

TikTok Influence on Affect Option Prices: Attention Dynamics and Asset Valuation

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Abstract. The rise of social media platforms has fundamentally changed how investors gather information and make decisions. Traditional financial theories, such as the Efficient Market Hypothesis (EMH) and the Black Scholes option pricing model, assume that investors are rational and that asset prices reflect all available information quickly and accurately. However, recent market dynamics have revealed that the attention garnered through social media can exert a substantial influence on asset prices, particularly option prices. This article examines how social media attention, exemplified by TikTok, impacts option pricing. It integrates basic financial theory with behavioral finance concepts to analyze real-world cases like GameStop, AMC, Tesla, and Xiaopeng Motors. The study investigates changes in option trading volume, implied volatility (IV), and prices during spikes in social media popularity, using indirect indicators such as online search trends, number of posts, and short video views. Results indicate that sudden internet popularity can significantly increase a stock's option price and implied volatility even without new company information. This is often triggered by emotionally driven retail investors, rather than rational judgments based on company fundamentals. Additionally, high transaction costs and rapid market changes hinder arbitrage mechanisms that could have corrected price deviations. In conclusion, social media attention is emerging as a key variable influencing option market pricing.

Keywords: social media, options market, option price, TikTok

1. Introduction

The efficient market hypothesis (EMH) has long been a foundation of modern finance, positing that asset prices reflect all available information, and that arbitrage keeps prices accurate. Financial models like Black-Scholes, which revolutionized the way investors value derivatives, rest on the assumption that investors act rationally, markets are frictionless, and information is quickly and evenly distributed [1].

However, in the digital era, this paradigm has shifted dramatically. The rise of social media platforms for example TikTok, Reddit, and Twitter have completely changed the way information is disseminated and investors make decisions. A video that becomes popular, what internet celebrities say, or discussions in online communities can all have an impact on the market. Retail investors now not only make decisions based on company financial reports, but they often follow popular topics on

TikTok or discussions on Reddit forums. The GameStop and Tesla incident proves that even if the company itself has not changed much, the online popularity can cause drastic price fluctuations. Moreover, not only stock prices are affected, but the options market is also completely affected. When something suddenly becomes popular and hyped up on social media, its option price can skyrocket, which cannot be explained by traditional financial theory.

This paper aims to explore how the "attention" brought by social media platforms like TikTok affects option pricing. This research seeks to provide insights into the evolving dynamics of financial markets and offer a more comprehensive understanding of the factors influencing asset prices.

2. Theory foundation

2.1. Option pricing theory and implied volatility

Options are financial contracts that give investors the right, but not the obligation, to buy (call options) or sell (put options) a stock at a specified price before a specified expiration date. Their value depends on factors like the underlying stock price, strike price, time to expiration, interest rates, and volatility.

The Black Scholes model is a famous formula for calculating the "fair price" of options [2]. One key input inside is Implied Volatility (IV), which reflects the market's expectation of future stock price fluctuations. Higher IV indicates a greater likelihood of significant price changes, making options more expensive.

Previously, IV increased only in response to real news or data, such as financial reports or geopolitical events. However, social media can now trigger a surge in demand for options even without new company news. Market makers, seeking to hedge risk, raise option prices and IV accordingly. This shift shows that option pricing is no longer solely based on fundamentals but is also influenced by investor sentiment and social media trends.

In the real-world market, IV is also affected by the imbalance between supply and demand in option trading. When demand for call options surges, it may be a social media trend where market makers raise premiums to hedge their risk exposure, leading to higher IV. This demand driven volatility may not necessarily reflect actual expectations of future price increases [3]. Therefore, option prices can rise even without new information about the underlying stock, highlighting the role of investor emotions and social media in pricing.

2.2. Investor attention and behavioural finance

Behavioral finance can help us understand why investors are not always so rational. A key concept is limited attention: investors, constrained by cognitive limitations, are more attracted to conspicuous and popular information. The rise of the Internet and social media platforms has amplified this effect, with algorithms often prioritizing visibility over accuracy.

Barber and Odean's study found that individual investors often buy stocks that "catch their attention", even if these stocks were not originally in their plans [4]. Now, social media algorithms have amplified this effect, always pushing the most eye-catching content - but not necessarily the most accurate information.

On platforms like TikTok, Reddit, and Twitter, content creators with large followings can direct attention to particular assets [5]. Hence big influencers can generate a huge wave of attention, especially for inexperienced novice traders who may really consider a popular TikTok video as

investment advice. Then the “hype cycle” ensues views lead to interest, interest leads to trading, trading leads to price movement, and price movement feeds back into more views.

This type of attention can be indirectly measured, such as by looking at Google search trends, Reddit post counts, TikTok hashtag counts, and Twitter mentions. The study by Da, Engelberg, and Gao confirms that when these attention indicators suddenly surge, it often indicates a short-term price increase, but this increase is usually temporary [6]. This indicates that prices are driven up by behavioural factors (following trends), rather than a real increase in company value [7].

Investor attention distorts not only the stock market but also the options market, where it interacts more aggressively with volatility expectations [7]. Short-term, high-leverage instruments like weekly call options are particularly sensitive to attention-driven demand surges [3]. Thus, attention functions as a variable that traditional financial models have yet to formally integrate, but which clearly influences real-world prices.

3. The mechanism of social media–driven option demand

Social media driven transactions usually start with a viral video or post. It could be an internet celebrity saying that a certain stock is the 'next big opportunity', or posting a trend chart that looks very “bullish”. Options have become the preferred tool for many retail investors, who discuss technical chart patterns or simply gather followers to purchase. Due to the low upfront cost of options providing high leverage, retail investors often choose out of the money call options to speculate on price spikes.

Due to the affordability and expected quick returns of short-term options, this demand disproportionately targets short-term options. When many people buy these contracts at the same time, market makers have to buy the corresponding stocks to hedge the risk through a process known as Delta hedging. This in turn pushes the stock price higher, forming a self reinforcing cycle called Gamma squeeze. The rise in stock prices has stimulated more people to buy options, further pushing up option prices and IV.

But the problem is that these operations have little to do with the actual financial situation of the company. Retail traders may not even know how profitable the company is or how much debt it owes, but they know that this stock is currently “very popular”. The mechanism of TikTok is to reward fun content, rather than accurate or profound financial analysis. As a result, investment decisions based on social media are often driven by excitement rather than value judgments.

This leads to an option market temporarily ruled by sentiment and speculation. The usual pricing mechanisms, which rely on probability distributions and volatility forecasts, are overridden by crowd behavior [1]. In this environment, speed and visibility are prioritized over thorough analysis and patience.

4. Empirical cases

Several high-profile cases demonstrate how social media attention can disrupt both stock and option pricing mechanisms.

The most prominent example is GameStop (GME). At the beginning of 2021, General Motors' stock price rose from below \$20 to nearly \$500 in just a few weeks. This wave of enthusiasm was mainly caused by Reddit's r/WallStreetBets, which were then wildly spread by TikTok and Twitter. Including large-scale purchase of call options, especially short-term non principal contracts. The large-scale purchase of short-term call options led to a surge in IV, with the highest exceeding 800%. Traditional models like Black Scholes have completely failed in the face of such crazy dynamics.

AMC Entertainment has also followed a similar trajectory. TikTok videos have hyped it up as the next 'internet celebrity stock', leading to a surge in demand for stocks and options. The trading volume has surged, and the implied volatility has surged significantly. Market makers respond with larger spreads and higher premiums, but even these adjustments cannot dampen people's enthusiasm. Like GME, option prices and IV have risen far beyond the predictions of any model based on the company's fundamentals [8].

Tesla (TSLA) provides a long-term case study. Musk himself is a big internet celebrity on Twitter, and his tweets often trigger a trading frenzy for Tesla options. Unlike General Motors and AMC, Tesla is a company with strong fundamentals, but its option prices are often significantly influenced by social media hype, not just financial reports or forecasts.

In China, Xiaopeng has also experienced similar price fluctuations driven by attention, especially on Tiktok (China's TikTok) and Xueqiu (a financial forum). Explosive videos about delivery volume or government subsidies can lead to a surge in short-term option trading volume and IV inflation, despite more restrictions on individual investors trading options in China. These cases demonstrate that social media attention can shape markets globally, across different platforms and regulatory environments [5].

These examples highlight that this phenomenon is global, cross platform, and not limited to low cap stocks. In each case, the trends of the underlying and derivative markets are determined by attention rather than valuation.

5. Arbitrage restrictions and price deviations

In theory, if the option price is too high, professional traders can make money through "arbitrage", such as selling (short selling) overvalued options while hedging with stocks. However, the limitations of the real world restrict this process [9].

Firstly, transaction costs, including spreads, fees, and slippage, will reduce profitability. Arbitrage requires trading across multiple tools simultaneously, and even a few milliseconds of delay can lead to execution risk.

Secondly, there are many restrictions on short selling. Some rules make short selling particularly difficult during periods of intense volatility.

Thirdly, arbitrage requires capital and risk tolerance. Arbitrage requires a lot of capital and must be able to withstand significant short-term fluctuations. When retail investors flood in and cause extreme volatility, even large funds may temporarily suffer heavy losses.

Finally, the power of individual investors is astonishing. In events like GameStop, online retail investors responded with overwhelming force that could crush hedge funds. Some short selling hedge funds lose everything, Melvin Capital is an example.

All these factors combined mean that mispricing caused by social media hype may last longer than expected, sometimes days or even weeks - before the market slowly "calms down".

6. Cross-market dynamics: insights from Chinese markets

Although many examples come from the US market, the situation in the Chinese market also shows that social media driven transactions are not a phenomenon unique to the West. Platforms such as Tiktok, Bilibili and Snowball can spread the attention rapidly even under the environment of stricter supervision in China.

For example, when Chinese electric vehicle companies such as NIO and Xiaopeng become popular online, ETF funds tracking them often flood in with a large amount of funds, and the trading

volume of related options or futures may also be abnormal. This indicates that even under regulation, people's psychological reactions to viral content are still very strong.

Chinese regulatory agencies are more actively monitoring online discussions, but even under strict control, speculative waves can still emerge. This indicates that attention driven market behavior is not just a product of unregulated platforms, but a broader psychological response to digital visibility.

The globalization of social media means that narratives often cross national borders. A TikTok video posted by an American internet celebrity about a Chinese company can influence investor behavior in Hong Kong and New York. Therefore, attention driven pricing should be understood as a transnational phenomenon that transcends regulatory environments.

7. Implications for traders, academics, and regulators

The attention economy has a profound impact on all market participants [10].

For traders, it brings new opportunities and risks. Smart investors may exploit attention signals by tracking social media trends, but they may also be at risk of momentum reversal.

For scholars, it challenges long-standing theories. It may be necessary to establish a new model that incorporates attention data (social media activity, search trends, influencer influence). Behavioral finance combined with data analysis may be the key to explaining and predicting these price changes. This provides us with a new direction for this research.

For regulatory agencies, on the one hand, financial freedom and democratic access are crucial for inclusive markets. On the other hand, uncontrolled viral transmission may lead to widespread speculation and losses. For example, should internet celebrities be required to disclose whether they hold the assets they recommend? Should platforms have stricter scrutiny and warning labels for content related to investment advice? These issues are still unresolved.

Ultimately, education is key. Investors, especially young retail participants, not only need to receive financial knowledge training, but also media knowledge training. Understanding how digital platforms shape perception and amplify emotions is now an important component of risk management.

8. Conclusion

This article investigates how social media influences option pricing by directing attention rather than fundamentals to financial markets. Its results emphasize the real and measurable impact of online attention on implied volatility, option trading volume, and price distortions. This article also identifies some factors that limit the ability to correct arbitrage: transaction costs, funding constraints, execution risks, regulatory frictions, and retail drivers.

This new reality holds significant importance. For traders, understanding attention flow and emotional dynamics is crucial for identifying risks and opportunities. For scholars, the challenge lies in adjusting financial models to reflect behavioral and numerical variables. For regulatory agencies, the rise of attention trading has raised challenges regarding misinformation, promotion, and investor protection in a dispersed media environment.

However, this study also has some limitations. Firstly, the analysis of social media attention is based on indirect indicators such as post counts and public search trends, which may not fully reflect actual investor behavior. Secondly, the cases that this article mainly focuses on may not represent a broader market. Future research can use more platforms, select more detailed and large-scale data

(such as video participation rate or viewing time), and apply quantitative methods to construct predictive models.

In summary, today's financial markets are no longer solely governed by completely rational logic. They are influenced by trends, visibility, and viral transmission. In this era of attention, perception may be more powerful than information. Traders, educators, and policy makers must adapt to this new reality if they want to effectively manage, teach, or regulate the modern financial system.

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