

The dynamics of the Reddit collective action leading to the GameStop short squeeze

Keywords: GameStop short squeeze, Reddit, social coordination, causality, market impact

Extended Abstract

Online social media has transformed global communication, shaping political outcomes, social movements, and increasingly financial markets. Platforms such as Twitter and Google Search have been shown not only to reflect but sometimes anticipate market dynamics, as retail investors—once marginal compared to institutional funds—play a growing role. Social media enables the diffusion of financial knowledge and investment strategies, potentially improving price discovery, yet it also amplifies behavioral biases, sentiment, and collective narratives. This duality makes the relationship between online activity and stock market trends highly complex, especially around specific events where surges in online interactions align with sharp trading activity.

The most striking case occurred in January 2021 with the GameStop (GME) short squeeze. Spurred largely by the Reddit community WallStreetBets (WSB), GME stock skyrocketed by over 1600% in one week, followed by similar rallies in BlackBerry, AMC, and Nokia. Unlike mainstream platforms such as Twitter, which function primarily as news feeds, Reddit could fuel the short squeeze by providing a forum for coordinated, community-driven discussions (see e.g. [1, 2]). The event raised two unresolved questions: Did WSB activity truly anticipate the GME surge (and when), and did the platform act as a genuine hub of coordinated strategy rather than mere discourse?

To address these questions, this study analyzes the temporal interplay among stock market movements, WSB activity, and public attention using both linear (Granger causality, Vector Autoregression) and nonlinear methods (Detrended Cross-Correlation Analysis, Convergent Cross-Mapping). The results demonstrate that WSB activity indeed forecasted the price surges of GME and related stocks, and that the event unfolded in three phases: *discussion*, *action*, and *visibility*.

A sharp transition occurred on January 13, when WSB activity began to strongly anticipate changes in GME trading volume, marking the shift from *discussion* to *action*. At this stage, the collective financial position of WSB users closely mirrored GME's market capitalization and reached at least 1% of it—evidence of tangible influence. Importantly, the surge attracted broader market participants, despite these having access to comparable information [3]. Following Elon Musk's January 27 tweet, the event entered the *visibility* phase, gaining global attention.

Overall, this work shows that online communities can catalyze coordinated collective action with direct, measurable impact on financial markets. In a context of accelerating technological change and commission-free trading platforms, retail investors organized through social media have become non-negligible actors. Studying the interplay of online engagement and market movements at fine temporal scales is therefore essential for understanding the evolving structure and dynamics of modern financial systems.

References

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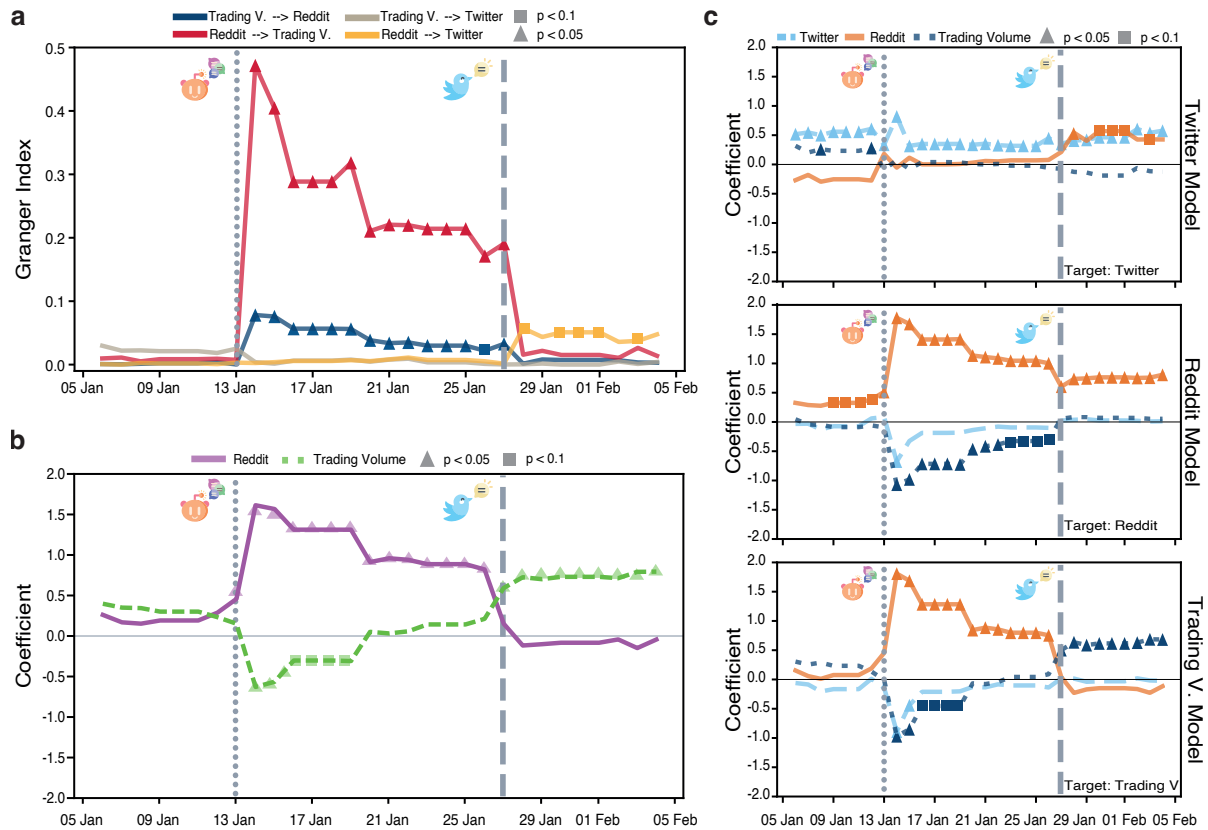


Figure 1: Reddit activity anticipates trading volume during the short squeeze. The vertical gray dotted line indicates the beginning of the *Action* phase (13 January 2021), whereas the vertical gray dashed line corresponds to the Tweet by Elon Musk (27 January 2021) that brought the squeeze to the public attention. Triangles correspond to p -values < 0.05 , squares to p -values < 0.1 . Each point is computed considering time series spanning the 15 preceding days. **a)** Granger Index capturing the predictive power of a signal on another (with a lag of 1 hour) for the following pairs: Trading Volume-to-Reddit (blue), Reddit-to-Trading Volume (red), Trading Volume-to-Twitter (gray) and Reddit-to-Twitter (yellow). **b)** Coefficients of the Granger Model predicting Trading Volume, capturing the size effects of Reddit (magenta) and Trading Volume (green) activities. **c)** Each panel shows the coefficients of a Multivariate Vector Autoregressive Model predicting Twitter (top), Reddit (middle), and Trading Volume (bottom) activities, corresponding to antecedent values of Reddit (solid orange), Twitter (dashed light-blue), and trading volume (dotted blue).