Article

High-frequency Trading and Stock Markets: Past, Present and the Road Ahead

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Abstract

High-frequency trading (HFT) is one of the most significant recent developments in the financial markets. This study aims to assess the present status of HFT in stock markets in India and across the world to identify subjective areas that can be used for carrying out research in HFT in relation to stock markets operating in India. The study will help to bring out significant areas of research gap which can help to regulate the HFT without much impact on the retail investors by reducing the leveraging effect of the prices. With the use of major studies that have highest citations during the previous ten years in the area of HFT, the regulatory measures and their impact on HFT were found to be an interesting area of research that is left unexplored. This study on whole has provided clear synthesis of HFT and its impact on stock markets over the decade which has helped to identify significant areas of research related to Indian as well as world stock markets.

Keywords

Algo trading, high-frequency trading, stock markets, volatility

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Introduction

The high-frequency trading (HFT) has significantly replaced the traditional trading among the high-volume trades and impacts the prices of securities in all markets. This form of trading and its role in the volatility of the prices are scrutinised by the regulators across the world. The growth of technology has created a space for algorithms for making HFTs which has caused significant growth in the number of transactions as well as securities. The HFT has a significant impact on the turnover of the shares which results in increased market value of the shares and leads to significant financial crash in the market. The algorithmic trading (AT) is traced from its evolution and is energising itself with technology to pose significant growth in the near future. The trades are set off automatically based on algorithms which give lesser pressure on the transactions and higher rewards for the risk taken by the investors.

This trading form has caused vital crash in the financial markets which has led to several measures to regulate AT. The trading using the algorithms places orders based on the pre-determined values which can be attributed to significant returns. The usage of algorithms has significantly changed the pattern among the traders and it is causing significant noise in the regular market activities based on the leveraging effects. The number of firms dealing in the HFT has got considerable rise in the country and the growth of these companies reflects the need. The transactions are channelised through algorithms which most of the time enables the investors to return with lesser risk.

The study aims to assess the present status of HFT in stock markets in India and across the world to identify subjective areas that can be used for carrying out research in HFT in relation to stock markets operating in India. The study will help to bring out significant areas of research gap which can help to regulate the HFT without much impact on the retail investors by reducing the leveraging effect of the prices. The study has used major studies that have highest citations during the previous ten years in the area of HFT. This will help classify the areas that have significant presence of research carried out and identify various potential areas of research that can improve the knowledge towards the HFT. The research carried out so far in HFT can be discussed in the following structure.

High-frequency Trading in Stock Market

In recent years, rapid technical advances, and their widespread use, notably in equities markets have fuelled the growth of HFT. A thorough knowledge of HFT's impacts, as well as the possible hazards and possibilities it may bring in terms of market performance such as volatility, liquidity, pricing efficiency, and price

discovery, are explored in this study. HFT and AT may have a number of positive benefits on markets, despite widely held unfavourable beliefs. However, under some conditions, this form of trading might lead to market instability. To resolve issues in the near term, well-chosen regulatory actions are required. Considering the many uncertainties and data gaps, further research is required to better inform long-term policy decisions as per the research stud (Linton & Mahmoodzadeh, 2018). Due to time priority rule, resources are allocated based on tick size when price competition is restricted. Three effects of speed competition are shown. The one single penny tick size has a greater impact on price competitiveness in lower-priced equities with a large market capitalisation.

With regards to both the financial and real sectors, these advances may have a detrimental influence because of distortions such as misinformation, market speculation, and increased volatility as transactions increase velocity (Baron et al., 2014). The performance and competitiveness of HFTs have a substantial influence on stock prices. Latency metrics demonstrate considerable differences in HFT trading performance, which are accounted for by relative delays. HFT firms benefit from increased latency rank because of colocation enhancements (Baron et al., 2014). Market creation and cross-market arbitrage require speed because of the short-lived information and risk management channels that it supplies.

When it comes to speed, it is all about comparison. For the quotation stuffing hypothesis (Biais et al., 2011) established support using NASDAQ channel assignment. According to Gai et al. (2013) classic definition, rivalry in velocity but not price causes externalities. HFT is either helpful or bad for the markets, according to experts.

The impact on the lowest tercile of stocks is the opposite of what one would expect from a rise in the average AT intensity (Ma & McGroarty, 2017). This article examines dark pools, which are stock trading platforms with no pre-trade transparency. Trading in dark pools has steadied at or below 10% and is consistent across stock groups from different countries. In major financial markets throughout the world, technical, institutional, and market trends have all adopted HFT trading, which leverages prices (Shafi et al., 2019). Both these incidents and the extent to which HFT tactics have been discovered on Asian regional stock exchanges exhibit some striking similarities (Kauffman et al., 2015). HFT and algorithm trading in Indian Stock Markets are based on Grounded Theory. HFT has also had an impact on financial market connections as a result of financialisation. The VIX Index, a measure of volatility derived from SPX option prices, has an inverse relationship with SPX option prices that most traders are unaware of. To better understand how index options interact with the high-order moment models that replicate their behaviour, this study is being conducted. Future theory development may benefit from an awareness of the logic vs. perception issue in option pricing theory (Shafi et al., 2019). Limit up Limit down rule (LULD) and HFT behaviour in connection to the price limit

are the subject of this research. This research investigates five different hypotheses, including trade interference, volatility spillovers, and delayed price discovery. On maker-taker markets, magnet effects and HFT function around a price restriction. In maker-taker and inverted markets, when a subset of sample stocks is moving above and below the $3 barrier as prices approach their upper and lower limits. Although trading is disturbed, volatility is decreased in the near term without delaying the discovery of price. Due to the impending price limit, traders encounter a 'magnet effect'. There was a decrease in HFT trading activity on the maker-taker market following the trading halt, but no change on the inverted market (Lin, 2018).

In the trading market, traders make decisions depending on whether or not a particular phenomenon is widely recognised. Algorithms and HFT are familiar concepts to Indian traders. The current Indian market is hampered by AT and HFT (Chakervarti & Chaitanya, 2016). Investors now have additional alternatives because of technology advancements. As of 2010, the Tokyo Stock Market's Arrowhead trading platform had been established by the Tokyo Stock Exchange. HFQ has increased from 0% to 36% of trade activity on this platform in the last year. Extreme market circumstances coupled with HFQ might lead to systemic hazards, such as flash crashes. CoVaR and correlations can be used to mitigate the systemic hazards posed by HFQ, but circuit breakers and other limits should be applied to do so (Jain et al., 2016). HFTs and buy-side algorithmic traders (BSTs) use two different types of algorithmic trading tactics (BATs). Trading volumes between BATs and HFTs are quite comparable, although the BATs have a greater within-group similarity than do the HFTs. Similarity in directionality of execution metrics between groups is also apparent. BATs are more likely than HFTs to engage in contrarian trading behaviour, according to a new study. The existence of commonality and contrarian trading among ATs ensures market stability and price discovery in the market (Arumugam & Krishna Prasanna, 2021). Advances in technology and novel concepts have spurred global financialisation. Among the many technological advances developed to keep pace with the financial sector's rapid evolution and to reduce risk while increasing profit is AT. Despite the widespread use of AT, there is a lack of scientific research on the evidence of its efficacy. No evidence exists to support the assertion that AT and HFT definitions are interchangeable. An understanding of the impact of an ever-increasing number of financial transactions on the world economy must be based on evidence. AT, which we see as a component of financialisation, can be accurately described and identified in the Indian stocks market. There is a lot of interest in how financialisation's transaction velocity-symbolising AT influences prices (Dubey et al., 2017).

There is no correlation between foreign institutional investments (FIIs) and domestic institutional investments (DIIs) in India, based on the most recent high-frequency data (Iskandar, 2018).

HFT has a significant influence on Tehran Stock Exchange stock returns, causing market shockwaves. Because of the disparities in firm size, the HFT volume and returns for small and large businesses differ (Sarlak & Talei, 2016).

High-frequency Trading and Liquidity

HFT has a significant influence on Tehran Stock Exchange stock returns, causing market shockwaves. The statistics basis includes all Tehran Stock Exchange companies that have traded in the stock market during the past two years. Some large and small companies have assets logarithms that are significantly different from the average. It is difficult to predict the direction of Tehran's stock market because of its non-linear dynamics and the HFT of significant enterprises. Because of these disparities in firm size, the HFT volume and returns for small and large businesses differ. High-frequency market makers are generally unable to offer stable liquidity as a result of these restrictions (Ait-Sahalia & Saalam, 2017). HFTs are expected to lower their liquidity provision as a result of volatility (Ait-Sahalia & Saalam, 2017). Liquidity is not affected in the same way by internationalisation in all companies and nations (Ma et al., 2016). There were potential repercussions on Bulgarian capital market when new EU rule targeting HFT is put into effect (Stefanova, 2018). Ethical standards are necessary to ensure fair and stable marketplaces in the financial sector (Dalko & Wang, 2018). According to some proponents, HFT is a net liquidity supplier, although this is not the case. HFT significantly affected spoofing and quote stuffing on the market (Wang et al., 2016). During instances of extreme high and low returns, illiquidity has a greater influence (Bhattacharya et al., 2022). In summary, ephemeral orders are not the cause of market illiquidity and so should not be characterised as 'spoofing' described under the Dodd–Frank Act (Li, 2018). A stochastic order-driven model with waiting has a major influence on order books that are diverse in nature.

For large-cap equities, there is a decrease in liquidity during the time when HFT activity is strong, but an increase for small-cap stocks (Wang et al., 2016). AT in the Indian equities market has been hindered by the usage of an orders-to-trades ratio charge. The second charge had little or no effect on the order-to-trades ratio or the quality of the market (Aggarwal et al., 2017). Market characteristics including trade time, tightness, depth and robustness may all be measured using liquidity as a metric, according to the literature (Hou et al., 2017).

Traditional market makers are unable to compete with high-frequency market makers in terms of speed and information (Ait-Sahalia & Saalam, 2017). During market collapses, market-aggregate margin trading has a far greater influence on selling and investor order submission tactics than individual margin trading (Hu et al., 2021).

Despite a more thorough analysis revealing that the new situation benefits only HFT, this macro phenomenon disappears in markets containing both institutional investors and HFT, leaving institutional investors even with increased trading expenses (Lachapelle et al., 2016). It is clear that machine-based liquidity provision markets have the potential for systemic instability, and our findings support regulators' worries (Raman et al., 2015).

HFT and Volatility

The volatility of the market is significantly affected by the operation of HFT which is caused by AT. There are many who argue that it gives an opportunity for traders to calm down and make sensible judgments at times of high volatility in the market. Opponents downplay its importance, calling it a roadblock to a free market in price discovery. The calls for increased market regulation got stronger in the wake of the 2007–2008 Crisis and the 2010 Flash Crash. Because of this, it is doubtful that circuit breakers will go out of use (Sifat & Mohamad, 2019). During the V-shape bounce, there was an initial surge in selling, followed by a surge in purchasing. There were a lot of ups and downs in the market. As a consequence of this catastrophic occurrence, many people are left wondering what caused and aggravated the Flash Crash in the first place (Dalko, 2016). Sociological issues about the connection between investment businesses and society are impacted by illiquidity and dispersed execution (Pitluck, 2011). This publication is one of the first systematic assessments of theoretical and empirical research on the magnet effect as this new sub-discipline evolves (Sifat & Mohamad, 2020).

Market volatility, liquidity shocks and stock returns were found to have a direct correlation with the use of HFT. Faster trading and greater governance, as well as a lack of prohibitions on short sells, all have a role (Ma et al., 2018). There is new evidence that increased automated trading leads to lower intraday liquidity management and a decreased risk of extreme intraday price fluctuations (Aggarwal & Thomas, 2014). The HFT has significant impact on the stock market's volatility from a variety of angles. Volatility in the stock market and foreign commerce are mutually exclusive, since volatility decreases trade and exacerbates the country's current and capital account deficits (Bhowmik, 2013). The Securities and Exchange Board of India recently implemented a securities legislation known as the volume limit. It examines existing research on the detrimental effects of high sales volumes on the stock market's stability. The recent growth of HFT in India is exorbitant. The volume limit control works by decreasing the substantial price implications caused by legitimate transactions. There is insufficiency in the regulations when HFTs use spoofing to manipulate order display (Dalko & Wang, 2019).

Using high-frequency data, authors can identify the precise time intervals impacted by upcoming events (Agarwalla & Pandey, 2012). Semi-martingales based on high-frequency financial returns are the subject of an economics research. The effect of various stock specific and market-wide events on intraday volatility dynamics in the Indian market was thoroughly investigated. The high-frequency asset returns to its basic components (continuous, tiny jumps and big jumps) (dan Rosad, 2015). Investors might use these trends to construct heuristics, which would allow them to recognise probable bubble and herd scenarios before they occur (Ghosh & Kozarevic, 2019).

The research articles studied for the present study purpose and their contribution to literature are explained in Table 1.

Table 1. A Summary of Articles Reviewed.

Authors	Year	Title	Contribution
Linton & Mahmoodzadeh	2018	The Implication of High-frequency Trading for Security Markets	To identify potential dangers and opportunities for financial stability as well as other market outcomes including volatility, liquidity, pricing efficiency and price discovery, this article looks at how high-frequency trading (HFT) may evolve in the future.
Ma & McGroarty	2017	Social Machines: How Recent Technological Advances have Aided Financialisation	This study investigates how these social machines evolve to be.
Baron et al.	2019	Risk and Return in High-frequency Trading	With the study of high-frequency traders' behaviour and competition the researchers constructed latency measurements and discover that variations in relative latency account for large differences in HFTs' trading performance.
Ye et al.	2013	The Externalities of High-frequency Trading	The study demonstrates that while there is no detectable impact on liquidity, price efficiency or trading volume when exogenous technology shocks increase the trading speed from microseconds to nanoseconds, the order cancellation/execution ratio increases drastically from 26:1 to 32:1.
Boehmer et al.	2012	International Evidence on Algorithmic Trading	This study investigates the impact of algorithmic trading (AT) intensity on equity market liquidity, short-term volatility, and informational efficiency in 42 equity markets around the world between 2001 and 2011.
Petrescu & Wedow	2017	Dark pools in European Equity Markets: Emergence, Competition and Implications	This article assesses the advantages and disadvantages of using dark pools, both from the point of view of specific traders and for market efficiency and financial stability.
Linton et al.	2013	The Regulatory Challenge of High Frequency Markets	The challenges of regulating in a high-frequency environment are discussed in detail in this article, along with how these concerns differ from regulatory issues regulators have faced in the past.

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Authors	Year	Title	Contribution
Kauffman et al.	2015	Will High-frequency Trading Practices Transform the Financial Markets in the Asia Pacific Region?	The article suggests that appropriate regulations must be implemented to control and restrict the actions of high-frequency traders.
Shafi et al.	2019	High-frequency Trading: Inverse Relationship of the Financial Markets	The objective of this study is to better understand how SPX and VIX index trading relate to one another and to raise market awareness using high order moment models that simulate the behaviour of these index options.
Lin & Swan	2017	Limit Up Limit Down, Exchange Access Fee and High-frequency Trading Around Price Limits	It is found that LULD does interfere with trading activity, but it also reduces short-term volatility without delaying the price discovery process.
Chakervarti & Chaitanya	2018	Algorithm Trading and High-frequency Trading Boon or Bane in Indian Context	This study uses grounded theory to carefully examine algorithm trading and high-frequency trading in Indian Stock Markets to identify the reasons in a qualitative manner.
Jain et al.	2016	Does High-frequency Trading Increase Systemic Risk?	The research has provided a methodology for determining if HFQ raises systemic hazards and emphasises the necessity to use correlations and CoVaR techniques to control these risks through circuit breakers and other restrictions.
Arumugam & Prasanna	2021	Commonality and Contrarian Trading Among Algorithmic Traders	In this study, HFTs and buy-side algorithmic traders (BATs) are two diverse categories of ATs whose trading behaviour is examined. The outcomes show a significant trade similarity between HFTs and BATs.
Dubey et al.	2017	Evidence of Algorithmic Trading from Indian Equity Market: Interpreting the Transaction Velocity Element of Financialization	The researchers in this study, in order to demonstrate algorithmic trading and understand it as the transaction velocity component of financialisation, take the advantage of the Indian equity market's explicit definition and identification of AT.
Dhananjaya	2020	Do Domestic Institutional Investors (DIIs) Neutralize the Impact of Large Reversal by Foreign Institutional Investors (FIIs)? Recent Evidence from Indian Stock Market	The researcher in this article tried to identify how domestic institutional investors (DIIs) and foreign institutional investors (FIIs) interact in India, by using recent high-frequency data.

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Authors	Year	Title	Contribution
Sarlak & Talei	2016	Impact of High-frequency Trading on the Stock Returns of Large and Small Companies in the Tehran Stock Exchange	The outcomes show that high-frequency trading by major corporations has an impact on the turnover of small businesses and that the dynamics of stock returns on the Tehran Stock Exchange are non-linear functions.
Sahalia & Saglam	2017	High-frequency Market Making: Implications for Liquidity	Using several liquidity indicators, the researcher discovers that the market maker offers more liquidity as he moves more quickly but backs off when volatility rises.
Aït-Sahalia & Saglam	2013	High-frequency Traders: Taking Advantage of Speed	The researcher provides a model of dynamic trading where a strategic high-frequency trader receives an inaccurate signal about future order flows and utilises his speed advantage to improve his quoting policy.
Ma et al.	2016	International Stock Market Liquidity: A Review	This article reviews the literature on liquidity in global stock markets, recommends opportunities for future research, and shows the contrasts and similarities in empirical findings among existing studies.
Stefanova	2018	High-speed Technology Trading Innovations and Capital Market Performance in Bulgaria	Empirical studies done in this article significantly highlight how HFT enhances the quality of financial markets through greater liquidity, decreased transaction costs and quick price discovery.
Dalko & Wang	2018	High-frequency Trading: Deception and Consequences	The article goes into detail regarding the harm caused by spoofing and quote stuffing, two common high-frequency trading practices.
Dalko & Wang	2020	High-frequency Trading: Order-based Innovation or Manipulation?	In this research, the three effects that high-frequency traders have had on the market—increased volatility, a rise in unethical practises and a possibility for instability are highlighted. The study is justified by recent regulatory improvements and successful prosecutions of deceptive HFT methods.
Bhattacharya et al.	2021	Does Time-varying Illiquidity Matter for the Indian Stock Market? Evidence from High-frequency Data	This study observes that in the situation of open interest and volatility, illiquidity plays a significantly uneven role in describing stock returns in both up- and down-market scenarios.

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Authors	Year	Title	Contribution
Kun	2018	Do High-frequency Fleeting Orders Exacerbate Market Illiquidity?	The findings show that transitory orders have very little impact on market illiquidity and do not contribute to either the amplified impact of prices or the decline in revenue for the market maker.
Wang et al.	2017	Market Decline, High-frequency Trading and Liquidity Commonality	Results show that for large-cap equities, HFT participation offers liquidity under wildly fluctuating market conditions.
Aggarwal & Panchapagesan	2017	Do Regulatory Hurdles Work?	The study examines two scenarios in which the Indian equities market's orders-to-trades ratio cost served as a barrier to algorithmic trading. To determine the causal influence of the charge in both situations, the researcher employs a difference-in-difference estimation technique.
Salighehdar et al.	2017	Cluster Analysis of Liquidity Measures in a Stock Market Using High-frequency Data	To identify commonalities and differences among liquidity measurements, researchers study their connection. Then, in order to quantify how similar, the liquidity measurements are to one another, researchers assess their correlation.
Aıt-Sahalia & Saglam	2016	High-frequency Market Making	The article gives the first rigorous, model-based evaluation of the effects of four hotly debated high-frequency trading regulations.
Hu et al.	2021	Deleveraging Commonality	This article uses empirical evidence to demonstrate that, even after adjusting for market index and market-wide liquidity, stock-level margin trading still considerably moves with market-aggregate margin trading.
Lachapelle et al.	2016	Efficiency of the Price Formation Process in Presence of High-frequency Participants: A Mean Field Game Analysis	In this study, a random order-driven market system with awaiting costs is examined for orderbook with diverse dealers. The researcher has used a natural framework for mean field game theory with anonymous players. The author offers both numerical experiments and analytical solutions.
Raman et al.	2020	Man vs. Machine: Liquidity Provision and Market Fragility	This study compares how human and algorithmic traders participate and offer operational liquidity during 'abnormally' difficult days to how they behave throughout 'normal' times, with an eye on the implications for the strength and fragility of markets.

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Authors	Year	Title	Contribution
Sifat & Mohamad	2019	Circuit Breakers as Market Stability Levers: A Survey of Research, Praxis, and Challenges	This article attempts to explain the regulatory rationale and synthesises three decades' worth of theoretical and empirical works. It also highlights limitations, issues and methodological flaws undermining. Findings and offers guidance for future research in an environment where markets are becoming more complex.
Dalko	2016	Limit Up–Limit Down: An Effective Response to the 'Flash Crash'?	This article's goal is to evaluate limit up–limit down (LULD), a new rule from the US Securities and Exchange Commission, in light of manipulating high-frequency trading. A 'fair and orderly' market may be maintained and widespread crises can be avoided even in the age of computerised trading by promoting quantitative regulation measures that can be automated using high-speed computers.
Pitluck	2011	Distributed Execution in Illiquid Times: An Alternative Explanation of Trading in Stock Markets	This article argued that despite temporary spikes in liquidity, global stock markets are typically illiquid, and it was suggested that local investors might be quick and stealthy, whereas international corporations are forced to move more slowly due to their increased illiquidity.
Sifat & Mohamad	2020	A Survey on the Magnet Effect of Circuit Breakers in Financial Markets	The researchers in this article synthesise the theoretical and empirical research on the magnet effect hypothesis and identify the flaws in these studies that need to be fixed in the academic community before regulators start to take their findings more seriously.
Ma et al.	2018	Market Volatility, Liquidity Shocks, and Stock Returns: Worldwide Evidence	In 41 countries between 1990 and 2015, the researchers examine at how market volatility, liquidity shocks and stock returns interact. The results show that liquidity plays a significant role in how market volatility influences stock returns in global markets.

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Authors	Year	Title	Contribution
Aggarwal & Thomas	2014	The Causal Impact of Algorithmic Trading on Market Quality	By introducing co-location, an exogenous occurrence known to increase algorithmic trading after it occurs, the researchers attempt to address the difficulty in establishing the casual impact of algorithmic trading. The results indicate that increasing AT reduces the liquidity risk and it is suggested that securities with higher AT activity have more advantages than disadvantages.
Bhowmik	2013	Stock Market Volatility: An Evaluation	With the aid of significant economic literatures, the research examined a wide range of aspects of stock market volatility, including measurement and the nature of volatility's influence.
Dalko & Wang	2019	Volume Limit: An Effective Response to the India Flash Crash?	The article evaluates the Securities and Exchange Board of India's most recent securities regulations, known as the volume limit. It examines the research on the detrimental effects of high selling volumes on stock market stability.
Agarwalla & Pandey	2012	Whether Cross-listing, Stock-specific and Market-Wide Calendar Events Impact Intraday Volatility Dynamics? Evidence from the Indian Stock Market Using High-frequency Data	This research examines the impact of several stock-specific and market-wide events on intraday volatility dynamics in the Indian market using high-frequency stock price data. It was found that the intraday volatility in the Indian Stock Market has a 'reverse J' shape and is substantially higher than what has been reported in other markets.
Aït-Sahalia & Jacod	2012	Analyzing the Spectrum of Asset Returns: Jump and Volatility Components in High-frequency Data	This article outlines a straightforward but effective methodology for breaking down asset returns sampled at high-frequency into their basic components (continuous, small jumps, large jumps), assessing their relative magnitudes, and analysing their finer details, such as the level of activity of the jumps.
Ghosh & Kozarević	2019	Multifractal Analysis of Volatility for Detection of Herding and Bubble: Evidence from CNX Nifty HFT	This research explores the herding and bubble detection in a capital market underlying's volatility domain. The empirical study of the 'financial Reynolds number (ReHFT)' derived from the CNX Nifty HFT domain using MFDFA has shown that ReHFT strongly exhibits herding characteristics.

Conclusion

The HFT in India and as well across the world is controlled based on various technical regulations and with the advent of technology, the HFTs are able to carry out the transactions. The literature explained above has given vital areas of research in improvising the HFT with minimal impact on the retail investors and crunch on prices of the financial securities. The reviews have also helped to learn various techniques of arbitrages, passive trading and spoofing, which has an impact on the leveraging effect of the prices. The liquidity of the market is having significant impact based on the operation of the HFT which is clearly explained by the market crash in the year 2010. The HFT has the potential to bring down the market based on its operation has significant impact on the liquidity of the market. The world over has gained significant knowledge about the vital impacts created in the areas of liquidity and volatility. The majority of the studies found in the literature that are highly cited are based on multi-national and other world markets. The Indian market related researches are very scarce in the literature. The Indian Stock Market has been affected vitally with the operation of HFT which is explained by the literature. The connecting link between the HFT with the operational areas of liquidity and volatility of stock market is hardly found in the literature. The various measures to eliminate the overcoming effects of spoofing and quotation stuffing are identified as potential area of research based on this synthesis. The regulatory measures and their impact on HFT were found to be an interesting area of research that is left unexplored. This study on whole has provided clear synthesis of HFT in the areas of liquidity and volatility over the decade which has helped to identify significant areas of research related to Indian as well as world stock markets.

Implications of the Study

This research study contributes to the regulators by providing insights to earlier research in HFT so that regulators can concentrate on devising more extensive regulatory policy. This study also contributes to the researchers in the area of HFT as this gives a condensed view of previous research done in studying impact of HFT on various layers of stock markets. This study mainly contributes to the HFTs and institutional investors by specifying what kind of impact it will have in their trading transactions and also the challenges it is posing.

Declaration of Conflicting Interests

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