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GameStonk: What happened and what to do about it

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Abstract

The price of GameStop stock exploded from $18.84 at the end of 2020 to a high of $483 on January 28, 2021, before collapsing to under $60 in early February. The stock had long been heavily shorted even before the pandemic. A stock bubble and its collapse inflict collateral damage even on those not participating in the bubble, including index-fund investors. The incident raises questions about the duties of brokers and financial service professionals in the age of social media, and the role of payment for order flow (PFOF).

The price dislocation in GameStop highlights several leaks in the plumbing of the US equity market that need to be plugged or else similar dislocations will happen again. The antiquated T+2 settlement cycle needs to be shortened to reduce risk and attendant collateral needs in the system. Institutional short positions should be disclosed on SEC Form 13F just as long positions are. The frequency of short interest disclosure should be increased to daily from the current biweekly. The SEC should implement the Congressional mandate in Dodd-Frank §984 to increase transparency in the stock lending market by implementing a ticker tape for stock lending transactions. Short positions should be marked to market yearly for tax purposes yearly to eliminate the tax incentive to delay covering short positions. SEC rules 204 and 15c3-3 need to be modernized to help prevent spikes in prices far beyond any reasonable levels. Rule 606 should be extended to require brokers to report retail execution quality.

Keywords: GameStop, bubbles, short selling, short interest, retail investors, payment for order flow, financial regulation, settlement, T+2, DTCC, NSCC, Securities and Exchange Commission, SEC, Rule 204, Rule 606, Rule 15c3-3, Dodd-Frank

JEL Classification: G1, G2

Disclosures

All opinions are strictly my own and do not necessarily represent those of Georgetown University or anyone else. I am very grateful to Georgetown University for financial support. Over the years I have served as a Visiting Academic Fellow at the NASD (predecessor to FINRA), served on the boards of the EDGX and EDGA stock exchanges, served as Chair of the Nasdaq Economic Advisory Board, and performed consulting work for brokerage firms, stock exchanges, other self-regulatory organizations, market makers, industry associations, and law firms. I've also visited over 75 stock and derivative exchanges around the world. As a finance professor, I practice what I preach in terms of diversification and own modest and well-diversified holdings in most public companies, including brokers, asset managers, market makers, and exchanges.

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Executive Summary

The price of GameStop stock exploded from $18.84 at the end of 2020 to a high of $483 on January 28, 2021, before collapsing to under $60 in early February. It was a classic and colorful battle between bulls and bears and longs and shorts. It involved large hedge funds on both sides and an army of retail investors cheered on through Reddit's r/wallstreetbets. Trading volume in GameStop and similar stocks was so intense that several retail brokers including Robinhood restricted trading in the face of large increases in collateral demands from National Stock Clearing Corporation (NSCC). The collateral demands are an artefact of our antiquated settlement system which takes two business days to settle a stock trade.

An overpriced stock is nobody's friend. A stock selling for more than the present value of its future cash flows locks in losses for investors. A stock bubble and its popping inflict collateral damage to innocent bystanders. Retirement investors in index funds that purchase an overpriced bubble stock are among the losers. Dislocations of a stock's price far away from any reasonable estimate of its fundamental value brings into question the integrity and fairness of the market mechanism.

The "GameStonk" episode illustrates several weaknesses in the plumbing of US equity markets. Such price spikes have occurred in other stocks and will occur again unless changes are made to reduce the likelihood of such extreme dislocations in price. Such spikes are often associated with the hard-to-borrow nature of the shares in question, which impedes the ability of short sellers to sell grossly overpriced stocks. In particular, the following improvements are needed:

1. The T+2 settlement cycle imposes unnecessary risk upon our financial system. We should switch to a T+midnight cycle in which trades are settled on the evening of the trade date. This will reduce risk in the system and thus reduce collateral requirements.
2. SEC Rule 204 requires fails-to-deliver in equities to be bought in at any price regardless of the damage to a fair and orderly market. The equity market should follow the Treasury bond market and impose suitable late fees instead of a buy-in at any price. This will prevent buy-ins from disrupting the market and prevent manipulations that push stocks to absurd and unsustainable levels.
3. Under the Customer Protection Rule (SEC Rule 15c3-3), different sets of rules apply to the lending of fully-paid shares than for shares on which there is a margin loan. Different rules apply to the same shares in the same account at different times depending on whether there is a debit balance or not. Consequently, the regulatory burdens associated with lending fully-paid shares are so great that many brokers consider it unfeasible to lend out fully-paid shares. The same lending rules should apply to the same shares in the same account regardless of the debit balance. Rule 15c3-3 should be modernized so that retail investors have the same ability as hedge funds to rent out shares and thus take money from the short sellers. This will make more shares available in the stock lending market and thus reduce dislocations from an inability to borrow shares.
4. In our current T+2 settlement system, brokers are required to post collateral on T+1 for settlement actions due on T+2. Under Rule 15c3-3, brokers are not allowed to use customer cash in hand on T+1 to post the collateral required by those customer's trades to be settled on T+2. This should be addressed in the modernization of the rule and the shortening of the settlement cycle discussed above.

5. There is a glaring lack of transparency around short selling that helps to feed mistrust of the market. Better disclosure is needed. In particular, SEC Form 13F disclosures of institutional holdings should report short positions just as they report long positions.
6. The SEC has failed to implement Congress' Dodd-Frank §984 mandate to improve transparency in stock lending. There should be a ticker tape for stock lending transactions.
7. Aggregate short interest for each stock is currently reported only twice a month. It should be reported daily. This will help level the playing field in access to information between retail and institutional investors.
8. Long-term short sellers enjoy a peculiar tax break in that they do not pay taxes on their profits until they close out the position, even though they may have received their cash profits long before through the return of their collateral. This loophole should be closed by marking short positions to market for tax purposes at the end of each year similar to the §1256 treatment of futures. This will reduce the tax incentive for short sellers to remain short for long periods of time and never exit their positions.
9. The practice of payment for order flow (PFOF) raises the issue of whether brokers are getting the best prices for their clients. SEC Rule 606 should be updated to require brokers to disclose standardized execution quality statistics for retail orders.
10. FINRA and the SEC should explore the actions of licensed financial industry participants in social media and consider rulemaking to clarify the duties of brokers, investment advisers, and their firms.
11. While short selling can protect investors from overpriced securities, an excessive level of short interest increases the risk of a short squeeze that raises stock prices to absurd levels. The SEC should conduct more research and consider position limits similar to those in futures markets. It should consider restricting new short positions in hard-to-borrow stocks with more than 100% short interest. Legitimate market makers and arbitrageurs should be exempt.

Introduction

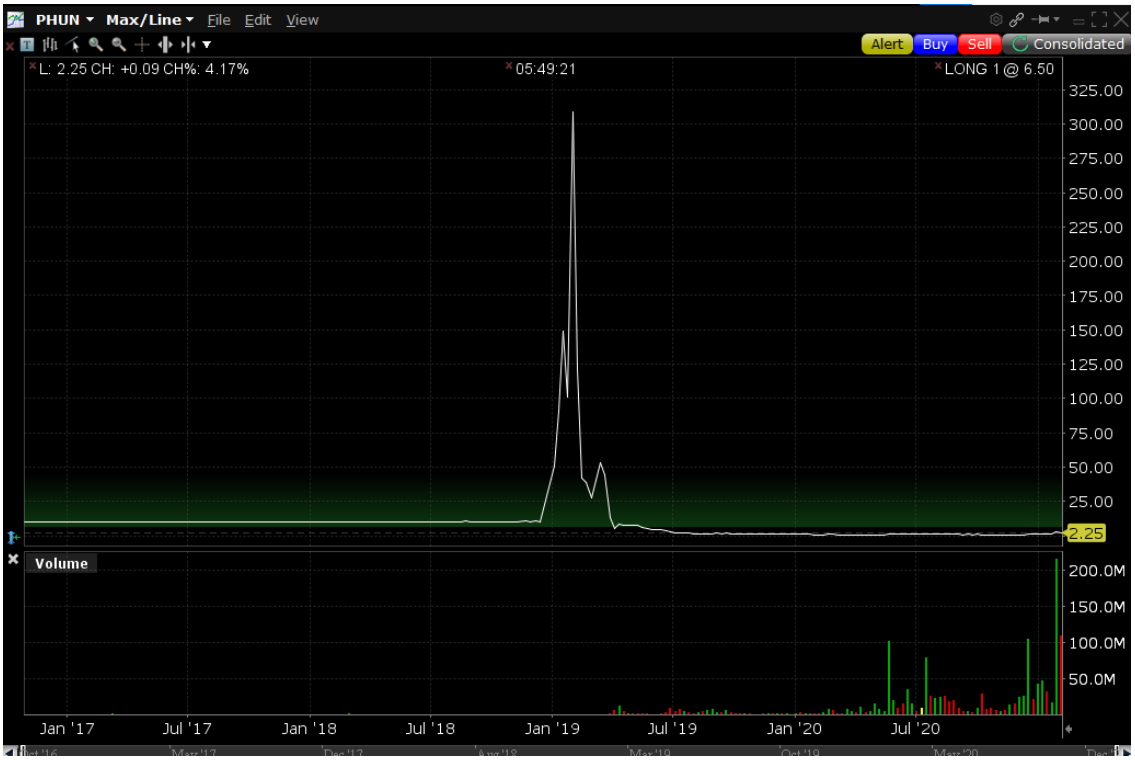
The "GameStonk" episode is not the first instance in which a stock price rocketed to an absurd level and then crashed, leaving massive losses in its wake. Nor will it be the last, unless several improvements are made to the plumbing of the U.S. equity market. Improvements need to be made in several SEC rules to create better investor protection and to unclog some of the bottlenecks that contribute to price spikes.

Price dislocations such as the GameStop (GME) episode are blemishes on our otherwise excellent capital markets. Our economy depends upon a fair and orderly market in order to raise and allocate the capital needed for job-creating economic growth. A market that misfires will scare aware needed investment. Investors who are swept into these cyclones and lose money are likely to feel that the market is rigged. They will take their capital elsewhere and support punitive actions against the financial sector, even if those actions would harm the overall economy or them personally.

Active speculators in stock spikes such as GameStop are not the only ones who are harmed by an egregious bubble that collapses. There is collateral damage to innocent bystanders including buy-and-hold retirement investors in index funds. As broad-based index funds hold every stock in an index, investors buying into those funds those funds pay the market price for all the stocks in the fund, even GameStop at $300 per share.

Prequel: It happened before with Phunware

The case of Phunware (PHUN) is yet another example of what can go wrong and what will go wrong again unless changes are made. Phunware went public as a result of a SPAC deal.[1] As many of the original investors in the SPAC did not wish to participate in the post-acquisition company, there were very few shares in circulation.[2] Even as the price rose to absurd levels, it was virtually impossible to short because it was impossible to find shares to borrow. A short squeeze developed in 2019, and the stock rose to over $300 per share before collapsing to under $1.00.



[1] A Special Purpose Acquisition Corporation (SPAC) is also known as a blank check company. In a SPAC, a promoter launches a public company that has no operations. The intent is to later merge with a private company to take the private company public. In a typical SPAC deal, the shareholders of the SPAC can bail out and get some of their money back if they don't like the company chosen to be acquired. See https://www.wsj.com/articles/investors-flock-to-spacs-where-risks-lurk-and-track-records-are-poor-11605263402

[2] https://www.wsj.com/articles/how-a-nasdaq-loophole-fueled-one-stocks-rise-of-3-750-11550066400

GameStop

The price of GameStop stock followed a similar trajectory to Phunware. At the end of 2020, GameStop stock closed at $18.84. The stock price rose dramatically in January, closing at $347.51 on January 27. It reached an intraday high of $483 on January 28 before collapsing to under $60 by early February.

A major physical retailer of games, GameStop was losing money even before the COVID19 pandemic made the losses even worse. Two dueling narratives emerged: Under one narrative, the company was a failing brick-and-mortar retailer likely to join the ranks of the many other bankrupt retailers. The other narrative is that the firm would survive and benefit from a pivot towards online gaming. As the old saying goes, differences of opinion lead to a horse race.

A classic battle between bulls and bears emerged, with many colorful characters disseminating opinions in online chat forums such as Reddit's WallStreetBets.[3] A "man bites dog" narrative emerged that it was the little guys ganging up on hedge funds.[4] In particular, many were presumably targeting heavily shorted stocks in an effort to punish short-selling hedge funds. However, some of the pseudonymous posters in WallStreetBets were also licensed securities industry professionals.[5] One of the more colorful ones used

[3] https://www.reddit.com/r/wallstreetbets/ . The forum describes itself as "/r/wallstreetbets is a community for making money and being amused while doing it. Or, realistically, a place to come and upvote memes when your portfolio is down." https://www.reddit.com/r/wallstreetbets/wiki/faq

[4] For an example, see https://abcnews.go.com/Technology/wireStory/fight-man-gamestops-surge-online-mobs-75596520

[5] https://www.wsj.com/articles/keith-gill-drove-the-gamestop-reddit-mania-he-talked-to-the-journal-11611931696

the name Roaring Kitty on YouTube. He began his testimony before the House Financial Services Committee by declaring under oath that "I am not a cat."[6] This raises serious compliance questions about whether firms are properly supervising how their registered representatives communicate with the public.[7]

This episode also highlights the significant power of social media in modern life. Modern communication methods allow the rapid dissemination of information as well as disinformation. There is also a concern about bots – automated programs on all social media, including Reddit.[8] Were manipulators using bots to manipulate opinion on Reddit and influence the stock? This is something that should be explored by the SEC as part of its investigations.

Options trading acted as an accelerant.

Derivative trading in GameStop options also acted as an accelerant to the price moves.[9] In particular, when an investor buys a call option on an options exchange, their counterparty is typically an option market maker who hedges their exposure by buying the stock. The option market maker will typically buy more dollar value of stock than the price of the option. Thus, the number of dollars spent on purchasing a call option results in the purchase of an even larger number of dollars in the underlying stock, resulting in more price impact on the underlying stock. [10]

For example, for a $20 stock with an annualized volatility of 40%, a one-month "at-the-money" call option with an exercise price of $20 would sell for approximately $0.93 per share.[11] Note that an investor who wanted to bet on the stock and had $0.93 could buy $0.93/$20 or 0.046 shares.

In order to hedge the option, an option market maker would purchase 0.53 shares worth $10.52 and borrow $9.59. (The difference $10.52 - $9.59 gives the $0.93 value of the option.) Note that the purchase of the option by the investor instead of the stock directly leads to the purchase of 0.53/0.046 or 11.53 times more stock. Thus, the increase in option trading by retail investors also likely had a large impact on the underlying stock price.

If the stock rose by 25% to $25 the next day, the option would increase in value from $0.93 to $5.04, a 443% gain. This shows the tremendous potential for massive gains in options. Of course, losses can be

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[6] See testimony of Kevin Gill before the U.S. House Financial Services Committee on February 18, 2021. https://financialservices.house.gov/calendar/eventsingle.aspx?EventID=407107#YT at 41:11. Also at https://www.youtube.com/watch?v=RfEuNHVPc_k&feature=emb_logo

[7] Public communications by brokerage firms are highly regulated. See FINRA Rule 2210, Communications with the Public, https://www.finra.org/rules-guidance/rulebooks/finra-rules/2210

[8] https://www.cbsnews.com/news/wallstreetbets-reddit-bot-activity/

[9] Investopedia has a nice tutorial on options. https://www.investopedia.com/options-basics-tutorial-4583012

[10] Bloomberg's Matt Levine provides a nice explanation of both the GameStop saga and the impact of options trading. This is well worth reading. https://www.bloomberg.com/opinion/articles/2021-01-25/the-game-never-stops

[11] Calculations are done using the Black-Scholes option pricing model assuming no dividends and an annual interest rate of 1.0%.

huge as well. If the stock were to drop 25% to $15, the value of the option would drop to $0.004, a loss of 99.61%. To repeat: If the investor merely bought the stock and it went up, the return would be 25%, but spending the same amount on options would have resulted in an increase of 443%.

If the stock goes up, the market maker will want to buy even more shares to keep the hedge in place, an effect known as "gamma." In this example, an increase from $20 to $25 the next day would increase the number of shares that the market maker would buy to hedge from 0.53 to 0.98. In other words, the market maker would have to buy more stock as the stock price went up, driving the stock price up even further.

Overpriced stocks harm investors – even innocent bystanders.

While investors naturally cheer increases in a stock's price, an overpriced stock is nobody's friend. If a stock is selling for more than the present value of its future cash flows, it guarantees future losses for investors. Often it is the less sophisticated retail investors who get sucked into a bubble and are left holding the bag when it inevitably collapses.

Active participants in meme stocks are not the only ones affected. Collateral damage harms innocent bystanders as well. For example, many buy-and-hold retirement investors prudently invest through index funds that hold all of the stocks in a broad market index. As those funds explicitly do not attempt to make active bets on stocks based on their value, they end up buying all stocks at whatever the market price is at the time. As mutual funds are generally priced at the closing price for the day, those who purchased a mutual fund holding GameStop on January 27 unknowingly bought GameStop at $347.51 and have suffered accordingly from its collapse. Fortunately, broad market index funds are well diversified so GameStop is only a tiny fraction of their portfolios. However, not all index funds are well diversified. GameStop at its peak represented 20% of the SPDR S&P Retail ETF (XRT).[12]

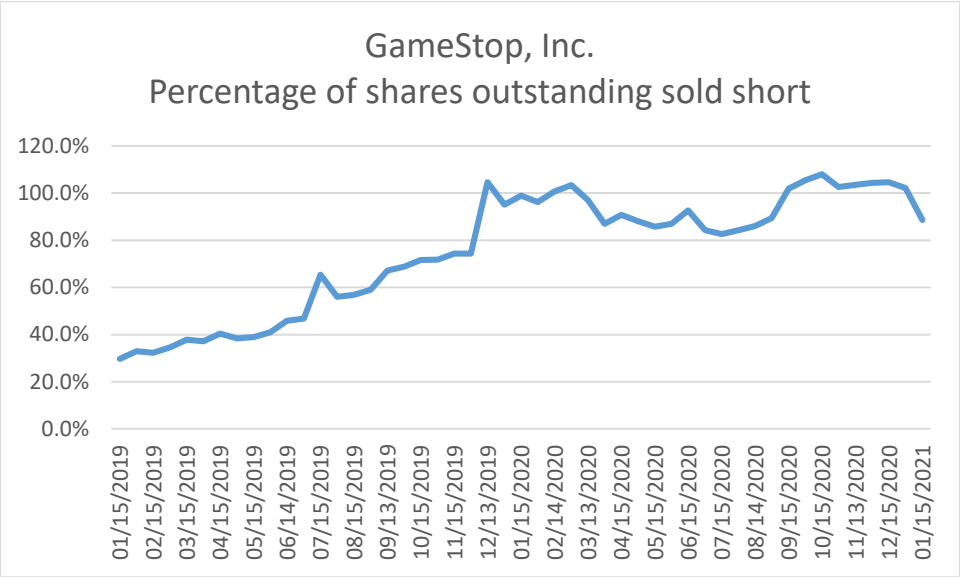
Violent fluctuations in stock prices call into question the integrity of our market mechanism. Wild swings in prices naturally bring up concerns about manipulation. Investors who have lost money are prone to believe that the market is "rigged" even when the losses are due to their own poor trading decisions. They are likely to stop investing. This harms the entire economy by depriving growing firms of the capital needed to fund their growth. Less economic growth leads to fewer jobs and less tax revenue, thus harming many who are not participants in the stock market at all.

[12] https://www.thestreet.com/etffocus/market-intelligence/etfs-gamestop-frenzy

The role of short sellers

GameStop stock was highly shorted, even before the pandemic.[13] While the short interest in most stocks is typically far less than 5% of the shares outstanding, the short interest in GameStop was well over 25% during much of 2019 and rose during the year. At the beginning of 2019, GameStop was selling for $15. Share prices fell below $4 by August as the company suffered continuing losses. The company responded to its low stock price by repurchasing significant quantities of shares.[14] The reduction in shares outstanding caused the number of shares shorted relative to shares outstanding to increase even more.

Short interest in GameStop was so high that at times the reported short interest was higher than the shares outstanding. As a portion of the shares were held by insiders, the short interest relative to the public float was even higher. As of February 6, 2021, Bloomberg reported that the short interest as a percentage of the public float was 122%, and that institutional holdings represented 141.1% of the public float.



[13] In a short sale, someone who does not own the stock borrows the stock and sells it. Brokers typically arrange the borrowing on behalf of their customers. Institutions often rent out their securities as a means of generating additional revenue for their beneficiaries. Brokers can also arrange to lend out shares from customer accounts. If the stock price goes down later, the short seller can purchase the stock at the new lower price and use it to repay the stock loan. The difference between the price at which the short seller originally sold and the price at which they repurchase the shares later represents profit for the short seller. For a great explainer on short selling, see https://www.nasdaq.com/articles/how-short-selling-works-2021-02-04

[14] https://www.fool.com/investing/2019/12/10/gamestop-just-bought-back-a-crazy-amount-of-stock.aspx

Short selling can legitimately be more than 100% of the shares outstanding.

It is natural to wonder how there can be a higher short interest than the total number of shares outstanding. The answer is that the same shares can be lent over and over again. Here is an example: Short sellers need to borrow shares in order to deliver them to buyers. Suppose that Shareholder #1 owns 100 shares. Shareholder #1 is more than happy to take some money from the short sellers by renting out the shares to Short Seller A.[15] Short Seller A sells the borrowed shares to Shareholder #2. Likewise, Shareholder #2 is happy to take money from short sellers by renting the shares to Short Seller B. Short Seller B sells the shares to Shareholder #3. Shareholder #3 does not lend out the shares. Notice that in this example there are 300 shares of long positions (Shareholders 1,2, and 3) and 200 shares of short positions (Short sellers A and B), but only 100 actual shares outstanding.[16] This does not break any current US rules.

However, just because the current practice does not violate present rules, the question remains whether extreme levels of short interest jeopardize the operation of a fair and orderly market. In particular, there is a danger that a short squeeze develops that would result in dislocation in prices. For example, suppose in our example that Shareholder #1 decides to stop lending out shares and demands the stock back.[17] In that case the short seller would typically attempt to borrow the shares from someone else. However, if the short seller cannot find another stock loan to replace the original loan, the short seller must purchase the shares. If the short seller buys the shares from Shareholder #2, then Shareholder #2 will recall the shares, forcing Short Seller B to purchase the shares. This forced purchasing can cause prices to skyrocket in what is known as a short squeeze.

Note that short selling creates the equivalent of a derivative market in the shares. This example is essentially similar to a situation where there is one shareholder (#3) who owns 100 shares with voting rights. In addition, there are two other long investors (#1 and #2) without voting rights who are engaged in contract similar to an indefinitely-lived contract for differences where they exchange the daily gains and losses with the party in the short position. When a short seller borrows shares, they have to put up collateral and that collateral is adjusted every day to reflect changes in the value of the shorted security. Thus, the short seller and the stock lender exchange the gains and losses daily on the borrowed shares. In a futures contract, both sides put up collateral known as margin, and it is adjusted daily to reflect gains or losses in the underlying contract. Thus, the long and short side of the futures contract exchange the gains and losses daily.

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[15] This is safe to do because the short seller has to post collateral with the stock lender. Typically, short sellers post collateral equivalent to 102% of the market value of the borrowed shares. This collateral is adjusted every day, in a process known as "marking to market."

[16] Note that securities lenders lose the voting rights when they rent out their shares, as only 100 shares get to vote. Also, the borrowers have to make the lenders whole for any dividends paid during the loan period. These "payments in lieu" are treated as ordinary income for tax purposes and not as "qualified" dividends with a lower tax rate.

[17] Most stock lending arrangements are demand loans in which the lender can demand the shares back at any time. This is similar to a checking account with a bank in which the customer can withdraw funds at any time. Stock lenders may recall shares for several reasons. They may want to sell the shares, or to make sure that they can vote the shares in a corporate election.

This has strong implications for the regulation and taxation of short positions.

It is clear that a very high level of short interest increases the risk of a dislocation in prices. What is not clear is what, if anything, regulators should do about it. The CFTC and the futures exchanges sometimes impose position limits in futures contracts to prevent dislocations in prices.[18] It is tempting to consider imposing futures-style position limits on short selling. For example, additional short selling could be restricted when the short interest reaches a certain level, say 100% of the shares outstanding. This is an area in which there needs to be additional research to determine the extent of the risk. Consideration should be given to giving the SEC explicit rulemaking authority to set position limits on additional short sales when the level of short interest relative to total shares outstanding reaches a level specified by the SEC.

However, any restrictions on short selling should be approached with caution, as short sellers are an important part of the market eco-system. Short selling is an important tool that allows market makers to provide liquidity by accommodating customer buy orders even when they have run out of shares in inventory. Arbitrageurs use short selling to make sure that the prices of ETFs purchased by retail investors properly track the baskets of securities inside the ETFs. Directional short sellers bring in information and can help to prevent overvaluation of stocks that would harm investors. Market makers and bona fide arbitrageurs should be exempt from such restrictions. Any restrictions should only be imposed after careful economic analysis.

Remove the tax incentive for protracted short positions by marking short positions to market each year.

Before the pandemic, GME stock was shorted at very high rates for a protracted period of time. Even after the stock price fell from $15 to under $4, short interest remained high. Why didn't the shorts take their profits and go away? Unfortunately, even after a stock drops in value, short sellers often don't go away and the short interest remains high.

The activities of Melvin Capital Management came under particular scrutiny. Melvin was a long/short hedge fund that "had been short GameStop since Melvin's inception six years earlier…"[19] Here is a graph of GameStop from 2015 through 2020.

[18] For details see https://www.cmegroup.com/rulebook/files/cme-group-Rule-562-pending.pdf and https://www.cftc.gov/sites/default/files/2021/01/2020-25332a.pdf.

[19] Testimony of Gabriel Plotkin, CEO of Melvin Capital Management, before the United States House Financial Services Committee, February 18,2021. http://docs.house.gov/meetings/BA/BA00/20210218/111207/HHRG-117-BA00-Wstate-PlotkinG-20210218.pdf See also https://www.wsj.com/articles/melvin-capital-says-it-has-been-short-gamestop-since-2014-11613593854

Note that when Melvin started shorting the stock, GameStop was in the $40 range. It declined for the rest of the decade and was selling near $4 in the middle of 2020. Why did Melvin not close out its short then and move on to other investments?

It turns out that short sellers still have an economic incentive to stay short even after a stock has declined. The reason for this incentive is simple: taxes. The IRS generally taxes stock trades a position is closed out and the profit or loss is realized. This makes sense for long investments as the cash is usually received when the stock is sold. For a successful short sale, however, the short seller has received the cash long before the position is closed out. This is a result of the collateral adjustment that occurs in the stock lending market.

For example, suppose that a short seller decides to short Pump&Dump.com which sells for $100 per share. They borrow shares from Friendly Index Fund and sell them. As part of the stock loan agreement, the short has to put up 102% of the value of the borrowed shares, or $102. On the settlement day, the shorts put up as collateral the $100 proceeds of the sale and $2.00 of their own cash. This collateral amount is adjusted every day. If the stock goes up by $100 to $200 per share, the shorts have to put up another $102 per share in cash as collateral for the increased value of the shares that they owe. However, if the stock drops to $1.00, the collateral amount drops to $1.02. The shorts would get a cash refund of $100.98 of the collateral. However, they have not closed out the position and officially realized their gain, so no income taxes are due on the profit despite the fact that they have received the cash.

Now the short has a decision to make: They already have their profits in hand. If they buy the shares at $1.00 and close out the short, they would have to pay income tax right away on the $99 profit. If they don't close out the short, they can defer paying taxes on their profit indefinitely. The short thus has an economic incentive to never close out the position. The short seller's idea of a good time is not for a stock to go bankrupt and be cancelled, but for it to become a penny-stock zombie forever.[20]

[20] Indeed, due to the step up in basis at death, the profits could be forever tax free if deferred long enough.

Unfortunately, this tax incentive to delay closing a short position after the stock has declined also creates an incentive to continue to spread bad news about the issuer. Note that in this situation the short seller's original thesis has been confirmed and the stock has already fallen substantially. However, if the stock price were to rally, the short seller would have to pay cash to cover the increase in the required collateral. In order to prevent this from happening, the short seller has an incentive to discover or create more bad news about the company. In short, the short seller has an economic incentive to kick the firm while it is down.

This inadvertent incentive in the tax code for bad behavior is simple to fix. The profits (or losses) on short positions should be taxed each year by marking short positions to market for tax purposes at the end of each year. This means treating positions as if they were covered at the end of the year. This is already done for some active security traders in equities.[21]

Futures contracts act similarly to short equity positions in that gains or losses are immediately reflected in changes in the collateral, also known as margin, that investors must put up. The IRS marks futures contracts to market at the end of each year, meaning that any profit or loss that occurred during the year would be taxed in that year.[22]

Short positions should also be marked to market each year by treating them as if they were closed out on the last day of the year. Thus their profits or losses would be taxed each year. This will result in modest additional revenue for the government as the profits are realized for tax purposes sooner rather than later.

Most short selling helps maintain market quality by proving liquidity and information to the market. However, not every short seller is an angel. There have been shorts who disseminate false or misleading information about their targets. Even worse, there are shorts who actively seek to interfere with the operations of the companies they have shorted. Perhaps the worst example is that of the famous Contac poisoning case, in which a poisoner tampered with Contac cold medicine hoping to benefit from a drop in the manufacturer's stock price. [23]

Removing this tax break for short sellers would take away the incentive for them to never close out a position. This removes the incentive for them to continue to denigrate firms even after their previous investment thesis has been realized through a decline in the stock price.

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[21] Section 475 of the Internal Revenue Code permits certain active traders to elect mark-to-market treatment. In general, such traders must seek to profit from daily movements in stock prices and not interest, dividends, or capital appreciation. See https://www.irs.gov/publications/p550 .

[22] Futures are known as §1256 contracts after §1256 of the Internal Revenue Code. The profits are taxed each year at a combination of 60% of the long-term capital gains rate and 40% of the short-term capital gains rate.

[23] See "Californian Gets 27 years in Drug Tampering Case," Los Angeles Times October 31, 1986, http://articles.latimes.com/1986-10-31/local/me-8417_1_drug-capsules . He was released on 2002 according to http://www.bop.gov/inmateloc/. Also see http://www.businessinsider.com/our-interview-with-rick-ackerman-the-man-who-helped-helped-the-fbi-catch-a-criminal-merrill-lynch-trader-2010-5 and http://www.nytimes.com/1986/06/08/us/drug-tampering-suspect-has-long-arrest-record.html

Inefficiencies in the stock lending market exacerbated the price spike. The SEC should implement §984 and create a ticker tape of stock lending transactions.

Normally, we depend upon short sellers to sell overpriced stocks and thus help prevent overvaluation. Short sellers also serve other important functions by making it possible for arbitrageurs to keep the prices of ETFs locked on the prices of their underlying assets, as well as making it possible for market makers to provide liquidity.

The common thread in GameStop, Phunware, and other price spikes is that it became impossible for most investors to short the shares due to inefficiencies in our stock lending market. When the prices reached absurd levels, short selling was unavailable just when it was needed the most.

This is an area where there is a very unlevel playing field between retail investors and institutional investors. Often when a stock becomes harder to borrow, firms that cater to retail investors often stop letting their customers short the stock by saying they can't get a borrow. However, institutional investors with better access to the opaque stock lending market can find shares to borrow – for a price.

In 2010, Congress explicitly ordered the SEC Dodd-Frank §984 to pass new rules to improve transparency in the stock lending market within two years. The SEC has conspicuously failed to do so.[24] The ability of the SEC to ignore such an explicit Congressional mandate with impunity demonstrates the dysfunctional nature of our regulatory system and the need for a complete legislative overhaul of our financial regulatory structure.

Congress needs to put pressure on the incoming SEC leadership to implement §984. In particular, the SEC should mandate the creation of a ticker tape of stock loan transactions so that there is transparency into the price and volume of stock lending. Better transparency will allow investors to get a better sense of what actually is going on with short selling. Better transparency will also allow give the owners of securities a better sense of their true value in the stock lending market and thus the ability to make more intelligent decisions with regard to stock lending.

[24] Dodd-Frank §984(b) reads: RULEMAKING REQUIRED.—Not later than 2 years after the date of enactment of this Act, the Commission shall promulgate rules that are designed to increase the transparency of information available to brokers, dealers, and investors, with respect to the loan or borrowing of securities.

In 2016, six years after the passage of Dodd-Frank, the SEC did adopt some rules requiring investment companies to report some information about their aggregate securities lending revenue as part of their overhaul of investment company reporting. The SEC "proposed these disclosures in order to allow investors to better understand the income generated from, as well as the expenses associated with, a fund's securities lending activities." However, it has not adopted any actions to improve transparency in the stock lending market for individual securities. https://www.sec.gov/rules/final/2016/33-10231.pdf , page 312.

The SEC should modernize Rule 15c3-3 to make it easier for retail investors to lend shares.

We need to make it easier for legitimate investors to short in these situations by modernizing rules that make it hard for some investors to lend out their shares. Unfortunately, current rules make it next to impossible for some retails investors to lend out their shares. As the fees for lending out shares in these situations can be rather lucrative, retail investors are losing out on these attractive opportunities to take money from the short sellers. Again, this is an area of inequality where there is a need to level the playing field between retail and institutional investors.

The Customer Protection Rule (SEC Rule 15c3-3) is a very important rule that regulates how brokers can lend out shares from their customer accounts. It turns out that there are two sets of rules for lending out the same shares from the same account, depending on whether the customer has borrowed money from the broker.[25] In brief, if a customer borrows money from the broker in a brokerage margin account, the broker can lend out shares from that account worth up to 140% of the amount borrowed, known as the debit balance.[26] The current protections work really well to protect investors whose shares have been loaned out from margin accounts. I cannot recall a single instance in the last 48 years since the rule was first passed in which an investor whose margined shares were loaned out did not get their shares returned.

However, if there is no debit balance in the account, the exact same shares are considered fully paid and treated differently. In order to lend out fully-paid shares, the broker has to jump through so many bureaucratic hoops that most brokers don't bother, or only bother for very large positions of hard-to-borrow securities.[27]

Those time-tested protections for margined shares can provide the same excellent level of consumer protection for fully-paid shares. We should modernize Rule 15c3-3 to make is easier for investors to lend out their fully-paid shares with their permission by making the protections the same as for margined shares.

By modernizing rule 15c3-3, the SEC would make it possible for the little guy to benefit from renting out their shares just like institutions do. I would love it if my broker would let me take money from the short sellers by renting out the fully-paid shares in my IRA. This would benefit me, either directly with cash, or indirectly with better customer service or cuter baby ads in the Super Bowl. Furthermore, it would free up shares for shorting, making a disruptive price dislocation less likely.

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[25] SEC Rule 15c3-3(b)(3) specifies the added requirements for lending out fully-paid and excess margin securities.

[26] This is one way for the broker to fund the margin loan to the customer, because the broker will receive the collateral for the loaned securities.

[27] Interactive Brokers is one exception. Schwab will enter into agreements to lend out fully paid shares, but they require $100,000 in the account and will only do it for a short list of about 100 hard-to-borrow stocks. See https://client.schwab.com/secure/file/P-5182696/MKT33373-05.pdf

Rule 204, the "buy-in-at-any-price rule" exacerbates manipulative short squeezes.

Sometime sellers, both long owners and short sellers, fail to deliver the sold shares on the normal settlement date, which is the second business day after the trade ("T+2"). Fails to deliver can occur for a number of reasons. Some of these are operational snafus that are normally resolved quickly. At other times, short sellers have not borrowed shares and thus cannot deliver them. This sometimes happens even if they think they have located on the trade date shares to borrow on the settlement date only to discover later that the promised shares are not available.

In 2008, the SEC implemented Rule 204 in the midst of the financial crisis to deal with the endemic settlement failures that had been plaguing our equity market. Prior to Rule 204, the US was very lax when stocks were not delivered on the settlement date. Usually the shares would show up sooner or later, so buy-ins were rare. Unfortunately, this system was abused by short sellers who were too cheap to pay to borrow shares in the proper fashion. Buyers of shares were forced to wait for their shares; they were effectively forced into make involuntary stock loans at below-market rates. Large failures to deliver persisted for months for many companies, even in the stock of the NYSE itself.[28]

In October 2008, the SEC rightly put its foot down and instituted Rule 204T as an emergency measure.[29] The hastily adopted rule contained a draconian requirement to deliver the shares on the regular settlement date, or else be bought in immediately.[30] Later made permanent as Rule 204, it requires a buy in at any price without any regard to the impact on a fair and orderly market. This knife-edge delivery requirement plays into the hands of manipulators who engineer short squeezes that disrupt our market. The rule did, however, clear up the bulk of the settlement failures that plagued our system.

One may be tempted to cheer the price spike that can occur during a short squeeze as a well-earned comeuppance for short sellers. Once again, innocent bystanders such as retirement savers in index mutual funds get hurt. Furthermore, all short sellers are not evil blood-sucking vipers plotting the demise of sound companies. Indeed very few of them are.[31] Legitimate market makers who shorted as part of legitimate market making can also suffer serious losses. The prospect of such potential losses makes

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[28] Data on fails to deliver can be found on the SEC's web site at https://www.sec.gov/data/foiadocsfailsdatahtm .

[29] https://www.sec.gov/rules/final/2008/34-58773.pdf

[30] Technically, one is to be bought in by the open of the next business day after the regular settlement day upon which the fail occurred. There are a few extensions for market makers and long sellers. The fail can also be cured by borrowing the shares, but if that had been practicable it would already have been done.

[31] A few short sellers are indeed nefarious and take criminal actions to harm solid companies and even their customers. Perhaps the worst example is that of the famous Contac poisoning case. In that case, the perpetrator put rat poison into packages of Contac cold medicine and then hoped to profit from a fall in the stock price. See "Californian Gets 27 years in Drug Tampering Case," Los Angeles Times October 31, 1986, http://articles.latimes.com/1986-10-31/local/me-8417_1_drug-capsules. Also see http://www.businessinsider.com/our-interview-with-rick-ackerman-the-man-who-helped-helped-the-fbi-catch-a-criminal-merrill-lynch-trader-2010-5 and http://www.nytimes.com/1986/06/08/us/drug-tampering-suspect-has-long-arrest-record.html.

them less willing to provide liquidity in such issues, leading to higher trading costs and higher volatility that harms all investors. Legitimate arbitrageurs who keep ETF prices in line with the underlying basket can also be collateral damage.

A mandatory buy in at any price is not the only way to deal with a failure to deliver shares on the normal settlement date. The US Treasury bond market uses a different system. They charge late fees, just like many libraries do. The equity market should learn from the Treasury market and impose suitable late fees instead of immediate mandatory buy-ins at any price. Relaxing the "buy-in-at-any-price" rule will alleviate some of these price dislocations when buy-ins occur. The late fees should escalate with the length of the delivery delay and need to be stiff enough that market participants will only delay delivery in exceptional circumstances. Those failing to receive should still have the ability to force a buy in if they desire.

Buy-ins may have accelerated the price dislocation in GameStop.

Fails to deliver occur routinely in most stocks on any business day. They are generally quite small. The fear of a forced buy-in generally motivates most sellers to deliver on time. Under Rule 204, market makers have three additional days to deliver shares before being bought in. In January, 2021, the median stock reported fails of 1,457 shares on a day. [32] The numbers are skewed, however, with an average of 43,070 shares on a day.

The following graph and table show the price of GameStop and the fails to deliver data for the period in question. The total number of shares that were sold and not delivered on the settlement date peaked on January 22 at 2,099,572 shares or 3.0% of the 69 million shares outstanding. On that day, GameStop closed at $65 per share.[33] As a percentage of trading volume, the failures to deliver peaked at 16.1% of the 4.9 million shares traded on January 5, 2021 when GameStop closed at $17.

It is worth noting that there were relatively few fails attributable to the trading on January 27, when the price dislocations in GameStop hit their closing peak of $348. Indeed, fails to deliver fell dramatically on January 27, from 1,032,986 shares the day before to 138,179 for trading on the 27th.[34] The reason for this reduction is unclear, but is consistent with trading on the 27th either through forced buy-ins or the fear of forced buy-ins. This buying activity undoubtedly acted as an accelerant to the upward price dislocation in the price of the stock.

The fails to deliver fell again on January 28, from the 138,179 of the day before to 10,975. That was the day upon which GameStop hit its intraday high of $483. Again, the reasons for the reduction are unclear but could represent forced buying due to buy-ins or the fear of buy-ins. Indeed, On January 28, the stock became extremely hard to borrow. The buy-ins and the inability for short sellers to borrow shares that day undoubtedly contributed to the extreme price levels reached by the stock.

[32] The fail to deliver data at can be found at https://www.sec.gov/data/foiadocsfailsdatahtm . The reported data include not only fails from operational failures and fails due to short sellers unwilling or unable to borrow shares, but also those fails by market makers who make use of their three-day extension before being bought in.

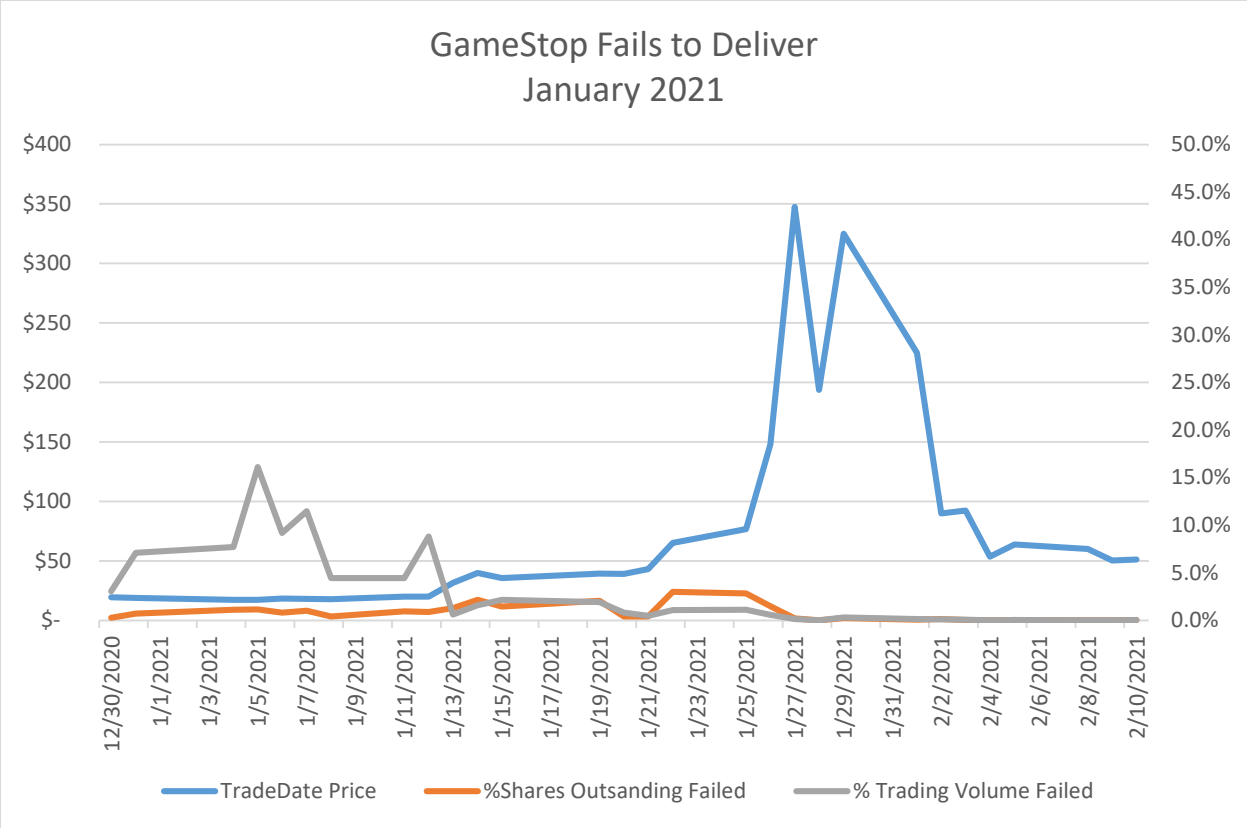
[33] Share prices are from Yahoo! Finance.

[34] These dates are adjusted for T+2 settlement. Thus, the 138,179 figure is for shares that were failed to be delivered on the January 29, 2021 settlement date are attributable to trading on January 27,2021 and any post-trade borrowing that may have affected previous fails to deliver.

Table 1
Fails to Deliver in GameStop
January 2021

Trade Date (T)	GameStop closing price	Shares failed to deliver on settlement date (T+2)	Fails to deliver as a percentage of shares outstanding	Fails to deliver as a percentage of total trading volume
1/4/2021	$ 17	772,112	1.1%	7.7%
1/5/2021	$ 17	799,328	1.1%	16.1%
1/6/2021	$ 18	555,658	0.8%	9.2%
1/7/2021	$ 18	703,110	1.0%	11.5%
1/8/2021	$ 18	287,730	0.4%	4.5%
1/11/2021	$ 20	662,524	0.9%	4.4%
1/12/2021	$ 20	621,483	0.9%	8.8%
1/13/2021	$ 31	892,653	1.3%	0.6%
1/14/2021	$ 40	1,498,576	2.1%	1.6%
1/15/2021	$ 36	1,007,562	1.4%	2.2%
1/19/2021	$ 39	1,438,994	2.1%	1.9%
1/20/2021	$ 39	273,600	0.4%	0.8%
1/21/2021	$ 43	275,113	0.4%	0.5%
1/22/2021	$ 65	2,099,572	3.0%	1.1%
1/25/2021	$ 77	1,972,862	2.8%	1.1%
1/26/2021	$ 148	1,032,986	1.5%	0.6%
1/27/2021	$ 348	138,179	0.2%	0.1%
1/28/2021	$ 194	10,975	0.0%	0.0%
1/29/2021	$ 325	159,298	0.2%	0.3%
2/1/2021	$ 225	47,564	0.1%	0.1%
2/2/2021	$ 90	88,767	0.1%	0.1%
2/3/2021	$ 92	27,307	0.0%	0.1%
2/4/2021	$ 54	304	0.0%	0.0%
2/5/2021	$ 64	22,796	0.0%	0.0%
2/8/2021	$ 60	99	0.0%	0.0%
2/9/2021	$ 50	1,534	0.0%	0.0%
2/10/2021	$ 51	15,102	0.0%	0.0%

This table represents the shares that were failed to be delivered in GameStop stock on the settlement dates associated with the given trading dates. Settlement is scheduled to take place on the second business day after the trade (T+2).



More frequent disclosure of short interest will level the informational playing field between retail and institutional investors.

The GameStop debacle has focused attention on short selling.[35] One of the big problems with short selling is the lack of transparency. This lack of transparency provides fertile ground for conspiracy theories. As the saying goes, "Sunlight is the best disinfectant." Better transparency will bring attention to problematic activities and provide less darkness for breeding mistrust.

In particular, the aggregate short interest in each stock is disclosed only twice a month, and with a lag of several days.[36] This means that investors are making trading decisions based on data that may be weeks old in an environment in which conditions change much more quickly.

Retail investors have easy access to the stale bimonthly short-interest data. It is widely reported on free web sites such as Yahoo!. Retail investors have less access to more timely data such as IHS Markit's data on stock lending that shows the degree of utilization of shares available for lending and stock lending rates.

The aggregate stock-by-stock short interest data are far from perfect. As they are collected from FINRA member firms and uploaded to FINRA in Excel spreadsheets. With so many different reporting firms, errors do occur.[37] However, even this imperfect data can be useful, and would be even more useful with more frequent reporting.

Daily disclosure of short interest on a stock-by-stock basis will help to dispel conspiracy theories as well as alert the market (and regulators) to unusual increases in short interest. More frequent and more timely reporting will help to level the informational playing field between retail and institutional investors.

[35] For a look at the ethics of short selling, see Angel, James J., and Douglas M. McCabe. "The business ethics of short selling and naked short selling." *Journal of Business Ethics* 85.1 (2009): 239-249.

[36] http://nasdaqtrader.com/Trader.aspx?id=ShortInterest . Also, see https://www.finra.org/filing-reporting/short-interest/regulation-filing-applications-instructions

[37] For one of many examples, see https://www.finra.org/media-center/news-releases/2015/finra-fines-deutsche-bank-securities-inc-14-million-violating-reg-sho .

Form 13F filings should include short as well as long holdings.

Another area with a lack of transparency is in the disclosure of institutional short positions. Such a lack of disclosure makes it easier for the bad guys to hide, while the innocent get blamed.

Section 13(f) of the Securities Exchange Act requires institutional investors managing more than $100 million to disclose their equity holdings.[38] The SEC's current FAQ guidance for Form 13F mistakenly contains explicit instructions to NOT report short positions in equities or options.[39] This is a mistake that should be corrected. There is no reason the transparency requirements in 13(f) should not apply equally to short as well as long holdings. The same public interest concerns about the activities of institutional investors apply equally to the short side as the long side of their holdings. Indeed, given the potential for manipulative short selling, the public interest concerns are even stronger for short positions. In addition to price manipulation, short selling can also be used to manipulate corporate governance through "empty voting" in shareholder votes.[40] Better disclosure of short positions would make it easier to detect such behavior, which currently is extremely difficult to detect.

It should be noted that the European Union has a ***lower*** threshold for reporting short positions than long positions.[41]

Nevertheless, the Commission has repeatedly turned a deaf ear to the repeated pleas of issuers, exchanges, and investors for better transparency around short selling.[42] The SEC should amend its Form 13F FAQ guidance to clarify that holdings includes short holdings as well as long holdings. FAQs generally don't go through the notice and comment process, so this can be done quickly and easily.

The SEC's traditional Form 13F guidance is a mistaken interpretation of the statute as well as of the more recent will of Congress. The statute speaks of "holdings" and requires reports for "each such equity security held." Given a lack of an official statutory definition of "equity security held," it is certainly within the Commissions interpretive power to interpret "holdings" as the contents of a portfolio, not just

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[38] 15 U.S. Code § 78m

[39] See questions 41 and 43 of the FAQ at https://www.sec.gov/divisions/investment/13ffaq.htm.

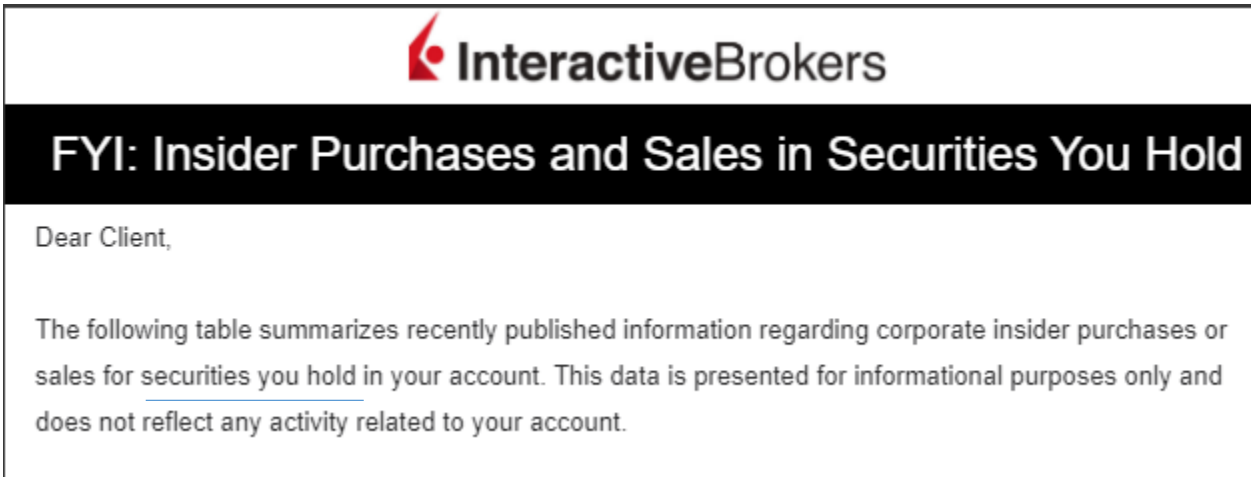
[40] A manipulator who wanted to affect the outcome of a shareholder vote could go long in one account and then hedge the position either by short selling in another account or through derivatives. For example, a bad actor with a large position in one firm, could engage in empty voting to disrupt a competitor of that firm, such as through blocking a value-enhancing merger. See Brav, Alon, and Richmond D. Mathews. "Empty voting and the efficiency of corporate governance." *Journal of Financial Economics* 99.2 (2011): 289-307. Also see Hu, Henry TC, and Bernard Black. "The new vote buying: Empty voting and hidden (morphable) ownership." *S. Cal. L. Rev.* 79 (2005): 811.

[41] The EU requires short positions greater than 0.1% to be reported to regulators and greater than 0.5% to be reported publicly. See https://www.esma.europa.eu/regulation/trading/short-selling.

[42] See for example, various petitions for rulemaking including https://www.sec.gov/rules/petitions/2020/petn4-758.pdf, https://www.sec.gov/rules/petitions/2017/petn4-712.pdf, https://www.sec.gov/rules/petitions/2015/petn4-691.pdf, and https://www.sec.gov/rules/petitions/2015/petn4-689.pdf .

the long positions. This is indeed the common understanding of the phrase. For example, Investopedia defines holding as, "Holdings are the contents of an investment portfolio held by an individual or entity, such as a mutual fund or a pension fund."[43] Short positions are clearly part of the contents of a portfolio.

Here is another example of how the word "hold" is commonly understood in the financial world. Interactive Brokers regularly sends me a list of insider purchases and sales in securities I hold. Here is an excerpt from a recent email they sent me:


InteractiveBrokers

FYI: Insider Purchases and Sales in Securities You Hold

Dear Client,

The following table summarizes recently published information regarding corporate insider purchases or sales for securities you hold in your account. This data is presented for informational purposes only and does not reflect any activity related to your account.

The table provided by Interactive Brokers includes insider purchases and sales in securities in which I hold a short position, **not just the securities in which I hold a long position.** The SEC should accept that the standard financial usage of the word "holdings" includes both long and short positions and modify the instructions to Form 13F to explicitly include short positions.

Here is yet another example demonstrating that the standard usage of the word "holdings" in the finance profession includes short as well as long positions. There is a class of mutual funds known as long-short funds that engage in short selling. Like most mutual funds, most of these mutual funds put out fact sheets that provide useful information about the funds. I did a search on mutualfund.com and identified 30 long-short funds with more than $115 million in assets. Of these 30 long-short funds, 23 of them explicitly included short positions as "holdings" on their fact sheets or on their web sites. None of them posted only long positions as holdings, except for one fund which only posted its largest holdings which all happened to be long. Thus, it is a common usage in financial markets to include short positions as well as long positions when discussing holdings.

The SEC's own instructions for Form N-Q also treat short positions as holdings.

The SEC's directions to exclude short holdings from Form 13F is even more puzzling given that the instructions to Form N-Q (Quarterly Schedule of Portfolio Holdings of Registered Management

[43] https://www.investopedia.com/terms/h/holdings.asp

Investment Company) call for the complete schedule of investments.[44] Thus, the SEC itself uses the common financial usage of "holdings" to refer to both long and short positions. The SEC should be consistent and revise the guidance for Form 13F to explicitly include short positions.

Option positions equivalent to short equity holdings are already included in 13F requirements.

Another reason to report short positions is that some short equity exposures are already included in Form 13F. Options are clearly included in the official list of 13F securities.[45] Indeed, here is a sample from a recent 13F list:

Run Date: 7/2/2020 ** List of Section 13F Securities ** Page 1

Run Time: 10:15 Year: 2020 Qtr: 2 IVM001

CUSIP NO		ISSUER NAME	ISSUER DESCRIPTION	STATUS
B38564 10 8	*	EURONAV NV ANTWERPEN	SHS	
B38564 90 8		EURONAV NV ANTWERPEN	CALL	
B38564 95 8		EURONAV NV ANTWERPEN	PUT	
D18190 89 8	*	DEUTSCHE BANK A G	NAMEN AKT	
D18190 90 8		DEUTSCHE BANK A G	CALL	
D18190 95 8		DEUTSCHE BANK A G	PUT	
F21107 10 1	*	CONSTELLIUM SE	CL A SHS	
F21107 90 1		CONSTELLIUM SE	CALL	
F21107 95 1		CONSTELLIUM SE	PUT	

It is well known from "European Put-Call Parity" that a long position in a put option has the same payoff and is economically equivalent to the payoff from a combination of shorting the stock and owning a call. It is common sense that, if one type of position is included in the disclosure, then an economically equivalent position should also be included. Thus, short equity positions should be included in 13F filings just as long put options are required. Similarly, short option positions should also be included in the disclosures.

[44] https://www.sec.gov/files/formn-q.pdf

[45] https://www.sec.gov/divisions/investment/13f/13flist2020q2.pdf

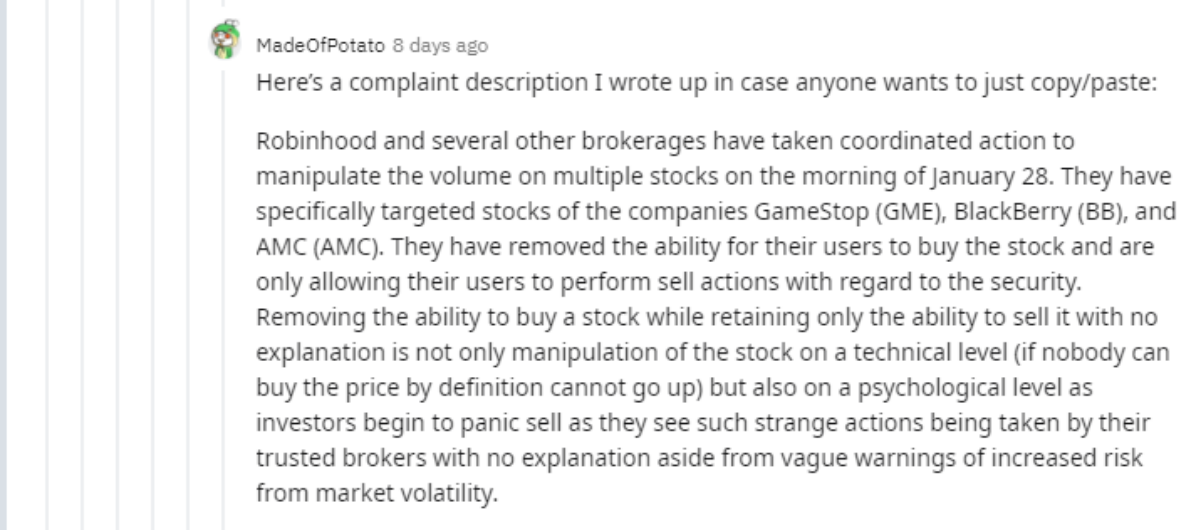
Dodd-Frank expanded 13(f), so a reinterpretation is within the recent intent of the law.

Congress amended 13(f) in 2010 to include "purchase ***or sale*** of a security-based swap " in defining the assets under management that would be counted for the $100 million threshold that triggers the requirement to disclose. This indicates Congressional thinking that long and short positions, as well as derivatives, should be counted by its use of the words (***emphasis*** added) "purchase ***or sale***." Even if the Commission's overly narrow interpretation of 13(f) were somehow defensible prior to Dodd-Frank, it became less defensible after Congress added its intention to count long and short swap transactions. The Commission should update the instructions and FAQ to Form 13F as part of its unfinished Dodd-Frank housekeeping.

Our antiquated T+2 settlement infrastructure created bottlenecks.

The price of GameStop skyrocketed with high volatility in January 2021. Retail investors at brokers including Robinhood joined the party. On January 28, Robinhood restricted trading in GameStop and several other securities, citing collateral demands from its clearinghouse.[46] Several other brokers including TDAmeritrade and InteractiveBrokers, also restricted trading.[47] This created a furor as some viewed it as a conspiracy to manipulate prices.[48]

Here is one of the cleaner posts from Reddit:



MadeOfPotato 8 days ago

Here's a complaint description I wrote up in case anyone wants to just copy/paste:

Robinhood and several other brokerages have taken coordinated action to manipulate the volume on multiple stocks on the morning of January 28. They have specifically targeted stocks of the companies GameStop (GME), BlackBerry (BB), and AMC (AMC). They have removed the ability for their users to buy the stock and are only allowing their users to perform sell actions with regard to the security. Removing the ability to buy a stock while retaining only the ability to sell it with no explanation is not only manipulation of the stock on a technical level (if nobody can buy the price by definition cannot go up) but also on a psychological level as investors begin to panic sell as they see such strange actions being taken by their trusted brokers with no explanation aside from vague warnings of increased risk from market volatility.

The reality is not that of a massive conspiracy to manipulate prices, but that of a mad dash to deal with the leaks in our antiquated market plumbing. In short, the brokers had to come up with enormous amounts of cash collateral for the trades their customers were making. In order to reduce the need for collateral, they scaled back the ability of their customers to trade the most volatile stocks that were driving the large collateral demands.

In the United States, equity trades are normally settled on "T+2", the second business day after the trade.[49] This means that buyers do not actually pay for the shares and become the beneficial owners until the actual settlement date. Settlement is normally done through the auspices of the Depository Trust and

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[46] https://blog.robinhood.com/news/2021/1/28/keeping-customers-informed-through-market-volatility

[47] Many smaller brokers use a clearing firm to settle their trades at a clearinghouse instead of being a direct member. A clearing firm is a member of a clearinghouse. Brokers that used Apex Clearing to settle their trades were also forced to scale back trading in affected securities. These firms include Webull, M1 Finance, Ally Financial, Tastyworks, and Public.com.

[48] https://www.reddit.com/r/investing/comments/l6wvia/robinhood_and_other_brokers_literally_blocking/

[49] SEC Rule 15c6-1, 17 CFR § 240.15c6-1

Clearing Corporation (DTCC).[50] On T+1, a DTCC subsidiary, the National Stock Clearing Corporation (NSCC) requires participants to post collateral for the cash and securities that they need to deliver or receive on T+2. It is reasonable to demand collateral because NSCC guarantees settlement at this point. If a brokerage firm dies on T+1, NSCC/DTCC will make the original trade counterparties whole. The amount of collateral required is based on a complex formula that is based on the quantity of securities awaiting settlement, their volatility, and projected trading on T+1. As the customers of these retail firms were loading up on highly volatile securities and were likely to continue to do so, the required amount of collateral increased dramatically. Total industry collateral requirements jumped overnight from $26 billion to $33.5 billion on January 28, 2021.[51] DTCC reports an average collateral requirement of $13.4 billion.[52] Brokers such as Robinhood scrambled to raise additional capital.[53]

This capital crunch was exacerbated by SEC Rule 15c3-3, the Customer Protection Rule.[54] This very important rule requires brokerage firms to segregate customer assets from those of the firm. This protects customers from losing their securities or cash due to abuses by the brokerage firm. In particular, a brokerage firm is not permitted to touch the customer cash to post as collateral on T+1, even for fully paid trades done by the customer.

Note that brokerage firms generally require that retail customers deposit cash before letting them purchase securities.[55]

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[50] Here is a simplified view of how settlement takes place. Most retail investors hold their shares in "street name" in their brokerage accounts. The brokers, in turn, hold the shares in their accounts at the Depository Trust Corporation (DTC), a subsidiary of the Depository Trust and Clearing Corporation (DTCC). DTC, through their nominee name "Cede and Co." is registered as the owner of record on the books of the issuing corporation. On T+1, NSCC calculates who owes what to whom by netting out all of the trades for each broker. Thus, a broker whose customers bought 900 shares and sold 500 shares would have those trades combined into a single 400 share purchase. The broker would put up collateral on T+1 to protect DTCC from the risk that the broker does not show up and pay for the shares on T+2. On T+2, the broker would pay for and receive the 400 shares. This would be done electronically on the books of DTC, so no paper certificates need to be moved.

[51] https://www.bloomberg.com/news/articles/2021-01-29/what-s-the-dtcc-and-how-did-it-stop-gamestop-mania-quicktake

[52] See DTCC, Advancing Together: Leading The Industry to Accelerated Settlement: A White Paper To The Industry. Available at https://www.dtcc.com/-/media/Files/PDFs/White%20Paper/DTCC-Accelerated-Settle-WP-2021.pdf

[53] https://www.nytimes.com/2021/01/29/technology/robinhood-fundraising.html

[54] 17 CFR § 240.15c3-3. For a detailed discussion, see Jamroz, Michael P. "The Customer Protection Rule." *The Business Lawyer* (2002): 1069-1125.

[55] As the US payment system is slow, brokers generally put a hold on the use of funds while they wait for the funds to arrive. (e.g. https://www.interactivebrokers.com/en/general/education/faqs/deposits.php) Some, like Robinhood, provide instant access for some amount once they know the transfer has been initiated. https://robinhood.com/us/en/support/articles/deposit-money-into-your-robinhood-account/ Institutional brokers, on the other hand, often execute trades for institutional clients on a "DVP" (delivery versus payment) basis in which the broker does not hold the client funds at all. The institutional client is trusted to deliver the funds or payment through their custodian or prime broker on the settlement date.

Here is a simplified example of what happened: Customer has cash on trade date T and buys a volatile stock. Broker has to put up collateral at NSCC on date T+1 to cover the delivery of cash for settlement on date T+2. However, because of Rule 15c3-3, the broker cannot use the customer's cash for the collateral. The broker can use the customer's cash on T+2 to pay for the purchased shares.

The T+2 settlement system is an archaic holdover from the days of paper certificates. In the modern (almost) paperless world, there is no need to allow time for paper stock certificates to be moved around. Our modern computing systems give us the ability to settle stock trades much faster. We need to modernize our antiquated settlement system. A lengthy settlement cycle adds risk to the system and ties up collateral. My favorite equation in all of finance is

TIME = RISK

Shortening the settlement cycle to T+1, or better yet, T+0, will result in a substantial reduction in this risk along with the collateral requirements in the settlement system. We should move quickly to a T+1 and then T+midnight settlement.[56]

[56] There are still some good technical reasons not to settle every trade instantly in what is known as Gross Real Time Settlement (GRTS). Many trades from market makers and arbitrageurs are closed out intraday. GRTS would result in a massive increase in the number of payments and security movements sloshing through our financial system, with additional cost and risk. https://www.dtcc.com/dtcc-connection/articles/2021/february/04/why-shortening-the-settlement-cycle-will-benefit-the-industry-and-investors Saudi Arabia actually moved from real-time settlement to T+2 in 2017. https://www.tadawul.com.sa/wps/portal/tadawul/knowledge-center/about/settlement-cycle?locale=en

Is gamification good or bad for the market?

Brokerage firms such as Robinhood have been criticized and even sued for the gamification of investing and for turning the market into a casino.[57] The combination of zero explicit commissions and an easy-to-use interface may entice investors into making ill-advised trades. Indeed, Robinhood's fun confetti that shows up after a trade provides an immediate reward that may stimulate investors to trade even more.

Robinhood is really the epitome of the promise and the peril of fintech. They have used technology to dramatically lower the cost of brokerage services and roll them out to a previously underserved market, younger people with relatively small amounts to invest. In a world where billions of people still don't have access to basic financial services like a payment account, there is a real need for more fintech advances. There is a need to make sure that these new fintech-enabled services are beneficial and not predatory. As fintechs often fall between the cracks of our current fragmented financial regulatory structure, it may be difficult to achieve the traditional goals of financial regulation: customer protection, crime prevention, economic growth, and economic stability.

Some of the new and inexperience investors in the market will undoubtedly lose some money. Indeed, even old and experienced investors sometimes lose money as markets are volatile. These inexperienced investors are learning by doing. I know that I made some dumb trades when I was younger that taught me important lessons. Fortunately, most of these new investors are speculating with relatively small amounts of money. It has been reported that the average Robinhood account size is between $1,000 and $5,000.[58] That is also roughly the range of a cost of semester long class in finance at our universities.

Undoubtedly, some market participants are scratching their gaming itch by using the market for short-term speculation. Is this a bad thing? Not necessarily. It is far more socially beneficial for someone to speculate on stocks than for them to go to a casino or to buy lottery tickets. Their close attention to the market helps to bring in more information, and this benefits all investors. Their active trading increases market liquidity, and this reduces transaction costs for long-term buy-and-hold investors like me and many other retirement savers. They bring in capital that helps to fund the long-term growth of the economy.

Finally, and perhaps most importantly, they bring in risk bearing capacity. The long-term health and growth of our economy depends on investors who are willing to take risks. We need people who are willing to invest in companies that might fail but that might also bring great benefits if they succeed. Investors' enthusiasm for Tesla stock has led to a tremendous allocation of capital towards clean electric vehicles. Our capital markets have funded hundreds of biotech companies. They are working on the vaccines and treatments for awful diseases that we desperately need. Each individual biotech is a big risk. Many, if not most, of them will be underwhelming investments if not outright failures. It only takes a few big successes, however, to make all of the failures worthwhile.

We need investors who are willing to take risks. We are all better off if we manage to draw the gamers away from lottery tickets and into the market. However, we need to make sure that this is done properly and we don't cut corners in terms of consumer protection. We need to make sure that our market

[57] https://www.sec.state.ma.us/sct/current/sctrobinhood/MSD-Robinhood-Financial-LLC-Complaint-E-2020-0047.pdf

[58] https://www.fool.com/investing/2020/06/22/robinhood-is-not-moving-the-entire-stock-market.aspx

infrastructure can at best prevent egregious dislocations in price such as occurred with Phunware and GameStop or at least survive them.

Some risk-taking investors will lose money. That is what risk means. The goal of financial regulation cannot and should not be to eliminate all risk. Instead, the goal of the regulators should be to make sure that investors have the information they need to make their own decisions about the risks they are willing to take, and to make sure that the market is free of fraud and manipulation.

Rule 606 needs updating to provide better execution quality statistics in a payment for order flow world.

The recent attention on Robinhood and its "commission-free" trading has brought intense scrutiny on how Robinhood and other brokers can make money even without charging commissions. What many observers have failed to recognize is that the industry's business model has changed. Brokers have shifted away from the traditional commission-based model towards a commercial banking model. Customers deposit cash in commercial banks who then lend out the cash at a profit while charging fees for other services. The banks provide free bill paying as a customer service. Now investors deposit their cash and securities with brokers who lend them out for a profit while selling other services such as wealth management. The brokers provide free stock trading as a customer service.

Robinhood receives payments from the banks who hold the cash for Robinhood customers, and also when customers swipe their debit cards.[59] Robinhood also receives payments from the brokerage firms to whom they route orders in a controversial practice known as payment for order flow (PFOF). Exchanges such as the NYSE and Nasdaq match buyers and sellers and do not take a position in the stocks themselves. They have to pay for their computerized matching facilities and thus charge brokers for filling customer market orders. Market makers, on the other hand, are willing to pay brokers for the ability to take the other side of customer orders.

The business of equity market makers is similar to that of car dealers.[60] A customer who wants to sell their car quickly can sell their car at the dealer's trade-in price. The dealer does not want to drive the car long-term, but desires to sell the car quickly to another customer at the retail price. Of course, car buyers can sell the car themselves through ads in places like Facebook or Craigslist. The dealers are really selling the service of convenience and liquidity. Similarly, market makers offer to buy from customers at their bid price and sell to them at a slightly higher offer or ask price. Competition from market makers and other investors keeps the "bid-ask spread" between the bid and ask prices quite small. The market makers are selling the service of convenience for investors who want to trade quickly. They are not long-term investors, nor should they be.

Market makers particularly like to take the other side of small retail trades because they know that those retail traders are not sophisticated institutional investors such as hedge funds. Market makers know that they can lose when they trade with large institutions that know more than they do. Market makers can buy from a retail order at the bid and sell at the ask or offer and pocket the bid-ask spread. They don't need to worry that retail investors as a group have better information and will dump shares on the market maker just before bad news is announced. Competition among market makers for retail order flow is so intense that market makers are willing to pay for order flow and offer various levels of "price improvement" – prices better than the national best bid and offer (NBBO) prices.

I am very happy that my brokers sell my order flow to market makers. While I don't get a direct payment for each trade, the revenue subsidizes commission-free trading.

[59] See https://robinhood.com/us/en/support/articles/how-robinhood-makes-money/

[60] In contrast, an option market maker is more like a custom tailor who manufactures options for customers.

However, PFOF raises the issue of whether the brokers are fulfilling their duty of getting "best execution" for their clients.[61] Are brokers merely sending orders to the market maker who pays the most, regardless of execution quality? Some view PFOF as creating a conflict of interest at best or a bribe or kickback at worst. However, retail order flow is so valuable relative to other types of order flow that attempts to ban it are likely to drive it underground. Instead of paying directly for order flow in a transparent and disclosed manner, there will be temptations for market makers to offer under the table *quid pro quo* deals. Sales people may offer ever more enticing entertainment to the decision makers at the retail brokers.

The SEC has dealt with this in two ways. First, the SEC monitors best execution practices at retail firms and fines them when they are inadequate.[62] Second, the SEC requires disclosure of the payments through Rule 606 disclosures that disclose where the orders are sent and how much the broker is paid.[63] However, the Rule 606 disclosures do not provide investors with what we really need, which is information about how good a job our brokers are doing in executing our orders.

Brokers should be required to display execution quality statistics, not just routing information.

SEC Rule 606 requires brokers to provide extensive information to institutional clients about how and where their orders are routed. Again, there is a big gap between the information given to institutional investors and to retail investors. Under SEC Rule 606, brokers must disclose where they route orders and how much they get paid for doing so. Unfortunately, this doesn't help a potential customer determine whether the broker is doing a good job or not. A better solution would be to require each broker to produce execution quality statistics for their clients. Most brokers already gather this information to monitor whether they are giving their customers best execution. Brokerage firms should release two sets of data:

- Each trade confirmation for marketable orders should contain the NBBO at the time of order receipt (if the order was received during normal trading hours) and calculate the difference between the quote at the time the order was received and the execution price. The confirmation would also display the date and time of the order receipt and the date and time of order execution.

[61] See FINRA Rule 5310. https://www.finra.org/rules-guidance/rulebooks/finra-rules/5310

[62] For an example, see https://www.sec.gov/news/press-release/2020-321

[63] 17 CFR § 242.606. For a sample of Robinhood's disclosure, see https://cdn.robinhood.com/assets/robinhood/legal/RHS%20SEC%20Rule%20606a%20and%20607%20Disclosure%20Report%20Q4%202020.pdf. Schwab's can be found at https://content.schwab.com/drupal_dependencies/psr/606/2020-Q4-Schwab-Quarterly-Report.pdf.

- Brokerage firms should be required to prominently display on their web sites summary execution quality statistics in an easy to interpret manner. Such a display would allow consumers to quickly compare execution quality across brokerage firms and thus assist consumers in choosing brokerage firms that provide good execution quality. Customer complaints are also an important part of execution quality, so the number should be displayed relative to the number of orders. The appendix contains an example of what such a report could look like.

Summary and recommendations

The infrastructure of the U.S. equity market usually works pretty well. Except when it doesn't. In recent years, transaction costs have dropped dramatically. Today's investors have access to instant low-cost information that was unobtainable by anyone a generation ago. The internet has truly leveled the playing field. However, even the best can get better. The GameStonk episode has revealed some leaks in our market plumbing that need to be fixed. Prices that spike to absurd levels are not the sign of a fair and orderly market. Such price dislocations damage the reputation of the market for market integrity and impose losses on innocent bystanders such as index-fund investors.

The following needs to be done:

1. The SEC needs to investigate to figure out exactly what happened and prosecute any wrongdoing it finds. This is a good opportunity to utilize the nascent Consolidated Audit Trail (CAT) system. The investigation should include the role of industry professionals as well as bots in social media. However, the SEC has long been an extremely underfunded entity without the resources to do its job right. The total SEC budget since its founding in 1934 has only been $40 billion, adjusted for inflation, less than investors lost from one Enron (approximately $70 billion).[64] We have been penny wise and pound foolish in our funding of the SEC.[65]

2. Retail investors should be able to benefit from renting out shares to short sellers just like the institutions do. Rule 15c3-3 needs to be modernized to increase the ability of investors to lend out fully-paid shares, but only with the shareholder's permission. Identical rules should apply to the same shares in an account regardless of whether there is a debit balance in the account. The increased availability of shares for lending will help to prevent the extreme price dislocations seen in short squeezes.

3. Payment for order flow (PFOF) raises questions about whether brokers are ignoring execution quality due to their acceptance of PFOF. Investors need better information about execution quality so they can see for themselves how their brokers are performing. In particular, SEC Rule 606 needs to be updated to require brokers to report useful standardized execution quality statistics to retail investors.

4. Lack of transparency around short selling makes it harder to spot unusual market developments and breeds conspiracy theories. There needs to be better disclosure of short selling. In particular, aggregate short interest in individual stocks should be reported daily instead of biweekly, and Form 13F instructions should be clarified to require reporting of short positions by institutions.

[64] The SEC's cumulative budget from 1934 through 2020 was approximately $28 billion before adjusting for inflation.

[65] While beyond the scope of this paper, the entire US regulatory structure is long overdue for an overhaul. We now have hundreds of regulatory agencies at the state and federal level that don't always play nicely with each other. Congress needs to overhaul and streamline this structure. It will take some time to accomplish this, but the conversations need to begin.

5. The SEC should implement the Congressional mandate in Dodd-Frank §984 through the implementation of a ticker tape for stock lending transactions.

6. The two-day settlement cycle needs to be shortened to reduce risk in the system along with collateral needs. We should move expeditiously to T+1 and then towards T+midnight.

7. The draconian buy-in at any price nature of SEC Rule 204 needs to be replaced with a system of late fees similar to that used in the US Treasury market. This will prevent buy-ins from pushing prices to astronomical levels that impose losses on innocent bystanders such as index-fund investors.

8. The SEC should conduct research to determine whether high levels of short interest relative to shares outstanding increase the likelihood of extreme price dislocations. If so, consideration should be given to restricting new short positions in such stocks to prevent dislocations. However, exceptions should be given to legitimate market makers and derivative arbitrageurs.

9. Directional short sellers have a tax incentive to never close out a successful short position. Short sales should be marked to market at the end of each year for tax purposes. This will eliminate the incentive for short sellers to stay short indefinitely and to continue to badmouth a company even after the stock price has fallen.

Appendix: Sample Execution Quality Report

The existence of payment for order flow (PFOF) raises questions about whether brokers are sacrificing execution quality in the light of the payments they receive. Unfortunately, it is difficult for consumers to compare execution quality across brokerage firms. Brokers should be required the disclose the execution quality they deliver. As the overwhelming majority of retail trades are less than 200 shares, a simple format that displays the results only for orders less than 200 shares might be appropriate. Alternatively, a dollar threshold of $5,000 or less might be appropriate. Here is an example of what such a report card might look like:

Execution Quality Report Generic Broker Marketable Retail Orders Received During Normal Trading Hours (9:30 am to 4:00 pm) Orders less than 200 shares (including fractional shares) Month, Year	
Average price relative to quoted price (Higher is better)	$0.000 (0.00%)
Percent executed outside the bid-ask spread	0.25%
Percent executed at quote	78.00%
Percent executed inside bid-ask spread	21.75%
Number of orders	50,280
Number of complaints regarding these orders	2
Average price relative to quote is the average for buy orders of (Ask Quote – Execution Price) and for sell orders of (Execution Price – Bid Quote).	

Note that this table gives the information really relevant for a retail investor: The trade-through rate (getting an execution price worse than the quote), the likelihood of something bad happening (the complaint rate), and the likelihood and magnitude of price improvement.

If one wants more granularity, one could break the statistics down by size of order and add limit order execution quality as follows:

Execution Quality Report
Generic Broker
Marketable Retail Orders Received During Normal Trading Hours (9:30 am to 4:00 pm)
Month, Year

	Odd lots < 100 shares (including fractional shares)	100-499 shares	500-999 shares	1000 +shares
Average price relative to quote (Higher is better)	$0.000 0.00%	$0.001 0.01%	($0.001) (0.001%)	($0.015) (0.008%)
Percent executed outside the bid-ask spread	0.00%	0.35%	1.5%	5.2%
Percent executed at quote	100.00%	84.15%	87.23%	70.12%
Percent executed inside bid-ask spread (when spread > 1 cent)	0.00%	20.10%	12.98%	3.14%
Average execution time (seconds)	.8 seconds	.6 seconds	1.5	9.8
Number of marketable orders	5,280	3,141,592	2,718	1,414
Number of other orders	1,234	2,718,281	5,280	1,732
Number of complaints (all orders)	0	1	2	0

This table displays execution quality statistics for market (including marketable limit) orders received during regular trading hours. Other orders consist of orders received outside regular trading hours (9:30 am to 4:00 pm EST), limit orders, stop orders, and orders with special handling conditions including "not held" orders or orders in which the customer specified that the order should be routed to a specific market.

Average price relative to quote is the average for buy orders of (Ask Quote – Execution Price) and for sell orders of (Execution Price – Bid Quote).

For marketable orders received outside normal market hours that are held until the next open, what matters is the execution price relative to the open:

Execution Quality Report Generic Broker Market and Marketable Limit Orders Received Outside Normal Business Hours That Are Held to the Next Market Open Month, Year				
	Odd lots < 100 shares	100-499 shares	500-999 shares	1000 +shares
Average price relative to official opening price (Higher is better)	$0.00	$0.001	($.002)	($0.008)
Number of orders	5,280	1,234,567	654,321	17,320
Number of complaints	0	4	1	2
Average price relative to official opening price is the average for buy orders of (Official opening price– Execution Price) and for sell orders of (Execution Price – Official opening price)				

After hours trading is very different from trading during standard market hours. Brokers offering after-hours trading should also display similar statistics for after-hours trading.

Execution Quality Report Generic Broker Marketable and Executable Retail Orders Received During Extended Trading Hours (Before 9:30 AM or after 4:00 PM) Orders less than 200 shares (including fractional shares) Month, Year	
Average price relative to quoted price (Higher is better)	$0.000 (0.00%)
Percent executed outside the bid-ask spread	0.25%
Percent executed at quote	88.00%
Percent executed inside bid-ask spread	11.75%
Number of orders	5,280
Number of complaints regarding these orders	5
Average price relative to quote is the average for buy orders of (Ask Quote – Execution Price) and for sell orders of (Execution Price – Bid Quote).	

With non-marketable limit orders, what matters is the skill of the broker in choosing the venue with the highest probability of filling the order. Measuring execution quality is difficult in that some limit orders are placed far away from the NBBO and are unlikely to be filled. Others are cancelled after varying lengths of time for any number of reasons. It may be difficult to tell whether a cancelled order would have been filled later had it not been cancelled. However, probabilities of execution can be measured for uncancelled orders. Here is an example of some useful information on retail limit order execution quality.

Execution Quality Report Generic Broker Non Marketable Limit Orders Received Orders placed during normal market hours but not cancelled within 30 minutes of submission Month, Year				
	Odd lots < 100 shares	100-499 shares	500-999 shares	1000 +shares
Orders with limit priced in between NBBO at time of order submission. Percentage of orders filled.	75.2%	66.6%	50.3%	45.1%
Number of orders	5,280	1,234,567	654,321	17,320
Orders placed at the NBBO Percentage of orders filled	50.2%	45.6%	35%	25%
Number of orders	7,777	2,345,678	345,678	45,678
Orders placed one tick outside the NBBO	20.0%	15.1%	13.9%	12.1%
Number of orders	6,666	122,222	22,222	11,111