PROBING INTO THE NOVEL METHODS OF MARKET MANIPULATIONS IN THE AGE OF AI AND MACHINE LEARNING

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ABSTRACT

The history of Market Manipulation goes back in time since the inception of Stock Markets. Some mischievous market players have since the days of yore have always tried to hoodwink the market and defraud honest investors. With the passage of time, technology evolved and so did the manipulation methods employed by market manipulators. This research has been conducted to identify the new age market manipulation techniques and steps taken by Regulatory bodies like SEBI to discover, detect and prevent them. The rise of new technologies and investment strategies necessitates the adoption of scalable machine learning algorithms. This paper also explores the potential of supervised learning techniques to identify suspicious transactions indicative of market manipulation in the stock market.

1. Introduction

The landscape of stock market manipulation (SMM) has undergone a significant transformation in the new global economy. Traditional methods are evolving alongside the rise of advanced technologies, with manipulators adapting their tactics. Before we delve into the analysis it is imperative to define market manipulation. Blacks Law Dictionary defines Market Manipulation as, "illegal practice in an attempt to raise or lower stock prices by creating an active trading appearance". To put it succinctly, market manipulation would be any deliberate act that disrupts the true market price of a stock[1]. The 1977 Supreme Court case Santa Fe Industries v. Green addressed the scope of market manipulation and observed that market manipulation "refers generally to practices, such as wash sales, matched orders, or rigged prices, that are intended to mislead investors by artificially affecting market activity."[2] The market Regulators like SEBI are empowered under the law and entrusted with the duty of a watchdog to keep a check on the market and prevent fraudulent practices. The Supreme Court in the case of *SEBI v. Kanaiyalal*[3] observed in para 23, "The object and purpose of the 2003 FUTP (SEBI Prohibition of Fraudulent and Unfair Trade Practices relating to securities market, Regulation 2003) is to curb "market manipulations". Market manipulation is normally regarded as an "unwarranted" interference in the operation of ordinary market forces of supply and demand and thus undermines the "integrity" and efficiency of the market". While interpreting market abuse, SC in the case of *N. Narayanan*[4] held that, " "Market abuse" impairs economic growth and erodes investor's confidence. Market abuse refers to the use of manipulative and deceptive devices, giving out incorrect or misleading information, so as to encourage investors to jump into conclusions, on wrong premises, which is known to be wrong to the abusers." It further observed that, "Prevention of market abuse and preservation of market integrity is the hallmark of securities law…. Section 12-A of the SEBI Act read with Regulations 3 and 4 of the PFUTP Regulations specifically aim to curb market manipulations which can have an adverse effect on investor confidence and the healthy growth of the securities market".

[1] Maruf Rahman Maxim & Abu Sadat Muhammad Ashif, *A New Method of Measuring Stock Market Manipulation through Structural Equation Modeling (SEM)*, 14 INVESTMENT MANAGEMENT AND FINANCIAL INNOVATIONS 54 (2017).
[2] Santa Fe Industries, Inc. v. Green, 430 U.S. 462 (1977).
[3] SEBI v. Kanaiyalal Baldevbhai Patel, 15 SCC 1 (2017).
[4] N. Narayanan v. SEBI, 12 SCC 152 (2013).

Market manipulation encompasses a range of deceptive practices aimed at artificially influencing stock prices. Allen and Gale[5] (1992) provide a comprehensive classification system, categorizing manipulation into three main types:

I. Action-based manipulation: This involves intentional actions by investors or company management to distort prices. Firms can manipulate market perception through strategic, favourable, or unfavourable managerial decisions[6] (Chatterjea et al., 1993).

II. Information-based manipulation: This category includes trading on non-public information or spreading rumours to influence prices and gain an advantage. Classic examples include "bear raids" and "pump-and-dump" schemes[7] (Vila, 1989; Pickholz & Pickholz, 2001).

III. Size-based manipulation: Jarrow (1992) highlights the influence of large traders who can leverage their buying power to artificially move prices in their favour[8].

It's important to note that the definition of punishable manipulation varies across jurisdictions, making a universally applicable legal definition challenging.

Since the past decade, abuse of market and frauds have been linked to "social media" or "internet" in numerous research studies[9]. Studies have revealed that Twitter sentiment can be a significant factor influencing stock returns[10]. Notably, negative tweets appear to have a stronger effect compared to positive ones. The direct impact of sentiment on daily returns has been estimated to be around 0.036% for positive sentiment and 0.078% for negative sentiment, demonstrating an economically relevant influence[11].

2. The New Age Methods of Market Manipulation

Historically, market manipulation has relied on human intervention to distort market forces.

[5] Franklin Allen & Douglas Gale, *Stock-Price Manipulation*, 5 THE REVIEW OF FINANCIAL STUDIES 503 (1992).
[6] Arkadev Chatterjea, Joseph A. Cherian & Robert A. Jarrow, *Market Manipulation and Corporate Finance: A New Perspective*, 22 FINANCIAL MANAGEMENT 200 (1993).
[7] Jean-Luc Vila, *Simple Games of Market Manipulation*, 29 ECONOMICS LETTERS 21 (1989).
[8] Robert A. Jarrow, *Market Manipulation, Bubbles, Corners, and Short Squeezes*, 27 THE JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS 311 (1992).
[9] Ermanno Affuso & Kyre Dane Lahtinen, *Social Media Sentiment and Market Behavior*, 57 EMPIRICAL ECONOMICS 105 (2019).
[10] *Id.*
[11] *Id.*

This manipulation often involves deception, spreading misinformation, or leveraging inside information in interactions with other market participants. The primary aim is to artificially inflate or deflate the price of specific financial instruments or transactions, ultimately benefiting the manipulator. These attempts to disrupt the natural price equilibrium manifest in various forms. Some of the most common and well-known methods include cornering the market, squeeze plays, front-running, wash trading, pump-and-dump schemes, and benchmark manipulation.

Unlike traditional manipulation driven by human actions, new methods exploit the digital landscape of modern finance. This manipulation leverages electronic communication, information systems, and algorithmic platforms to unfairly distort information and prices of financial instruments. Essentially, these tactics tamper with the interplay between human and computerized elements within the market. They disrupt how humans and machines interact, corrupting communication across the financial ecosystem. Lin describes such actions as 'Cybernetic Market Manipulation.'[12] Cybernetic market manipulation refers to the evolution of financial crime in the digital age and includes employment of technologically sophisticated tools and techniques for market manipulation. The novel manipulation techniques identified by economists and researchers include pinging & spoofing, mass misinformation and electronic front running.

1. Pinging & Spoofing

The rise of financial technologies has introduced new opportunities for market manipulators, such as pinging and spoofing. These methods exploit the digital infrastructure of markets to disrupt the natural price discovery process[13].

In **Pinging** a huge number of miniscule orders are placed and cancelled within a fraction of a second. These orders then lure others in the market to respond to and reveal their trading intention to the party that is placing the pinging orders. Large-scale and persistent pinging can inflict substantial financial losses on investors and disrupt the overall market's efficiency. The

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[12] Tom Lin, *The New Market Manipulation*, 66 EMORY LAW JOURNAL 1253 (2017).

[13] Gregory Scopino, *The (Questionable) Legality of High-Speed 'Pinging' and 'Front Running' in the Futures Markets | CLS Blue Sky Blog*, (May 29, 2014), https://clsbluesky.law.columbia.edu/2014/05/29/the-questionable-legality-of-high-speed-pinging-and-frontrunning-in-the-futures-markets/ (last visited Mar 29, 2024).

manipulator employing this tactic does not intent to act upon the order and eventually cancels almost all the orders which allows his to gather critical information at little to no cost.

These quickfire order placements and cancellations act as deceptive probes, strategically designed to bring about trading intentions from other participants. This grants high-frequency trading (HFT) firms an informational advantage, similar to spoofing and wash trading[14]. In these established illegal practices, deceptive activity creates the illusion of greater market interest or liquidity in specific instruments to lure others into unfavourable trades. High speed pinging being similar to other well established deceptive techniques like spoofing and wash trading are prohibited as it violates Section 9 and 10 of the U.S. Securities Exchange Act (SEA) and potentially falls under the purview of Rule 3 and 4 of SEBI's PFUT Regulations[15].

Spoofing is parallel to pinging and works in a similar deceptive fashion to defraud the honest market participant. In spoofing, automated trading platforms strategically enter orders for a financial instrument at prices exceeding or falling below the genuine buying and selling interest (bona fide limits) in the market. This tactic aims to manipulate the perceived supply and demand, potentially tricking other participants into reacting favourably to the spoofer's agenda.

SEBI's order in the case of Nimi Enterprises16 shed light on the understanding of spoofing in the Indian markets and jurisdiction. In this case SEBI observed, "… that neither the securities market regulations nor the SCN has defined the term '*spoofing*'… it is observed that though the said term spoofing has not been defined statutorily, however, as a general understanding, it means the unlawful practice of placing orders containing large number of shares on one side of the market (buy/sell) and eventually executing orders containing relatively smaller quantities of shares on the opposite side (sell/buy) and cancelling the orders containing large orders." The board remarked that by engaging in spoofing, the entity seeks to manipulate the price and volume of the security. These large, artificial orders displayed to investors can create a false impression of strong interest, potentially driving the price in a direction that benefits the spoofing party. This manipulation can lead to significant enrichment at the expense of other

[14] *Id.*
[15] Securities and Exchange Board of India (Prohibition of Fraudulent and Unfair Trade Practices relating to Securities Market) Regulations, (2003), https://www.sebi.gov.in/legal/regulations/jan-2022/securities-and-exchange-board-of-india-prohibition-of-fraudulent-and-unfair-trade-practices-relating-to-securities-market-regulations-2003-last-amended-on-january-25-2022-_55604.html.
[16] Trading Activities of Nimi Enterprises, In re, 74 SCC OnLine (2023).

market participants[17].

2. Mass Misinformation

The convergence of social media and high-speed financial technology has empowered bad actors to exploit markets on a previously unimaginable scale. These unscrupulous parties weaponize misinformation, spreading bad data, fake news, and faulty information through interconnected information channels. Wrongdoers manipulate markets through various tactics, including fabricated regulatory filings, fictitious news reports, and erroneous data feeds. The interconnected nature of the new financial landscape fosters a "cascading effect." A single distorted information source can trigger market volatility in the short term and erode investor confidence in the long term. Imagine a successful misinformation campaign targeting a major company like Apple. The sheer number of investors holding shares in such companies, especially through retirement accounts, could translate to billions of dollars in losses.

Various platforms like Instagram, Twitter, YouTube, etc. which experience high viewership can be misused to deceive honest investors by misguiding them with false information. As in the case of Manish Mishra[18], SEBI investigated into alleged market manipulation by the Promoters of Sadhna Broadcast Limited. In this case after investigation SEBI in its interim order in para 12 remarked that, "Subsequent to the release of the misleading YouTube videos, there was an increase in the price and trading volume of the Sadhna scrip. The volumes appear to have been contributed by large number of retail investors likely influenced by the misleading YouTube videos. During this period, certain promoter shareholders, key management personnel of Sadhna, and non-promoter shareholders who held more than 1% of shareholding in Sadhna offloaded a significant part of their holdings at inflated prices and booked profits.[19]" The SEBI after going through the facts of the case came to the *prima facie* conclusion "that the Noticees were engaged in a coordinated scheme to induce unsuspecting investors to acquire securities in Sadhna leading to an unnatural increase in the prices of the scrip and finally sold shares at inflated prices thereby making illegal gains at the cost of the new investors. This coordinated scheme is, *prima facie* a violation of Section 12A(a), (b) and (c) of the SEBI Act read with Regulation 3(a), (b), (c), (d) and Regulation 4(1) and 4(2)(a), (d), (k) and (r) of

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[17] *Id.*
[18] Manish Mishra, In re, 2023 SCC OnLine SEBI 34.
[19] *Id.*

the PFUTP Regulations.[20]" This interim order was confirmed by SEBI in October 2023[21] through which it restricted 21 people from participating in trading of scrip of Sadhna Broadcast until further orders and estimated an illegal gain of Rs. 38 crores[22]. It was discernible that artificial inflation in share price took place post the YouTube videos which was supported by fraudulent scheme and led to an increase in volume by 28%[23].

In the year 2000, a student perpetrated a hoax involving a fabricated press release. This release falsely claimed an SEC investigation into Emulex, a publicly traded company. The misinformation caused the stock price of the listed entity to plunge from $104 to $43 each share, resulting in a shocking market value loss of $2.2 billion[24].

3. Electronic Front Running

Similar to traditional methods, electronic front running exploits advanced knowledge of upcoming price movements to profit by trading ahead of them. However, unlike its manual predecessor, it leverages the speed and automation of electronic platforms to capitalize on these opportunities. Traditional front running relied on human brokers to execute small-scale purchases ahead of client orders. In contrast, electronic front running exploits the technological advancements of modern markets. It utilizes sophisticated mechanisms to glean insights into order flow at one venue, enabling them to pre-emptively trade at another venue for their own benefit. The rise of novel financial technologies has fuelled the practice of electronic front running. These technologies allow participants to exploit disparities in price information across different trading venues. By capitalizing on high-speed connections and sophisticated algorithms, they can witness a price change or transaction on one platform and then execute a trade on another venue before the new price is fully reflected. Furthermore, certain parties may leverage privileged access to order flow data through special feeds or "flash orders," granting them an unfair advantage in anticipating and preying on upcoming trades. Supreme Court in the matter of Kanaiyalal[25] defined front running as "buying or selling securities ahead of a large

[20] *Id.*
[21] Manish Mishra, In re, 2023 SCC OnLine SEBI 369.
[22] Business Standard, *Sebi Confirms Market Ban on 22 Entities in Stock Manipulation Case*, (2023), https://www.business-standard.com/markets/news/sebi-confirms-market-ban-on-21-entities-in-stock-manipulation-case-123103101499_1.html (last visited Mar 30, 2024).
[23] Manish Mishra, In re, 2023 SCC OnLine SEBI 369, *supra* note 21.
[24] Alex Berenson, *TECHNOLOGY; Suspect Is Arrested in Fake News Case*, THE NEW YORK TIMES, Sep. 1, 2000, https://www.nytimes.com/2000/09/01/business/technology-suspect-is-arrested-in-fake-news-case.html (last visited Mar 30, 2024).
[25] SEBI v. Kanaiyalal Baldevbhai Patel, *supra* note 3.

order so as to benefit from the subsequent price move which denotes that the persons dealing in the market, knowing that a large transaction will take place in the near future and that parties are likely to move in their favour. The illegal private trading by a broker or market-maker who has prior knowledge of a forthcoming large movement in prices." The rise of technology makes it even easier for perpetrators to get information at the fastest pace possible and successfully predict a big transaction on the basis of which large scale buying or selling can be done to acquire wrongful profits.

In a recent order (26 Mar, 2024) passed by SEBI while curbing a Front Running activity, the Board noticed that, "the Noticee(s) in the process of front running trades of the Big client have not only interfered with the market forces of supply and demand of a particular scrip but have also artificially influenced the price and volume of the scrip and have thus, prima facie distorted them. The actions of the Noticee(s) have not only prima facie mislead the investors but have also induced them to deal in securities to their detriment."[26] Identifying the front running activities, SEBI ordered to ban the two personnel involved in this case for 3 years and fined them for Rs. 38 lakh[27].

Conclusion

SEBI being vigilant and responsive to change in finance technology made several amendments time and again to catch the pace of technological developments, for example inserting Rule 4(2)(r) vide 2018 PFUTP[28] amendment. This rule states that whoever knowingly plants false or misleading news which may induce sale or purchase of securities shall be considered as a market manipulator. This is an important step towards acknowledging the vast outreach and impact of social media which can also be misused like in the case of Manish

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[26] Final order in the matter of front running activities by Shila Devi, (2024), https://www.sebi.gov.in/enforcement/orders/mar-2024/final-order-in-the-matter-of-front-running-activities-by-shila-devi_82537.html.

[27] Front-running case: Sebi bans two persons from securities market for 3 years; slaps Rs 77 lakh fine, THE ECONOMIC TIMES, Mar. 26, 2024, https://economictimes.indiatimes.com/markets/stocks/news/front-running-case-sebi-bans-two-persons-from-securities-market-for-3-years-slaps-rs-77-lakh-fine/articleshow/108797684.cms?from=mdr (last visited Mar 29, 2024).

[28] SEBI | Securities and Exchange Board of India (Prohibition of Fraudulent and Unfair Trade Practices relating to Securities Market) Regulations, 2003 [Last amended on January 25, 2022], https://www.sebi.gov.in/legal/regulations/jan-2022/securities-and-exchange-board-of-india-prohibition-of-fraudulent-and-unfair-trade-practices-relating-to-securities-market-regulations-2003-last-amended-on-january-25-2022-_55604.html (last visited Mar 30, 2024).

Mishra[29]. In the case of *MBL and Company*[30] it was observed by Chief Justice Chandrachud in para 12 of his judgement that, "It is important to note that SEBI has amended the Regulations, a number of times, to keep up with the technology and times. Although aforesaid amendments are made to the Regulations, yet such amendments sometimes fail to live up to human ingenuity and growth of technology. Usurpation of reprehensible profits by fraudsters, who are not entitled to them, must be made answerable by this Court as per established tenets of rule of law without leaving incentives for fraudulent practices, based on creativity of disingenuous, to survive the legal gambits. Before embarking upon the necessary discussions, I would like to record my views on a somewhat unclear picture that emerge from undefined concepts contained in the Act and the Regulations framed thereunder, a comprehensive legislation can bring about more clarity and certainty on these aspects." The obiter remark in this case comments on the lack of necessary alterations and modifications by the Board to fall in line with the technological advancements and update the regulations and statutes accordingly. The Judiciary and enforcement bodies have expressed their concerns when it comes to interpretation and implementation of regulations against serious offenders.

We have recently witnessed the indices rallying up and ending at record high on the last trading day of financial year 2024[31]. Amidst the exalted moods of the market, we have also seen a significant rise in stock market frauds where 112 frauds[32] were registered in Pune city alone in the first two months of 2024. Such frauds warrant expeditious investigation and reveal the flaws in detection and prevention systems implemented by market Regulators. The Whole-time member of SEBI recently speaking at an international gathering held in Delhi said that "We have started the pilot use of ChatGPT for first-level processing of draft public offer

[29] Manish Mishra, In re, 2023 SCC OnLine SEBI 34, *supra* note 18.

[30] MBL AND COMPANY LIMITED VS. SECURITIES AND EXCHANGE BOARD OF INDIA, 8 SCC 273 (2022).

[31] "India coming of age": Sensex, Nifty soar to record highs in FY23-24. What's next, THE TIMES OF INDIA, Mar. 28, 2024, https://timesofindia.indiatimes.com/business/india-business/india-coming-of-age-sensex-nifty-soar-to-record-highs-in-fy23-24-whats-next/articleshow/108854885.cms (last visited Mar 30, 2024); Taking Stock: Market nears record high on final trading day of FY24, MONEYCONTROL (2024), https://www.moneycontrol.com/news/business/markets/taking-stock-market-near-to-record-high-nifty-above-22300-sensex-rises-655-points-12537661.html (last visited Mar 30, 2024).

[32] Steep rise in share market frauds, 112 cases in Jan-Feb, THE TIMES OF INDIA, Mar. 4, 2024, https://timesofindia.indiatimes.com/city/pune/steep-rise-in-share-market-frauds-112-cases-reported-in-jan-feb/articleshow/108192551.cms (last visited Mar 29, 2024).

documents.[33]" This can be considered as a positive step taken by the Regulator to incorporate AI technology in investigations.

In a recent circular the SEBI[34] noticed the use of AI and Machine learning by market intermediaries and Asset management companies. Through this circular, SEBI directed these market participants to report to SEBI the use of AI tools and Machine learning software employed by the intermediaries to trade in market. The Securities and Exchange Board of India (SEBI) has undertaken an initiative to map the landscape of Artificial Intelligence (AI) and Machine Learning (ML) applications within the Indian financial markets. This comprehensive survey aims to gain a deep understanding of the current adoption rate of these technologies by market participants. By gathering this data, SEBI is strategically positioning itself to develop informed policies and regulations that can effectively govern the use of AI/ML in the future Indian financial landscape. The Regulator considering the foreseeable risks of cybersecurity breaches has formulated a regulatory framework that works as a guidance mechanism for Registered Intermediaries and Regulated Entities like Stock Exchanges to fortify themselves from potential cyber threats. The Whole-time member of SEBI speaking at an international conference stated that a framework for cyber security has been devised to tackle cyber threats and to build a robust cyber resilience system[35]. This Framework is yet to be notified but suggests for an optimistically bright path ahead of us where we see a market that provides for a level playing field for all investors and achieves the objectives of prevention of market abuse and preservation of market integrity[36].

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[33] PTI, *Sebi Using AI for Investigations, Says Official*, BUSINESSLINE (2024), https://www.thehindubusinessline.com/markets/sebi-using-ai-for-investigations-says-official/article67881581.ece (last visited Mar 29, 2024).
[34] SEBI | Reporting for Artificial Intelligence (AI) and Machine Learning (ML) applications and systems offered and used by Mutual Funds, https://www.sebi.gov.in/legal/circulars/may-2019/reporting-for-artificial-intelligence-ai-and-machine-learning-ml-applications-and-systems-offered-and-used-by-mutual-funds_42932.html (last visited Mar 29, 2024).
[35] K. R. Srivats, *SEBI Set to Unveil Cybersecurity and Resilience Framework for Capital Markets*, BUSINESSLINE (2024), https://www.thehindubusinessline.com/economy/sebi-set-to-unveil-cybersecurity-and-resilience-framework-for-capital-markets/article67882102.ece (last visited Mar 30, 2024).
[36] N. Narayanan v. SEBI, *supra* note 4.

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13. Santa Fe Industries, Inc. v. Green, 430 U.S. 462 (1977).

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