EXHIBIT 28

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA

CASE NO. 21-2989-MDL-ALTONAGA/Damian

In re: JANUARY 2021 SHORT SQUEEZE TRADING LITIGATION

Rebuttal Expert Report of Professor Steven Grenadier

March 28, 2023

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I. Introduction

1. I have been asked by counsel for Robinhood Markets, Inc., Robinhood Financial LLC, and Robinhood Securities, LLC (together, "Robinhood" or "the Company") to assess certain issues concerning market efficiency and a potential class-wide damages methodology in this litigation. In the expert report I submitted on February 16, 2023 (the "Grenadier Report"),[1] I opined that:

   a. The evidence is inconsistent with the notion that the markets for the "At-Issue Stocks"[2] were efficient leading up to and throughout the proposed Class Period, collectively the "Relevant Period";[3]
   b. Plaintiffs' liability theory is inconsistent with the notion of market efficiency, that is, if the At-Issue Stocks traded in efficient markets, one would not expect Robinhood's trading restrictions to have "artificially distorted" prices as Plaintiffs allege; and
   c. Plaintiffs face fundamental challenges in providing a class-wide damages methodology that is consistent with their theory of liability in this action.

2. Since then, I have been asked by counsel to review and respond to the analysis and opinions in the Declaration of Adam Werner dated February 16, 2023 ("Werner Declaration"),[4] which concludes that:

   a. "Seven of the nine" At-Issue Stocks (AMC, BB, BBBY, EXPR, GME, NOK, and TRVG) "traded in an efficient market" during the one-year period before the proposed Class Period;[5] and

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[1] All references to the "Grenadier Report" are to my corrected report filed February 24, 2023 (Corrected Expert Report of Professor Steven Grenadier, *In re: January 2021 Short Squeeze Trading Litigation*, February 24, 2023).
[2] Specifically, these refer to the common stock of AMC Entertainment Holdings, Inc. ("AMC"), Bed Bath & Beyond Inc. ("Bed Bath & Beyond" or "BBBY"), BlackBerry Limited ("BlackBerry" or "BB"), Express, Inc. ("Express" or "EXPR"), GameStop Corp. ("GameStop" or "GME"), Koss Corporation ("Koss" or "KOSS"), Tootsie Roll Industries Inc. ("Tootsie Roll" or "TR"), and American Depositary Shares ("ADRs") of Nokia Corp. ("Nokia" or "NOK") and trivago N.V. ("Trivago" or "TRVG").
[3] I considered January 21 through January 27, 2021 as the period shortly before the start of the proposed Class Period, which refers to the period from January 28, 2021 to February 4, 2021. Therefore, the Relevant Period includes the period from January 21 through February 4, 2021.
[4] Declaration of Dr. Adam Werner, *In re: January 2021 Short Squeeze Trading Litigation*, February 16, 2023.
[5] Werner Declaration, ¶ 8.

b. "With expert assistance, the finder of fact in this matter will be able to compute damages using a common class-wide methodology that applies to the calculation of damages for each and every Class member."[6]

3. A supplemental list of the documents that I have considered in forming my opinions is attached as **Appendix A**. My work in this matter is ongoing. The opinions presented in this report are the result of the information available to me as of the report date. I reserve the right to supplement or modify my opinions if new information comes to light and to respond to any additional report(s) or opinions offered by other experts.[7]

II. Summary of Opinions

4. A summary of my opinions in this matter is provided below. The full bases for these opinions are detailed in the sections that follow.

5. **Opinion 1**: The Werner Declaration does not alter my conclusion that the evidence is inconsistent with the notion that the markets for the At-Issue Stocks were efficient leading up to and throughout the Proposed Class Period.

6. First, Dr. Werner fails to analyze or opine on whether the At-Issue Stocks traded in efficient markets during the proposed Class Period *at all*, attributing his decision at least partly to the proposed Class Period being affected by the alleged "market manipulation."[8]

7. Dr. Werner fails to explain why allegations of manipulation would prevent him from examining market efficiency during the proposed Class Period. To the extent that Dr. Werner is claiming that the markets for the At-Issue Stocks were made inefficient by Robinhood's alleged market manipulation (i.e., Robinhood's trading restrictions), as discussed in the Grenadier Report, the mere fact that a brokerage implemented restrictions on a subset of retail investors

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[6] Werner Declaration, ¶ 8.

[7] As noted in the Grenadier Report, I am being compensated at my standard billing rate of $1,250 per hour. I have been assisted in this matter by staff of Cornerstone Research, who worked under my direction. I receive compensation from Cornerstone Research based on its collected staff billings for its support of me in this matter. Neither my compensation in this matter nor my compensation from Cornerstone Research is in any way contingent or based on the content of my opinion or the outcome of this or any other matter.

[8] Dr. Werner states that he did not analyze whether the At-Issue Stocks traded in efficient markets during the proposed Class Period "[d]ue to the short length of the Class Period, and the allegations of market manipulation that occurred during the Class Period" (Werner Declaration, fn. 1). To the extent Dr. Werner attributes his decision to the "short length of the Class Period," he fails to explain how the length of the Class Period would prevent him from being able to examine market efficiency for the At-Issue Stocks during that period at all.

would not necessarily imply that market prices would be "artificially" distorted, or that the market would be inefficient as a result.

8. Furthermore, any supposed "distortions" allegedly caused by Robinhood's trading restrictions would have been observable to market participants because the restrictions and the "distortions," if any, were public. Therefore, during the proposed Class Period, to the extent that putative class members were aware of Robinhood's restrictions and what Plaintiffs allege were "artificially distorted" prices, they would have transacted based on their own individual information or preferences without trusting the integrity of the market prices.[9] As a financial economist, I am not aware of a class-wide approach to determine which putative class members believed that prices were efficient when transacting the At-Issue Stocks during the proposed Class Period and which believed the prices were "artificially distorted," without asking each putative class member individually.

9. Second, instead of examining market efficiency in the period directly leading up to and during the proposed Class Period, Dr. Werner examines the full year prior to the start of the proposed Class Period, from January 28, 2020 through January 27, 2021. This approach masks the highly unusual market conditions during the "meme stock" episode immediately before and during the proposed Class Period. In fact, Dr. Werner does not even mention the "meme stock" episode nor any of the features that characterized this period—such as coordinated trading, short squeezes, attempted short squeezes, and short-sale constraints—that are inconsistent with or can impede market efficiency. His approach, which looks at the general behavior of each At-Issue Stock over an extended period that consists mostly of the "normal" preceding period, does not allow Dr. Werner to draw reliable conclusions about market efficiency during the highly unusual period immediately before and during the proposed Class Period.

10. Third, Dr. Werner's assessment of the fifth *Cammer* factor is fatally flawed, as it does not address the lack of a causal relationship between *new, value-relevant* information and large price movements immediately prior to and during the proposed Class Period, evidence that I have provided in the Grenadier Report.

11. Specifically, Dr. Werner purports to assess whether there is a "cause and effect" relationship between stock price movements and information by examining "whether or not a

[9] See, for example, Deposition of Abraham Huacuja, March 21, 2023, 94:15–21, 97:3–25.

stock's price reacts differently on days in which new information is revealed ('news days') versus all other days ('non news days')." Dr. Werner determines the set of "news days" by obtaining a list of articles for each stock from Factiva and categorizing the 10% of trading days with the largest number of news articles as "high information flow" days. Crucially, this approach does *not* assess whether there was actually *new, value-relevant* information on any given day. Information that was not new or value-relevant would not be expected to cause a sustained, large price movement in an efficient market.

12. Dr. Werner's flawed approach fails to acknowledge that much of the "news" in the period leading up to the proposed Class Period, coupled with the extraordinary price movements at the time, precisely showcases evidence *inconsistent with market efficiency*. Much of the "news" was about the companies' observed stock price movements or other information that would not be expected to cause investors to revise their estimates of the companies' expected cash flows or the risk associated with those cash flows, and therefore would not be expected to cause a sustained, large price movement if the market was efficient. First, many news articles in Dr. Werner's analysis describe the price movements as being detached from value-relevant information. Further, many news articles in Dr. Werner's analysis attribute the price movements to coordinated trading, short squeezes, attempted short squeezes, and short-sale constraints. Finally, Dr. Werner's news selection is subject to circular reasoning: he purports to test a cause-and-effect relationship between news and stock price movements (i.e., whether news "caused" price movements), but his "news" includes numerous articles about the observed stock price movements themselves. In contrast to Dr. Werner's flawed approach, in the Grenadier Report, I found that new, value-relevant information about the financial or business conditions of the nine at-issue companies cannot explain the large price run-up and reversal that the At-Issue Stocks collectively experienced during the Relevant Period.

13. To illustrate how the measure of "news" could affect Dr. Werner's test, I rerun his test of the fifth *Cammer* factor but identify "news days" using other definitions of "news" that Dr. Werner has used in the past and that are less susceptible to erroneously including non-value-relevant information—such as commentary on retail investor coordination, short squeezes,

attempted short squeezes, short-sale constraints, and observed price movements—as "news."[10] Setting aside all the other issues with Dr. Werner's test, changing the definition of "news days" by itself reverses his results for a majority of the At-Issue Stocks. Thus, Dr. Werner's test fails to provide evidence that the At-Issue Stocks traded in efficient markets.

14. Fourth, Dr. Werner's assessment of the other *Cammer* and *Unger/Krogman* factors fails to address evidence inconsistent with market efficiency during the Relevant Period. Here, high trading volume and analyst coverage are inconsistent with market efficiency if they reflect extremely large volumes of trading, and analyst commentary on such trading, in light of potential coordinated trading, short squeezes, attempted short squeezes, and short-sale constraints.

15. Indeed, Dr. Werner's analysis of *Cammer* Factor 2 involves simply tabulating the number of analysts covering each of the At-Issue Stocks. This is similar to Dr. Werner's treatment of the fifth *Cammer* factor, where he considers the volume of news articles without considering the content of the news. Many analysts during the Relevant Period directly commented on the disconnect between prices of the At-Issue Stocks and new, value-relevant information. Dr. Werner relies on the existence of analyst coverage as evidence supporting market efficiency while ignoring the fact that the actual analysts' commentary questions market efficiency.

16. Dr. Werner's analysis of *Cammer* Factor 3 fails to address evidence of constraints on arbitrageurs. While Dr. Werner acknowledges the importance of arbitrageurs for market efficiency, his analysis of *Cammer* Factor 3 is limited to tabulating the number of market makers and institutional investors for each of the At-Issue Stocks. He conducts no analysis to assess the extent to which arbitrageurs could and did perform the function described in *Cammer*: trading to allow prices to quickly and fully incorporate information. As I showed in the Grenadier Report, analysts, academic studies, other observers, and Plaintiffs themselves attribute the price movements during the Relevant Period to coordinated trading, short squeezes, and attempted short squeezes, and my own analysis of data from the stock lending market provides evidence of constraints that may have inhibited the ability of arbitrageurs and other market participants to sell short certain At-Issue Stocks. Dr. Werner fails to address this evidence. His analysis of *Cammer* Factor 3 therefore cannot inform a finding of market efficiency.

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[10] For example, as discussed in Section III.C.2, Dr. Werner has previously identified "news days" as days with (i) earnings or guidance announcements, (ii) Form 8-K or Form 6-K filings, or (iii) company press releases.

17. **Opinion 2**: Dr. Werner fails to show that there is a damages methodology capable of measuring damages on a class-wide basis consistent with Plaintiffs' theory of liability.

18. In the Grenadier Report, I explained that this case involves unique fact patterns and economic issues that present tremendous challenges for Plaintiffs' ability to put forth a reliable class-wide damages methodology. Dr. Werner does not propose any actual methodology for measuring damages on a class-wide basis that is tied to Plaintiffs' theory of liability and the unique facts of this case. He has failed to demonstrate that such a methodology even exists.

19. First, Dr. Werner suggests that he would use the stock prices on January 27, 2021 to measure the At-Issue Stocks' "fair value" for the purpose of calculating damages. However, he has no economic basis to do so given the evidence that the prices on this date do not represent prices in efficient markets. Instead, they represent prices following an extreme run-up that cannot be explained by new, value-relevant information. Dr. Werner himself appears to recognize that the prices on January 27, 2021 were highly abnormal, as he removes January 27, 2021 when estimating his regression model "so that the model parameters can better reflect typical stock price dynamics." This renders any purported damages methodology derived from those prices unreliable.

20. Second, Dr. Werner's vague references to an "empirical model" do not explain how he could ultimately be able to calculate damages on a class-wide basis consistent with Plaintiffs' theory of liability. In the Grenadier Report, I explained that given the unique fact pattern in this case, I am not aware of any formulaic approach or data that would allow Plaintiffs to reliably calculate hypothetical prices (and thus damages) on a class-wide basis in a setting where markets are inefficient. Dr. Werner's vague damages description does not offer an actual methodology to overcome these concerns, including how an "empirical model" would be able to "apportion[] the responsibility for the deflation" on a class-wide basis, or how it would be able to reconcile why the trading restrictions would have allegedly affected the prices of the At-Issue Stocks but not the prices of other stocks with similar restrictions.

III. Opinion 1: The Werner Declaration Does Not Alter My Conclusion That the Evidence Is Inconsistent with the Notion That the Markets for the At-Issue Stocks Were Efficient Leading up to and throughout the Proposed Class Period

21. In the Grenadier Report, I concluded that the evidence is inconsistent with the notion that the markets for the At-Issue Stocks were efficient leading up to and throughout the proposed Class Period.[11] In particular, the At-Issue Stocks experienced extreme price movements that were not associated with new, company-specific, value-relevant information that could explain such movements. Instead, analysts, academic studies, other observers, and Plaintiffs themselves attribute the price movements to coordinated trading by retail investors, as well as short squeezes, attempted short squeezes, and short-sale constraints, which are inconsistent with market efficiency. As discussed below, the Werner Declaration does not alter my conclusion regarding market efficiency in the period immediately prior to and during the proposed Class Period.

22. In particular, as discussed in **Section III.A**, Dr. Werner fails to analyze or opine on whether the At-Issue Stocks traded in efficient markets during the proposed Class Period *at all*, attributing his decision not to analyze the proposed Class Period at least partly to it being affected by the alleged "market manipulation."[12] As discussed below, Dr. Werner fails to explain why allegations of manipulation would prevent him from examining market efficiency during the proposed Class Period or what the implications of his failure to analyze efficiency during the proposed Class Period are for his overall market efficiency findings.

23. In **Section III.B**, I discuss Dr. Werner's market efficiency analysis, which examines the full year prior to the proposed Class Period, from January 28, 2020 through January 27, 2021.[13] I show that by focusing on the entire year prior to the proposed Class Period, Dr. Werner's analysis is unreliable because it masks the extreme events and market conditions during the

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[11] Grenadier Report, Section VI.

[12] Dr. Werner states that he did not analyze whether the At-Issue Stocks traded in efficient markets during the proposed Class Period "[d]ue to the short length of the Class Period, and the allegations of market manipulation that occurred during the Class Period" (Werner Declaration fn. 1). To the extent Dr. Werner attributes his decision to the "short length of the Class Period," he fails to explain how the length of the Class Period would prevent him from being able to examine market efficiency for the At-Issue Stocks during that period at all.

[13] Werner Declaration ¶¶ 1, 8. Dr. Werner does not conclude that Koss or Tootsie Roll traded in efficient markets during the period he analyzes.

highly unusual "meme stock" period immediately before and during the proposed Class Period.[14] Tellingly, Dr. Werner fails to even mention the coordinated trading, short squeezes, attempted short squeezes, or short-sale constraints that characterized this period, let alone analyze the implications of these dynamics for market efficiency.

24. In **Section III.C**, I show that even for the period he does examine, Dr. Werner's assessment of the fifth *Cammer* factor, the "most important"[15] test of market efficiency, is fatally flawed and unreliable due to his reliance on a flawed measure of "news flow." In particular, Dr. Werner's analysis fails to acknowledge that much of the "news flow" leading up to the proposed Class Period consists of market observations of extreme price movements *not* being attributable to new, value-relevant information. Further, Dr. Werner's news selection is subject to circular reasoning: he purports to test a cause-and-effect relationship between news and stock price movements (i.e., whether news "caused" price movements), but his "news" includes numerous articles about the observed stock price movements themselves. Finally, to further illustrate the flaws in Dr. Werner's measure of "news flow," I rerun his test of the fifth *Cammer* factor with other definitions of "news" that Dr. Werner has used in the past and that are less susceptible to erroneously including non-value-relevant information, and find that using these other definitions by themselves would reverse his results for most of the At-Issue Stocks. In summary, Dr. Werner's test is unreliable and fails to provide evidence that the At-Issue Stocks traded in efficient markets during the period he analyzes, let alone during the proposed Class Period.

25. Finally, in **Section III.D**, I explain that Dr. Werner's assessment of the other *Cammer* and *Unger/Krogman* factors is also flawed and deficient, and fails to address evidence from these factors that is inconsistent with market efficiency.

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[14] As described in the Grenadier Report, in January 2021, several dozen "meme stocks" experienced large price movements and/or increased trading volume that far exceeded movements in the broader stock market. Public press described this episode as driven by factors such as "investor euphoria and excessive speculation," and noted the role that social media played in enabling investor coordination (Grenadier Report, ¶¶ 38, 40).

[15] See ¶ 34.

A. Dr. Werner Fails to Analyze Market Efficiency of the At-Issue Stocks during the Proposed Class Period

26. Dr. Werner states that he analyzed market efficiency in the year prior to the proposed Class Period because the earlier period was not "affected by the alleged market manipulation."[16] I understand Dr. Werner's reference to the "alleged market manipulation" to mean Plaintiffs' allegation that Robinhood "artificially" distorted prices by implementing trading restrictions which "artificially restrict[ed] demand"[17] for the At-Issue Stocks throughout the six-trading-day proposed Class Period. Importantly, these restrictions were publicly available information.[18]

27. Dr. Werner fails to explain why allegations of market manipulation would prevent him from examining market efficiency during the proposed Class Period. As discussed in the Grenadier Report, in an efficient market, if restrictions were placed on a subset of investors, other unaffected investors (in particular, arbitrageurs) would be expected to quickly enter the market, trade profitably, and thus reverse any temporary mispricing.[19] To the extent that Dr. Werner is claiming that the markets for the At-Issue Stocks were made inefficient by Robinhood's alleged "market manipulation" (i.e., Robinhood's trading restrictions), as discussed in the Grenadier Report, the mere fact that a brokerage implemented restrictions on a subset of retail investors would not by itself imply that market prices would be "artificially" distorted, or that the market would be inefficient, throughout the proposed Class Period as a result.

28. Furthermore, even if Plaintiffs were able to show that the alleged manipulation (i.e., Robinhood's trading restrictions) resulted in "artificially distorted" stock prices and inefficient markets for the At-Issue Stocks during the proposed Class Period, then any such "distortions" should have been observable to market participants because the restrictions and the resulting price impact, if any, were public. Therefore, during the proposed Class Period, to the extent that putative class members were aware of Robinhood's restrictions and what Plaintiffs allege were

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[16] Werner Declaration, fn. 1.
[17] Amended Consolidated Class Action Complaint, *In re: January 2021 Short Squeeze Trading Litigation*, United States District Court Southern District of Florida, Case No. 21-2989-MDL-ALTONAGA/Torres, January 17, 2023 ("Complaint"), ¶ 124.
[18] Grenadier Report, fn. 82. "Although it was relatively unknown to a national audience before January 28, 2021, Robinhood's name was on everyone's lips after it roiled the markets for the Affected Stocks through the unique and extreme actions it took that day" (Complaint, ¶ 8).
[19] Grenadier Report, ¶ 153.

"artificially distorted" prices, they would have transacted based on their own individual information or preferences without trusting the integrity of the market prices.[20] As a financial economist, I am not aware of a class-wide approach to determine which putative class members believed that prices were efficient when transacting in the At-Issue Stocks and which believed the prices were "artificially distorted," without asking each putative class member individually.[21]

B. Dr. Werner's Market Efficiency Opinion Is Unreliable Because He Fails to Specifically Analyze Market Efficiency during the Highly Unusual "Meme Stock" Episode

29. In his declaration, Dr. Werner purports to examine whether the At-Issue Stocks "traded in efficient markets prior to the Class Period"[22] and does so by analyzing one full year before the start of the proposed Class Period, from January 28, 2020 through January 27, 2021. Such an approach is unreliable because it masks the highly unusual market conditions during the "meme stock" episode immediately before and during the proposed Class Period, and fails to address the evidence of coordinated trading, short squeezes, attempted short squeezes, and short-sale constraints that I discussed in the Grenadier Report. Dr. Werner's approach, which looks at the general behavior of each At-Issue Stock over an extended period that consists mostly of the "normal" preceding period, does not allow Dr. Werner to draw reliable conclusions about market

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[20] "Q. So when did you learn of Robinhood disabling the buy button, as you put it? A. I learned on that specific day when their markets opened. ... It wasn't working. So then I went to -- I went online to try to figure out what was going on. A lot of people were having the same problem. And then I figured out, you know, that they actually -- they did this on purpose. Q. Okay. And was it after figuring that out that you made the decision to sell the securities, AMC and Nokia? A. Yes." (Deposition of Abraham Huacuja, March 21, 2023, 94:15–95:25). "Q. What was it about the inability of Robinhood users to purchase certain stocks that caused you to place a sell order? ... A. Well, if you disable the buy button, there's only one way a stock can go. I mean, when this happened, and I figured out that they disabled that option, like, immediately after, a light bulb went in my head … Because the only way a stock can move is down if no one can buy a security anymore. I mean, it would be the same if no one can sell a security. It's a simple supply-and-demand situation. I mean, if no one can sell anything and only people can buy, of course the price is going to raise. And the same thing goes for if anyone -- if you can't buy anything and you can only sell, the price is going to go down. It's obvious." (Deposition of Abraham Huacuja, March 21, 2023, 97:3–97:25).

[21] To the extent that Plaintiffs allege that Robinhood's restrictions "sent false signals to the market," hereby causing the prices to be "distorted," the market would need to be efficient for the prices of the At-Issue Stocks to incorporate such "false signals." Plaintiffs' Opposition to Defendants Robinhood Markets, Inc., Robinhood Financial LLC and Robinhood Securities, LLC's Motion to Dismiss the Consolidated Class Action Complaint, *In re: January 2021 Short Squeeze Trading Litigation*, United States District Court Southern District of Florida, Case No. 21-2989-MDL-ALTONAGA/Torres, January 28, 2022, p. 14.

[22] Werner Declaration, ¶ 1.

efficiency during the highly unusual Relevant Period.[23] Indeed, whether the At-Issue Stocks traded in efficient markets during normal market conditions has little bearing on whether they traded in efficient markets during the extreme "meme stock" period.

30. As I discussed in the Grenadier Report, efficiency is not an inherent or static characteristic of markets, but can change over time.[24] The basis for the efficient market hypothesis is that competition among sophisticated investors quickly eliminates opportunities to trade and profit on public information, which causes a stock price to react quickly to new, value-relevant public information about its expected future cash flows and the risks to those cash flows.[25] Academic research has shown that market impediments, such as short-sale constraints that prevent arbitrageurs' ability to trade, can impede market efficiency and such impediments can change over time.[26] Consistent with this, academic research has shown that even large, widely followed companies can temporarily exhibit behavior inconsistent with efficiency.[27] Therefore, a stock that trades in an efficient market at one point in time may not trade in an efficient market at another point in time, particularly if arbitrageurs' costs and risks of trading to ensure prices impound new, value-relevant information suddenly change. Therefore, it is important to assess market efficiency for the relevant time period at issue.

31. Dr. Werner's analysis purports to "examine[] market efficiency for the one-year period prior to the Class Period"[28] and Dr. Werner states that he "chose to examine a one-year period so that any inferences made on data would be based on an adequately large sample size."[29] However, he fails to acknowledge that the "large sample" he relies on is not at all representative

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[23] Separately, Dr. Werner suggests that damages could be calculated using the "market value" of the At-Issue Stocks on January 27, 2021 as a starting point to measure the At-Issue Stocks' "fair value" (Werner Declaration, Section VI.A). Despite his reliance on the price on January 27, 2021 as a measure for "market value" or "fair value," he has so far failed to demonstrate market efficiency at that specific time.

[24] Grenadier Report, ¶ 66.

[25] Grenadier Report, ¶ 65.

[26] See e.g., J.E. Engelberg, A.V. Reed, and M.C. Ringgenberg (2018), "Short-Selling Risk," *Journal of Finance*, 73(2), pp. 755–786 at pp. 755–756.

[27] A particularly famous example, which I discussed in the Grenadier Report (¶ 127), involves an equity carve-out, in which 3Com sold a fraction of its ownership in Palm but retained 95% of Palm's equity, which it planned to distribute to its own shareholders by giving them 1.5 shares of Palm for every share of 3Com they owned. This arrangement implied that 3Com's share price should have been, at least, 1.5 times the share price of Palm because each 3Com share would receive the value of 1.5 Palm shares, yet Palm's stock price following the IPO violated this relationship as arbitrageurs were unable to correct the mispricing through trading due to high stock borrowing costs. In other words, academic studies have documented evidence that prices can fail to reflect value-relevant information when there are short-sale constraints. See e.g., O.A. Lamont and R.H. Thaler (2003), "Can the Market Add and Subtract? Mispricing in Tech Stock Carve-Outs," *Journal of Political Economy*, 111(2), pp. 227–268 at p. 230.

[28] Werner Declaration, fn. 1.

[29] Werner Declaration, fn. 1.

of the period that is relevant for the issues at hand. Indeed, the period he analyzes includes both the *one week* prior to the proposed Class Period (which I analyzed in the Grenadier Report), as well as an additional *51 weeks*, which represent very different market conditions than the period at issue. This is analogous to a situation where a scientist is tasked to evaluate air quality during and in the wake of a rare volcano eruption (analogous to the "meme stock" episode), but the scientist chooses to study the average air quality during the whole year preceding and including the eruption period, rather than the highly unusual period in question. Any conclusion the scientist reached from the study of the preceding year about the air quality during and in the wake of the eruption (for example, finding that the air quality during the eruption period was healthy simply based on the air quality during the whole year being generally healthy) would be unreliable.

32. As I showed in the Grenadier Report, price movements and trading volume for the At-Issue Stocks leading up to and during the proposed Class Period were extreme outliers compared to contemporaneous movements of other stocks, compared to their own historical performance, and when compared historically to a broad set of stocks over the last 25 years.[30] I also showed that analysts, academic studies, other observers, and Plaintiffs themselves attribute these unusual price movements to coordinated trading, short squeezes, attempted short squeezes, and/or short-sale constraints that occurred during the Relevant Period.[31] These factors are inconsistent with or can impede market efficiency.

33. Despite these highly unusual market conditions, Dr. Werner does not even mention the "meme stock" episode, nor any of the characteristics of this period that would impede market efficiency. Therefore, Dr. Werner's analysis is unreliable and does not allow him to draw conclusions about market efficiency during the period immediately prior to the proposed Class Period, let alone during the proposed Class Period.

[30] Grenadier Report, Section VI.B.1.
[31] Grenadier Report, Sections VI.C, VI.D.

C. Dr. Werner's Assessment of the Fifth *Cammer* Factor Is Fatally Flawed, as It Does Not Address the Lack of a Causal Relationship between New, Value-Relevant Information and Large Price Movements during the Relevant Period

34. As discussed in the Grenadier Report, I understand that courts have considered five *Cammer* factors, along with other factors, when assessing whether markets are efficient. The "most important" test of market efficiency is a cause-and-effect relationship between the arrival of new, value-relevant information regarding a company and its stock price movement.[32] This is the fifth *Cammer* factor. The fifth *Cammer* factor is the only factor that Dr. Werner considers which, if properly evaluated, can directly test whether there is empirical evidence that a security price rapidly and fully incorporates new, value-relevant information.

35. The other four *Cammer* factors are structural factors meant to indicate whether a sufficiently fluid and informed trading environment exists, which could facilitate the process by which stocks react quickly and fully to new, value-relevant information. Put another way, I understand that *Cammer* Factors 1–4 and other structural factors speak to the question of whether there are a sufficient number of competing investors monitoring and trading the stock.[33] These structural factors provide evidence of the type of open and developed market that could facilitate efficient trading of a stock.

36. The fifth *Cammer* factor is a direct test for the existence of a "cause and effect relationship, *between unexpected corporate events or financial releases* and an immediate

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[32] "Under *Teamsters*, the most important *Cammer* factor is the 'cause and effect' factor—evidence that unexpected corporate events or releases caused an immediate response in the price of a security. This is 'the essence of an efficient market and the foundation for the fraud on the market theory.' *Teamsters*, 546 F.3d at 207 (quoting *Cammer*, p. 1287). The court stated: ['']Without the demonstration of such a causal relationship, it is difficult to presume that the market will integrate the release of material information about a security into its price. An event study that correlates the disclosures of unanticipated, material information about a security with corresponding fluctuations in price has been considered prima facie evidence of the existence of such a causal relationship.['']" (*In re: Federal Home Loan Mortgage Corp. (Freddie Mac) Securities Litigation,* 281 F.R.D. 174, Nos. 09 Civ. 832 (MGC), 09 MD 2072 (MGC), United States District Court, S.D. New York, March 27, 2012 at 178). "The cleanest evidence on market efficiency comes from event studies, especially event studies on daily returns. When an information event can be dated precisely and the event has a large effect on prices, the way one abstracts from expected returns to measure abnormal daily returns is a second-order consideration. As a result, event studies can give a clear picture of the speed of adjustment of prices to information" (E.F. Fama (1991), "Efficient Capital Markets: II," *Journal of Finance*, 46(5), pp. 1575–1617 ("Fama (1991)"), at p. 1607). "When the announcement of an event can be dated to the day, daily data allow precise measurement of the speed of the stock-price response—the central issue for market efficiency" (Fama (1991), p. 1601).

[33] Grenadier Report, ¶¶ 68, 69.

response in stock price."[34] Even if some or all of the At-Issue Stocks meet certain structural factors such as trading volume and analyst coverage, the question is whether unusual market conditions have rendered the markets inefficient during the particular period under study such that one does not observe such a cause-and-effect relationship. In an efficient market, one would expect large company-specific price fluctuations to be driven by new information about the company's financial or business conditions that could cause investors to revise their estimates of expected cash flows or the risk associated with those cash flows. Dr. Werner quotes the same *Cammer* ruling,[35] and purports to provide an assessment of the fifth *Cammer* factor.[36]

37. I showed in the Grenadier Report that the nine At-Issue Stocks experienced dramatic price movements prior to and during the proposed Class Period. However, these extreme price run-ups and subsequent reversals that the At-Issue Stocks collectively experienced over the Relevant Period cannot be explained by new, value-relevant information.[37] Instead, analysts, academic studies, other observers, and Plaintiffs themselves attribute the price movements to coordinated trading by retail investors, as well as short squeezes, attempted short squeezes, and short-sale constraints, which are inconsistent with market efficiency.[38]

38. Dr. Werner's purported assessment of the fifth *Cammer* factor fails to address this evidence that I presented in the Grenadier Report. As explained below, this is because the methodology that Dr. Werner uses to assess the fifth *Cammer* factor is fatally flawed and, by construction, incapable of reliably testing market efficiency during the Relevant Period. I provide an overview of his methodology in **Section III.C.1**. In **Section III.C.2**, I show that by focusing on a flawed measure of "information flow" that simply counts the number of articles, including articles commenting on the disconnect between value-relevant news and extreme stock price movements, Dr. Werner fails to test whether *new, value-relevant* information was rapidly and fully incorporated into the prices of the At-Issue Stocks immediately prior to the proposed Class Period.

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[34] *Rose Cammer, et al. v. Bruce M. Bloom, et al.,* 711 F. Supp. 1264, 1273, United States District Court, New Jersey, April 19, 1989 *("Cammer")*, p. 1287 (emphasis added).
[35] Werner Declaration, ¶ 52.
[36] Werner Declaration, V.C.5.
[37] Grenadier Report, Section VI.B.
[38] Grenadier Report, Sections VI.C and VI.D.

1. Overview of Dr. Werner's Assessment of the Fifth *Cammer* Factor

39. Dr. Werner purports to assess if there is a "cause and effect" relationship between stock price movements and information by examining "whether or not a stock's price reacts differently on days in which new information is revealed ('news days') versus all other days ('non-news days')."[39]

40. Dr. Werner's approach is as follows. For each of the nine At-Issue Stocks, he obtains a list of articles from Factiva for the year prior to the proposed Class Period, and then determines when the articles were published and with what trading day each article would be associated.[40] Dr. Werner then categorizes the 10% of trading days with the largest number of articles as the "high information flow group," and categorizes the remaining 90% of trading days as the "low information flow group."[41]

41. Dr. Werner then compares whether the proportion of statistically significant days is higher for the high information flow days than the low information flow days. He "employ[s] a Fisher's exact test to compare the frequency of statistically significant stock price reactions on high information flow days as compared to lesser information flow days."[42] Using this test, Dr. Werner finds that for all the At-Issue Stocks, with the exception of Tootsie Roll, there were "statistically significant difference[s] between high information flow days and low information flow days during the Relevant Period."[43] Dr. Werner concludes that his test supports "the conclusion that the stock prices for eight of the nine Affected Companies reacted to information during the Relevant Period."[44]

2. Dr. Werner's Assessment of the Fifth *Cammer* Factor Does Not Address the Lack of a Causal Relationship between New, Value-

[39] Werner Declaration, ¶ 67.
[40] Werner Declaration, ¶ 70.
[41] Werner Declaration, ¶ 70.
[42] Werner Declaration, ¶ 75.
[43] "Fisher's Exact Test p-values that are less than 5% are statistically significant at the 95% confidence level. The eight companies all had p-values of less than 1%, i.e. greater than a 99% confidence level), and all but one had confidence levels greater than 99.5%" (Werner Declaration, ¶ 78).
[44] Werner Declaration, ¶ 79.

Relevant Information and Large Price Movements during the Relevant Period

42. Dr. Werner's assessment of the fifth *Cammer* factor is fatally flawed because his determination of "news" days simply counts the number of articles, and does not include an assessment of whether there was actually new, value-relevant information that might cause an investor to revise expectations of the company's cash flows or the risks to those cash flows. To the contrary, I showed in the Grenadier Report that the large stock price movements leading up to and during the proposed Class Period cannot be explained by such new, value-relevant information.[45]

43. In an efficient market, the price of a stock should react quickly and fully to new, value-relevant information related to the company's expected future cash flows or the risks to those cash flows. A stock price should not react to information that is not value-relevant, or that is stale and not "new."[46] Similarly, Dr. Werner quotes *Basic*, which states, "[t]he fraud on the market theory is based on the hypothesis that, in an open and developed securities market, the price of a company's stock is determined by the available *material information regarding the company and its business*."[47] Dr. Werner also quotes *Cammer*, which states, "it would be helpful to … [have] empirical facts showing a cause-and-effect relationship between *unexpected corporate events or financial releases* and an immediate response in stock price."[48] This is also consistent with language Dr. Werner has used in prior declarations, where he stated:

> The efficient market hypothesis forms the foundation of modern finance theory. Finance theory holds that the *market price of a stock reflects the discounted value of expected future cash flows to the stockholder*. As a result, new information that

[45] Grenadier Report, Section VI.B.
[46] Grenadier Report, ¶¶ 64–65; E.F. Fama (1970), "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 25(2), pp. 383–417, p. 383; J.T. Greene and S.G. Watts (1996), "Price Discovery on the NYSE and the NASDAQ: The Case of Overnight and Daytime News Releases," *Financial Management*, 25(1), pp. 19–42 ("Greene and Watts (1996)") at pp. 41–42; S.A. Ross, R.W. Westerfield, and J. Jaffe (2002), *Corporate Finance*, 6th ed., New York, NY: McGraw-Hill/Irwin ("Ross et al. (2002)") at p. 351; A. Shleifer (2000), *Inefficient Markets: An Introduction to Behavioral Finance*, Oxford, UK: Oxford University Press ("Shleifer (2000)") at p. 5.
[47] Werner Declaration, ¶ 29 (emphasis added).
[48] Werner Declaration, ¶ 52 (emphasis added).

> causes the market to significantly alter its expectations of future cash flows will cause a repricing of the security to reflect these new expectations.[49]

44. As a corollary, prices in an efficient market "should not react to changes in demand or supply of a security that are not accompanied by news about its fundamental value."[50] Similarly, when discussing the fifth *Cammer* factor, Dr. Werner explains that "[t]o the extent that the new information may have been expected, or the valuation impact of the new information is modest, the appropriate abnormal price return should be statistically insignificant."[51] Consistent with Dr. Werner's explanation, information that was not new or value-relevant would not be expected to cause a sustained, large price movement in an efficient market. As I discussed in the Grenadier Report,[52] information about retail investors coordinating over social media, short squeezes, attempted short squeezes, or short-sale constraints does not represent information that would cause "the market to significantly alter its expectations of future cash flows" to the stockholder.[53] Put another way, this information reflects such "changes in demand or supply of a security that are not accompanied by news about its fundamental value."[54] Therefore, if information on these topics (or other topics that were irrelevant for a company's expected cash flows or risks to those cash flows) caused stock prices to move in a statistically significant manner, that would be inconsistent with market efficiency. Similarly, news articles about prior stock price movements do not represent new, value-relevant information.

45. Dr. Werner does not conduct any analysis in his declaration to determine whether his "high information flow" days did in fact contain new, value-relevant information about expected cash flows or risks to those cash flows for the at-issue companies. When Dr. Werner describes his methodology, he only discusses the number of articles on a given date, and does not mention

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[49] Declaration of Dr. Adam Werner, *In re: Hi-Crush Partners L.P. Securities Litigation*, April 15, 2014 (*Hi-Crush 2014*), ¶ 13 (emphasis added). Dr. Werner cites Fama (1991).
[50] "[S]ince a security's price must be equal to its value, prices should not move without any news about the value of the security. That is, prices should not react to changes in demand or supply of a security that are not accompanied by news about its fundamental value" (Shleifer (2000), p. 5).
[51] Werner Declaration, ¶ 55.
[52] Grenadier Report, Section VI.C, Section VI.D, Appendix E, Appendix F.
[53] *Hi-Crush 2014*, ¶ 13.
[54] Shleifer (2000), p. 5.

the contents of the articles at all.[55] Dr. Werner claims that his approach is "highly objective,"[56] because he only relies on the count of articles. However, this approach results in Dr. Werner's analysis being detached from the financial theory of efficient markets that he himself references.[57] This is because he does not actually test price reactions to new, value-relevant information, or assess the "cause and effect" relationship under the fifth *Cammer* factor that he purports to test.

46. Instead, he merely analyzes the relationship between stock prices and the number of news articles, which is especially problematic in this setting because much of the "information flow" for the At-Issue Stocks in the week before the proposed Class Period does not contain value-relevant news.[58] For example, as I demonstrated in Appendix E of the Grenadier Report, there was no new, value-relevant, company-specific information for Express, GameStop, Koss, or Tootsie Roll on any day in the week before the proposed Class Period. Additionally, I provide examples below of news articles in Dr. Werner's backup that (i) discuss the fact that the price movements were detached from value-relevant information and not based on a change in the companies' financial or business conditions; (ii) attribute the price run-up to retail investors coordinating over social media, short squeezes, attempted short squeezes, or short-sale constraints and not to value-relevant news; and (iii) simply state that the At-Issue Stocks had experienced large stock price increases or that the stock price volatility had caused trading to be halted.

47. Indeed, many articles in Dr. Werner's analysis in the week before the proposed Class Period describe the price movements as being detached from value-relevant information. The flaws in Dr. Werner's analysis are highlighted by the fact that he includes articles that state that the stock price increases were not based on a change in the companies' financial or business conditions as support of market efficiency. Hypothetically, if every article on a "high information flow day" constitutes commentary that the market was not efficient, and the residual

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[55] Consistent with a lack of analysis of the content of the articles, Dr. Werner's backup materials only included article headlines and the first few lines of the article, and did not contain the full text of the articles (Werner Declaration, backup).

[56] Werner Declaration, ¶ 68.

[57] See ¶¶ 43–44 above.

[58] As demonstrated in Appendix E of the Grenadier Report, there was very little new, value-relevant information in the week before the proposed Class Period. Additionally, I have reviewed the headlines provided by Dr. Werner, and none change the opinion in the Grenadier Report.

stock return was statistically significant, Dr. Werner's methodology would still treat that as supportive of market efficiency. Essentially, Dr. Werner uses public press discussion of evidence *inconsistent* with efficiency as *support* for a finding of efficiency. For example, some of the articles included in Dr. Werner's headline search stated:

- Isn't this a bubble? … It sure is. There's an argument that GameStop was undervalued, but hardly anyone believes that GameStop, BlackBerry, Macy's, AMC, or any of the other companies that WSB is promoting have fundamentals to support these surging stock prices. At some point, reality has to set in. But that's the problem with bubbles — get out too early, and you lose at a chance to cash out on top. So GameStop keeps surging ... until it won't anymore. … like all bubbles, this one's going to burst at some point.[59] (Napa Valley Register, January 21, 2021)

- Names like GameStop, BlackBerry, and AMC Entertainment have soared … with little fundamental news behind the moves. … Shares of GameStop soared as much as 145% in Monday trading on no apparent news.[60] (Business Insider, January 25, 2021)

- Tuesday morning, RBC Capital analyst Paul Treiber cut his rating on BlackBerry shares to Underperform from Sector Perform, while keeping his price target of $7.50. He said the rally has lifted the stock's valuation to multiyear highs, and above those of its peers, while the fundamental outlook for the security-software business hasn't significantly changed.[61] (Dow Jones Institutional News, January 26, 2021)

- Nokia stock (ticker: NOK) shares ha[ve] rallied more than 70% this week -- including gain of more than 50% on Wednesday -- without any fundamental basis.[62] (Dow Jones Institutional News, January 27, 2021)

Additionally, as I discussed in the Grenadier Report, both BlackBerry and Nokia stated that they were unaware of any undisclosed information that would account for the price movements.[63]

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[59] "Isn't this a bubble?," *Napa Valley Register*, January 21, 2021. Note that this article was repeated 16 times in Dr. Werner's backup. Therefore, of the 63 GameStop articles he identified on this day, roughly ¼ were repeats of an article that called the stock price movement a "bubble."
[60] "From AMC to Bed Bath & Beyond, the Market's Most-Shorted Stocks Are Rallying as Reddit Day-Traders Pile In," *Business Insider*, January 25, 2021.
[61] "BlackBerry Stock Extends Rally Despite Downgrade -- Barron's.com," *Dow Jones Institutional News*, January 26, 2021.
[62] "Nokia Stock Is Surging. The Company Says It Can't Explain It -- Barron's.com," *Dow Jones Institutional News*, January 27, 2021.
[63] Grenadier Report, ¶ 98.

Following these announcements, public press reported on the announcements, reiterating that the companies were "not aware" of any undisclosed information that could be causing the stock price increases. For example, some of the articles included in Dr. Werner's headline search stated:

- BlackBerry [is] "not aware" of any material, disclosed corporate developments[.] The company said, "BlackBerry Limited is issuing this press release in response to a request by the Investment Industry Regulatory Organization of Canada to comment on recent trading activity of its stock. The Company is not aware of any material, undisclosed corporate developments and has no material change in its business or affairs that has not been publicly disclosed that would account for the recent increase in the market price or trading volume of its common shares."[64] (Theflyonthewall.com, January 25, 2021)

- Blackberry Ltd. on Monday said it knows no reason for the recent surge in its share price and trading volume. … The Waterloo, Ontario, provider of security software and services said it isn't aware of any material, undisclosed corporate developments, and that there has been no undisclosed material change in its business or affairs that would account for the activity.[65] (Dow Jones Institutional News, January 25, 2021)

- Nokia not aware of any developments that would account for trade activity[.] Nokia issued a stock exchange release to comment on recent trading activity of its stock. Nokia is not aware of any material, undisclosed corporate developments or material change in its business or affairs that has not been publicly disclosed that would account for the recent increase in the market price or trading volume of its shares, the company said.[66] (Theflyonthewall.com, January 27, 2021)

- Finnish technology firm Nokia said on Wednesday it was not aware of any reason for the continuing surge in its share price. "Nokia is not aware of any material, undisclosed corporate developments or material change in its business or affairs that has not been publicly disclosed that would account

[64] "11:11 EST BlackBerry 'not aware' of any material, disclosed corporate...," *Theflyonthewall.com*, January 25, 2021.
[65] "Blackberry Says Knows No Reason for Trading Activity >BB BB.T," *Dow Jones Institutional News*, January 25, 2021.
[66] "13:16 EST Nokia not aware of any developments that would account for trade...," *Theflyonthewall.com*, January 27, 2021.

> for the recent increase in the market price or trading volume of its shares," it said in a statement.[67] (Reuters News, January 27, 2021)

48. Furthermore, many articles in Dr. Werner's analysis attribute the price run-up to retail investors coordinating over social media, short squeezes, attempted short squeezes, or short-sale constraints and not to value-relevant news. As I discussed in the Grenadier Report, these factors are inconsistent with or can impede market efficiency.[68] For example, some of the articles included in Dr. Werner's headline search stated:

- On one side [of the "GameStop frenzy"] you have a band of mostly young day traders who coordinate on Reddit to drive up the share price of struggling companies, including GameStop, but also BlackBerry, Macy's and AMC. At least one Reddit user posted that he'd paid off thousands of dollars in student loans with his GameStop gains. On the other you have hedge funds and short-sellers.[69] (Napa Valley Register, January 21, 2021)

- Short squeeze in GameStop Corp (NYSE: GME) and others like the clothing retailer Express, Inc (NYSE: EXPR) has seen a frenzy of late due to internet message boards.[70] (Benzinga, January 26, 2021)

- The investor group whose concerted action has apparently created a short squeeze in the stock of videogame retailer GameStop Inc. is also targeting shares of AMC Entertainment Inc., BlackBerry Ltd and retailer Express Inc., all of which are seeing sharp moves without any apparent news to act as a driver.[71] (MarketWatch, January 26, 2021)

- BlackBerry Ltd (NYSE:BB) jumped 24%, to above $23, Koss Corporation (NASDAQ:KOSS) jumped 222%, to $32.25, and Express Inc (NYSE:EXPR) rose 247%, to $10.57, all seemingly part of a short squeeze pitting professional and retail traders against each other.[72] (Investing.com, January 27, 2021)

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[67] "Nokia not aware of any reason for share surge," *Reuters News*, January 27, 2021.
[68] Grenadier Report, Sections VI.C and VI.D.
[69] "The cast of characters," *Napa Valley Register*, January 21, 2021. Note that this article was repeated 16 times in Dr. Werner's backup. Therefore, of the 63 GameStop articles he identified on this day, roughly ¼ were repeats of an article that discuss retail investors attempting to drive the share price up.
[70] "Can GameStop Short Squeeze Bring Down The Market? What The Experts Are Saying," *Benzinga.com,* January 26, 2021.
[71] "Here are some of the other stocks seeing GameStop-like short squeezes," *MarketWatch*, January 26, 2021.
[72] "Koss, Express, Blackberry Also Caught In Epic Short Squeeze," *Investing.com*, January 27, 2021.

- Shares of GameStop and AMC Entertainment Holdings each more than doubled on Wednesday, forcing hedge funds to take heavy losses as they unloaded short positions, sparking calls for scrutiny of anonymous stock market trading posts on social media. The short squeeze was so sharp that funds were selling long positions in stocks to pay for the losses, which contributed to a slide in Wall Street's main indexes.[73] (Reuters News, January 27, 2021)

- Like GameStop and AMC, many of the stocks fueling the Reddit trade are among the most shorted stocks in the market, including Bed Bath & Beyond, Ligand Pharma and National Beverage Corp, which are up 28%, 18% and 36% Wednesday afternoon while the broader market struggles to stay afloat. "It seems we have done it again and forced the shorts into playing their dirty little tricks on us," one Reddit user wrote Wednesday on the r/WallStreetBets discussion board, referencing the buying frenzy among online traders successfully propping up the prices of stocks Wall Street firms are betting against.[74] (Forbes, January 27, 2021)

49. Accordingly, Dr. Werner's "news vs. no-news" analysis is methodologically flawed. He purports to test a cause-and-effect relationship between news and stock price movements,[75] but his "news" includes numerous articles about the stock price movements themselves, rather than new, value-relevant information about the companies. This renders Dr. Werner's analysis circular, as he correlates articles about stock price movements with stock price movements. As a result, Dr. Werner's analysis cannot reliably assess the cause-and-effect relationship between new, value-relevant information and stock price movements for the At-Issue Stocks during the Relevant Period.

50. Moreover, Dr. Werner's "news vs. no-news" analysis does not follow the methodology in the articles Dr. Werner himself cites. In the discussion of the analysis he performed regarding the fifth *Cammer* factor, the Werner Declaration cites Ferrillo et al. (2004), which sets out a methodology to evaluate the stock price reaction to news. Ferrillo et al. (2004) states, for "each day, we examined whether there was a news story about the company, *excluding* those stories

[73] "Quotes 3-No let up in short squeeze, retail frenzy forces funds to cover," *Reuters News*, January 27, 2021.
[74] "Not Just GameStop: Here Are The Meme Stocks WallStreetBets Traders Are Pumping Up During This 'Extremely Erratic' Reddit Rally," *Forbes*, January 27, 2021.
[75] Werner Declaration, ¶ 52.

that simply reported on prior price movements."[76] Excluding such stories is consistent with the principle that information about prior price movements does not represent new, value-relevant information, and thus does not represent information that would cause "the market to significantly alter its expectations of future cash flows" to the stockholder.[77] Put simply, in an efficient market, a company's stock price should not react to news about its prior stock price movements. Contrary to this approach, and in contrast with the fifth *Cammer* factor, Dr. Werner includes articles that report on contemporaneous price movements in his analysis. Indeed, a number of the articles included in Dr. Werner's analysis simply state that the At-Issue Stocks had experienced large stock price increases, or that the stock price volatility had caused trading to be halted. For example, an article published at 10:34AM on January 27, 2021 exclusively reported on price movements, including that AMC's stock price was up 183% from the prior day's close.[78] This article, and those like it, show that it was often extraordinary price movements that engendered Dr. Werner's so-called "news flow," rather than the other way around. As additional examples, some of the articles included in Dr. Werner's headline search exclusively commented on price movements and volatility, stating:

- Express is up 105.0%, or $1.88 to $3.67.[79] (Theflyonthewall.com, January 25, 2021)

- Tootsie Roll Industries, Inc. (TR) is currently at $34.34, up $4.21 or 13.95%-- Would be highest close since July 2, 2020, when it closed at $34.37 … On pace for largest percent increase since Dec. 20, 2000, when it rose 18.84%.[80] (Dow Jones Institutional News, January 25, 2021)

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[76] Werner Declaration, fn. 77, citing P.A. Ferrillo, F.C. Dunbar, and D. Tabak (2004), "The 'Less Than' Efficient Capital Markets Hypothesis: Requiring More Proof from Plaintiffs in Fraud-on-the-Market Cases," *St. John's Law Review*, 78(1), pp. 81–129 at p. 121 (emphasis added). Note that I am not endorsing the methodology proposed in this article, but rather point out that Dr. Werner is not following the methodology as set out in the article he cites in his declaration.

[77] *Hi-Crush 2014*, ¶ 13.

[78] "AMC Entertainment Holdings, Inc. Class A (AMC) is currently at $14.05, up $9.09 or 183.33%-- Would be highest close since May 8, 2019, when it closed at $14.65 … Would be largest percent increase on record (Based on available data back to Dec. 18, 2013)" ("AMC Entertainment Up Over 183%, On Pace for Record Percent Increase – Data Talk," *Dow Jones Institutional News*, January 27, 2021).

[79] "00 EST Express rises 105.0%," *Theflyonthewall.com*, January 25, 2021.

[80] "Tootsie Roll Up Nearly 14%, on Pace for Largest Percent Increase Since December 2000 -- Data Talk," *Dow Jones Institutional News*, January 25, 2021.

- *GameStop Corp. Cl A (GME) Halted due to volatility.[81] (Dow Jones Institutional News, January 25, 2021)

- *Koss Corp. (KOSS) Paused due to volatility.[82] (Dow Jones Institutional News, January 25, 2021)[83]

- Bed Bath & Beyond Inc. (BBBY) is currently at $46.60, up $9.73 or 26.38%-- Would be highest close since Dec. 19, 2016, when it closed at $47.09 … Best five day stretch on record (Based on available data back to June 5, 1992).[84] (Dow Jones Institutional News, January 27, 2021)

- *Nokia Corp. ADR (NOK) Halted due to volatility.[85] (Dow Jones Institutional News, January 27, 2021)

51. In contrast to Dr. Werner's flawed approach, in Section VI.B and Appendix E and Appendix F of the Grenadier Report, I found that new, value-relevant information about the financial or business conditions of the nine at-issue companies cannot explain the large stock price run-up and subsequent reversal that the At-Issue Stocks collectively experienced over the span of two weeks leading up to and during the proposed Class Period.[86] Furthermore, I showed that six of the nine at-issue companies issued contemporaneous press releases or made statements in their subsequent financial filings discussing their price movements during this period and the lack of explanatory news.[87] In line with this, I showed that analyst reports discussing the week before the proposed Class Period commented on the disconnect between

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[81] "*GameStop Corp. Cl A (GME) Halted due to volatility," *Dow Jones Institutional News*, January 25, 2021.
[82] "Koss Corp. (KOSS) Paused due to volatility," *Dow Jones Institutional News*, January 25, 2021.
[83] In fact, Dr. Werner identifies eight articles for Koss on January 25, 2020, which results in that day having the second highest volume of articles in the year before the proposed Class Period. Yet every single article he identifies on that day simply states that Koss's trading had been paused due to volatility or that it resumed trading. Despite there being no information on this day about Koss's financial or business conditions, Dr. Werner relies on this day to support a finding that Koss's stock met *Cammer* Factor 5 (Werner Declaration, Table-1, Table-9, Exhibit-8, backup).
[84] "Bed Bath & Beyond Up Over 26%, On Pace for Highest Close Since December 2016 -- Data Talk," *Dow Jones Institutional News,* January 27, 2021.
[85] "*Nokia Corp. ADR (NOK) Halted due to volatility," *Dow Jones Institutional News*, January 27, 2021.
[86] Additionally, as demonstrated in Appendix E of the Grenadier Report, on many days in the week before the proposed Class Period, the At-Issue Stocks experienced statistically significant price increases without any new, potentially value-relevant information that could possibly explain the stock price returns. In fact, for Express, GameStop, Koss, Tootsie Roll, and Trivago, I found that none of the statistically significant residual stock returns were accompanied by new, potentially value-relevant information. Across all the companies, very few days had statistically significant residual stock returns and new, value-relevant information that could explain the return in an efficient market. I have reviewed the headlines provided by Dr. Werner, and none change the opinion in the Grenadier Report (Grenadier Report, ¶¶ 101–102).
[87] Grenadier Report, ¶ 98.

changes in stock prices and new, value-relevant information for many of these stocks, and further commented on the fact that this disconnect continued into the proposed Class Period.[88]

52. To further show the flaws in Dr. Werner's approach and demonstrate how the definition of value-relevant news could affect his test, I apply Dr. Werner's own methodology for identifying "news" from his prior expert reports in other cases. I rerun his test of the fifth *Cammer* factor,[89] but identify "high information flow days" as days with (i) earnings or guidance announcements,[90] (ii) Form 8-K or Form 6-K filings,[91] or (iii) company press releases.[92] Dr. Werner has used these definitions of news in past reports on market efficiency, for example:

> Earnings Announcements: "the events examined in this set of tests were dates on which Omega announced earnings during the Class Period."[93]
>
> Form 8-Ks: "the events examined in this set of tests were dates on which Array filed Form 8-Ks during the Class Period."[94]

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[88] Grenadier Report, ¶ 102.

[89] This is not an endorsement of Dr. Werner's "news vs. no news" approach to assessing cause and effect. Rather, it is meant to illustrate, under his own framework, the glaring deficiencies in his approach to identifying "news" days based on a count of Factiva articles.

[90] I identified five publicly available reports where Dr. Werner defined "news days" or "high information flow days" as days when the company made an earnings or guidance announcement: Declaration of Dr. Adam Werner, *In re: Spectrum Pharmaceuticals, Inc. Securities Litigation*, January 25, 2019 (*Spectrum 2019*), Section VIII.C.5; Declaration of Dr. Adam Werner, *Amanda Beezley v. Fenix Parts, Inc., et al.*, February 11, 2019 (*Fenix 2019*), Section V.C.5; Opening Report on Market Efficiency by Dr. Adam Werner, *In re: Insys Therapeutics, Inc. Securities Litigation*, March 1, 2019 (*Insys 2019*), Section V.C.5; Expert Report of Dr. Adam Werner, *In re: Innocoll Holdings Public Limited Company Securities Litigation*, August 31, 2020 (*Innocoll 2020*), Section VI.A.5; Declaration of Dr. Adam Werner, *In re: Omega Healthcare Investors, Inc. Securities Litigation*, March 16, 2022 (*Omega 2022*), Section V.A.5.

[91] I identified seven publicly available reports where Dr. Werner defined "news days" or "high information flow days" as days when the company filed a Form 8-K or Form 6-K: Declaration of Dr. Adam Werner, *Bing Li v. Aeterna Zentaris, Inc., et al.*, December 9, 2016 (*Aeterna 2016),* Section V.C.5; Declaration of Dr. Adam Werner, *In re: CytRx Corporation Securities Litigation*, November 17, 2017 (*CytRx 2017)*, Section V.C.5; Declaration of Dr. Adam Werner, *Andrew Meyer v. Concordia International Corp., et al.*, February 7, 2018 (*Concordia 2018*), Section V.C.5; Declaration of Dr. Adam Werner, *In re: K12 Inc. Securities Litigation*, March 1, 2018 (*K-12 2018)*, Section V.C.5; Opening Report on Market Efficiency by Dr. Adam Werner, *In re: Global Brokerage, Inc. f/k/a FXCM Inc. Securities Litigation*, January 6, 2020 (*Global Brokerage 2020)*, Section V.A.v; Report on Market Efficiency Dr. Adam Werner, *In re: Horsehead Holding Corp. Securities Litigation*, April 9, 2020 (*Horsehead 2020*), Section V.A.5; Declaration of Dr. Adam Werner, *Peter Voulgaris, et al. v. Array Biopharma Inc., et al.*, January 8, 2021 (*Array 2021*), Section V.A.5.

[92] I identified two publicly available reports where Dr. Werner defined "news days" or "high information flow days" as days with company press releases: Declaration of Dr. Adam Werner, *In re: Ebix, Inc. Securities Litigation*, December 7, 2012 (*Ebix 2012*), Section V.A.ii; *Hi-Crush 2014*, Section V.2.e.iii.

[93] *Omega 2022*, ¶ 46.

[94] *Array 2021*, ¶ 46.

> Press Releases: "[f]or the purposes of this analysis, I examine all days in which Hi-Crush issued press releases."[95]

To examine the At-Issue Stocks during the Relevant Period, these approaches are less susceptible to the erroneous inclusion of non-value-relevant information such as a firm's stock price, retail investors coordinating over social media, short squeezes, attempted short squeezes, short-sale constraints, and stale or duplicative news. I run the test over the same period that Dr. Werner examined in his declaration (January 28, 2020 through January 27, 2021).

53. Setting aside all the other issues with Dr. Werner's test I discuss above, when I rerun his test using his prior definitions of news, his findings no longer hold for the majority of the At-Issue Stocks. As shown in **Exhibit 1**, changing the definition of "high information flow days" (i) to earnings releases would reverse his result for all but three stocks (BlackBerry, Bed Bath & Beyond, and Nokia); (ii) to Form 8-Ks and Form 6-Ks would reverse his result for all but two stocks (AMC and Bed Bath & Beyond); and (iii) to press releases would reverse his result for all but one stock (Bed Bath & Beyond).[96] Thus, Dr. Werner's test fails to provide reliable evidence that the At-Issue Stocks traded in efficient markets. This is not an endorsement of his approaches in past reports—rather it is meant to illustrate the glaring deficiencies and unreliability in his approach to identifying "news" days in this case based on a count of Factiva articles.

54. Accordingly, Dr. Werner's test of the fifth *Cammer* factor, the "most important" test of market efficiency, is flawed because it merely captures how the stock price moved on days with a large number of news articles, many of which do not contain new, value-relevant information.[97]

D. Dr. Werner's Assessment of the Other *Cammer* and *Unger*/*Krogman* Factors Fails to Address Evidence Inconsistent with Market Efficiency during the Relevant Period

55. In the Grenadier Report, I explained that *Cammer* Factors 1–4 and other structural factors, such as the *Krogman* factors, speak to the question of whether there are a sufficient

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[95] *Hi-Crush 2014*, ¶ 56.
[96] Additionally, when "news days" or "high information flow days" are defined as the combination of earnings releases, Form 8-K and Form 6-K filings, and press releases, his results are reversed for all but two stocks (AMC and Bed Bath & Beyond).
[97] See ¶¶ 46–50 above.

number of competing investors monitoring and trading the stock. Nonetheless, even for stocks that are actively traded and followed by analysts, impediments to market efficiency may prevent the "cause and effect relationship" between new, value-relevant information and price reactions that is direct evidence of market efficiency. This is because, even for actively traded and well-followed stocks, arbitrageurs' incentives and effectiveness in trading on information can sometimes be affected by capital constraints, trading costs, and various risks they face.[98]

56. Specifically, for the At-Issue Stocks, even though certain structural factors such as high trading volume and analyst coverage (for a subset of the stocks) were present, as I demonstrate in the Grenadier Report, conditions in the period leading up to and during the proposed Class Period were highly unusual, and the evidence is inconsistent with the notion that the markets for the At-Issue Stocks were efficient leading up to and throughout the proposed Class Period. For example, high trading volume and analyst coverage are inconsistent with market efficiency if they reflect extremely large volumes of trading, and analysts' commentary on such trading, in light of potential coordinated trading, short squeezes, attempted short squeezes, and short-sale constraints. Dr. Werner's assessment of the *Cammer* and *Unger/Krogman* factors does not capture these dynamics.

57. As discussed below, Dr. Werner's assessment of the other *Cammer* and *Unger/Krogman* factors is deficient, flawed, and ignores the issues discussed in the Grenadier Report. With respect to *Cammer* Factor 2, Dr. Werner credits the existence of analyst coverage as being indicative of market efficiency while ignoring analyst commentary that highlights a disconnect between the At-Issue Stocks' prices and value-relevant information. This is similar to Dr. Werner's treatment of the fifth *Cammer* factor, where he considers the volume of news articles without considering the content of the news. Similarly, with respect to *Cammer* Factor 3, although Dr. Werner recognizes the important role played by arbitrageurs, he does not analyze the evidence of constraints that may have impeded the ability of arbitrageurs to trade to ensure that the At-Issue Stocks traded in efficient markets.[99]

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[98] Grenadier Report, Section VI.A.
[99] *Cammer*, pp. 1286–1287.

1. Dr. Werner's Analysis of *Cammer* Factor 2 Fails to Address Evidence Inconsistent with Market Efficiency

58. In his declaration, Dr. Werner purports to assess *Cammer* Factor 2, quoting the *Cammer* opinion, "[i]f investment professionals were closely monitoring a firm's information and subsequently making buy/sell recommendations to their clients based on that information, 'the market price of the stock would be bid up or down to reflect the [company's] financial information … as interpreted by the securities analysts.'"[100] Dr. Werner tabulates the number of analysts covering each of the At-Issue Stocks according to data from Refinitiv Eikon, and concludes that for "all Affected Companies, except KOSS and TR, the analyst coverage supports a finding of market efficiency."[101]

59. However, Dr. Werner's analysis of analyst coverage fails to address the evidence from analyst reports that is inconsistent with market efficiency. In particular, many analysts directly commented on the *disconnect* between At-Issue Stock prices and new, value-relevant information. As discussed in the Grenadier Report, analysts stated that the stock prices were "decoupled"[102] from valuations and did "not appear to be fundamentally based,"[103] and analysts attributed the stock price increases in the At-Issues Stocks to retail "squeeze play[s]"[104] and retail investors "aggressively buying the securities of several out-of-favor and heavily shorted US companies."[105] For example:[106]

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[100] Werner Declaration, ¶ 35; *Cammer*, p. 1286.
[101] Werner Declaration, Table-3, ¶ 38.
[102] "Downgrading to Sell: There's A Steep Price To Pay For Solvency," *MKM Partners*, February 1, 2021, p. 1.
[103] For example, a Scotiabank analyst report covering BlackBerry commented, "[o]ur view is that the move in BlackBerry's shares appears to be overdone in the short-term given fundamentals of the business relative to the movement in the underlying share price" ("Lowering Recommendation on Significant Market Move," *Scotiabank*, January 27, 2021, p. 1). ABG Sundal Collier wrote with respect to Nokia, "Over the last five days Nokia shares are up by more than 30% on materially higher-than-average trading volumes, mainly driven by US retail investors buying shares on the recommendations of online trading platforms. We have seen no company-specific or market-related developments that would warrant such a reaction in the shares, which does not appear to be fundamentally based" ("Sell on retail hype," *ABG Sundal Collier*, January 28, 2021, p. 1).
[104] "Cautious on Heels of Squeeze Play Coupled with Stampede Following Speculation," *Wedbush*, January 25, 2021, p. 1.
[105] "US Online Brokers," *Credit Suisse*, February 1, 2021, p. 1.
[106] Exhibit 7 of the Grenadier Report documents analysts commenting on the disconnect between prices and value-relevant information and Exhibits 10 and 13 of the Grenadier Report present analyst commentary attributing the stock price movements to the impact of retail investor coordination and/or attempted short squeezes.

- Over the last five days Nokia shares are up by more than 30% on materially higher-than-average trading volumes, mainly driven by US retail investors buying shares on the recommendations of online trading platforms. We have seen no company-specific or market-related developments that would warrant such a reaction in the shares, which does not appear to be fundamentally based.[107] (ABG Sundal Collier, January 28, 2021)

- In our view, the recent volatility and spike in the company's stock, thanks to the Reddit/WallStreetBets crowd, has decoupled AMC's share price and its valuation. … The emotion behind the #SaveAMC movement could carry the shares higher in the near-term, but we believe this valuation-be-damned momentum is not sustainable over the long term.[108] (MKM Partners, February 1, 2021)

- [M]id-January brought outsized share gains in AMC, with some sympathy trading in competitor shares late-January, driven by momentum unrelated to the company's fundamentals.[109] (Wedbush, March 15, 2021)

60. Therefore, the analyst commentary leading up to and during the proposed Class Period provides evidence *inconsistent* with market efficiency for the At-Issue Stocks. Dr. Werner's failure to address analyst commentary that questions market efficiency highlights the flaws and deficiencies in his analysis of *Cammer* Factor 2 and any conclusions he bases on this analysis.

2. Dr. Werner's Analysis of *Cammer* Factor 3 Fails to Address Evidence of Constraints on Arbitrageurs

61. Dr. Werner purports to assess *Cammer* Factor 3, which relates to market makers and arbitrageurs. As explained below, Dr. Werner fails to address evidence of constraints on arbitrageurs, which can impede market efficiency.

62. As discussed in the Grenadier Report, *Cammer* Factor 3 specifically recognizes the importance of arbitrageurs having the ability to trade to allow prices to quickly and fully incorporate information, and academic literature has established that constraints on the ability of

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[107] "Sell on retail hype," *ABG Sundal Collier*, January 28, 2021, p. 1.
[108] "Downgrading to Sell: There's A Steep Price To Pay For Solvency," *MKM Partners*, February 1, 2021, p.1.
[109] "Movies and Entertainment," *Wedbush*, March 15, 2021, p. 3.

arbitrageurs to trade can result in market inefficiency.[110] For example, high stock borrowing costs or other factors that constrain arbitrageurs' ability to short sell can prevent them from effectively impounding negative information into stock prices through trading, thus causing stocks to trade at too high a price. As discussed, these constraints include the risk of a short squeeze and the risk of coordinated trading activity.[111]

63. In his assessment of *Cammer* Factor 3, Dr. Werner does not address these potential constraints. He acknowledges the importance of arbitrageurs for market efficiency, citing the *Cammer* opinion, which states that "the existence of market makers and arbitrageurs would ensure completion of the market mechanism; these individuals would react swiftly to company news and reported financial results by buying or selling stock and driving it to a changed price level."[112] However, his analysis of this factor is limited to tabulating the number of market makers for each of the At-Issue Stocks, whether the stocks traded on NYSE or Nasdaq, and the number of institutional investors.[113] Importantly, Dr. Werner conducts no analysis to assess the extent to which arbitrageurs could and did perform the function he describes, that is, "react swiftly to company news and reported financial results by buying or selling stock and driving it to a changed price level."[114]

64. In contrast to his report in this matter, Dr. Werner has examined potential impediments to or constraints on arbitrage in his past expert reports. In multiple reports, Dr. Werner has recognized the link between market efficiency and the presence of short-sale constraints.[115] In his declaration in *Hi-Crush*, for example, Dr. Werner explained the role of arbitrageurs, stating, "[i]f, based on their information, a stock's price is too low, these individuals can profit by purchasing the security until it increases in value. Conversely, if the price is too high, the

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[110] Grenadier Report, ¶ 70. See also e.g., A. Shleifer and R. Vishny (1997), "The Limits of Arbitrage," *Journal of Finance,* 52(1), pp. 35–55 ("Shleifer and Vishny (1997)"); M. Mitchell, T. Pulvino, and E. Stafford (2002), "Limited Arbitrage in Equity Markets," *Journal of Finance*, 57(2), pp. 551–584.

[111] Grenadier Report, ¶ 71. See also e.g., M.K. Brunnermeier and L. H. Pedersen (2005), "Predatory Trading," *Journal of Finance*, 60(4), pp. 1825–1863; F. Allen, L. Litov, and J. Mei (2006), "Large Investors, Price Manipulation, and Limits to Arbitrage: An Anatomy of Market Corners," *Review of Finance*, 10(4), pp. 645–693.

[112] Werner Declaration, ¶ 39 (quoting *Cammer*).

[113] Werner Declaration, ¶¶ 39–47.

[114] Werner Declaration, ¶ 39 (quoting *Cammer*).

[115] Dr. Werner also cites to academic literature documenting certain ways in which arbitrageurs may be impeded from acting, beyond short-sale constraints. In particular, in his declaration in *Aeterna Zentaris*, Dr. Werner cites Shleifer and Vishny (1997), which discusses how various constraints on the ability of arbitrageurs to trade, such as extremely volatile arbitrage positions, can result in market inefficiency (*Aeterna 2016*, ¶ 135, fn. 127).

arbitrageur can sell its holdings, or perhaps even 'short' the stock (i.e., sell a stock that the arbitrageur does not own) and profit once the stock price declines."[116] Analyzing Hi-Crush common units' level of short interest, he concluded that "the level of short interest in relation to common units outstanding provides no indication of any constraint on short selling activities during the Class Period, such as the inability to locate or borrow the necessary common units to initiate a short position."[117]

65. In the Grenadier Report, I showed that analysts, academic studies, other observers, and Plaintiffs themselves attribute the price movements of the At-Issue Stocks during this period to coordinated trading, short squeezes, and attempted short squeezes, that is, precisely the types of constraints that could hinder arbitrageurs' willingness or ability to trade.[118] I also presented empirical analysis from the stock lending market that provides evidence of short-sale constraints that may have inhibited the ability of arbitrageurs and other market participants to sell short certain At-Issue Stocks during the Relevant Period.[119] Dr. Werner fails to address this evidence. His analysis of *Cammer* Factor 3 therefore cannot inform a finding of market efficiency.

IV. Opinion 2: Dr. Werner Fails to Show That There Is a Damages Methodology Capable of Measuring Damages on a Class-Wide Basis Consistent with Plaintiffs' Theory of Liability

66. I understand from counsel that at class certification in a securities case such as the current lawsuit, Plaintiffs must be able to put forward a methodology that is (i) applicable on a class-wide basis, and (ii) capable of reliably calculating damages for putative class members in a manner consistent with their theory of liability. In the Grenadier Report, I explained that while

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[116] *Hi-Crush 2014*, ¶ 74. Dr. Werner also repeats this description of short sales and arbitrageurs in his declaration in *Ebix* (*Ebix 2012*, ¶ 71).

[117] *Hi-Crush 2014*, ¶ 78; *Ebix 2012*, ¶ 75. Note that Dr. Werner compared the level of short interest of the stock to the average short interest for all NYSE stocks during the Class Period in those matters. In *Ebix*, the average of 21.2% is well above the NYSE average of 3.61%; in *Hi-Crush*, the average of 1.07% is below the NYSE average of 3.1%. In both reports, Dr. Werner makes the same conclusion that "the level of short interest in relation to common units outstanding provides no indication of any constraint on short selling activities during the Class Period, such as the inability to locate or borrow the necessary common units to initiate a short position."

[118] See Grenadier Report, Sections VI.C, VI.D.

[119] Grenadier Report, Section VI.D.3, presents empirical analysis based on data from the stock lending market. In Section VI.D.2, I also discussed a paper by Allen et al. (2023) that analyzes data from the stock lending market, and finds that there were short squeezes in five of the nine At-Issue Stocks (F. Allen et al. (2023), "Squeezing Shorts Through Social Media Platforms," Working Paper).

Plaintiffs had not yet put forth a damages methodology, this case involves unique fact patterns and economic issues that present tremendous challenges for Plaintiffs' ability to put forth a reliable class-wide damages methodology consistent with their theory of liability.[120]

67. In his declaration, Dr. Werner purports to lay out a "methodology [that] is generally accepted and widely used for calculating damages under the Exchange Act consistently on a class-wide basis."[121] He states that "damages [] can be measured as the difference between the market value of the Affected Companies' shares' prices at the close of trading on January 27, 2021 (before Robinhood first implemented various alleged restrictions), and the prices at which Class Members sold their shares during the Class Period, reduced by non-Robinhood related price deflation."[122] He further states that:

- "[A]nalytic tools would be used to establish that Robinhood's alleged market manipulation caused the price of the Affected Companies' shares to fall and remain deflated during the Class Period."[123]
- "An empirical model will be developed that apportions the responsibility for the deflation in the Affected Companies' shares by taking into account a variety of factors."[124]
- "[E]ach Class member's per security damages [] can be computed in the same way [] using readily available pricing information."[125]

68. As explained below, Dr. Werner does not propose any actual methodology, let alone a reliable one, for measuring damages on a class-wide basis that is consistent with Plaintiffs' theory of liability and tied to the unique facts of this case. He has so far failed to demonstrate that such a methodology even exists.

69. In **Section IV.A**, I explain that Dr. Werner has no economic basis to use the stock prices as of January 27, 2021 to measure the At-Issue Stocks' "fair value" in a damages calculation, given the evidence presented in the Grenadier Report and above that the prices of At-Issue Stocks as of January 27, 2021 did not result from trading in efficient markets. In **Section IV.B**, I

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[120] Grenadier Report, Section VIII.
[121] Werner Declaration, ¶ 99. He also opines that "with expert assistance, the finder of fact in this matter will be able to compute damages using a common class-wide methodology that applies to the calculation of damages for each and every Class member" (Werner Declaration, Opinion 2, ¶ 101).
[122] Werner Declaration, ¶ 95.
[123] Werner Declaration, ¶ 96.
[124] Werner Declaration, ¶ 96.
[125] Werner Declaration, ¶ 98.

explain that Dr. Werner's vague references to "analytical tools" or an "empirical model," without any indication of what the approach would actually entail, does not explain how any methodology ultimately used at a later stage of this case can overcome the myriad challenges raised in the Grenadier Report, or that such analysis can be done on a class-wide basis.

A. Dr. Werner Has No Economic Basis to Use the Stock Prices on January 27, 2021 to Calculate Damages, Given the Evidence That These Do Not Represent Prices in Efficient Markets

70. Dr. Werner asserts that "the measure of damages 'is the difference between the fair value of all that the [] seller received and the *fair value* of what he would have received had there been no fraudulent conduct.'"[126] He further suggests that "damages for a defrauded seller can be measured as the difference between the market value of the Affected Companies' shares' prices at close of trading on January 27, 2021 (before Robinhood first implemented various alleged restrictions), and the prices at which Class Members sold their shares during the Class Period, reduced by non-Robinhood related price deflation."[127] He has not yet defined what he means by "fair value." Nonetheless, regardless of the definition, he has no economic basis to assume that the prices of the At-Issue Stocks on January 27, 2021 represent such a "fair value."

71. As discussed in the Grenadier Report and above, the evidence is inconsistent with the notion that the At-Issue Stocks traded in efficient markets throughout the Relevant Period. I showed that there were extreme price increases during this period in the absence of new, value-relevant information that would explain such increases, culminating in some of the stocks' historically largest price increases on January 27, 2021.[128] Eight of the nine At-Issue Stocks had their largest stock price increases in the past 25 years in the week ending January 27, 2021.[129] I also documented extensive commentary from analysts, other observers, and the companies themselves stating that the prices of the At-Issue Stocks were decoupled from value-relevant information.[130] The evidence I have seen shows that the prices observed as of January 27, 2021 for the At-Issue Stocks would not represent prices in an efficient market, and Dr. Werner has not

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[126] Werner Declaration, ¶ 93 (emphasis added).
[127] Werner Declaration, ¶ 95.
[128] Grenadier Report, Section VI.B.
[129] Grenadier Report, Figure 4.
[130] Grenadier Report, Sections VI.B, VI.C, VI.D.

explained how such prices could reflect "fair value" of the stocks. Rather, for the At-Issue Stocks, the prices on January 27, 2021 followed an extraordinary price run-up that cannot be explained by new, value-relevant information.

72. Additionally, Dr. Werner himself appears to recognize that prices on January 27, 2021 were highly abnormal. In his event study regression model, he "used dummy variables in the regression model to control for the potentially abnormal returns on each Affected Company's earnings announcement dates and on January 27, 2021."[131] He further notes that "[u]sing dummy variables to control for potentially atypical observations in the regression estimation period so that the model parameters can better reflect typical stock price dynamics, is a widely used and generally accepted methodology."[132] He does not explain why it would be appropriate to remove the "atypical observations" on January 27, 2021 when estimating his regression model, but also use the prices on this day as the basis for measuring "fair value" in his damages analysis. Given the evidence that the prices of the At-Issue Stocks on January 27, 2021 do not represent prices in efficient markets, Dr. Werner has no economic basis to use these prices to calculate damages, rendering any purported damages methodology derived from those prices unreliable.

B. Dr. Werner's Vague References to an "Empirical Model" Do Not Explain How He Could Ultimately Calculate Damages on a Class-Wide Basis Consistent with Plaintiffs' Theory of Liability

73. In the Grenadier Report, I explained that given the unique fact pattern in this case, I am not aware of any formulaic approach or data that would allow Plaintiffs to reliably calculate hypothetical prices (and thus damages) on a class-wide basis in a setting where markets are inefficient.[133] Dr. Werner's vague damages description does not offer an actual methodology to overcome these concerns.

74. As a starting point, Dr. Werner does not put forth an actual methodology. Rather, he makes vague references to "analytic tools" and developing an "empirical model."[134] Dr. Werner does not identify what these "analytic tools" are, let alone explain how they would be applied to develop a reliable damages methodology. Nor does he provide any information on how an

[131] Werner Declaration, ¶ 63.
[132] Werner Declaration, ¶ 63.
[133] Grenadier Report, Section VIII.
[134] Werner Declaration, ¶ 96.

economist would develop a reliable "empirical model." This is analogous to a situation where I am tasked to come up with a methodology for solving a difficult mathematical problem: I could say that my "methodology" is (i) recognizing there is a problem, (ii) sitting down at my desk with a pen and paper, and (iii) considering a number of standard formulas that mathematicians often use. However, the description above would not actually constitute a methodology for solving the problem at hand, or even show that the problem is solvable. Here, by making these vague references, Dr. Werner does not explain how Plaintiffs (or "fact finders" as he suggests) would be able to calculate damages at a later stage in the case.

75. For example, Dr. Werner appears to recognize that the restrictions imposed by brokers other than Robinhood may have impacted the At-Issue Stocks during the proposed Class Period. He also appears to recognize that a model must account for changes in Robinhood's restrictions over time. He states that:

> An empirical model will be developed that apportions the responsibility for the deflation in the Affected Companies' shares by taking into account a variety of factors, that may include the timing, duration, and nature of the various trading restrictions imposed during the Class Period by Robinhood and others, relevant news entering the market, trading volume of Robinhood's customers in the Affected Companies' securities, share price movements in response to imposition and lifting of various restrictions, and other factors not related to the restrictions.[135]

Crucially, however, he provides no indication of how one would be able to do this on a class-wide basis. Making a vague statement about using an "empirical model" does not explain how this could ultimately be done.

76. Dr. Werner repeatedly describes his approach as "generally accepted and widely used for calculating damages,"[136] but provides no support for such a claim. Nor am I able to assess that approach, given that Dr. Werner has not provided any indication of what that approach would actually entail. As discussed above, Dr. Werner has not examined market efficiency during the proposed Class Period *at all*.[137] As I have also discussed in the Grenadier Report and above, this

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[135] Werner Declaration, ¶ 96.
[136] Werner Declaration, ¶ 99.
[137] In explaining his decision of the time period over which he assessed market efficiency, he notes that "[d]ue to the short length of the Class Period, and the allegations of market manipulation that occurred during the Class Period, [he] examined market efficiency for the one-year period prior to the Class Period" (Werner Declaration, fn. 1).

case involves a setting where the evidence is inconsistent with the notion that the markets for the At-Issue Stocks were efficient immediately prior to and during the proposed Class Period, and I am not aware of a formulaic approach or data that would reliably calculate hypothetical prices (and damages) in such a setting.[138] To the extent that any of the approaches Dr. Werner contemplates require an assumption of market efficiency to measure the alleged "artificial deflation," such a tool could not be reliably applied in this setting where there is no premise of market efficiency.

77. Dr. Werner further asserts that damages can be calculated "using readily available pricing information."[139] However, Dr. Werner's assertion has no reliable basis as he would need information beyond just "readily available pricing information" to measure "artificial deflation" and damages, and he has not shown that such information would be available on a class-wide basis. As I explained in the Grenadier Report, even if Plaintiffs were able to show that Robinhood's trading restrictions created "artificial deflation," in order to measure the "but-for" prices, they would presumably need to calculate damages based on individualized inferences of whether and how investors would have traded absent the trading restrictions in such highly unusual periods, and how such trading would have affected the "but-for" prices.[140] They also have not put forth any methodology to account for the impact of trading restrictions imposed by Robinhood as well as by other brokers, including identifying which investors would have traded absent the Robinhood restrictions, how their trading would have depended on prices and trading by other market participants, how their trading would have subsequently influenced the trading of others, and how restrictions by other brokers would factor into these determinations.

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[138] For example, in numerous other securities cases with 10(b) claims, Dr. Werner has proposed calculating damages based on an event study, and using tools such as "valuation tools" to account for other challenges such as non-fraud-related information. Dr. Werner has stated that "[c]onstruction of the inflation ribbon generally employs event study analysis, combined with widely used and generally accepted valuation tools and models" in reports filed in the following cases: *Aeterna 2016*; *CytRx 2017*; *Concordia 2018*; Declaration of Dr. Adam Werner, *Ivan Nibur, et al. v. SandRidge Mississippian Trust I, et al.,* February 15, 2018; Declaration of Dr. Adam Werner, *Michael Desta v. Wins Finance Holdings Inc., et al.,* September 17, 2018; *K-12 2018*; *Spectrum 2019*; *Fenix 2019*; *Insys 2019, Innocoll 2020*; *Global Brokerage 2020*; *Horsehead 2020*; *Array 2021*; Declaration of Dr. Adam Werner, *Gelt Trading Ltd. v. Co-Diagnostics, Inc., et al.,* October 17, 2022; Declaration of Dr. Adam Werner, *In re: NIO, Inc. Securities Litigation,* June 21, 2022; and *Omega 2022*. It is unclear whether Dr. Werner's vague references to an "empirical model" and "analytical tools" encompass an event study, but the fact that these commonly proposed tools (which he has proposed using in the past but does not specifically reference here) cannot be used here belies his claim that his methodology is standard.

[139] Werner Declaration, ¶ 98.

[140] Grenadier Report, Section VIII.

78. Finally, in the Grenadier Report, I explained that a damages methodology must be able to reconcile why the trading restrictions would have affected the price of the At-Issue Stocks (according to Plaintiffs' allegations), but not the prices of other stocks with similar restrictions.[141]

79. Dr. Werner does not provide any information on how a damages methodology would address the factors I have outlined above, and without doing so, has failed to show that there is a damages methodology capable of measuring damages on a class-wide basis consistent with Plaintiffs' theory of liability.

Executed this 28th of March, 2023



Steven Grenadier, Ph.D.

[141] Grenadier Report, Section VIII.B. I also explained that for any methodology Plaintiffs put forth to measure damages for their Section 9(a) claim to be reliable, it must be able to calculate the but-for prices where the subset of alleged actions specifically connected to those claims was absent but the "position closing only" ("PCO") restrictions and position limits were still in place (Grenadier Report, Section VIII.D).

Appendix A

Supplemental Documents Considered List

Academic Articles

- E.F. Fama (1991), "Efficient Capital Markets: II," *Journal of Finance*, 46(5), pp. 1575–1617

Depositions

- Deposition of Abraham Huacuja, March 21, 2023

Expert Reports and Declarations

- Declaration of Dr. Adam Werner, *In re: Ebix, Inc. Securities Litigation*, December 7, 2012
- Declaration of Dr. Adam Werner, *In re: Hi-Crush Partners L.P. Securities Litigation*, April 15, 2014
- Declaration of Dr. Adam Werner, *Bing Li v. Aeterna Zentaris, Inc., et al.*, December 9, 2016
- Declaration of Dr. Adam Werner, *In re: CytRx Corporation Securities Litigation*, November 17, 2017
- Declaration of Dr. Adam Werner, *Andrew Meyer v. Concordia International Corp., et al.*, February 7, 2018
- Declaration of Dr. Adam Werner, *Ivan Nibur, et al. v. SandRidge Mississippian Trust I, et al.*, February 15, 2018
- Declaration of Dr. Adam Werner, *In re: K12 Inc. Securities Litigation*, March 1, 2018
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- Declaration of Dr. Adam Werner, *In re: Spectrum Pharmaceuticals, Inc. Securities Litigation*, January 25, 2019
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- "trivago N: A note from trivago's CEO regarding COVID-19," *MarketScreener*, March 18, 2020, available at https://www.marketscreener.com/quote/stock/TRIVAGO-N-V-32502940/news/trivago-N-A-note-from-trivago-s-CEO-regarding-COVID-19-30184514/
- "Vecima Networks to Acquire DOCSIS Distributed Access Architecture and EPON/DPoE Portfolios from Nokia," *Business Wire*, July 29, 2020, available at https://www.businesswire.com/news/home/20200729005311/en/Vecima-Networks-to-Acquire-DOCSIS-Distributed-Access-Architecture-and-EPONDPoE-Portfolios-from-Nokia
- "Vodafone Idea: Nokia and Vodafone Idea complete world's largest Dynamic Spectrum Refarming deployment to improve network coverage and enhance connectivity," *MarketScreener*, June 3, 2020, available at https://www.marketscreener.com/quote/stock/VODAFONE-IDEA-LIMITED-

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9743588/news/Vodafone-Idea-Nokia-and-Vodafone-Idea-complete-world-s-largest-Dynamic-Spectrum-Refarming-deployme-30714262/

- Press releases from AMC Entertainment Holdings, Inc.'s website between January 28, 2020 and January 27, 2021, available at https://investor.amctheatres.com/newsroom/default.aspx
- Press releases from Bed Bath & Beyond, Inc.'s website between January 28, 2020 and January 27, 2021, available at https://bedbathandbeyond.gcs-web.com/news-releases
- Press releases from BlackBerry Limited's website between January 28, 2020 and January 27, 2021, available at https://www.blackberry.com/us/en/company/newsroom/press-releases
- Press releases from Express, Inc.'s website between January 28, 2020 and January 27, 2021, available at https://investors.express.com/news-events/news/default.aspx
- Press releases from GameStop Corp.'s website between January 28, 2020 and January 27, 2021, available at https://news.gamestop.com/newsroom
- Press releases from Koss Corporation's website between January 28, 2020 and January 27, 2021, available at https://investors.koss.com/press-releases
- Press releases from Nokia Corporation's website between January 28, 2020 and January 27, 2021, available at https://www.nokia.com/about-us/newsroom/press-and-stock-exchange-releases/
- Press releases from Tootsie Roll Industries Inc.'s website between January 28, 2020 and January 27, 2021, available at https://tootsie.com/financials/
- Press releases from trivago N.V.'s website between January 28, 2020 and January 27, 2021, available at https://ir.trivago.com/news-releases

Public Press

- *Public press article headlines extracted from a Factiva search of all publications with "AMC Entertainment," "Bed Bath & Beyond," "BlackBerry Ltd," "Express Inc," "GameStop Corp," "Koss Corp," "Nokia Corp," "Tootsie Roll Industries," or "Trivago NV" in the headline or lead paragraph, or indexed to "AMC," "BB," "BBBY," "EXPR," "GME," "KOSS," "NOK," "TR," or "TRVG" between January 28, 2020 and January 27, 2021*

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SEC Filings[1]

- AMC Entertainment Holdings, Inc., Form 8-K, filed February 27, 2020, 4:23PM
- AMC Entertainment Holdings, Inc., Form 8-K, filed February 27, 2020, 4:32PM
- AMC Entertainment Holdings, Inc., Form 8-K, filed March 3, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed March 20, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed March 23, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed March 24, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed April 17, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed April 24, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed April 29, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed June 3, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed June 9, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed June 22, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed June 30, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed July 10, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed July 23, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed July 31, 2020, 1:45PM
- AMC Entertainment Holdings, Inc., Form 8-K, filed July 31, 2020, 5:20PM
- AMC Entertainment Holdings, Inc., Form 8-K, filed August 6, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed August 31, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed September 15, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed September 24, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed October 13, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed October 20, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed November 2, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed November 10, 2020
- AMC Entertainment Holdings, Inc., Form 8-K, filed December 11, 2020, 6:00AM

[1] Timestamps are provided if there are multiple Form 6-K/8-K filings on the same day.

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- AMC Entertainment Holdings, Inc., Form 8-K, filed December 11, 2020, 4:19PM
- Bed Bath & Beyond Inc., Form 8-K, filed February 11, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed February 18, 2020, 7:19AM
- Bed Bath & Beyond Inc., Form 8-K, filed February 18, 2020, 4:27PM
- Bed Bath & Beyond Inc., Form 8-K, filed February 27, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed March 4, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed March 20, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed March 23, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed April 2, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed April 15, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed April 21, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed April 24, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed April 30, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed May 8, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed May 13, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed May 22, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed June 1, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed June 22, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed July 8, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed July 14, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed July 16, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed July 21, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed July 28, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed July 29, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed August 3, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed August 10, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed August 24, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed August 26, 2020

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- Bed Bath & Beyond Inc., Form 8-K, filed October 1, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed October 13, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed October 28, 2020
- Bed Bath & Beyond Inc., Form 8-K, filed December 14, 2020
- BlackBerry Limited, Form 8-K, filed March 31, 2020
- BlackBerry Limited, Form 8-K, filed April 27, 2020
- BlackBerry Limited, Form 8-K, filed June 2, 2020
- BlackBerry Limited, Form 8-K, filed June 23, 2020
- BlackBerry Limited, Form 8-K, filed June 24, 2020
- BlackBerry Limited, Form 8-K, filed July 27, 2020
- BlackBerry Limited, Form 8-K, filed August 24, 2020
- BlackBerry Limited, Form 8-K, filed September 1, 2020
- BlackBerry Limited, Form 8-K, filed September 2, 2020
- BlackBerry Limited, Form 8-K, filed September 24, 2020
- BlackBerry Limited, Form 8-K, filed December 17, 2020
- Express, Inc., Form 8-K, filed March 11, 2020
- Express, Inc., Form 8-K, filed March 17, 2020
- Express, Inc., Form 8-K, filed March 27, 2020
- Express, Inc., Form 8-K, filed April 1, 2020
- Express, Inc., Form 8-K, filed April 21, 2020
- Express, Inc., Form 8-K, filed May 4, 2020
- Express, Inc., Form 8-K, filed June 3, 2020
- Express, Inc., Form 8-K, filed June 15, 2020
- Express, Inc., Form 8-K, filed July 10, 2020
- Express, Inc., Form 8-K, filed August 4, 2020
- Express, Inc., Form 8-K, filed August 26, 2020
- Express, Inc., Form 8-K, filed October 2, 2020
- Express, Inc., Form 8-K, filed December 3, 2020

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- GameStop Corp., Form 8-K, filed March 9, 2020
- GameStop Corp., Form 8-K, filed March 26, 2020
- GameStop Corp., Form 8-K, filed April 21, 2020
- GameStop Corp., Form 8-K, filed May 19, 2020
- GameStop Corp., Form 8-K, filed June 4, 2020, 4:19PM
- GameStop Corp., Form 8-K, filed June 4, 2020, 7:50PM
- GameStop Corp., Form 8-K, filed June 9, 2020
- GameStop Corp., Form 8-K, filed June 18, 2020, 8:31AM
- GameStop Corp., Form 8-K, filed June 18, 2020, 4:12PM
- GameStop Corp., Form 8-K, filed July 2, 2020
- GameStop Corp., Form 8-K, filed July 6, 2020
- GameStop Corp., Form 8-K, filed September 2, 2020
- GameStop Corp., Form 8-K, filed September 9, 2020
- GameStop Corp., Form 8-K, filed November 10, 2020
- GameStop Corp., Form 8-K, filed December 8, 2020, 4:09PM
- GameStop Corp., Form 8-K, filed December 8, 2020, 4:43PM
- Koss Corporation, Form 8-K, filed January 30, 2020
- Koss Corporation, Form 8-K, filed May 7, 2020
- Koss Corporation, Form 8-K, filed July 23, 2020
- Koss Corporation, Form 8-K, filed August 20, 2020
- Koss Corporation, Form 8-K, filed October 15, 2020
- Koss Corporation, Form 8-K, filed October 29, 2020
- Nokia Corporation, Form 6-K, filed February 6, 2020
- Nokia Corporation, Form 6-K, filed February 13, 2020
- Nokia Corporation, Form 6-K, filed February 18, 2020
- Nokia Corporation, Form 6-K, filed March 2, 2020
- Nokia Corporation, Form 6-K, filed March 5, 2020
- Nokia Corporation, Form 6-K, filed March 18, 2020

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- Nokia Corporation, Form 6-K, filed March 19, 2020
- Nokia Corporation, Form 6-K, filed April 27, 2020
- Nokia Corporation, Form 6-K, filed April 30, 2020
- Nokia Corporation, Form 6-K, filed May 5, 2020
- Nokia Corporation, Form 6-K, filed May 6, 2020
- Nokia Corporation, Form 6-K, filed May 7, 2020
- Nokia Corporation, Form 6-K, filed May 14, 2020
- Nokia Corporation, Form 6-K, filed May 27, 2020
- Nokia Corporation, Form 6-K, filed June 3, 2020
- Nokia Corporation, Form 6-K, filed June 11, 2020
- Nokia Corporation, Form 6-K, filed June 23, 2020
- Nokia Corporation, Form 6-K, filed June 24, 2020
- Nokia Corporation, Form 6-K, filed July 7, 2020
- Nokia Corporation, Form 6-K, filed July 31, 2020
- Nokia Corporation, Form 6-K, filed August 10, 2020
- Nokia Corporation, Form 6-K, filed August 19, 2020
- Nokia Corporation, Form 6-K, filed August 21, 2020
- Nokia Corporation, Form 6-K, filed September 4, 2020
- Nokia Corporation, Form 6-K, filed October 8, 2020
- Nokia Corporation, Form 6-K, filed October 9, 2020
- Nokia Corporation, Form 6-K, filed November 4, 2020
- Nokia Corporation, Form 6-K, filed November 27, 2020, 6:09AM
- Nokia Corporation, Form 6-K, filed November 27, 2020, 9:27AM
- Nokia Corporation, Form 6-K, filed December 16, 2020
- Nokia Corporation, Form 6-K, filed December 17, 2020
- Nokia Corporation, Form 6-K, filed December 21, 2020
- Nokia Corporation, Form 6-K, filed December 22, 2020
- Tootsie Roll Industries Inc., Form 8-K, filed February 12, 2020

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- Tootsie Roll Industries Inc., Form 8-K, filed April 22, 2020
- Tootsie Roll Industries Inc., Form 8-K, filed July 23, 2020
- Tootsie Roll Industries Inc., Form 8-K, filed September 8, 2020
- Tootsie Roll Industries Inc., Form 8-K, filed November 12, 2020
- trivago N.V., Form 6-K, filed February 11, 2020
- trivago N.V., Form 6-K, filed April 27, 2020
- trivago N.V., Form 6-K, filed May 18, 2020
- trivago N.V., Form 6-K, filed May 28, 2020
- trivago N.V., Form 6-K, filed July 6, 2020
- trivago N.V., Form 6-K, filed July 28, 2020

Note: In addition to the documents on this list, I considered all documents cited in my report and exhibits to form my opinions.

Exhibit 1A
Applying Dr. Werner's News vs. No-News Test
Using Earnings and Guidance Releases[1]
1/28/20 – 1/27/21

	High Information Flow Days			Low Information Flow Days			
Affected Company	Total Days	Statistically Significant Days	% of Significant Days	Total Days	Statistically Significant Days	% of Significant Days	Fisher's Exact Test P-Value[2]
AMC	5	0	0.00%	248	19	7.66%	100.00%
BB	4	2	50.00%	249	10	4.02%	1.18%
BBBY	5	5	100.00%	248	16	6.45%	0.00%
EXPR	6	1	16.67%	247	13	5.26%	29.18%
GME	7	1	14.29%	246	12	4.88%	31.19%
KOSS	4	0	0.00%	249	11	4.42%	100.00%
NOK	4	2	50.00%	249	15	6.02%	2.36%
TR	4	1	25.00%	249	12	4.82%	19.13%
TRVG	4	1	25.00%	249	13	5.22%	20.48%

Source: EDGAR; Factiva; Werner Declaration, Exhibit 7; "Newsroom," AMC Entertainment Holdings, Inc., available at https://investor.amctheatres.com/newsroom/default.aspx; "BlackBerry Press Releases," BlackBerry Limited, available at https://www.blackberry.com/us/en/company/newsroom/press-releases; "News Releases," Bed Bath & Beyond, Inc., available at https://bedbathandbeyond.gcs-web.com/news-releases; "News," Express, Inc., available at https://investors.express.com/news-events/news/default.aspx; "Newsroom," GameStop Corp., available at https://news.gamestop.com/newsroom; "Investor Relations," Koss Corporation, available at https://investors.koss.com/press-releases; "Press and Stock Exchange Releases," Nokia Corporation, available at https://www.nokia.com/about-us/newsroom/press-and-stock-exchange-releases/; "Company: Tootsie Roll News," Tootsie Roll Industries Inc., available at https://tootsie.com/financials/; "Press Releases," trivago N.V., available at https://ir.trivago.com/news-releases

Note:

[1] I identified five publicly available reports where Dr. Werner defined "news days" or "High Information Flow Days" as days when the company made an earnings or guidance announcement: Declaration of Dr. Adam Werner, *In re: Spectrum Pharmaceuticals, Inc. Securities Litigation*, January 25, 2019, Section VIII.C.5; Declaration of Dr. Adam Werner, *Amanda Beezley v. Fenix Parts, Inc., et al.*, February 11, 2019 (*Fenix 2019*), Section V.C.5; Opening Report on Market Efficiency by Dr. Adam Werner, *In re: Insys Therapeutics, Inc. Securities Litigation*, March 1, 2019, Section V.C.5; Expert Report of Dr. Adam Werner, *In re: Innocoll Holdings Public Limited Company Securities Litigation*, August 31, 2020, Section VI.A.5; Declaration of Dr. Adam Werner, *In re: Omega Healthcare Investors, Inc. Securities Litigation*, March 16, 2022, Section V.A.5. This table replicates Dr. Werner's test of *Cammer* Factor 5 for the nine At-Issue Stocks, but defines High Information Flow Days as days when earnings or guidance information were provided to the market through a press release on the company's website or through Edgar. In *Fenix 2019*, Dr. Werner includes "pre-announcements" in his definition of "news" (¶ 64). I also include pre-announced financial results as a High Information Flow Day for purposes of this analysis.

[2] Fisher's Exact Test p-values are statistically significant at the 95% confidence level if they are less than 5%.

Exhibit 1B
Applying Dr. Werner's News vs. No-News Test
Using Forms 8-K and 6-K[1]
1/28/20 – 1/27/21

	High Information Flow Days			Low Information Flow Days			
Affected Company[2]	Total Days	Statistically Significant Days	% of Significant Days	Total Days	Statistically Significant Days	% of Significant Days	Fisher's Exact Test P-Value[3]
AMC	27	5	18.52%	226	14	6.19%	3.83%
BB	10	2	20.00%	243	10	4.12%	7.51%
BBBY	33	8	24.24%	220	13	5.91%	0.22%
EXPR	14	2	14.29%	239	12	5.02%	17.66%
GME	15	1	6.67%	238	12	5.04%	55.72%
KOSS	6	0	0.00%	247	11	4.45%	100.00%
NOK	34	4	11.76%	219	13	5.94%	25.88%
TR	5	1	20.00%	248	12	4.84%	23.35%
TRVG	7	1	14.29%	246	13	5.28%	33.20%

Source: EDGAR; Factiva; *Business Wire*; *GlobeNewswire*; Werner Declaration, Exhibit 7; "Newsroom," AMC Entertainment Holdings, Inc., available at https://investor.amctheatres.com/newsroom/default.aspx; "BlackBerry Press Releases," BlackBerry Limited, available at https://www.blackberry.com/us/en/company/newsroom/press-releases; "News Releases," Bed Bath & Beyond, Inc., available at https://bedbathandbeyond.gcs-web.com/news-releases; "News," Express, Inc., available at https://investors.express.com/news-events/news/default.aspx; "Newsroom," GameStop Corp., available at https://news.gamestop.com/newsroom; "Investor Relations," Koss Corporation, available at https://investors.koss.com/press-releases; "Press and Stock Exchange Releases," Nokia Corporation, available at https://www.nokia.com/about-us/newsroom/press-and-stock-exchange-releases/; "Company: Tootsie Roll News," Tootsie Roll Industries Inc., available at https://tootsie.com/financials/; "Press Releases," trivago N.V., available at https://ir.trivago.com/news-releases

Note:

[1] I identified seven publicly available reports where Dr. Werner defined "news days" or "High Information Flow Days" as days when the company filed a Form 8-K or Form 6-K: Declaration of Dr. Adam Werner, *Bing Li v. Aeterna Zentaris, Inc., et al.*, December 9, 2016, Section V.C.5; Declaration of Dr. Adam Werner, *In re: CytRx Corporation Securities Litigation*, November 17, 2017, Section V.C.5; Declaration of Dr. Adam Werner, *Andrew Meyer v. Concordia International Corp., et al.*, February 7, 2018, Section V.C.5; Declaration of Dr. Adam Werner, *In re: K12 Inc. Securities Litigation*, March 1, 2018, Section V.C.5; Opening Report on Market Efficiency by Dr. Adam Werner, *In re: Global Brokerage, Inc. f/k/a FXCM Inc. Securities Litigation*, January 6, 2020, Section V.A.v; Report on Market Efficiency Dr. Adam Werner, *In re: Horsehead Holding Corp. Securities Litigation*, April 9, 2020 (*Horsehead 2020*), Section V.A.5; Declaration of Adam Werner, *Peter Voulgaris, et al. v. Array Biopharma Inc., et al.*, January 8, 2021 (*Array 2021*), Section V.A.5. This table replicates Dr. Werner's test of *Cammer* Factor 5 for the nine At-Issue Stocks, but defines High Information Flow Days as days when the company filed a Form 8-K or Form 6-K. In *Array 2021,* Dr. Werner states that Form 8-Ks or Form 6-Ks are analyzed on the impact date of the filing if filed after market close (fn. 67). In *Horsehead 2020*, Dr. Werner states that if the company provides information in a press release that is later repeated in Form 8-K or Form 6-K, the impact date of the press release is treated as the impact date (¶ 99). I use the same approach when determining High Information Flow Days days for purposes of this analysis.

[2] NOK and TRVG are foreign firms that file Form 6-Ks (a "report of foreign private issuer"), whereas the other seven companies file Form 8-Ks.

[3] Fisher's Exact Test p-values are statistically significant at the 95% confidence level if they are less than 5%.

Exhibit 1C
Applying Dr. Werner's News vs. No-News Test
Using Press Releases[1]
1/28/20 – 1/27/21

	High Information Flow Days[2]			Low Information Flow Days			
Affected Company	Total Days	Statistically Significant Days	% of Significant Days	Total Days	Statistically Significant Days	% of Significant Days	Fisher's Exact Test P-Value[3]
AMC	43	6	13.95%	210	13	6.19%	10.59%
BB	66	6	9.09%	187	6	3.21%	8.51%
BBBY	61	10	16.39%	192	11	5.73%	1.46%
EXPR	20	2	10.00%	233	12	5.15%	30.51%
GME	35	2	5.71%	218	11	5.05%	69.72%
KOSS	5	0	0.00%	248	11	4.44%	100.00%
NOK	150	10	6.67%	103	7	6.80%	100.00%
TR	4	1	25.00%	249	12	4.82%	19.13%
TRVG	17	1	5.88%	236	13	5.51%	100.00%

Source: Factiva; *Bloomberg*; *Business Wire*; *GlobeNewswire*; *MarketScreener*; *Nasdaq*; *telecompetitor*; Werner Declaration, Exhibit 7; "Newsroom," AMC Entertainment Holdings, Inc., available at https://investor.amctheatres.com/newsroom/default.aspx; "BlackBerry Press Releases," BlackBerry Limited, available at https://www.blackberry.com/us/en/company/newsroom/press-releases; "News Releases," Bed Bath & Beyond, Inc., available at https://bedbathandbeyond.gcs-web.com/news-releases; "News," Express, Inc., available at https://investors.express.com/news-events/news/default.aspx; "Newsroom," GameStop Corp., available at https://news.gamestop.com/newsroom; "Investor Relations," Koss Corporation, available at https://investors.koss.com/press-releases; "Press and Stock Exchange Releases," Nokia Corporation, available at https://www.nokia.com/about-us/newsroom/press-and-stock-exchange-releases/; "Company: Tootsie Roll News," Tootsie Roll Industries Inc., available at https://tootsie.com/financials/; "Press Releases," trivago N.V., available at https://ir.trivago.com/news-releases

Note:

[1] I identified two publicly available reports where Dr. Werner defined "news days" or "High Information Flow Days" as days with company press releases: Declaration of Dr. Adam Werner, *In re: Ebix, Inc. Securities Litigation*, December 7, 2012, Section V.A.ii; Declaration of Dr. Adam Werner, *In re: Hi-Crush Partners L.P. Securities Litigation*, April 15, 2014 (*Hi-Crush 2014*), Section V.2.e.iii. This table replicates Dr. Werner's test of *Cammer* Factor 5 for the nine At-Issue Stocks, but defines High Information Flow Days as days when the company issued a press release. In *Hi-Crush 2014*, Dr. Werner states that he identifies press releases on the company's website, and relies on Bloomberg to identify the timestamp (fn. 59). I also identify press releases from the companies' websites and determine the time stamp from Factiva or other providers of the press releases.

[2] Timestamps could not be identified for all Nokia press releases. Press releases for which a timestamp could not be identified are excluded from this analysis. If press releases for which a timestamp could not be identified are treated as impacting both the date of the press release and the following trading date, the p-value is 100.00%.

[3] Fisher's Exact Test p-values are statistically significant at the 95% confidence level if they are less than 5%.