Authors' calculation
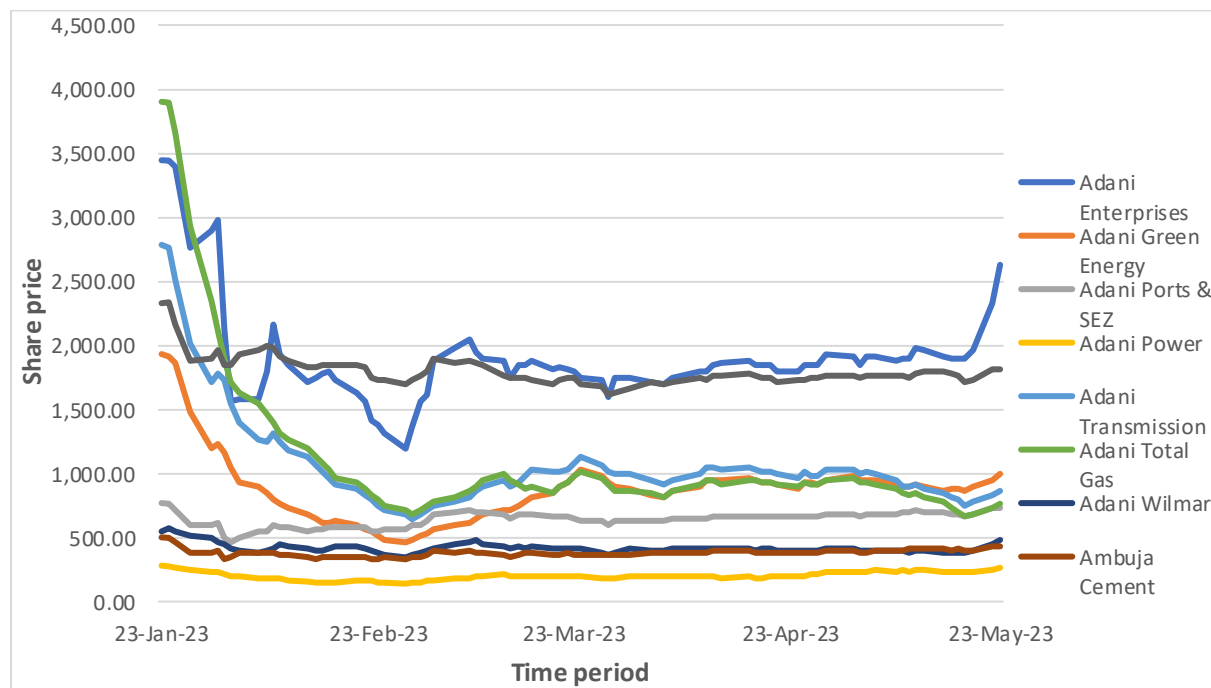
Figure 1: Flow of Sentiment Analysis
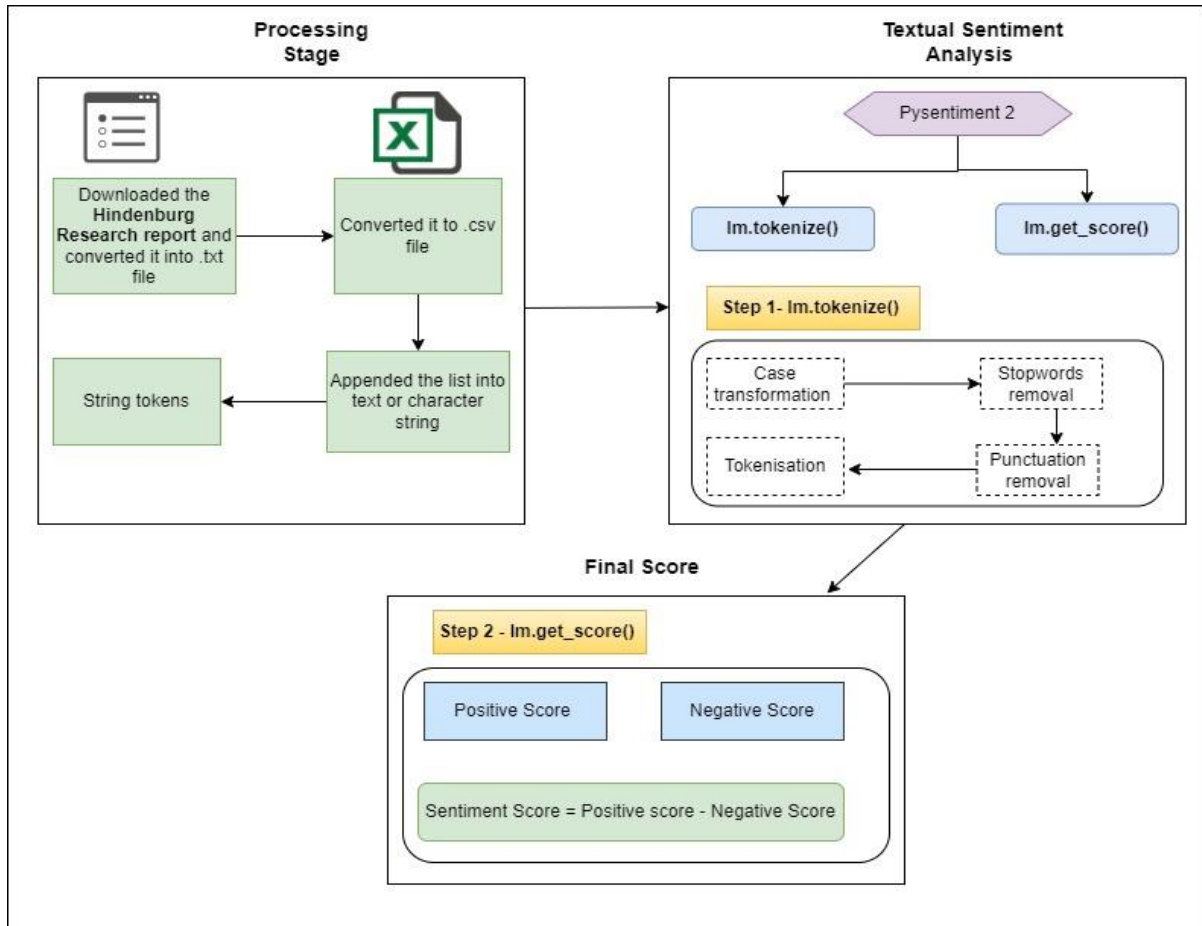
Source: Authors' Compilation

Figure 2: Plot of the closing share price of Adani Enterprises over a time period after the Hindenburg report

Source: Authors' compilation

Figure 3: Plot of the closing price of Adani Group over a time period after the Hindenburg report

Source: Authors compilation

3.   Results

Table 1 displays the sentiment score obtained from Hindenburg's research report regarding Adani Enterprises. It shows more negative sentiment in the report than positive sentiment. Hence, the overall sentiment of the published report is negative.

Figure 2 demonstrates that the Adani enterprise share price was trading at Rs.3442 on 24 January 2023 and it dropped to Rs.3388 on the next day. The decrease in share price continued till 27 January to Rs.2761.45, a decrease of 19.64% from 23 January 2023. This shows that the report published by Hindenburg Research with a negative sentiment had impacted the investor's sentiment and influenced their decision which resulted in a decrease in the share price. On January 29, Adani Enterprises gave a response to the Hindenburg research report which resulted in an increase in the share price, however, the increase was for two days only. As on February 1, 2023, it was reported that Credit Suisse stopped accepting Adani Enterprises bonds as collateral for margin loans. The share price plummeted further and resulted in a decline in share price to Rs. 1565.25 on February 2 which is a decline of about 54.61% from 23 January 2023 (the date before the Hindenburg report). This shows that the Hindenburg report had explosively impacted the Adani Enterprise share price. However, the market did not respond aggressively very immediately to the

information embedded in the report. It took a fair amount of time to reflect on the information. The report triggered the sell-off and by February end, the decrease in share price return was around 60.31%. On March 2, the Supreme Court ordered an expert committee to inquire about the concern being raised by the public via PIL (public interest litigation) claiming a decrease in the company's share price due to the Hindenburg report. The stock price kept trading in March nearly half of the value of the share price on January 23. On May 6, the Supreme Court-appointed expert panel stated no evidence of regulatory framework and abusive trading. From Figure 2 above, it can be deduced that the prices have been stable at a new repriced level though it is pertinently less than the pre-Hindenburg report level.

Figure 3 shows the closing share price of Adani Group over a while after the Hindenburg report. The Adani Group comprises of Adani Enterprises, Adani Green Energy, Adani Ports & SEZ, Adani Power, Adani Transmission, Adani Total Gas, Adani Wilmar, Ambuja Cement, ACC. Adani Enterprises is the flagship company of Adani Group and hence we have studied in detail how the report affected the share price of Adani Enterprises. Further, it depicts that the share price of all the group companies decreased after the Hindenburg report and it impacted the Adani Group severely. However, it tends to increase in the month of March and has been stable at a new repriced level which is comparatively less than the pre-Hindenburg report price.

4.   Conclusion and Implication

4.1 Concluding Remarks

This case explains the significance of qualitative information as it provides insights that can impact a company's stock performance. Faced with difficulty to read voluminous reports this case uses qualitative information published by Hindenburg research regarding the Adani Enterprise as a research object. By employing textual sentiment analysis using the LM (2011) dictionary, we try to emphasize how qualitative information can change the perception and sentiment of investors. The negative sentiment expressed in the Hindenburg report plummeted the stock price of the company, and the decrease in share price was evident from the next day, however, the aggressive decrease in share price took a certain time period and the decrease in the share price was explosive. Nearly a month after the report the share price declined to an extent of 60%. This shows that the information embedded in the report took time to be incorporated into the stock price which pertains to the inefficiency of the semi-strong form of market efficiency (Mallesha & Archana, 2023). The share price started to increase in value after a perpetuated decrease when the Supreme Court intervened by forming an expert committee and it further increased after a clean chit was given that no regulatory failure and abusive trading had been witnessed in view of stock price

manipulation. In conclusion, this case shows the significance of corporate governance by emphasizing the importance of transparency and ethical conduct to maintain business reputation in this dynamic global economy.

4.2   Implication

With the amount of information out there in the digital age, there is always a risk of people spreading false rumours. The SEBI (LODR) amendment has made it mandatory to verify rumours spread through media or other public forums for the top 100 listed entities starting from October 1, 2023, and the top 250 listed entities starting from April 1, 2024. The horizon of this step can be expanded by including all the listed companies to safeguard the reputation of the business and lessen the impact of fake news on investor sentiment and misinformation and thereby, an attempt to help investors make rational decisions. The other pivotal implication of this study is a collaborative partnership between the regulatory body and the company to educate and aware investors. This synergy will enhance the credibility of the information and improve transparency. Moreover, investors must do a fundamental analysis and make unbiased decisions considering their individual and market factors.

4.3   Limitations and scope for future research

The present case study suggests that the negative sentiment in the published report decreased Adani's stock price. However, the present study is anecdotal evidence, there is a need for research that explores this area with extensive data and variables complemented with the empirical methodology and profound theoretical base. Further, with the increase in the usage of sentiment analysis techniques and event study methodology, a study amalgamating the two approaches would be an interesting area to explore in these areas of research studies. The study uses bag of word approach for sentiment analysis which is a unigram approach and hence avoids word order in a text. A more sophisticated representation of sentiment analysis can be done by deploying an ensemble method with a combination of BoW and TF-IDF or n-gram approach. Lastly, machine learning learns and adapts to the special characteristics of input data they are trained on, while the dictionary-based approach is a hard matching of the words and may struggle with the context sometimes. A promising study can be done using the machine learning method over a dictionary-based approach.

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Appendix

Company Briefing

ADANI ENTERPRISES

Adani Enterprises Ltd was incorporated in 1993. Initially, it was called Adani Exports Ltd. In the beginning years, particularly in 1988, the company began its operation as a partnership firm and became a joint stock company in the year 1993. The Ministry of Commerce Government of India presented them with 'Star Trading House' and 'Super Star Trading House' status in the years 1993 and 1994 respectively. The company went public in the year 1994 to offer its shares to the general public. Adani Enterprises is the flagship of the Adani Group, potentially recognized as largest business conglomerate of India. It is creating wealth for its shareholders and hence, contributed to the growth of the nation. Adani Enterprises is growing remarkably with its diversified conglomerates – Integrated Coal Management and mining, solar cells, module manufacturing, agri-storage infrastructure, and services as well as edible oils and food products. The main philosophy of Adani Enterprises is to develop world-class infrastructure serving underserved areas of India.