CENTRAL EUROPEAN REVIEW
OF ECONOMICS AND MANAGEMENT

ISSN 2543-9472; eISSN 2544-0365

Vol. 9, No.3, September 2025, 59-84

www.cerem-review.eu
www.ojs.wsb.wroclaw.pl

The Impact of Online Trading on Stock Market Efficiency: what have we learned from the Gamestop case?

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Received: 06.07.2025, Revised: 18.09.2025, Accepted: 28.11.2025
doi: http:// 10.29015/cerem.1038.

Abstract:
Aim: To examine the impact of online trading and technological innovations on stock market efficiency, with a focus on the GameStop case as an illustrative example.

Research methods: Conceptual and qualitative analysis drawing on the GameStop event, regulatory comparisons between the US and Europe, and a review of literature on electronic trading platforms, financial information dissemination, and social media–driven investor coordination.

Findings: Online trading platforms, Web 2.0, and social media have transformed investor behaviour and market dynamics. The GameStop case revealed how coordinated retail investors can challenge traditional market mechanisms and the efficient market hypothesis. The "gamification" of trading apps encourages speculative behaviour and raises concerns about investor risk awareness. Regulatory approaches to short selling differ between the US and Europe, highlighting the need for balanced, internationally coordinated frameworks. Strengthened financial education and updated regulation are essential to mitigate risks while retaining the benefits of technological advances.

Keywords: Online trading, Stock market efficiency; GameStop case, Social media
JEL: G14, G18, G23, O33

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1. Introduction

Several recent events involving the stock market can provide interesting indications of how the combined effect of some important phenomena, with different times and modes, has contributed to profoundly reshaping the reality of the stock markets. These are distinct phenomena but strongly interrelated, as the common root lies in the impact of technological innovation on the activity of financial markets and the behaviour of investors. In particular, we can distinguish:
a) the effects of technological innovation on the methods and transaction costs of stock market negotiations (electronic stock exchanges and online trading);
b) the availability, timeliness and cost-effectiveness of information from reliable sources (Internet and WWW);
c) the possibility of interaction between investors and the exchange of information of uncertain reliability (WWW 2.0);
d) the progressive replacement of individual operators ("retail investors") between investor-savers and investor-speculators and, for the latter category, the phenomenon of "gamification" of investment activity.

These phenomena, due to the growing interconnection of financial markets at a global level (Raddant, Kenett 2020), have affected almost all the leading financial centres, albeit with different intensity and characteristics, depending on the specific economic, cultural and regulatory factors that characterise the different national contexts.

In the following, after briefly recalling some theoretical foundations regarding the efficiency of the financial market, each of these phenomena is examined, evaluating their possible implications for the conditions of stock market trading. An analysis of the GameStop case is then proposed, which has caused a considerable outcry, both for the very significant fluctuations recorded by the stock market performance and for the socio-political implications that have characterised the affair, when some observers have interpreted it as a conflict between a multitude of small investors and the powerful hedge funds of Wall Street. Finally, some possible lines of intervention are discussed to preserve transparency and fairness in negotiations and the orderly functioning of capital markets.

2. Theoretical framework: the efficient market hypothesis

The theory of the efficient market or Efficient Market Hypothesis (EMH), whose complete definition is due to the Nobel laureate Eugene Fama in 1970, constitutes one of the fundamental pillars of financial economics (Fama 1970). The essential core of the EMH is the relationship between information and the prices the market expresses. A financial market can be efficient if, at any moment, the price of the securities traded fully reflects the relevant information. In such a financial market, neither technical analysis (forecasting future prices based on the study of past prices) nor fundamental analysis (study of companies through the analysis of accounting data, the industrial sector and the competitive position) should allow an investor to achieve systematically higher returns than those that another investor would obtain from a portfolio, with the same degree of risk, composed of securities chosen at random. Suppose all available information is immediately incorporated into the prices, and the movements of securities depend only on currently unknown information. In that case, the performance of securities can only be random (Random Walk Hypothesis).

In the past decades, a vast literature has developed on the topic of the efficiency of financial markets and different meanings and typologies of efficiency have been elaborated;[1] the most commonly referred to are reported below:

• Information-evaluation efficiency is obtained when all available information is used to determine a company's value correctly. It is based on selecting available information and using only reliable information.

• Technical-operational efficiency: occurs when the market carries out its functions at the lowest cost for participants, minimising the direct and indirect operations costs.

• Allocative efficiency: occurs when the result of transactions concluded in the particular market is optimal from an allocative point of view, that is, the allocation of resources available on the market is the best among all possible ones (so-called Pareto optimum);

In particular, the phenomena described in the introduction have had an impact on information-evaluation efficiency and technical-operational efficiency, albeit with

[1] For a comprehensive literature review see Bock, Geissel (2024).

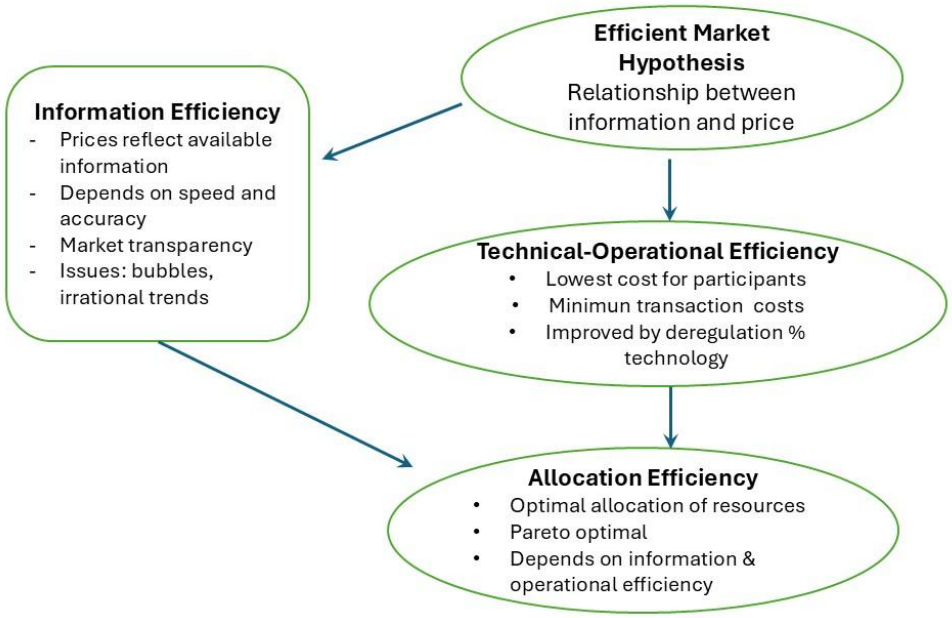
sometimes contrasting effects and, in any case, inevitable repercussions on allocative efficiency.

Information-evaluation efficiency is defined as a function of the speed and precision with which the information available to operators is reflected in prices. In particular, it refers to the degree of "market transparency" (the speed with which information is correctly incorporated into current prices).[2] Empirical tests by financial economists have produced conflicting evidence for the various markets under analysis (Degutis, Novickyt 2014). However, the conditions of a strong, efficient market are hardly found. The analysis of historical data shows instead that financial markets are often inefficient (think, for example, of the formation of speculative bubbles), and prices do not follow random trends since their movements generate short-term trends, sometimes fuelled by irrational choices made by investors.[3] While the empirical evidence on market efficiency is uncertain, there is no doubt regarding operational efficiency and its increase, which is also confirmed by the consequent reduction in transaction costs. The operational efficiency of financial markets has increased thanks to important innovations, first of all, regulatory, with the progressive deregulation of markets and, subsequently, technological, with the dematerialisation of securities and the transition from in-person markets (public exchanges) to virtual markets (online platforms).

[2] This type of efficiency can occur with different degrees of intensity; the HMH distinguishes between: a) Weak efficiency: the prices observed on the market reflect all the information contained in the historical series of prices themselves; it is not possible to formulate an investment strategy with an expected return (possibly adjusted for risk) higher than that of the market based only on the information contained in the historical series of prices; b) Semi-strong efficiency: market prices reflect not only the information contained in the historical series of prices but also any other publicly available information; therefore, it is not possible to formulate an investment strategy with an expected return (possibly adjusted for risk) higher than that of the market, based only on publicly available information; c) Strong efficiency: market prices reflect any public or private information; it is not possible, therefore, to formulate an investment strategy with an expected return (adjusted for risk) higher than that of the market, not even if you have confidential information (Fama 1970).

[3] Technical analysis, for example, is based precisely on the assumption that specific historical price trends tend to repeat themselves with a certain regularity. Therefore, the future behaviour of prices is predictable. Behavioural finance studies the errors investors make in their investment choices, highlighting their frequent irrationality.

Exhibit 1. Market efficiency interactions



3. Electronic stock exchanges and online trading: the impact on transaction costs and practice

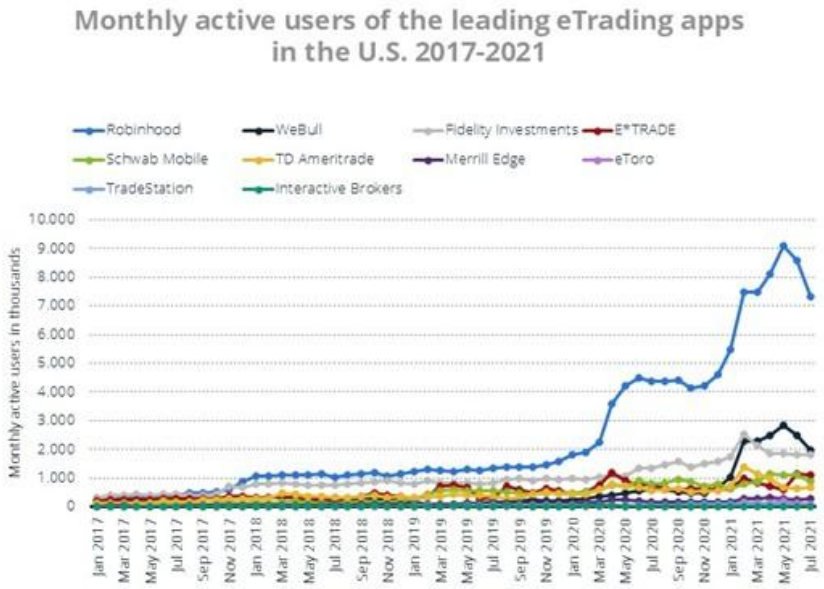
Innovation in stock trading accelerated during the late twentieth century. Until then, retail investors traded primarily by telephone through banks and intermediaries, incurring relatively high commissions—particularly in countries where specialised stockbrokers held legal monopolies. By contrast, in the United States, lighter regulation encouraged the rise of low-cost intermediaries, with Charles Schwab pioneering the model. From the 1980s onward, advances in electronics and market deregulation prompted exchanges to adopt new technologies to enhance efficiency. Initially, orders were placed by phone and transmitted through closed computer networks, but the mid-1990s marked a decisive shift: the spread of the World Wide Web and broadband enabled the rapid growth of online brokers. This model soon

expanded to Europe and Asia, extending beyond equities to include more complex and volatile instruments such as Forex, covered warrants, and derivatives. As Esaton et al. (2022) observe, brokers also began consolidating their services by investing in investor education, operational assistance, and integrated banking channels.

The emergence of mobile trading apps represented the next decisive stage. By shifting from desktop computers to smartphones and tablets, these platforms made trading more immediate and user-friendly, spurring forecasts of continued sector growth (Van der Beek, Coralie 2021). These developments significantly advanced financial market efficiency. They reduced transaction costs, simplified access, and increased liquidity through broader international participation. In addition, they allowed prices to adjust more quickly to new information (Haghani et al. 2022), while also facilitating enhanced oversight by regulatory authorities such as the SEC, Consob, and major exchanges.

At the same time, the business models underpinning these apps have introduced new challenges. Their commission-free policies rely heavily on payment for order flow (PFOF), a practice in which brokers route orders to market makers in exchange for small payments. This system enables zero-commission trading but, as critics argue, risks creating opacity and conflicts of interest. Market makers—often large firms employing high-frequency trading—profit from bid-ask spreads and their privileged access to order information. While occasional investors may be unaffected, frequent or high-volume traders could face suboptimal execution if brokers prioritise revenue over client outcomes. Moreover, the concentration of flows among a few dominant market makers raises concerns about informational advantages and deepening asymmetries, as highlighted by Benabou and Laroque (1992).

Exhibit 2. Trading apps active users in US



Taken together, these developments show that technological innovation has substantially improved access, liquidity, and efficiency in financial markets. Nevertheless, they also underscore the emergence of structural risks, particularly regarding transparency, incentives in order routing, and the unequal distribution of information among market participants.

4. Internet and the WWW

The advent of the Internet, even in its early forms in the 1990s, significantly increased access to low-cost information. This development particularly benefited small investors who had previously been excluded from rapid sources such as press agencies or real-time market data, which were largely reserved for institutional operators. Before the Internet, small investors relied on next-day financial

newspapers, intermediaries, or cumbersome processes to obtain official company filings. Today, all essential documents—from financial statements to prospectuses—are readily accessible online via company websites, regulatory authorities, or market platforms, and can be searched efficiently.

Numerous websites now provide databases, studies, and analyses, often at modest costs, making resources once exclusive to professional research departments widely available. This has reduced the informational advantage of financial intermediaries and contributed to greater market efficiency by promoting more uniform information distribution. While institutional investors retain some advantages, the gap has narrowed considerably.

From this point of view, the Internet and the WWW have represented a further step towards greater market efficiency, as one of the pillars of informational evaluation efficiency is precisely the uniform distribution of information among operators.

But a crucial point was the possible Interaction between investors offered by Web 2.0. Although it is impossible to indicate a precise date, the term Web 2.0 began to circulate in 2004; however, for some years before, static websites were starting to be joined by applications capable of actively involving the users, encouraging them to provide content instead of simply viewing it. Internet surfers could now publish articles and comments, create their pages on different sites, and upload documents and photos to make them available, in a more or less selective way, to other users. With Web 2.0, self-publishing platforms such as WordPress and applications called Social Media spread. Examples of Web 2.0 sites include Wikipedia, Facebook, X, Instagram, LinkedIn and various blogs, which have fundamentally changed how information is distributed online. These new network functions enable a higher level of information sharing and interconnection between participants, allowing users to actively participate in the experience rather than simply acting as passive spectators gathering information (Omarova 2021).

The social aspect of the Internet has thus been transformed; social media allows users to share their thoughts and opinions with others, creating new ways of organising activities, connecting with other people, and coordinating initiatives. They

can tag, share, tweet and signal to other users their agreement or disagreement with the information published.

Of course, the additional potential of WWW 2.0 has also impacted financial information. Transparent discussion of activities in public forums contributes to economic growth, improves the efficiency of capital allocation, and disseminates financial analysis and non-traditional trading strategies, which is also potentially positive. In market dynamics, asset prices reflect an average of different points of view. While this mechanism is supposed to be reliable, it sometimes does not work perfectly, and unconventional perspectives may prove it correct.

However, there are also obvious downsides to the Internet behaving more like an open forum. Social media is vulnerable to disinformation (fake news) operations for several reasons. First, they use targeting systems based on what users watch and suggest more or less similar content. For those with mainstream preferences, recommended content converges on mainstream media. For those interested in unconventional ideas, algorithms tend to generate "rabbit holes" or exposure to progressively more extreme positions. Strategically placed ads can accelerate the process and disinformers, skilled at feeding their opinions into this system, can successfully create self-reinforcing bubbles of oriented users.

In a context where information is consumed through monothematic channels or which do not offer professional mediation of the news, the tendency to select facts and opinions that confirm our preconceived vision of things, ignoring contrary evidence ("confirmation bias"), becomes increasingly dangerous (Cipriano, Gruca 2014). The same search engines, which tend to personalise the results of our searches, facilitate the creation of information bubbles that become the basis for hazardous and, in fact, externally directed investment choices.

Furthermore, despite the considerable efforts of the major platform operators, the presence of fake accounts on social media remains a complex problem to solve. Troll factories, which are large groups of individuals paid to write comments, can be implemented to create the illusion of active and numerically significant communities, distorting users' perceptions. Artificial intelligence can generate realistic profile photos that portray non-existent individuals and is making great strides towards publishing detailed and credible texts.

Another significant factor, more evident in specialised discussion forums, is the informal hierarchy among users. Some influencers play an important role in orienting a group's choices (Oedzes et al. 2019). Some can condition the behaviour of significant numbers of users, as those companies that widely use influencers for their communication activities have well understood. This also applies offline, but social media is a formidable amplifier and accelerator (Guan 2023).

The financial sector is an exciting target for malicious actors of all kinds. Attacks against companies or financial institutions are frequent. Fake news can be fuelled to provide the market with signals and undermine trust in companies or the credibility of financial institutions, contributing to the high volatility of prices. Although there is no evidence that the GameStop case was influenced, in its development, by episodes of disinformation, the affair has highlighted a different aspect of Web 2.0: the possibility, through the Internet, of implementing a coordinated action by a plurality of investors capable of influencing the trend of prices. Given the possible impact on their efficiency, this has represented the most disruptive aspect concerning the normality of financial markets. Among the hypotheses that are at the basis of the efficient market theory, one of the most important is that according to which none of the market operators can influence prices. This condition, however, could be respected in huge and liquid markets, such as those of currencies or even very large-float stocks, such as blue chips. In the case of stocks with a smaller float, in less liquid markets, it is not uncommon for some large operators to be able to influence prices with orders of a specific size. This will likely happen frequently to the detriment of small savers. Now, the GameStop case shows how, precisely in a market that is not particularly large, the power of large operators can find a form of contrast in the coalition of small savers who coordinate their actions via social media. This coalition, another aspect to reflect on, is not created around the sole objective of profit but is also fuelled by ethical-social motivations and playful aspects. In these cases, there has been talk of social media-driven trading (SMD trading) and meme stocks. This term refers to those stocks whose trading volume increases not necessarily because of the issuing company's economic results but because of social media's attention that can arise from various factors unrelated to the earnings prospects, financial position or other corporate fundamentals.

5. Gamification of investment activity

In the context of private investors in stocks, there has always been a substantial dichotomy between those operators who invest with a long-term time horizon and other operators who manage their financial activities in very short periods, usually lasting a few days or even just a few hours, betting on the performance of stocks daily, choosing the securities and the time of purchase based on the sensitivity gained on the market trend.

The purchase of stocks by retail investors for a long-term horizon was quite widespread until the 1980s, especially in Anglo-Saxon countries, where a fair number of small shareholders existed. Subsequently, the growing complexity and volatility of the markets have led many retail investors to entrust the management of their stock portfolios to specialised professionals, investing through the intermediation of mutual funds or asset management companies.

The typology of the speculator operator, with a short and very short-term time horizon, has instead found its habitat of choice in online trading. In particular, simple and intuitive trading apps offer a dynamic and fun way to invest in the stock market, allowing traders to adopt different operational strategies and involve even segments of the population previously unfamiliar with these activities and, sometimes, lacking financial culture. Many engage in stock market operations more as an exciting pastime than for factual investment purposes. This trend is supported by functions activated by trading apps, such as drawing up investor rankings based on the results achieved, and assigning badges and bonuses to the best-ranked, just like in the most popular video games.

Indeed, while the innovations of trading apps may have positively influenced market efficiency, allowing the expansion of the audience of participants with favourable repercussions in terms of liquidity, their influence on the behaviour of their customers in trading habits remains an open question. After all, investing in the stock market, or any market, is not a game. There are concerns that gamification may desensitise users to the inherent risk of investing. Fusing gaming and investing may cause users to lose sight of the real risks associated with their operations. This can be dangerous and encourage investment behaviours that users would not normally

engage in. This is a key challenge for trading apps in the coming years, mainly when regulators focus more on gamification.

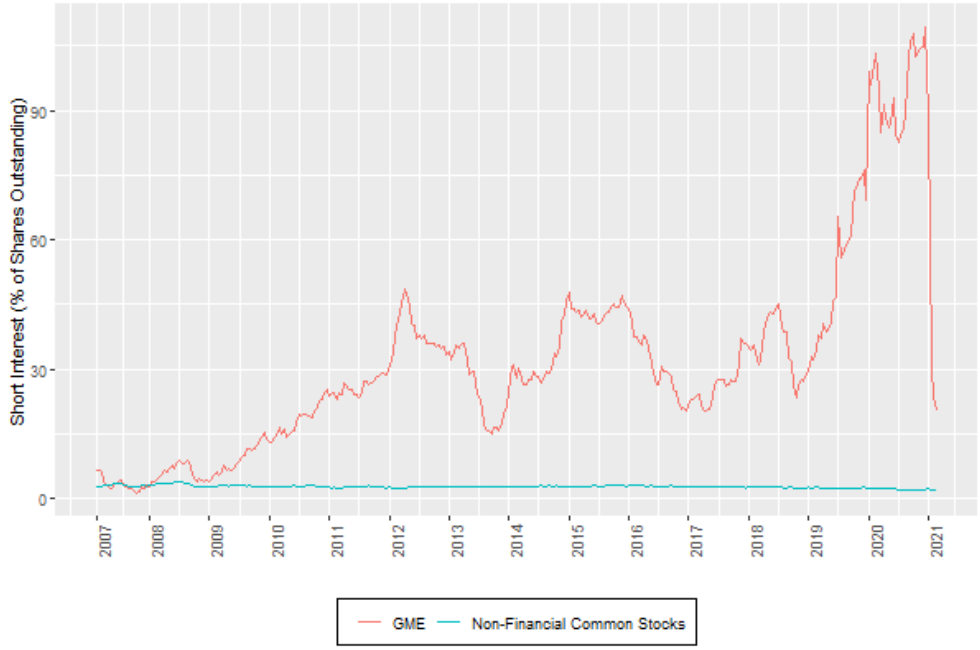
6. The GameStop case

GameStop is a chain of retail stores, with numerous outlets spread worldwide, specialising in video games and consumer electronics for electronic gaming. It was going through a deep crisis due to competition in the video game sector, online gaming sites, and the distribution of video games via the Internet. The stock price reflected these considerations, declining from just under $ 50 at the beginning of 2014 to $ 3 by the fall of 2020. The stock's disappointing performance and the unfavourable scenario expected for the company aroused the interest of "bears," who were convinced that the fundamentals were such as suggesting that GameStop would not be able to overcome and face the pandemic. On the other hand, the 2019 budget had closed with a loss of $795 million, and it was necessary to reduce the sales network significantly, closing a large number of stores. However, in October 2020, a young, successful entrepreneur, Ryan Cohen, purchased a significant stake in the company, urging management to commit to the relaunch of the company. Encouraged by Ryan Cohen's attempt, users of the "subreddit r/wallstreetbets," a social news site Reddit forum, launched an initiative supporting GameStop, inviting forum participants to invest in the stock. This appeal gained increasing support, and the share price began to increase on January 11, 2021, due to the company's announced entry into the board of directors of three new directors, including Ryan Cohen himself. The stock's upward trend intensified in the following days. The stock closed on January 22 at $65 (corresponding to a market capitalisation of $4.5 billion), with a rise of 51% in a single day. On January 25, the stock opened at $97 and rose to $160; then, after eight suspensions due to excessive volatility, the price fell below $60 per share, finally closing at $76. On January 26, the stock opened at $88 per share, rising throughout the session until closing at $149, with a gain of over 90% in a single day. In fact, in January alone, the company's market capitalisation grew from $1.3 billion on January 1 to $10.3 billion as of January 26, when GameStop shares recorded a volume of $20

billion in transactions, establishing itself as the most traded stock in all major markets. The sudden and unexpected rise in the price has caught off guard those who, in the previous weeks, had sold the stock short, expecting a decline. This has caused a market situation known as a "short squeeze" (literally "squeezing the bears"), which occurs when the failure of the price of a stock sold short to fall forces the same sellers to close their positions by purchasing at increasing prices, contributing to fuelling the rise itself.

The short squeeze materialised, therefore, in January 2021, causing severe financial consequences for some hedge funds (speculative investment funds) and the generality of short sellers. To realise the extent of the coverage required, consider that, as can be seen from the graph shown here, approximately 110% GameStop's shares had been sold short, which caused strong tensions on the stock price.

Exhibit 3. Short sale of Gamestop shares from 2007 to 2021



Source: SEC (2022).

On January 27, 2021, RobinHood and other trading platforms (such as TD Ameritrade, E-Trade, Charles Schwab) imposed some limits on the ability of their customers to purchase GameStop shares, easing the upward pressure on the price, which, between January 27 and February 2, essentially halved. The trading platforms justified these limits with the impossibility, based on their resources, to increase the guarantee margins for the required purchases. Trading platforms, such as Robinhood, also provide clearing services to their customers through participation as a clearing member in the central counterparty, the National Securities Clearing Corporation (NSCC); they are therefore required to pay margins to NSCC to guarantee their customers' positions. Following the high volatility recorded on January 27, exposures arising from open positions on GameStop (and other volatile stocks) caused several clearing members, including RobinHood, to exceed a threshold (trigger), triggering the application of the "excess capital premium charge" in practice an extraordinary increase in the margin requests. This circumstance generated an overall margin request of approximately $ 3 billion for RobinHood. In order to contain exposures, before the opening of the session on January 28, RobinHood informed NSCC of its decision to introduce purchase limits on GameStop and other volatile stocks. As permitted by its Regulation, NSCC assessed the market situation and withdrew the request for the excess capital premium charge for all clearing members. The immediate consequence was the decrease in the price of the company's shares below $ 100, with a reduction of approximately 40% of the value recorded in the previous week. The decision by the trading platforms has drawn intense criticism from small investors and accusations of market manipulation, as it undoubtedly allowed hedge funds to be exposed to short sales, effectively limiting their losses.

Despite the decline, some users on the r/wallstreetbets forum have actively convinced GameStop shareholders to hold on to the shares, expecting their value to increase. However, due to further declines in the share price, investors who held on to the shares in their portfolios have suffered significant losses.

A first recovery occurred on February 24, when GameStop share prices doubled in just 90 minutes of trading, reaching an average of $200 per share, to rise by 41 per cent on March 8. On March 9, the stock reached its highest value since January, with a market capitalisation of over $17 billion, and shares closed at $246.90.

Subsequently, as can be observed from the following graph, the price trend continued to show high volatility, although less noticeable than that recorded in January and February, to close the year at a value of $148.39.

It is clear from observing the graph that the performance of the GameStop stock is anomalous and that it is difficult to interpret its oscillations based on the company's economic reality.

Exhibit 4. GameStop stock price, 2021

Source: Yahoo Finance.

From this point of view, the GameStop affair demonstrates the market's informational inefficiency. However, some non-relevant aspects must be considered to mitigate this assessment.

First of all, it must be considered that empirical evidence and important theoretical works have shown that it is not realistic to hypothesise perfectly efficient markets at all times. Although they may be efficient, there are possible temporary imperfections that justify investors' investment of time and resources in the analysis activity. Otherwise, the very assumption of efficiency made possible by the arbitrage of market operators would fail. Therefore, even supporters of market efficiency cannot eliminate the idea of temporary inefficiencies. It is probably precisely the attention aroused by inefficiencies of this magnitude that confirms the tendential efficiency of the markets.

7. Regulation of short selling in the United States and Europe

Short selling has often been indicated as an element of destabilisation of financial markets; however, in principle, this statement is not entirely acceptable. Short selling is a necessary tool for that arbitrage activity that should allow the market to correct temporary situations of inefficiency and realign prices to their actual value (fair value). Regarding information efficiency, short-selling signals tend to incorporate into prices the information available to those who believe that the securities in question are overvalued.

It is, therefore, clear that the regulation of short selling involves a tricky balancing act: the rules must allow the market to benefit from the liquidity and information efficiency produced by short selling while preventing, at the same time, extreme speculation that destabilises it. To this end, the first objective of regulation should be to increase transparency by allowing operators to have information on the volume of short sales for securities traded on a given market. However, a regulation focusing exclusively on informational aspects may not be sufficient. In fact, in the presence of significant short sales, a downward trend, not justified by the fundamentals of the security, may not be counterbalanced by a flow of purchases due to market imperfections and high transaction costs (unlike the short seller, the buyer must pay for the security). When conditions make it difficult for the market to perform a stabilising function, the downward price trend could trigger further selling due to a possible "snowball effect." Hence, there is a need for a combination of constraints, appropriately calibrated, to control the undesirable effects of short selling and protect the issuing companies and the market from the undesirable consequences of strong short selling without eliminating the benefits that the possibility of short selling entails for market efficiency.

The European Precautionary Approach

In Europe, the debate on short selling regulation intensified after the 2008 financial crisis and the subsequent sovereign debt crisis, when excessive downward pressure on bank shares and government bonds threatened financial stability. To address these systemic risks, the European Union adopted a harmonised framework

through Regulation (EU) No. 236/2012, establishing stricter rules than those in the United States. This regulation reflects a precautionary approach, recognising the interconnectedness of European financial markets and their vulnerability to contagion effects.

A key feature of the European framework is the role of the European Securities and Markets Authority (ESMA). ESMA coordinates national regulators, ensures consistent application of rules, and may issue opinions or instructions to member states. Crucially, ESMA has the power to impose temporary bans on short selling in situations of market stress, enhancing the EU's capacity to act swiftly across borders.

This power has been exercised in several instances. During the sovereign debt crisis, national authorities in countries such as Spain, Italy, and Greece introduced temporary bans on short selling of financial stocks to stem excessive volatility. More recently, at the onset of the COVID-19 pandemic in March 2020, regulators in France, Spain, Italy, Belgium, Austria, and Greece imposed temporary restrictions on short selling. ESMA played a central role in coordinating these measures and extending transparency requirements across the Union, demonstrating the flexibility and strength of the European system in times of crisis.

The European system therefore places a heavy emphasis on market discipline through disclosure. Net short positions exceeding 0.1% of a company's issued share capital must be reported to national regulators, and positions above 0.5% are made public. This is far stricter than U.S. reporting obligations and reflects Europe's philosophy of prioritising stability and transparency, even at the cost of some trading flexibility.

Another important dimension is Brexit. Since leaving the EU, the United Kingdom has taken steps to diverge from EU short-selling regulation. The UK's Financial Conduct Authority (FCA) has retained core transparency and anti–naked short selling rules but has explored more flexible approaches, reflecting the UK's ambition to position itself as a competitive global financial centre. This divergence underscores the EU's distinctively cautious regulatory culture compared with both the U.S. and the UK.

Recent policy debates in Europe also point toward further refinement of the framework. In 2022–2023, the European Commission launched consultations on

revising the Short Selling Regulation, partly in response to concerns from market participants about burdens on liquidity provision. Nonetheless, policymakers continue to stress that Europe's experience with systemic crises justifies a precautionary approach. In this sense, the European regulatory model represents not only a set of legal rules but also a broader philosophy: safeguarding market integrity and financial stability takes precedence over the unfettered operation of speculative trading strategies.

U.S. Regulation as a Comparison

In the United States, the supervisory authority, the Security Exchange Commission (SEC), introduced, in 2005, Regulation SHO, which modernised the regulation on short selling with the intent of preventing frequent cases of default by the seller and, in particular, to limit "naked" short selling. A "naked" sale is when the short seller does not promptly borrow the securities sold with the risk of being unable to deliver to the buyer within the standard three-day settlement period. Hence, the consequent default occurs most frequently when a market maker, in the presence of a customer's purchase request, sells short a security that is not very liquid, risking being unable to obtain the security in time for delivery.

The SHO regulation has established two standards, "locate" and "close-out," that are primarily aimed at preventing the opportunity for traders to engage in "naked" transactions. The "locate" (Rule 203) requires the broker-dealer to ensure that the security it sells short can be borrowed and delivered within the expected timeframe. The "close-out" (Rule 204), on the other hand, requires broker-dealers to close out uncovered positions no later than the start of normal trading hours on the day following the settlement date, by purchasing or borrowing securities of a type and quantity similar to those in the contract.

Over time, many revisions and changes to the regulation in question have been made. One of the main issues the SEC addressed was using short selling to manipulate the price of a stock artificially. The remedy involved the rewording of Rule 201—(Short Sale Price Test Circuit Breaker)—designed to prevent short selling from causing further price declines in stocks that have already suffered a significant loss in the current trading session. The rule limits the price at which short selling can be

conducted, stipulating that when the price of a stock has declined by at least 10% in a single trading day, short-selling orders must be priced above the current price.

In addition to Regulation SHO, short sellers are subject to the broad anti-fraud provisions of federal securities law, such as Rule 10b-5 of the Exchange Act, which prohibits manipulative conduct, including the intentional dissemination of false information. In this regard, the SEC has broad and pervasive powers to investigate and punish fraudulent conduct, comparable to the judicial system's.

The Financial Industry Regulatory Authority (FINRA) plays an important role in market reporting, which collects information obtained from broker-dealers, who are required to report short positions in all stocks twice a month. FINRA validates and aggregates all the information and publishes it with the NYSE and NASDAQ. In 2011, the SEC also adopted a rule requiring broker-dealers to maintain additional information about trading activities. More specifically, broker-dealers are required to report, in specific registers, the transactions carried out through the accounts of large traders and, upon request, to electronically report these transactions to the SEC through the Electronic Blue Sheets systems.

In practice, however, the force of the regulation in the United States is less binding than the European one. Events like that of GameStop, with its excessive volatility, were possible due to the lack, in the United States, of stringent rules like those in Europe, which would not have allowed short selling to reach 140% of the free float.

Exhibit 5. EU vs US

Comparison of Short Selling Regulation: Europe vs. United States		
Aspect	Europe (EU Regulation No. 236/2012)	United States (SEC Regulation SHO & related rules)
Regulatory philosophy	Precautionary, restrictive; prioritizes stability and transparency, especially after 2008 crisis and sovereign debt crisis.	More market-oriented; aims to prevent abuses (e.g., naked short selling) while preserving flexibility for liquidity and trading.

Comparison of Short Selling Regulation: Europe vs. United States		
Supervisory bodies	European Securities and Markets Authority (ESMA) + national regulators. ESMA can coordinate and impose temporary bans.	Securities and Exchange Commission (SEC); enforcement also supported by FINRA and exchanges (NYSE, NASDAQ).
Naked short selling	Explicitly prohibited for stocks and government bonds.	Restricted through 'locate' (Rule 203) and 'close-out' (Rule 204) requirements, but not outright banned.
Disclosure & transparency	Mandatory reporting of net short positions: • ≥ 0.1% → report to regulator • ≥ 0.5% → public disclosure.	Broker-dealers report short positions twice monthly to FINRA; aggregated data published. Large trader reporting obligations apply. No individual public disclosure thresholds like in EU.
Temporary bans	Regulators (with ESMA coordination) can impose bans during market stress. Used in sovereign debt crisis (2011–12) and COVID-19 crash (2020).	No equivalent EU-style temporary bans. SEC uses circuit breakers (Rule 201) to limit short sales when stock drops ≥10% in a day.
Price restrictions	General prohibition of naked short sales and restrictions on CDS purchases linked to sovereign debt.	Rule 201 (price test circuit breaker): short sales must be priced above current market price if stock falls ≥10% in one day.
Anti-manipulation rules	Strict anti-abuse provisions, transparency obligations seen as deterrents.	Rule 10b-5 of the Exchange Act prohibits manipulation (e.g., spreading false info).
Crisis responses	Coordinated bans in multiple EU states during crises (2008–09, sovereign debt, COVID-19).	No coordinated bans; relies on disclosure and circuit breakers.
Brexit/UK divergence	UK retained core rules but is exploring more flexibility under FCA.	N/A
Recent reforms	EU consultations (2022–23) on revising SSR to balance liquidity vs. stability.	Ongoing adjustments to SHO, but generally less restrictive than EU.
Market outcome example	EU rules would have prevented GameStop-like case (short interest above 100% of float).	GameStop case (2021) showed vulnerabilities due to looser disclosure and restrictions.

8. Conclusions

In the concluding remarks, it is appropriate to ask what solutions, on a regulatory level, could be appropriately introduced to limit the risk factors deriving from new technologies without limiting their advantages in terms of market efficiency.

It has been said how the development and diffusion of digital technologies in financial intermediation is transforming the structure of supply and demand in capital markets and how this innovation constitutes, at the same time, an opportunity and a threat for supervisory authorities and investors.

For Supervisory Authorities, the digitalisation of trading activities makes a whole series of control procedures easier, which can be automated and carried out effectively, sometimes even using specific algorithms and with limited human intervention. However, it also represents a threat as technological developments have created a plurality of new entities, including unsupervised entities that perform services previously offered only by financial intermediaries. Furthermore, digitalisation leads to new risks with systemic relevance, whose management can complicate the market's operations.

From investors' perspective, online trading and new platforms have represented a great opportunity. They have made investment activity more straightforward and immediate, drastically reduced transaction costs, and allowed access to practically complete information even if it is not always completely reliable (outside of official sources). The other side of the coin is given by the risks associated with the possibility of being victims of real scams or even just being influenced by misleading information on social networks or by the commercial policies of trading apps, ending up unknowingly taking on much higher risks than they would be willing to take. This is also because some innovative instruments make significant use of leverage, resulting in a substantial, but not always perceived, increase in risk levels.

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determining a substantial, but not always perceived, increase in risk levels. The task that lies ahead on the legislative level in terms of technological evolution is, therefore, arduous and complex. Furthermore, it must be taken into account that capital markets tend to become increasingly international, if not downright global, where the objectives of national regulators are not always completely convergent. The legislative process that will be determined should start from an organic and shared regulatory framework at a supranational level. Regulatory and supervisory authorities generally focus on implementing international standards into national legislation, especially in the critical areas of governance, risk analysis, and assessment. However, the same authorities are convinced of the need to continuously update rules and regulations to keep pace with technological evolution. The innovations made possible by new technologies have called into question the traditional rules formulated before digitalisation, which are not always adequate and compliant with new developments. As emerging technologies drive new business models and services, governments must quickly create, modify and apply suitable regulations to preserve negotiations' orderly and regular conduct. The overriding question is how to limit the risk factors arising from new technologies while ensuring, at the same time, the benefits that they bring to the efficiency of the markets. The assumption that regulations can be developed gradually and thoughtfully and then remain in force, unchanged, for long periods has been effectively overturned in the current scenario. It would be ideal if the regulatory frameworks were periodically reviewed to ensure they are in step with the rapidly developing market. For example, it is necessary to review, adapt and apply the responsibilities and rights of investors to cases in which an intermediary provides its services online. This emerges from the fact that most investors, especially those who invest for fun and are attracted by the possibility of obtaining easy and fast profits, do not pay due attention to compliance by their counterparts with regulatory constraints. In detail, an investor must carefully analyse hazardous financial instruments, be aware of the dimensions of the Internet, critically evaluate the information available in forums and verify that the broker he is dealing with is authorised to operate in Italy.

Since trading requires a lot of practice and specific skills, it would be appropriate to increase the financial knowledge of individual users, promote events and programs and organise trading courses aimed at achieving full financial literacy.

Ideally, access to online trading platforms and trading apps could be allowed only to those who have adequate financial education, making it mandatory, by law, not only to verify new accounts through, for example, facial registration (among brokers authorised by Consob, to date, only the eToro platform provides for it) but also by subjecting the investor to a knowledge test, asking him questions on basic financial concepts. Only in the event of a positive outcome, that is, after having passed the test and, therefore, having reached a certain critical threshold (percentage of correct answers), can the individual user continue the registration process.

A further discriminating factor could be age. Age certainly cannot be considered an indicator of the level of financial knowledge, but it is reasonable to assume that a mature investor, compared to perhaps a particularly young one, has a wealth of experience, such as being more aware of the risks and any anomalies or unforeseen events typical of the financial market.

A final consideration concerns social networks and virtual communities focused on finance. These are growing in size and potential economic impact, as demonstrated by the role played in the GameStop case by discussion forums among small investors. Such communities are highly susceptible to manipulation and can be a prime target for malicious individuals or groups conducting malicious disinformation operations.

Sophisticated online disinformation operations can be complicated to distinguish from spontaneous behaviour. Financial authorities should learn how these operations work and act as a first line of detection and defence. An appropriate legal framework should be implemented so that industry watchdogs can provide data and expert knowledge to government actors tasked with analysing and responding to disinformation operations. This can be achieved by implementing organisational modules that allow entities with different levels of access to classified information to collaborate and, in different jurisdictions, by adapting existing legislation.

References

Allen F., Haas M., Nowak E., Pirovano M., Tengulov A. (2021), Squeezing Shorts Through Social Media Platforms, Swiss Finance Institute, 10 April.

Ardia D., Aymard C., Cenesizoglu T. (2022), Examining High-Frequency Patterns in Robinhood Users' Trading Behavior, 6 February, https://ssrn.com/abstract=4028045, http://dx.doi.org/10.2139/ssrn.4028045.

Armour J., Eidenmüller H. (2020), Brexit and Financial Regulation, "European Business Organization Law Review", vol. 21, pp. 55–82.

Avgouleas E. (2012), Governance of Global Financial Markets. The Law, the Economics, the Politics, Cambridge University Press, London, pp. 324–326.

Beber A., Pagano M. (2013), Short-Selling Bans Around the World. Evidence from the 2007–09 Crisis, "Journal of Finance", vol. 68 no. 1, pp. 343–381.

Benabou R., Laroque G. (1992), Using Privileged Information to Manipulate Markets. Insiders, Gurus, and Credibility, "The Quarterly Journal of Economics", vol. 107 no. 3, pp. 921–958.

Betzer A., Harries J.P. (2021), How Online Comments Affect Stock Financial Markets and Portfolio Management, https://ssrn.com/abstract=3844378 or http://dx.doi.org/10.2139/ssrn.3844378.

Bock J., Geissel S. (2024), Evolution of Stock Market Efficiency in Europe. Evidence from Measuring Periods of Inefficiency, "Finance Research Letters", vol. 62 part A, 105129.

Cipriano M., Gruca T. (2014), The Power of Priors. How Confirmation Bias Impacts Market Prices, "The Journal of Prediction Markets", vol 8 no 3, https://doi.org/10.5750/jpm.v8i3.974.

Degutis A., Novickytė L. (2014), The Efficient Market Hypothesis. A Critical Review of Literature and Methodology, "Ekonomika", vol. 93 no. 2, http://dx.doi.org/10.15388/Ekon.2014.2.3549.

DeMarzo P.M., Vayanos D., Zwiebel J. (2003), Persuasion Bias, Social Influence, and Unidimensional Opinions, "The Quarterly Journal of Economics", vol. 118 no. 3.

Eaton G.W., Green T.C., Roseman B.S., Wu Y. (2021), Zero-Commission Individual Investors, High Frequency Traders, and Stock Market Quality, https://pages.stern.nyu.edu/~jhasbrou/SternMicroMtg/Old/SternMicroMtg2021/Papers/Zero-commission%20individual%20traders.pdf.

Eaton G.W., Green T.C., Roseman B.S., Wu Y. (2022), Retail Trader Sophistication and Stock Market Quality. Evidence from Brokerage Outages, "Journal of Financial Economics", vol. 146, 2022, pp. 502–528, https://ssrn.com/abstract=3776874 or http://dx.doi.org/10.2139/ssrn.3776874.

ESMA (2020), Decision of 16 March 2020 on Short Selling Restrictions, ESMA70-155-9546.

ESMA (2022), Final Report: Review of the Short Selling Regulation, ESMA70-156-4978, March.

European Commission (2010), Proposal for a Regulation on Short Selling and Certain Aspects of Credit Default Swaps, COM (2010) 482 final, 15 September.

European Commission (2022), Targeted Consultation on the Review of the Short Selling Regulation (SSR), https://www.icmagroup.org/assets/documents/Regulatory/Secondary-markets/CSDR-Settlement-Regulation/ICMACSDR-Review-Targeted-ConsultationFeb-21Detailed-response-020221.pdf.

Fama E.F. (1970), Efficient Capital Markets. A Review of Theory and Empirical Work, "Journal of Finance", vol. 25 no. 2, May.

Financial Conduct Authority (2021), Short Selling Regulation (SSR). Notification and Disclosure of Net Short Positions, UK SSR.

Fisch J.E. (2022), GameStop and the Reemergence of the Retail Investor, U of Penn, Inst for Law & Econ Research Paper No. 22-16, Boston University Law Review, forthcoming, European Corporate Governance Institute - Law Working Paper No. 637/2022, https://ssrn.com/abstract=4049896.

Guan S. (2023), The Rise of the Finfluencer, 19 New York University Journal of Law and Business 489 (2023), Santa Clara Univ. Legal Studies Research Paper No. 4400042, https://ssrn.com/abstract=4400042 or http://dx.doi.org/10.2139/ssrn.4400042.

Haghani V., Ragulin V., Dewey R. (2022), Night Moves. Is the Overnight Drift the Grandmother of All Market Anomalies, June 17, https://ssrn.com/abstract=4139328 or http://dx.doi.org/10.2139/ssrn.4139328.

Jackson, Jr. R.J., Mitts J. (2023), Trading on Terror?, December 6, https://ssrn.com/abstract=4652027 or http://dx.doi.org/10.2139/ssrn.4652027.

Long S.C., Lucey B.M., Yarovaya L., Xie Y. (2022), "I Just Like the Stock". The Role of Reddit Sentiment in the GameStop Share Rally, https://ssrn.com/abstract=3822315 or http://dx.doi.org/10.2139/ssrn.3822315.

Moloney N. (2011), The European Securities and Markets Authority and Institutional Design for the EU Financial Market—A Tale of Two Competences. Part (1) Rule-making, "European Business Organization Law Review", vol. 12 no. 1, pp. 41–86.

Moloney N. (2014), EU Securities and Financial Markets Regulation, Oxford University Press, Oxford, pp. 1004–1012.

Oedzes J.J., Van der Vegt G.S., Rink F.A., Walter F. (2019), On the Origins of Informal Hierarchy. The Interactive Role of Formal Leadership and Task Complexity, "Journal of Organizational Behavior", vol. 40 no. 3, pp. 311–324.

Omarova S.T. (2021), The People's Ledger. How to Democratize Money and Finance the Economy, "Vanderbilt Law Review", no. 1231, https://ssrn.com/abstract=3715735 or http://dx.doi.org/10.2139/ssrn.3715735

Raddant M., Kenett D.Y. (2020), Interconnectedness in the Global Financial Market, "Journal of International Money and Finance", vol. 110 no. 3, 102280.

Singer P., Flöck F., Meinhart C., Zeitfogel E., Strohmaier (2014), Evolution of Reddit. From the Front Page of the Internet to a Self-referential Community?, “Proceedings of the 23rd International Conference on World Wide Web 2014”, http://dx.doi.org/10.1145/2567948.2576943.

Stiebel J.H. (2022), GameStop: Power to the Players?, “Journal of Insurance and Financial Management”, vol. 6 no. 4, pp. 95–116, https://ssrn.com/abstract=3883295 or http://dx.doi.org/10.2139/ssrn.3883295.

Tirole J. (1985), Asset Bubbles and Overlapping Generations, “Econometrica”, vol. 53 no. 6, pp. 1499–1528.

van der Beck P., Coralie J. (2021), The Equity Market Implications of the Retail Investment Boom, “Swiss Finance Institute Research Paper”, no. 21-12, 30 January, https://ssrn.com/abstract=3776421 or http://dx.doi.org/10.2139/ssrn.3776421.

Vasileiou E., Bartzou E., Tzanakis P. (2021), Explaining Gamestop Short Squeeze Using Intraday Data and Google Searches, “Journal of Prediction Markets”, 16 March, https://ssrn.com/abstract=3805630 or http://dx.doi.org/10.2139/ssrn.3805630.

Zaghini A. (2016), Short-selling Bans and Bank Stability. Evidence from the European Sovereign Debt Crisis, “Journal of Financial Stability”, vol. 26, pp. 107–118.