
SEBI'S 2025 FRAMEWORK FOR SAFER RETAIL PARTICIPATION IN ALGORITHMIC TRADING: AN EVALUATION OF INVESTOR PROTECTIONS, REGULATORY GAPS, AND INTERNATIONAL COMPARISONS

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ABSTRACT

The fast-growing interest in algorithmic trading in India, which now accounts for over 60% of market activity, has significantly increased retail participation, especially among young and inexperienced investors. This increased involvement also puts these people at risk of the enhanced risks of opaque black-box algorithms, application programming interface (API), cybersecurity threats, and behavioural biases. The circular issued on 4 February, 2025 by SEBI with the title of “Safer Participation of Retail Investors in Algorithmic Trading” establishes several main safeguards. These are to formalise principal-agent relationships between brokers and algorithmic service providers and classifying algorithms as white-box or black-box. In particular, black-box algorithms must be registered by a research analyst and provide internal reports.

The paper is a critical analysis of how the above framework affects retail investors, and it is observed that the framework can place significant accountability on brokers, most of whom are not highly technical in post-trading, yet provide few ex-ante protections. Critical gaps are created, such as the lack of suitability or appropriateness of assessment of retail clients, insufficient investor-facing transparency about algorithmic behaviour during stress conditions, an almost wholly intermediary-based approach instead of regulating algorithm designers directly.

The SEBI regime is inferior to the international standards, including the MiFID II of the EU, the regulations of the U.S. SEC/FINRA, and the IOSCO principles in a number of aspects. Even though the circular is a progressive move against retail access, it continues to create informational asymmetries and further imbalances the economic risks on retail investors who are

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digitally naive. To successfully overcome these weaknesses, the Securities and Exchange Board of India (SEBI) must put in place a strong ex ante protection system, a more investor-oriented disclosure system, and harmonize its regulatory regime with global best practices, thus creating a balanced balance in the dynamic algorithmic trading system of India.

Keywords: Algo trading, SEBI regulation, Stock brokers, investor protection, MiFID II comparison.

Need and scope of the study

At least sixty percent of the market activity is made up of algorithmic trading, and the retails are fast catching up in the digital-savvy young investors. Therefore, the present study will help to address the gap in the understanding of whether the 2025 framework offered by SEBI is sufficient to safeguard this risk group. The study laments regulatory loopholes in investor protection, the model of accountability that is broker-centric, lack of ex-ante protection, and lack of transparency. The area of interest includes a comparative analysis of international regimes to suggest evidence-based regulatory improvements to the Indian developing ecosystem of algorithmic trading.

Introduction

Algorithmic trade in India has experienced tremendous growth, with automated trades now representing over 60% of the market activity.² Its growth will continue at an expected rate of CAGR 11.65% during the forecast period FY2025 - FY2032, confirming its growing significance.³

Algorithmic trading (also called algo-trading or black-box trading) is theoretically designed to provide more profits at high speed and frequency, which is considered impossible by human-prompted traditional trading. It uses an established set of principles that can otherwise be termed as an algorithm to place an order by cancelling out all the emotional aspects of trading. The Direct Market Access (DMA) for investors was introduced by SEBI in a breakthrough

² Abir Jameel, Algorithmic Trading and Current Market Landscape in India, LINKEDIN (2024), <https://www.linkedin.com/pulse/algorithmic-trading-current-market-landscape-india-abir-jameel-wkc9c> .

³ Markets and Data, India Algorithmic Trading Market Assessment, By Component (Solution, Services), By Mode (Cloud, On-Premises), By Function (Programming, Debugging, Data Extraction, Back-Testing and Optimization, Risk Management), By Type (Stock Market, Foreign Exchange Market, Exchange-Traded Funds, Bonds, Cryptocurrencies, Others), By End-user (Short-Term Traders, Long-Term Traders, Retail Investors, Institutional Investors), By Region, Opportunities and Forecast, FY2018-FY2032 (2024), <https://www.marketsanddata.com/industry-reports/india-algorithmic-trading-market>.

circular in April 2008, which marked the beginning of algorithmic trading in India.⁴ Through brokers' infrastructure, DMA enabled customers to electronically enter orders straight into the exchange's trading system. As per the press announcements issued by SEBI in September 2024, 54% of the IPO shares issued to the retail investors were sold in a week, which indicates the increasing rate of retail participants in trading.⁵ The remarkable 144 initial public offerings that took place between April 2021 and December 2023 demonstrated the substantial contribution of individual investors to liquidity, particularly in the derivative sector.⁶ By FY2024, the number of retail traders had nearly doubled. In contrast to institutional traders who benefit from algorithmic techniques, retail traders, especially in the equities F&O market, suffer significant losses despite their increasing presence. SEBI's (Securities and Exchange Board of India) regulatory environment over the years has aimed to clarify the rights and obligations of the key participants in the trading ecosystem, including investors, brokers, algo providers, vendors, etc. The same has now reached its intricate circular in February 2025 to regulate safer retail participation in algo trading in response to growing demand and changing technology. This is intended to ensure that retail investors can access algorithmic trading facilities with the necessary safeguards in place. However, the same introduces new complexities and unintended consequences. Standards for retail algo trading settings that are traceable, validated, and surveillance-enabled have made India's regulatory system appear to be quite similar to its overseas counterparts. Even though this circular establishes supervision and traceability standards that are in line with international standards under policies like MiFID II, problems like broker accountability chains, API vulnerabilities, and black-box opacity still exist.

In connection with the above-mentioned problems, my research objectives are to analyse how retail investors are being targeted to the risks of algo trading; To find out the ambiguities in the latest regulation by SEBI and to identify how to fill these gaps with the help of international standards on algo trading.

⁴ Sec. & Exch. Bd. of India, Cir. No. MRD/DoP/SE/Cir-7/2008 (Apr. 3, 2008), https://www.sebi.gov.in/sebi_data/attachdocs/1291093518041.pdf.

⁵ Sec. & Exch. Bd. of India, Press Release No. 37/2024 (Sept. 2, 2024), https://www.sebi.gov.in/media-and-notifications/press-releases/sep-2024/sebi-study-shows-54-of-ipo-shares-allotted-to-investors-excluding-anchor-investors-are-sold-within-a-week_86387.html.

⁶ Sec. & Exch. Bd. of India, Study - Analysis of Profit and Loss in the Equity Derivatives Segment (FY22-FY24) (Sept. 23, 2024), https://www.sebi.gov.in/reports-and-statistics/research/sep-2024/study-analysis-of-profits-and-losses-in-the-equity-derivatives-segment-fy22-fy24-_86905.html.

Research Objectives

1. To analyse the specific risks algorithmic trading poses to retail investors in India's current market environment
2. To critically evaluate SEBI's February 2025 circular on algorithmic trading and identify regulatory gaps
3. To compare the Indian framework with international standards (MiFID II, SEC/FINRA, IOSCO) and recommend improvements

Technology-induced risks and Blackbox uncertainties: Real-world impacts on Retail investors

The intricacies of algorithmic trading- especially those related to APIs, black box unpredictability, and opaque systems have a significant effect on retail investors lacking financial education.⁷ Their risks and potential losses heightened as a result. The emergence of financial technology (FinTech) has lowered the costs associated with trading and obtaining investment-related information, thereby drawing more people to the stock market and resulting in events that have serious consequences for retail investors. Retail investors are often called “noise traders” due to their lack of cost-effective access to information, gambling-like trading preferences, and susceptibility to various behavioural biases.⁸ Aside from their in-built informational backlog, many retail investors focus on historical price movements while overlooking the essential fundamental data with high confidence. This false belief is creating an illusion among investors that they are in full control of their trading trajectories.

APIs (Application Programming Interfaces) serve as the foundation for retail algorithmic trading, allowing applications and platforms to automate transactions directly with brokers or exchanges. Weak API security, unverified third-party code, and poorly logged actions can lead to multiple forms of investor exposure.⁹ An API is a software interface that facilitates the connection of two applications without user involvement. In other words, an API is a collection

⁷ Yang Siyuan et al., Algorithmic Trading and Challenges on Retail Investors in Emerging Markets, 4 J. Econ., Fin. & Acct. Stud. 36 (2022).

⁸ Ahmed S. Baig & Benjamin M. Blau, Neoclassical Finance, Behavioral Finance and Noise Traders: A Review and Assessment of the Literature, 41 Int'l Rev. Fin. Analysis 89 (2015).

⁹ Cyrille S. Medegan Fagla & Mark D. Ryan, Security Analysis of the Open Banking Account and Transaction API Protocol, Appl. Computing & Informatics (forthcoming 2025).

of computer software and activities. It enables interactions between products or services without requiring an understanding of how those connections work. Most of the institutional and retail traders use black boxes where the outputs are often unpredictable and the process being opaque leaves no room for real-time analysis and studies. Retail investors with limited financial education frequently lack the critical thinking skills necessary to evaluate black box algorithms and API-based trading platforms. Although APIs link trading accounts to automated tools, they can also be abused by unapproved or defective code, which can result in unpredictable order placements or excessive risk-taking. Due to the access to trading systems and sensitive financial data, brokers are often the targets of hacking, data breaches, and cyberattacks. APIs and trading platforms may be subject to illegal access and manipulation due to inadequate security measures.¹⁰

Understanding SEBI's regulatory frameworks with special reference to the February 2025 regulation on Algo Trading

On February 4, 2025 Securities and Exchange Board of India (SEBI) issued a circular titled "Safer participation of retail investors in Algorithmic trading"¹¹, which sets up the main rules for algorithmic trading, including stakeholder responsibilities, compulsory registration, and oversight mechanisms. There were no regulations aimed at retail investors from SEBI until this one. NSE AND BSE had some rules to check the trading activities of institutional traders, where the onus was put explicitly on brokers who had limited knowledge of new technologies. India's algo trading journey began with a press release by SEBI on April 3, 2008¹², instigating the Direct Market Access (DMA), which allows clients to place orders directly into exchanges. SEBI, in the past 15 years, has issued many consultation papers and notifications to protect the interests of investors. The 2025 circular is devoted to a systematic strategy that allows the retail investor to engage in trading and improve the safety of the automated trading sphere. The most spoken clauses of the circular are that the brokers will become their principal and the algorithm providers their agents. By doing so, all complaints by

¹⁰ Dirk Helbing et al., Revisiting Big Data Optimism: Risks of Data-Driven Black Box Algorithms for Society, *Big Data & Soc'y*, July-Dec. 2023, at 1.

¹¹ Sec. & Exch. Bd. of India, Circular No. SEBI/HO/MIRSD/MIRSD-PoD/P/CIR/2025/0000013, Safer Participation of Retail Investors in Algorithmic Trading (Feb. 4, 2025), https://www.sebi.gov.in/legal/circulars/feb-2025/safer-participation-of-retail-investors-in-algorithmic-trading_91614.html.

¹² Sec. & Exch. Bd. of India, Press Release No. 81/2008, Broad Guidelines on Algorithmic Trading and Co-location/Proximity Hosting Facility (Apr. 3, 2008), https://www.sebi.gov.in/media/press-releases/apr-2008/broad-guidelines-on-algorithmic-trading-and-co-location-proximity-hosting-facility_11428.html (as referenced in historical analyses of SEBI's DMA framework).

the investors will be processed by the stock brokers, and API access will be verified to their agents, i.e., algo providers. Now it is made obligatory that the algorithms developed by individuals privately and used by them should be registered in case they surpass a identified limit as required by SEBI. This is in a bid to limit the use of these to the family of such investors. The same can be followed in the case of international regulators such as the European Securities and Markets Authority (ESMA)¹³. In addition to the positive approaches, there are some gaps that can be outlined in the regulation and which can adversely impact the investors.

First, in the circular, it is mentioned that, under the objective of the provision of algo trading by means of APIs, the brokers will be the principal and any algo provider or fintech/vendor (hereinafter referred to as "Algo Provider) will be its agent, and will use the API provided by the broker. It is a liability measure that places all the burdens on the stock brokers over the receipt of complaints, control over algo providers, etc. One thing to be noted in this is that this provision is merely a step that is being taken as a post-trade accountability measure, But with respect to trading among the retail investors, we are moving to a place where due caution in pre-trading accountability measures is greatly required to address the rising dangers of excess trading amid the youths, particularly over the past few years. In socialist economy, retail investors in India were very minimal in the 1990s. The investors were not ready to invest in our economy even after the successful opening because of fear of money loss and then there was some news of financial scams. However, this confidence was regained among the investors in India soon and some diversifications in the capital markets were made. According to the F&C Investment trust, 16% of the Gen Z have started investing over the Summers of 2020 and 2021.¹⁴ Social media is critical in modifying their decision regarding investment. It is not much different with the case of India; Millions of indian youth have joined the stock market with great expectations of high returns. The protective measures of India are not massive enough to absorb the giant risk factors in the accelerated involvement of the retail investors. This can be supported by international standards of curtailing such problems.

SEBI identifies black box greater algorithms and, pursuant to the circular, obligates the

¹³ Eur. Sec. & Mkts. Auth., ESMA70-156-4572, MiFID II/MiFIR Review Report on Algorithmic Trading (Sept. 28, 2021), https://www.esma.europa.eu/sites/default/files/library/esma70-156-4572_mifid_ii_final_report_on_algorithmic_trading.pdf.

¹⁴ ¹⁴ Eur. Sec. & Mkts. Auth., ESMA70-156-4572, MiFID II/MiFIR Review Report on Algorithmic Trading, Inv. Co. Inst. Res. Persp., Oct. 2021, at 1, 6, <https://www.ici.org/files/2021/per27-12.pdf> (noting that Generation Z and Millennial households held 14 percent of all household mutual fund assets, reflecting early investment trends post-2020).

portfolio of Black box algorithm providers to be listed as research analysts.¹⁵ Stock brokers, tasked with the responsibility of the algo providers in their agency role, now have enormous responsibilities, in that not every stock broker is familiar with the technology of such algorithms, and they will find it hard to trace their reasoning. More optimal rules can be highlighted when international standards are considered to maintain the balance between accountability and technology.¹⁶

A more detailed analysis of the circular reveals that the SEBI model of operation is strongly designed on the basis of the intermediary layer and not the end-investor, and that structural decision has some regulatory gaps that are particularly critical when applied in retail algorithmic trading.¹⁷ The example of the principal-agent construction between brokers and algo providers is instructive: on the one hand, it would seem to make one point of responsibility, but on the other hand, in reality, it shifts complex technological risk to an entity whose core competencies are in brokerage, compliance and rudimentary risk management as opposed to software assurance, model validation or code-level audit.¹⁸ The circular does not impose any analogous duty on any given algorithm provider who is directly subject to SEBI regulation (with a very limited exception in black box algorithms being regarded as a form of research advice) and therefore the party that designs and implements the underlying logic will not be directly engaged with the regulator under the cloak of the contractual relationship between them and the broker. This mismatch between the functional and formal accountability comes into focus especially when the retail investor relates almost perfectly to the interface and branding of the algo provider and the broker can only be seen in the background as a clearing and compliance provider.¹⁹

Further, the focus of the circular on post-trade accountability tools, including tagging all algo

¹⁵ Shivani Kabra, Retail Algo Trading under SEBI's Lens: The Unfinished Business of Black Box Regulation, *IndiaCorpLaw* (Jan. 11, 2026), <https://www.ircl.in/post/retail-algo-trading-under-sebi-s-lens-the-unfinished-business-of-black-box-regulation> (analyzing SEBI's requirement for black box algorithm providers to register as research analysts under the 2025 circular).

¹⁶ Fin. Indus. Regul. Auth., Algorithmic Trading, FINRA.org, <https://www.finra.org/rules-guidance/key-topics/algorithmic-trading> (detailing U.S. standards for algorithmic trading oversight and investor protection under SEC and FINRA rules).

¹⁷ Anushka Vohra, Between Innovation and Safeguards: Analysing SEBI's 2025 Algorithmic Trading Circular (Part I), *NLS Forum* (Feb. 1, 2026), <https://forum.nls.ac.in/nlsblr-blog-post/between-innovation-and-safeguards-analysing-sebis-2025-algorithmic-trading-circular-part-i> (highlighting regulatory gaps in SEBI's intermediary-focused model for retail algorithmic trading).

¹⁸ *Id*

¹⁹ Shivani Kabra, Retail Algo Trading under SEBI's Lens: The Unfinished Business of Black Box Regulation, *IndiaCorpLaw* (Jan. 11, 2026), <https://www.ircl.in/post/retail-algo-trading-under-sebi-s-lens-the-unfinished-business-of-black-box-regulation>.

orders with a distinct identifier and enabling exchanges with kill switches, is at the expense of a more comprehensive ex ante regime of appropriateness and product-based oversight on retail algos.²⁰ As an illustration, there would be no condition that a broker or provider would evaluate the suitability of a particular algorithmic strategy to a risk profile, financial literacy, or experience of a young first-time investor, whose sole prior exposure to markets came over social media. Neither is there a need to disclose in scenarios the way the algorithm will act in times of extreme volatility, illiquidity or technical failure in simple terms. It appears that the regulatory logic is based on the assumption that when it is possible to tag the order in which the investor is placed, and to monitor it and switch them off in extremis, the essence of the issue of the protection of the investors is already resolved, though, again, that is not the whole picture in a retail setting where false hopes, overconfidence and source of cognitive biases are at least equally damaging as sheer system failure.

This emphasis on system-level risk over the understanding of the tool being used by the investor can also be seen in the registration requirement of self-developed algos which cross specified order-per-second threshold, although the concept of such restriction is to control the high-frequency style activity by individuals. A low-frequency but levered strategy or a strategy involving complicated options structures may never hit the technical threshold and may however be subjected to much more downside risk than a high-frequency market-making strategy with tight risk boundaries. The circular does not connect the registration trigger with economic exposure, leverage, or complexity, but rather takes a very precise measure of operations that is not always congruent with investor harm.²¹ Also, the prudent limitation of such self-written algos to the use of only family relations is reasoned but not with any instructions on how such family relations will be checked or policed by the intermediaries, which may render the provision mostly symbolic in practice but still make the practice of sharing or collaborating small-scale among informed coders of retail a crime.

As an aspect of market microstructure, the circular relies considerably on the exchanges to provide missing essential operation information by way of Standard Operating Procedures (SOPs), frequently asked questions and empanelment requirements. This provides flexibility and enables the exchanges to respond to the changing nature of technology, but it also results

²⁰ Supra note 16

²¹ Shivanesh Ram R R, The Retail Gamble: Are SEBI's Safeguards Enough in India's Options Market?, 4 Int'l J. Legal Rsch. & Analysis 1, 15 (2025), <https://www.ijlra.com/details/the-retail-gamble-are-sebis-safeguards-enough-in-indias-options-market-by-shivanesh-ram-r-r->.

in a fragmented normative form whereby numerous substantive requirements will be found in documents not in the form of formal regulations, but as quasi-soft law tools. To such a researcher or practitioner attempting to know the real content of the actual regulation of the so-called SEBI circular, the answer will not be limited to the circular itself but will be based on a mosaic of exchange level documents, which can vary in language, focus and focus of enforcement. This can create compliance uncertainty and add to the direct and indirect expenses of brokers, who are operating across more than one exchange, which can be in turn transferred to retail clients or reflected by a risk averse attitude to providing access to algorithms at all. The circular does not specifically deal with this coordination issue or recommend minimum harmonisation principles, although it knows that the Broker Industry Standards Forum will be preparing implementation standards on the Broker Standards of Implementation under the oversight of the exchanges.²²

How the black box algos are being treated under the circular is a highly productive area of criticism. SEBI is trying to impose on a code-based, data-based and machine-based domain of decision-rules a disclosure-based regime that is designed on human-written research. However, the circular does not say what will constitute a sufficient research report on an algorithm: must it provide the researcher with the underlying investment hypothesis, the datasets on which it is being back-tested, the crucial parameters and risk controls, or the policies on model drift and re-training? In the absence of instruction, the providers are likely to adhere to it in a formal way, creating documents that do not substantially shed light on the behaviour of the algorithm to the brokers or to exchanges. Worse still, the investor actually exposed to the black box is still out of this loop of information, the circular must be maintained and reports on the reports be confirmed to the exchange, but it does not provide the retail client with the right to access such reports, or even their summary, before they decide to subscribe to or turn on a specific algo.²³

The informational asymmetry is further aggravated by the fact that the same circular puts redressal of grievances in the hands of a broker, who might not have access to or knowledge of what is happening at the inside of the black box. In a case when a retail investor has suffered

²² Dipti Sharma & Mehul Jain, Evaluating SEBI's Circular on Retail Investor Participation in Algorithmic Trading: A Critical Analysis- Part I, GNLU Blog on Corp. L. (Oct. 4, 2025), <https://gbcl.blog/2025/10/04/evaluating-sebis-circular-on-retail-investor-participation-in-algorithmic-trading-a-critical-analysis-part-i>.

²³ Arjun Kumar, SEBI's Role In Regulating Fintech And Algorithmic Trading: Legal And Ethical Challenges, 2 *Indian J. L. & Soc. Sci. Stud.* 45, 52 (2025), <https://ijlsss.com/sebis-role-in-regulating-fintech-and-algorithmic-trading-legal-and-ethical-challenges>.

heavy losses due to unexpected actions of a complex algorithm, the broker will be officially liable to take up the complaint and possibly compensate the investor but to determine if the algorithm acted as it was supposed to in line with its declared strategy, the broker will be forced to accept the clarifications of the provider. When the provider falls under the third category of not being a direct jurisdiction of SEBI (beyond registration in the RA) and not having an obligation to an algorithm-specific audit or disclosure obligations, the possibilities of the broker to investigate and seek redress meaningfully are structurally limited. This lack of correspondence between the algorithm designer or its seller or distributor, accountability to SEBI, and the one who interfaces with the investor is one of the main flaws of the 2025 framework.²⁴

The other critical regulatory design selection in the circular is the demand of some technical controls around API access such as the use of static IP whitelisting, open API non-use, OAuth-only authentication, and the mandatory two-factor authentication. Such steps are driven by the sound motives of traceability and account security, but it is also indicative of a technology-specific regulation mode rather than a technology-neutral mode. The concept of static IP simply does not sit well with the realities of cloud computing, mobile-first access and distributed infrastructure geographically, which are the very instruments that allow low-cost experiments with algorithms to be accessible to all small retail users and start-up providers. The dependence on an IP-based perimeter can also lead to the illusion of being secure and it is comparably simple to pass traffic that fits within accepted addresses and still adopt dangerous and even manipulative tactics on the application half of the stack. Equally, the requirement to use OAuth without specifying minimum implementation criteria has the risk of making a security-sensitive requirement a box-ticking activity, and the loose requirement of two-factor authentication at the tier of API access can be hard to balance with the mandatory constant and unattended running of algorithms.²⁵

The general trend that can be defined by these decisions is that the 2025 circular of SEBI attempts to attempt to retrofit an intermediary-intensive, survey-intensive form of framework to a code based, interfaces and behavioural dynamics retail algo environment. By elevating brokers to centre stage and by requiring exchanges to increase their supervisory and technical controls it does not equally develop the investor-facing aspect of the regime honest but

²⁴ Supra note 21

²⁵ Supra note 22

understandable disclosure, product design and suitability, explicit classification of complexity and graded obligations based on the riskiness of the strategy, and not proxies of rough operations like order per second. To analyse and identify potentially harmful elements of the regulation, it is thus important to point out that the circular may, unwillingly, institutionalise a system under which technology power and informational advantage are concentrated on the side of the algorithm providers and the operators of the platform whilst legal responsibility is formally placed on the brokers and economic risk is placed on the younger generation of retail investors who have just been attracted to automated trading via social and digital networks.²⁶

Understanding better - what SEBI is lacking; A detailed inspection through international rules

The international best practices on algorithmic trading have evolved in a handful of consistent pillars in major jurisdictions; Direct regulation of the entity that designs and implements the algorithm, significant ex ante risk management, a detailed regime of suitability and appropriateness of retail clients, and granular transparency requirements on the strategy and its risks.²⁷ The retail algo trading circular by SEBI of February 2025 takes inspiration in some aspects of this architecture, especially in terms of tagging of orders, audit trails and kill-switch controls, but is otherwise much narrower and intermediary-focused.²⁸ What has been obtained is an arrangement that underlines post-trade accountability of brokers and supervision by exchanges, but does not directly regulate the algo suppliers, product governance, and protections facing the investors.

One initial area of divergence is the conceptualisation of the regimes by different regimes on whom the primary subject of regulation is. In the EU under MiFID II, firms that are involved in algorithmic trading must be themselves authorised investment firms and face an elaborate systems and controls burden, such as pre-trade risk checks, capacity, and resilience requirements, and night time monitoring.²⁹ The rules set by SEC and FINRA in the US also revolve around the firm creating or implementing the algorithm and, in that case, it must have written policies, supervisory control, testing and reviewing of strategies periodically.³⁰ The

²⁶ Supra note 16

²⁷ id

²⁸ Shreya Singh et al., Understanding the Impact of Algorithmic Trading on Indian Financial Markets: A Quantitative Analysis, 5 Asian J. Applied Rsch. in Acct. & Fin. 1, 5 (2025).

²⁹ Directive 2014/65/EU, of the European Parliament and of the Council of 15 May 2014 on Markets in Financial Instruments and Amending Directive 2002/92/EC and Directive 2011/61/EU, 2014 O.J. (L 173) 349.

³⁰ U.S. Sec. & Exch. Comm'n, Staff Report on Algorithmic Trading in U.S. Capital Markets (Aug. 5, 2020),

2025 framework of SEBI, by its turn, clearly positions the broker as a principal and the provider of an algorithm as its agent, yet also indicates that an algorithm provider will not be regulated by SEBI except through empanelment, and black-box algorithms registration, in which case. It implies that the fundamental author of the trading logic typically remains out of a specific algorithmic trading regime and the obligation to police technology which the broker did not design and which it does not necessarily know well.³¹ Formal regulatory responsibility and the functional regulation of the algorithm are more likely to be harmonized by international practice; the model used by SEBI divides them, which creates a structural imbalance that is not a leading characteristic of the most developed markets.

Second, the global standards put more emphasis on ex ante system and product risk controls. The principles of IOSCO on Direct Electronic Access and algorithmic trading focus on sound pre-trade controls, kill switches, throttling and capacity management inherent in trading systems prior to the order being posted to the market.³² The labour of MiFID II under ESMA extends to finding convergence in pre-trade controls and governance of the firm (e.g. algorithms under test, firms under validation, with a documented change-management process). The circular of SEBI does specify that exchanges should have kill switches and monitoring and issue SOPs to test algorithms, and require the use of unique identifiers to identify algo orders in order to facilitate audit trails. It, however, does not in itself enforce concrete pre-trade risk checks (price collars, fat-finger limits, maximum order sizes per client, automated position limits) upon either of the brokers or the providers³³

The third area SEBI is behind international best practice is in the protection of retail clients by suitability and appropriateness regimes based on algorithm products. In other markets like the UK or EU, companies providing complex services or execution only services may face an appropriateness test that investigates the knowledge and experience of the client prior to access to more risky instruments or services including some forms of automated trading. The recent practice of IOSCO on digital engagement practices and copy-trading is also clear on the point that the online tools that affect the decision to trade should be supported by robust suitability

https://www.sec.gov/tm/reports-and-publications/special-studies/algo_trading_report_2020.

³¹ Fin. Indus. Regul. Auth., Algorithmic Trading, <https://www.finra.org/rules-guidance/key-topics/algorithmic-trading> (last visited Feb. 19, 2026).

³² Int'l Org. of Sec. Comm'ns, FR08/10, Principles for Direct Electronic Access to Markets (Aug. 2010), <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD332.pdf>.

³³ Eur. Sec. & Mkts. Auth., ESMA70-156-4572, MiFID II/MiFIR Review Report on Algorithmic Trading (Sept. 28, 2021), https://www.esma.europa.eu/sites/default/files/library/esma70-156-4572_mifid_ii_final_report_on_algorithmic_trading.pdf.

governance and warning when the products are not likely to fit retail investors.³⁴ Comparatively, the 2025 circular of SEBI does not say much about the suitability or appropriateness of retail algo strategies, although the purpose it expresses is to have a safer involvement of retail investors.³⁵ The regulation uses registration, empanelment and technical access as the major leverages, without having brokers or providers to determine whether a specific algorithmic strategy suits a risk tolerance, experience or financial capacity of a specific investor. Considering the speed at which digitally-native young investors are entering into Indian markets, it is an astonishing omission in contrast with the more investor-friendly structure of international regimes.

The fourth axis of comparison is transparency and information rights. Internationally, a growing trend is a growing expectation that the clients should be provided with meaningful, understandable information regarding the functioning of automated tools and the associated risks although the complete code or proprietary settings can be in secret. Other European regulators, ESMA included, demand that algorithmic strategies are disclosed (not labelled) clearly, in terms of their goals and their constraints.³⁶ The circular by SEBI however is concerned with classifying algos as white-box and black-box as well as with the requirement of black-box providers to keep internal research reports and become registered as research analyst. Such reports shall be kept and their presence attested to exchanges, but the circular will not provide rights to retail investors to see such reports or access even a summary of them to a high level before subscribing to or availing a strategy. The white-box category is characterized by a logic of disclosed and replicable but addressees of the disclosure, broker, exchange or client are not defined. This is contrary to best practice which puts a value on investor-facing transparency, rather than mere regulator- or venue-facing documentation.

Lastly, in most developed markets, the regulations of algorithmic trading are framed within a wider conduct-of-business and organisational system in which issues of conflict of interest, remunerations, application of engagement mechanisms, and complaints management are incorporated.³⁷ Although the circular issued by SEBI does cover conflict in a cursory manner,

³⁴ Int'l Org. of Sec. Comm'ns, FR07/2025, Digital Engagement Practices (DEPs) (2025), <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD794.pdf>.

³⁵Id

³⁶ Eur. Sec. & Mkts. Auth., ESMA70-156-4572, MiFID II/MiFIR Review Report on Algorithmic Trading (Sept. 28, 2021), https://www.esma.europa.eu/sites/default/files/library/esma70-156-4572_mifid_ii_final_report_on_algorithmic_trading.pdf.

³⁷ Directive 2014/65/EU, of the European Parliament and of the Council of 15 May 2014 on Markets in Financial Instruments and Amending Directive 2002/92/EC and Directive 2011/61/EU, 2014 O.J. (L 173) 349.

such as in revenue sharing between brokers and algorithm providers, it does so on a general basis and entrusts to the intermediaries and exchanges the fine-grained conflict-management structure. The use of exchange-specific empanelment criteria, which are implemented standards that are written by an industry forum, and non-binding FAQs further distinguish it from the jurisdictions in which the actual content of the algo controls has been established in form of directly binding rules. Altogether, the above contrasts indicate that the SEBI regime of retail algo regulation of February 2025, despite being a significant step in the right direction, is still less concerned with the entire range of risk, governance and investor-protection capabilities that international best practice regimes have.

Conclusion

In an analysis conducted above, the February 2025 circular by SEBI is both a needed but imperfect reply to the risks and unknowns in the retail trading sector in India that are caused by technology and remain unknown as black box. It places brokers at the centre and the agents, the algorithm providers, as their agents, thus generating a formal accountability node, but not necessarily ensuring that the entity in technological control is regulated directly and strongly. Though the circular provides significant plumbing, such as order tagging, kill switches, and empanelment and API controls, it is very post-trade and infrastructure-oriented, and provides comparatively little by way of ex ante product regulation, clear suitability tests in respect of inexperienced retail investors, and investor-facing disclosure as to how the algorithms actually perform in stress conditions. Simultaneously, its technology-differentiated controls over APIs are likely to ossify around certain architectures, and not necessarily reflect on real risk.

Compared to the emerging international practice, the regime seems to be intermediary-heavy, and investor-light: the regime shifts legal risk on the brokers and economic risk on the retail participants and in particular on digitally native youth, and leaves, in comparison, brokers of algorithms relatively unregulated and information asymmetries intact. Unless these structural gaps are bridged, namely by stricter and more immediate commitments on the part of algo designers, the pre-trading controls, and intelligible disclosures to the retail users, the 2025 framework may serve the purpose of legalising a broader range of retail access to automated trading, without sufficiently addressing the very harms it was intended to prevent.

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