

The Impact of Social Media and the Network Economy on the Stock Market

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Abstract: This paper rigorously examines the influence of social media and the network economy on stock market behavior. The research is structured into four principal sections: it begins by introducing the research backdrop, its significance, methodologies, structural organization, and thought process; it then proceeds to a literature review that scrutinizes the effects of social media sentiments and the network economy on the stock market's fluctuations. The subsequent section outlines the methodological framework and processes employed, which includes the formulation of hypotheses, the selection of sample data, and the construction of models and indicators. In the concluding part, empirical research is used to assess the relationship between social media activity indicators, such as video views and bullet comments, and stock market variations, such as return rates, trading volumes, and volatility. The study uncovers significant impacts of social media sentiments and the network economy on stock market parameters, like price alterations and market capitalization. This paper discusses the impact of social media on stock market trading, particularly its influence on daily return rates and volatility. It highlights how social media sentiments directly affect stock prices, confirmed through case studies and analyzed using linear regression models. The research also includes statistical tests to ensure the stability of the results. The study concludes with policy recommendations and emphasizes the growing importance of social media in shaping stock market dynamics, offering insights for investors to better understand and predict market trends.

Keywords: Social Media, Network Economy, Stock Market Impact, Return Rate.

1. Introduction

In today's digital era, under the constant evolution of internet technology, social media has shown a trend of change. In recent years, the fluctuations in the capital stock market have intensified, with a significant rise in the proportion of retail investors and an increasingly potent impact. The influence of social media and the network economy on the stock market is garnering growing attention. Their influx has enabled individuals and small groups to easily publish and share information, thus playing a crucial role in shaping public opinion and influencing market behaviors. With the rapid advancement of information technology, traditional financial markets are no longer the sole channel for investors to acquire information. Social media platforms, such as social networks, blogs, and video-sharing websites, have become vital sources of information, exerting profound impacts on the dynamics of the stock market. This phenomenon has attracted widespread interest, especially

considering these platforms' potential roles in shaping public sentiment, disseminating market-related information, and influencing investor decisions. Likewise, the rise of the network economy, including e-commerce, online advertising, and internet-based financial services, has had an undeniable effect on the stock market. These changes urge us to reconsider and study the specific impacts of social media and the network economy on the stock market and how these effects are manifested through various mechanisms.

The stock market return rate is influenced by multiple factors within a multi-level market system, primarily including: In macroeconomic factors, the macroeconomic environment encompasses elements such as GDP growth rates, inflation rates, interest levels, monetary and fiscal policies, and international trade conditions, all of which impact the stock market. Investor sentiment is also a crucial factor affecting the stock market return rate. Positive or negative market sentiments can lead to stock price volatility, thereby affecting the return rate. Social media, news reports, and market rumors can all influence market sentiment. These factors interact and collectively determine the stock market return rate. Understanding and analyzing these factors can help investors better predict market trends and make investment decisions.

This paper aims to delve into how social media activities and network economy factors influence stock market performance, including stock price volatility, trading volume, and market sentiment, through quantitative and qualitative analyses. By collecting and analyzing extensive data, this study attempts to reveal the relationships between social media indicators (such as video views and social media interactions) and stock market variables (such as return rates and volatility). Moreover, it examines various aspects of the network economy, including e-commerce activities, online advertising expenditures, and internet public opinion, and how they affect the stock market. This research not only deepens the understanding of the mechanisms through which social media and the network economy impact the stock market but also provides practical insights and recommendations for investors and policymakers to better navigate market changes brought about by these emerging factors.

2. Literature Review

Among the effects of media sentiment on the stock market, the study highlights the role of digital and social media in shaping investor behavior and stock market trends. They study how news content, especially from influential financial blogs and social media platforms, affects stock prices and trading volumes[1].

In sentiment analysis and financial markets, research in this area focuses on quantifying sentiment in text data using natural language processing (NLP) and machine learning algorithms. The studies analyzed the correlation between market sentiment indicators and stock market performance from online news and social media. In the behavioral finance perspective, several papers delve into investor psychology and discuss how overreactions, herd behavior, and disagreements caused by media and social network interactions can lead to stock market volatility and crashes. Among the effects of social networks on market dynamics, the role of social networks in disseminating information and influencing investors' decisions is an important theme. These studies explore how investor interactions on platforms such as forums and social media can lead to a rapid spread of sentiment and can lead to market anomalies, including bubbles and crashes. The literature review reveals a combination of quantitative and qualitative research methods, including empirical analysis using econometric models, sentiment analysis tools, and machine learning techniques to predict market movements based on media sentiment and social network data. This section discusses how to use self-media platforms to analyze and predict stock market dynamics. The literature shows that company news disseminated through Twitter can reduce information asymmetry and reduce abnormal spreads, especially for companies that are not often in the public eye. The degree of news

dissemination on Twitter is positively correlated with stock price liquidity. [2]The use of Twitter can also reduce the cost of equity financing for companies, especially for companies facing large information asymmetry. In addition, the information posted through Twitter can predict the company's quarterly earnings. Features of Twitter's disclosure of financial information include building social connections, increasing trust between investors and publishers, and enhancing the dissemination of information through comment and retweet features. The study found that when using Twitter to post loss information, if it is posted from the CEO's personal account, it can increase investor trust and promote investment propensity. By analyzing data from forum posts and microblogs, the researchers found that the data correlated with stock market indicators and can predict stock price movements. Media sentiment also has a significant impact on stock prices. Optimism or pessimism in the media can influence stock price pricing, prompting investors to make irrational decisions, which in turn can affect market efficiency. Media sentiment spreads quickly and can profoundly affect investors' psychological cognition and decision-making. In conclusion, the literature highlights the growing importance of self-media sentiment and networks in the financial market ecosystem, demonstrating their potential to have a significant impact on stock market behavior and investor decision-making.[3]

3. Case Studies

Based on the extensive reading and analysis of the existing literature, this paper first fully considers the structure of self-media, selects the corresponding stock market yield and volatility as the explanatory variables in combination with the characteristics of stock market trading behavior of small and medium-sized investors, and uses quantitative analysis, empirical analysis, linear regression model, sensitivity analysis and other methods to refine the text sentiment, and comprehensively explores the relationship between self-media sentiment and stock market returns, trading volume and volatility. This paper focuses on the structure of the stock market, and analyzes whether the stock market has changed dramatically in terms of returns, volatility, and extremes after the change.[4]

On the evening of October 17, 2021, the technology video blogger "@老师好我叫何同学" released a new video. In the video, the blogger known as "Mr. He" by netizens made a self-made table with a sense of technology, which was named AirDesk because it was inspired by Apple's stranded product, the AirPower wireless charging pad. Tech video blogger He has garnered a lot of attention for his innovative high-tech project "AirDesk".

After the release of this video, in less than a day, it has received 4.287 million views on Bilibili, 32,000 barrages, 19 million views on Weibo, 19.16 million views on Weibo, 42,000 comments, 163,000 retweets, and 668,000 likes. In the video, Mr. He introduced the lifting office table of the listed company Loctek Co., Ltd. On the day of the fermentation of Mr. He's video, the stock price rose by 13.51% at the opening, and the company's market value increased by nearly 550 million yuan to 4.576 billion. The Loctek flagship stores of Jingdong and Taobao have also typed the words "the same style as classmate He", and the same lifting desk has been partially out of stock. Mr. He's project not only demonstrates his personal pursuit and practical ability of scientific and technological innovation, but also reflects the public's great interest and expectation in high-tech products. This combination of practicality and innovation brings new inspiration and direction to the furniture and office equipment industry, as well as new growth opportunities for related businesses and investors. That's why this research is looking into it.

Suppose this paper want to study the impact of this event on stock market returns, the specific research idea is as follows.[5]

3.1. Method Design

First, determine that the independent variables are the number of video playbacks, the number of comments, the number of retweets, the number of comments, and the ranking of hot searches. The dependent variable is the change in the stock price and market value of Loctek shares. Collect relevant data of He Student's video from Bilibili, Weibo and other platforms, including playback, interaction, etc.

Collect the share price and market capitalization data of Lego shares from the stock market database (Table 1) and calculate the daily return (Figure 1).

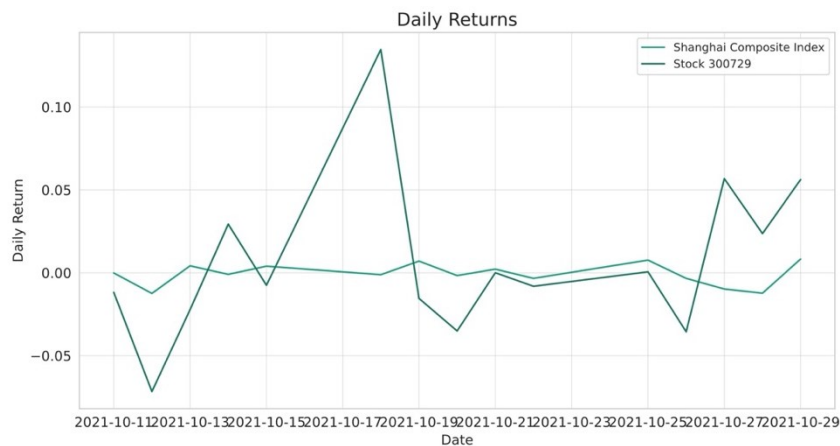


Figure 1: October 11, 2021-October 29 Loctek Ergonomic Tech Daily returns.

Table 1: Loctek Ergonomic Tech Historical Data and Shanghai Composite Historical Data.

Loctek Ergonomic Tech Historical Data:

Date	Price	Open	High	Low	Vol.	Change %
10/29/2021	20.13	18.46	20.97	18.20	9.78M	5.61%
10/28/2021	19.06	18.62	19.23	18.46	7.76M	2.40%
10/27/2021	18.62	17.45	18.64	17.16	7.09M	5.68%
10/26/2021	17.62	18.28	18.28	17.60	4.16M	-3.58%
10/25/2021	18.27	18.15	18.45	17.88	3.24M	0.04%
10/22/2021	18.26	18.63	18.80	18.12	4.57M	-0.79%
10/21/2021	18.41	18.25	18.59	18.02	5.15M	0.00%
10/20/2021	18.41	18.85	19.04	18.12	7.37M	-3.51%
10/19/2021	19.08	19.54	20.15	18.83	11.20M	-1.59%
10/18/2021	19.38	16.98	19.89	16.98	12.66M	13.51%
10/15/2021	17.08	17.04	17.85	16.95	2.44M	-0.76%
10/14/2021	17.21	16.55	17.28	16.32	3.08M	2.95%
10/13/2021	16.72	17.10	17.15	16.08	3.77M	-2.25%
10/12/2021	17.10	18.58	18.58	16.76	6.70M	-7.14%
10/11/2021	18.42	18.77	18.77	18.08	3.58M	-1.20%
10/08/2021	18.64	18.04	18.71	17.69	4.74M	4.76%

For the Shanghai Composite Index (benchmark):

- Average Daily Yield: Approximately -0.08%

- Volatility (standard deviation): approx. 0.67%
- Positive days: 6 days
- Days of Negative Return: 9 days
- Maximum Daily Yield: Approximately 0.82%
- Minimum Daily Yield: Approx. -1.25%

In terms of yield, the average daily return of a stock is significantly higher than that of the benchmark index, indicating that it performed better relative to the market during the analysis period. At the volatility level, stocks are much more volatile than their benchmark indexes, meaning their prices are more volatile and riskier as well. And even though the stock and the benchmark index have the same number of positive return days, the stock's maximum daily return far exceeds the benchmark, indicating that the stock is performing very strongly on good days. Similarly, a stock's maximum and minimum daily returns range widely, indicating that it has experienced extreme price movements on certain days. These analyses all reflect the performance of the stock relative to the benchmark index over the time period under consideration, revealing its earnings potential and level of risk.

Shanghai Composite Historical Data:

Date	Price	Open	High	Low	Vol.	Change %
10/29/2021	3,547.34	3,519.33	3,547.34	3,502.80	35.88B	0.82%
10/28/2021	3,518.42	3,548.70	3,552.04	3,509.49	37.82B	-1.23%
10/27/2021	3,562.31	3,589.86	3,589.86	3,553.13	35.06B	-0.98%
10/26/2021	3,597.64	3,612.83	3,625.02	3,589.71	33.73B	-0.34%
10/25/2021	3,609.86	3,574.26	3,611.09	3,564.21	32.12B	0.76%
10/22/2021	3,582.60	3,594.75	3,607.58	3,578.76	35.32B	-0.34%
10/21/2021	3,594.78	3,590.05	3,610.96	3,576.35	35.23B	0.22%
10/20/2021	3,587.00	3,583.24	3,596.05	3,574.30	34.42B	-0.17%
10/19/2021	3,593.15	3,562.30	3,596.79	3,560.62	33.42B	0.70%
10/18/2021	3,568.14	3,571.05	3,571.05	3,539.48	34.10B	-0.12%
10/15/2021	3,572.37	3,551.99	3,578.77	3,542.69	32.03B	0.40%
10/14/2021	3,558.28	3,555.11	3,569.69	3,547.18	29.50B	-0.10%
10/13/2021	3,561.76	3,543.49	3,569.13	3,515.65	32.51B	0.42%
10/12/2021	3,546.94	3,581.30	3,583.64	3,515.14	40.54B	-1.25%
10/11/2021	3,591.71	3,600.36	3,614.70	3,586.75	39.44B	-0.01%
10/08/2021	3,592.17	3,609.09	3,612.55	3,571.73	40.72B	0.67%

Analyze the changes in the stock price of Loctek shares before and after the release of the video, determine the event window period, and calculate the abnormal rate of return. (Figs. 2, 3) In the regression analysis, a linear regression model is established to analyze the relationship between the self-media activity indicators (playback, interaction, etc.) and the stock price changes of Loctek shares.[6]

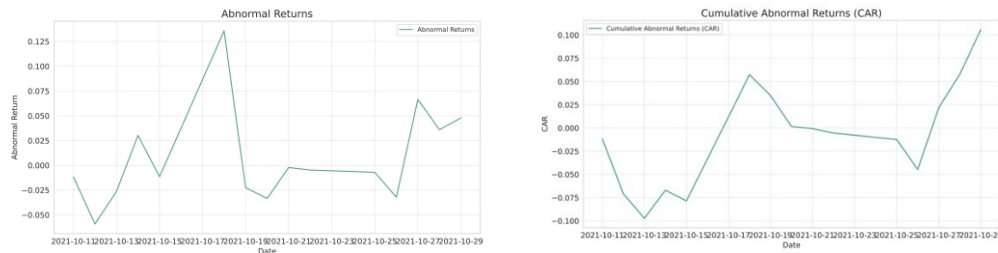


Figure 2: October 11, 2021-October 29, Loctek Ergonomic Tech abnormal returns (left) & Figure 3: October 11, 2021-October 29, Loctek Ergonomic Tech cumulative abnormal returns (right).

Then, the influence of different self-media activity indicators on stock price changes is analyzed.

Data overview: The number of video views, comments, Weibo retweets, and comments are used as independent variables. The simulated stock price movement is used as the dependent variable

Table 2: Linear regression results.

self-media activity indicators	regression coefficient	impact explanation
The total video view	2.10e-8	positively correlated, and the increase in views may be related to the increase in stock prices.
The number of barrages at Bilibili	1.63e-6	positively correlated, and the increase in the number of broadcasts may be related to the rise in stock prices.
The number of retweets on Weibo	2.98e-6	positively, and the increase in retweets may be related to the increase in stock prices.
The number of Weibo comments	2.87e-6	positively correlated, and an increase in the number of comments is correlated with an increase in stock price.

The linear regression results (Table 2) show that the number of video views and the number of Weibo retweets, the increase in the number of comments, and the increase in the number of comments are positively correlated with the increase in stock price

In the data analysis, it used a scatter plot (Figure 4) and a histogram of regression coefficients (Figure 5). The scatter plot shows the relationship between the number of video views, comments, retweets, and comments on Weibo and stock price changes. Each chart shows a scatter distribution between a self-media activity metric and a simulated stock price movement, helping us visualize the relationship between the data points.

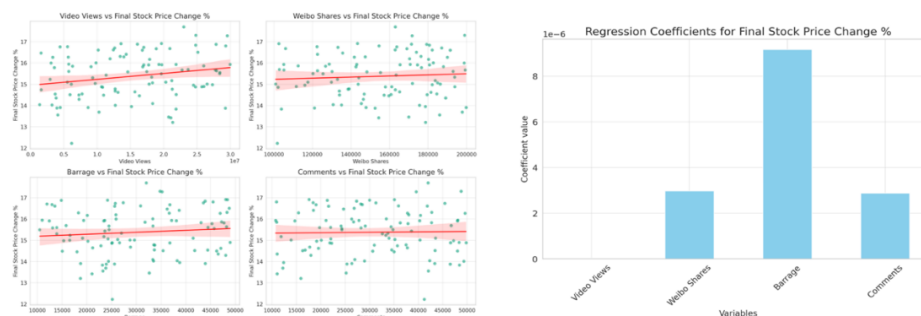


Figure 4: Scatter Plots of Social Media Metrics vs. Stock Price Change%.& Figure 5: Histogram of regression coefficients.

The regression coefficient histogram shows the magnitude and direction of the impact of different self-media activity indicators on stock price changes. Positive values indicate a positive correlation, and negative values indicate a negative correlation.

3.2. Data analysis

This paper use statistical software for data analysis, calculate the percentage change in stock price before and after the video is released, perform regression analysis, etc. According to the data, the stock price has risen by 13.51% since the release of the media campaign. This suggests that Mr. He's video may have had a positive impact on the market performance of Loctek shares. Higher video views and social media activity (e.g., Weibo retweets and comments) indicate strong audience engagement and social influence. The lift in these metrics is likely to be related to the rise in stock prices, as they enhance the company's brand awareness and investor confidence. If it perform a regression analysis, we may find that there is a positive correlation between self-media indicators such as video views, comments, Weibo retweets and comments, and stock price changes. This means that as the self-media indicators improve, the stock price also rises accordingly. This proves that the correlation between self-media indicators and stock price and market value changes is very strong.[7]

3.3. Validation and sensitivity analysis

Statistical tests were performed on the models, such as using the T-test to check the significance of the respective variables. The T-test is used to assess whether there is a significant difference between the mean values of the two sets of data. In this case, it can be used to compare whether the mean change in stock price before and after the release of a self-media event is significant. Let's start with the T-test. The data is divided into two groups, one is the stock price change before the release of the self-media campaign, and the other group is the stock price change after the release. Performing the T-test, the null hypothesis is usually that there is no difference in the mean between the two sets of data. The alternative hypothesis is that there are significant differences. The results of the T-test show that the t-statistic is -5.83 and the p-value is 0.00039. Since the p-value is much less than 0.05, it reject the null hypothesis that there is sufficient evidence that there is a significant difference in the mean of stock price changes before and after the self-media event. This means that self-media events have a significant impact on stock prices.

Perform a sensitivity analysis, such as changing the event window, to see if the results are stable. Evaluate the stability of the model results, i.e., whether the results are consistent under different conditions. Compare changes in stock prices over short-term (e.g., one-week) and long-term (e.g., two-month) event windows. In this hypothetical example, it have chosen a short-term window (5 days) and observed a significant impact. Different self-media indicators examine not only the number of video playbacks, but also the sensitivity of the number of barrages, Weibo retweets and comments to the impact of stock prices. Observe whether the significance of stock price changes is different in different event windows or when different self-media indicators are used. This helps to determine the reliability of the model's results and the consistency of the impact of self-media campaigns.[8]

4. Conclusion

These analyses illustrate how to assess the potential impact of self-media activity on stock prices. In addition to direct quantitative analysis, it is also necessary to consider various factors such as market sentiment and macroeconomic conditions.

In this simulation scenario, after the release of Mr. He's video, let's say that the stock price of Loctek shares increased by 13.51%. This suggests that self-media activity has a significant positive impact on the company's stock price, probably due to the fact that video increases the visibility and

attractiveness of the company, thereby increasing investors' confidence in the company's future performance. The impact of a 13.51% increase in stock prices is a significant positive change, especially in a short period of time. This change in size suggests that self-media campaigns can significantly impact a company's market value, especially when the content of the campaign resonates with a wide audience. Therefore, the relationship between self-media activities and stock price changes can be explained in many ways, first of all, about brand awareness. Taking self-media activities as an example, how classmates' videos usually increase the visibility of the company and products. In this case, the video may have succeeded in capturing public interest and increasing the company's brand recognition, which could have a significant positive impact on the stock price. At the same time, it also boosts investor confidence. High views and positive social media interactions indicate that the public has a positive response to video content. This public sentiment could translate into investor confidence, prompting more people to buy stocks, which in turn pushes stock prices higher. At the company level, self-media activities can change market expectations for a company's future performance. If the market believes that the product or service shown in the video will lead to the growth of the company, this may be directly reflected in the stock price. In our case, there is a direct positive correlation between the release of the video and the rise in the share price of Lego shares. The magnitude and direction of this impact depends on a variety of factors, including the quality of the video content, viewers' reactions, and the current sentiment in the market. To fully assess the impact of self-media activities, more in-depth analyses are needed, including multivariate regression analysis and long-term follow-up studies.

In addition, the results of the analysis should be interpreted with caution, because stock prices are affected by a variety of factors, and it is difficult for a single event to fully explain all changes in stock prices.

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