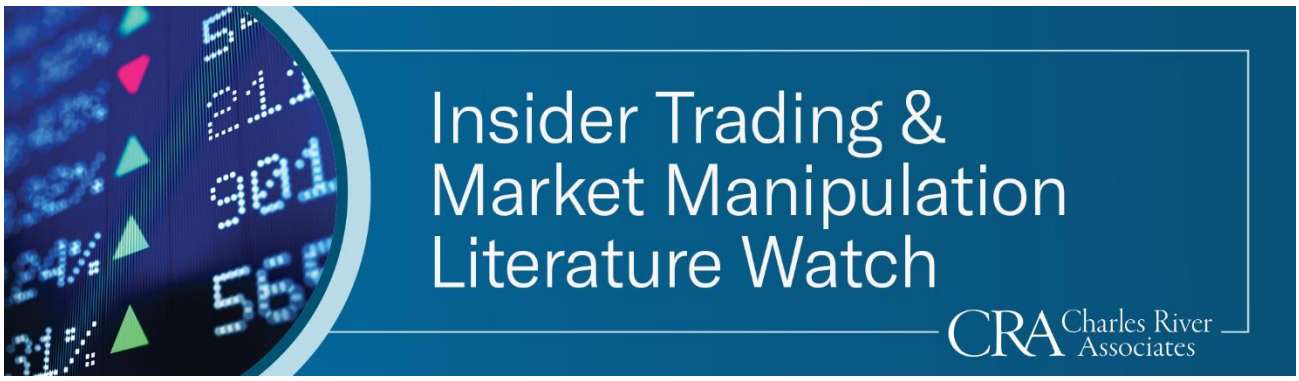

Quarter 2 2025, Volume 15

Each quarter, this newsletter summarizes newly published literature in the areas of Insider Trading and Market Manipulation, as well as one or more papers highlighted by CRA for additional discussion. The authors' own abstracts are included below and are unedited. Links to the full paper are provided. The inclusion of an article in this newsletter does not signify that CRA or any of its experts agree or disagree with the content or conclusions therein.

Quarterly literature watch highlight

The article "Betting on My Enemy: Insider Trading Ahead of Hedge Fund 13D Filings" (abstract and link below) contributes to the growing literature on hedge fund activism. The authors examine how firm insiders may exploit private information on an activist hedge fund's interest in the firm to profit from the price runup at the public revelation of the fund's stake.

Hedge fund activism is a strategy of taking a significant stake in a publicly traded company, with the goal of influencing its management and operations to increase the company′s stock price and generate profit for the fund. When a party acquires more than 5% of the outstanding shares of a firm, the SEC mandates a 13D filing within 10 days. This is typically the first time the public is notified of the activist's interest in the firm, but firm insiders may become aware before the 13D filing through private discussions with the activists or less well-defined informational back channels, such as rumors or tipping. The study examines the trading activity of insiders at targeted firms surrounding the filing of 13D forms by hedge funds from 1994-2016, and posits that profiting from the expected stock price appreciation is a motivation behind insiders' acquisition of shares of firms targeted by activist hedge funds. The paper also investigates whether insider buys predict announcement returns, and whether corporate culture influences insider trading.

The authors conclude that insiders engage in more opportunistic buying ahead of 13D filings, in comparison to a control group and compared to their own history. The authors also find that insider buys have predictive power for 13D announcement returns, and that poor corporate governance is linked with increased opportunities buying ahead of 13D filings.

Betting on My Enemy: Insider Trading Ahead of Hedge Fund 13D Filings

Corporate insiders often become aware of hedge fund attention prior to a 13D filing. We find abnormal buying activity by insiders in the months leading up to hedge fund 13D filings. Whereas 13D announcement abnormal returns are 7.72%, profits to insiders who buy average 12.09%. Insider buying is not linked to common firm characteristics that predict activist targeting. Our findings indicate that insiders are benefiting from private knowledge that their firm has become the focus of hedge fund activism, and sometimes this knowledge comes directly from the activist. However, insiders largely refrain from trading when there is formal communication with the activist. Profits to insiders who buy when there are no talks prior to the 13D filing are 14.49%, triple the amount for insiders who have had early talks with the hedge fund. Insider trading is linked to indicators of poor corporate culture, but not related to outcomes of activism campaigns.

Duong, Truong X. and Pi, Shaoting and Sapp, Travis, Betting on My Enemy: Insider Trading Ahead of Hedge Fund 13D Filings (February 07, 2025). Available at SSRN: https://ssrn.com/abstract=5208312 or http://dx.doi.org/10.2139/ssrn.5208312

Insider Trading

Cost Stickiness and Opportunistic Insider Trading

This paper explores the strategies managers employ to increase profits from insider trading by adjusting cost stickiness, the phenomenon where costs rise more significantly with increasing revenues than they fall with decreasing revenues. We hypothesize that opportunistic managers adjust cost stickiness according to their intentions to buy or sell company stock. Specifically, before selling shares, opportunistic managers might reduce cost stickiness to enhance profitability, thus inflating stock prices. Conversely, before making purchases, they may increase cost stickiness to lower earnings and depress stock prices. Using the algorithm developed by Cohen, Malloy, and Pomorski (2012), we distinguish “routine” trades from “opportunistic” insider trades. Our findings indicate that opportunistic insiders tend to decrease cost stickiness before selling and increase it before purchasing. These results remain robust across various definitions of insider trades and cost stickiness measures. Furthermore, the study finds that strong corporate governance mitigates the effect of cost stickiness on trading gains, whereas greater corporate opacity enhances it. Among all insider traders, CEOs and CFOs notably influence the interplay between cost stickiness and insider trading gains. This research contributes to the asymmetric cost behavior literature by documenting that opportunistic insiders can time cost behavior pattern to maximize insider trading gains, with significant implications for regulatory scrutiny and corporate governance practices.

Hossain, Mahmud and Darrough, Masako N. and Habib, Ahsan and Miao, Joan, Cost Stickiness and Opportunistic Insider Trading (February 03, 2025). Available at SSRN: https://ssrn.com/abstract=5123291

Insider Trading in Innovative Firms

This study investigates insider trading patterns in innovative firms. While prior research often attributes persistent insider trading profitability to governance failures, we argue that boards of innovative firms refrain from imposing restrictions on certain insider trades to help convey information

about the firm's opaque R&D activities. We document that insider purchases, but not sales, are more profitable at firms with R&D expense than firms without. Inconsistent with governance failures, the profitability of insider purchases in R&D firms is more pronounced in well-governed firms and after the Sarbanes-Oxley Act of 2002. While there is a positive relation between insider purchases and stock illiquidity for firms with no reported R&D, this positive relation is entirely muted for R&D firms. Moreover, insiders purchase (do not sell) more shares after receiving positive (negative) exogenous surprises about the likelihood of patent approval. Insiders of R&D firms also purchase shares more intensely after the disclosure of major corporate events than before. Crucially, firms' future profits are higher and innovation outcomes are better subsequent to insider purchases. Collectively, our findings suggest that the persistent insider trading profitability in innovative firms is driven by insider purchases that help convey information about their firms' opaque R&D activities.

Guest, Nicholas and Ljungqvist, Alexander and Ljungqvist, Alexander and Zeng, Jean and Zuo, Luo, Insider Trading in Innovative Firms (March 28, 2025). Available at SSRN: https://ssrn.com/abstract=5197872 or http://dx.doi.org/10.2139/ssrn.5197872

Topological Clustering of Agents in Information Contagions: Application to Financial Markets

Building on topological data analysis and expert knowledge, this study introduces a Mapper-based approach to cluster agents based on their tendency to be influenced by information spread. The context of our paper is financial markets with an aim to identify agents trading opportunistically on insider information while minimizing false positives, a critical challenge in financial market surveillance. We verify and demonstrate our methods using both synthetic and empirical data on insider networks and investor-level transactions in a stock market. Recognizing the sensitive nature of insider trading cases, we design a conservative approach to minimize false positives, ensuring that innocent agents are not wrongfully implicated. We find that the mapper-based method systematically outperforms other methods on synthetic data with ground truth. We also apply the method to empirical data and verify the results using a statistical validation method based on persistence homology. Our findings indicate that the proposed Mapper-based technique effectively identifies a subset of agents who tend to take advantage of inside information they have received. This method is highly adaptable to various applications involving the spread of information or diseases, where agents exhibit only indirect evidence of their carrier status (symptoms) through their behavior.

Goel, Anubha and Hansen, Henri and Kanniainen, Juho, Topological Clustering of Agents in Information Contagions: Application to Financial Markets. Available at SSRN: https://ssrn.com/abstract=5215071 or http://dx.doi.org/10.2139/ssrn.5215071

Can Machines Better Predict Insider Trading?

Yes, they can! Machine learning (ML) models predict the likelihood and magnitude of insider trading strikingly better than linear models such as OLS and logistic regression. We use ML models including LASSO, Random Forest, and Extreme Gradient Boosting, optimized model parameters through Bayesian hyperparameter tuning to find the best configuration and use SHAP values to better understand insider trading determinants. Additionally, Gaussian Thompson Sampling (GTS) is used to explore the sources of insiders' market timing capabilities. We find that ML models can boost R2 for the models that predict the magnitude of insider selling by 150% over OLS models. Further, ML

models can predict the likelihood of insider selling with accuracy, recall, and precision of 82%, 95%, and 82%, respectively. Additional tests indicate that the improvement in predictability due to the use of ML models is more apparent for female than male insiders. Lastly, while male insider trading is largely shaped by his risk-taking incentive, female insider trading appears to be more driven by possessing private information about future cash flows. This paper provides evidence that informational advantages are a key driver of insider trading's market timing capability.

Batebi, Solmaz and Elnahas, Ahmed, Can Machines Better Predict Insider Trading?. Available at SSRN: https://ssrn.com/abstract=5312406 or http://dx.doi.org/10.2139/ssrn.5312406

The Placebo Effect of Insider Dealing Regulation

Insiders can profit from material non-public information pertaining to their own firm by trading in the shares of their own company (traditional insider trading) or in the shares of other companies (shadow trading). We show that traditional insider trading and shadow trading have the same consequences for financial markets and corporate governance, but only the former is pursued aggressively by regulators in Europe, the UK and the United States. Drawing on a variety of evidence, including a survey of 200 retail investors, we suggest that, rather than protecting unsuspecting outside investors, such an arrangement enables insiders to profit at their expense. The ban on the more salient practice of traditional insider dealing regulation lulls outside investors into a false sense of security, thus effectively operating as a placebo, whilst insiders can still profit by engaging in shadow trading. We further argue that, ironically, this arrangement may nonetheless be efficient.

Enriques, Luca and Lee, Yoon-Ho Alex and Romano, Alessandro, The Placebo Effect of Insider Dealing Regulation (April 30, 2025). European Corporate Governance Institute - Law Working Paper No. 841/2025, Bocconi Legal Studies Research Paper Forthcoming, Northwestern Law & Econ Research Paper No. 25-10, Northwestern Public Law Research Paper No. 25-26, Available at SSRN: https://ssrn.com/abstract=5245930 or http://dx.doi.org/10.2139/ssrn.5245930

Insider Trading Reforms and Corporate Transparency: Evidence from the STOCK Act

We examine how insider trading restrictions on government officials affect corporate transparency. The 2012 STOCK Act prohibited executive branch officials from profiting from non-public information, potentially limiting firms' access to policy insights used in forecasting. Using a difference-in-differences design, we find that firms with significant government contracts reduced the frequency and precision of management forecasts following the Act. These firms also experienced declines in price informativeness and increases in implied cost of capital, suggesting weakened capital market information environments. Effects are strongest among politically engaged firms and those heavily reliant on government business, suggesting that the response reflects a loss of privileged information rather than heightened uncertainty. Text-based evidence from earnings calls reveals fewer procurement-related discussions and a rise in policy risk language. Our results suggest that insider trading reforms, while enhancing accountability, may inadvertently reduce firms' access to discretionary information, weakening disclosure quality and impairing market transparency.

Heitz, Amanda and WANG, Youan and Yu, Zhige, Insider Trading Reforms and Corporate Transparency: Evidence from the STOCK Act (May 12, 2025). Available at SSRN: https://ssrn.com/abstract=5251620 or http://dx.doi.org/10.2139/ssrn.5251620

Inside Access: The Role of In-Person Communication in Insider Trading

This paper investigates how corporate insiders acquire material information, focusing on the role of in-person interactions. We find that non-executive officers engage in significantly less informative trading-measured by trade profitability-compared to top executives and directors. The disparity suggests that low-tier insiders may rely on face-to-face interactions with senior insiders as a key channel for accessing operational insights. To identify this mechanism, we exploit the exogenous shock to in-person communication caused by U.S. stay-at-home orders during the COVID-19 pandemic. The decline in trading informativeness among non-executive officers is most pronounced for stocks with improved liquidity, reducing concerns about confounding changes in information asymmetry. These findings underscore the importance of informal interpersonal communication in insider information flow.

Foroughi, Pouyan and Rui, Yixuan, Inside Access: The Role of In-Person Communication in Insider Trading (September 11, 2024). Available at SSRN: https://ssrn.com/abstract=5214238

Shadow Trading Detection: A Graph-Based Surveillance Approach

This paper introduces a novel graph-based deep learning framework for detecting risks of shadow trading—an emerging form of insider trading where material non-public information is used to trade securities of economically related but distinct companies. Motivated by the landmark SEC v. Panuwat case in April 2024, the study proposes an Adaptive Market Graph Intelligence Network (AMGIN) that integrates both industry relationships (e.g., sectoral ties, inter-organizational connections) and dynamic market behaviors (e.g., short/long-term price comovements) to uncover hidden trading patterns. By modeling the financial market as a spatiotemporal graph, the framework captures complex interdependencies that traditional statistical methods often overlook. Empirical evaluation using U.S. equity market data demonstrates AMGIN's superior ability to identify subtle, non-obvious relationships indicative of shadow trading, offering regulators a scalable, data-driven tool for modern market surveillance.

Stenfors, Alexis and Guo, Andy and Li, Boyu and Dilshani, Kaveesha and Mere, Peter and Chen, Fang, Shadow Trading Detection: A Graph-Based Surveillance Approach. Available at SSRN: https://ssrn.com/abstract=5290642

ESG And Insider Trading: Legal And Practical Considerations

This Article preliminarily explores the contours of ESG information as a potential basis for unlawful insider trading under Section 10(b) of the Securities Exchange Act of 1934, as amended, and Rule 10b-5 adopted by the U.S. Securities and Exchange Commission under Section 10(b). Insider trading violations under Section 10(b) and Rule 10b-5 are rooted in a person's (1) trading of securities while in possession of material nonpublic information or (2) tipping another with material nonpublic information. ESG information has the capacity to be both material and nonpublic. ESG information, like other significant information, may be at the heart of insider trading and related enforcement activity if trading or tipping is effected with the requisite knowing state of mind.

The Article anticipates and prognosticates on this enforcement activity, investigating core legal questions and offering related analyses and observations. The reflections offered may be useful to those who may possess ESG information and desire to trade or tip (and their advisors); policymakers

in the U.S. Congress and at the SEC; enforcement agents in the U.S. Department of Justice and at the SEC; the judiciary; and business firms (and their advisors). For example, prospective and actual securities traders and tippers may gain awareness of the liability-generating capacity of ESG information in an insider trading context. Moreover, the Article may support government and regulatory officials and judges in efficient and effective rulemaking, enforcement activities, and adjudication of related cases and controversies. Takeaways for business firms may include, for example, wisdom about best practices for the retention of material nonpublic ESG information and refining the contents of insider trading compliance plans.

Heminway, Joan MacLeod, ESG And Insider Trading: Legal And Practical Considerations (May 18, 2024). Available at SSRN: https://ssrn.com/abstract=5289987

Market Manipulation

The Market Dreams of Machines: Anti-Manipulation Regulation, Autonomous Tactics, and the Rise of Agentic AI

This Article examines how autonomous trading systems, particularly agentic AI, are reshaping financial markets and destabilizing current legal frameworks designed to prevent market manipulation. Financial regulation, historically rooted in human intent and rational market theory, is increasingly misaligned with markets characterized by autonomous behavior and emergent manipulation. Modern manipulation law, including intent-based frameworks under Section 10(b) and Rule 10b-5, struggles to capture the distortions caused by AI agents operating without human oversight. At the same time, economic assumptions underpinning enforcement, such as the Efficient Market Hypothesis, fracture in markets driven by machine logic. This Article argues that intent is no longer a sufficient foundation for regulatory intervention. Instead, it proposes a shift toward structural harm as the basis for liability. To operationalize this model, the Article outlines a private enforcement mechanism designed to safeguard informational integrity and price discovery in autonomous markets. By moving beyond intent and addressing structural vulnerabilities, this framework aims to realign legal enforcement with the realities of modern financial systems increasingly governed by autonomous actors.

Brenner, Zachary, The Market Dreams of Machines: Anti-Manipulation Regulation, Autonomous Tactics, and the Rise of Agentic AI (April 25, 2025). Available at SSRN: https://ssrn.com/abstract=5234589 or http://dx.doi.org/10.2139/ssrn.5234589

Opening Call Auction Designs and Price Manipulation for Price Discovery: An Experimental Study

This study conducts laboratory experiments under three opening call auction designs to improve the price discovery process. The first design resembles the opening session of major stock exchanges, where traders can place and cancel their orders before the opening price is announced. We alternatively investigate two call auction designs in which traders are not allowed to cancel orders during the session, while the call auction time is divided into sub-periods and orders are executed every sub-period before the opening price is announced. We first demonstrate price manipulations in an economy with cancellations. However, we can mitigate manipulative behavior when we prohibit

order cancellations or execute orders periodically before the end of a call auction. Second, we find a gradual price discovery process in economies with and without cancellations. However, price discovery can be quickly achieved in periodic clearings. These results indicate that price manipulations and longer non-trading minutes result in slower price discoveries. Third, we demonstrate that reinforcement learning, by which traders attempt to find profitable strategies from past performances, explains the order choices of our lab participants, and thus, price manipulations and price discovery. We contribute to the literature by emphasizing the important role of reinforcement learning on price manipulations and the price discovery process under different opening call auction designs. Our study has important policy implications regarding which call auction design is better for the opening call market.

Yamamoto, Ryuichi and Fang, Xin and Funaki, Yukihiko, Opening Call Auction Designs and Price Manipulation for Price Discovery: An Experimental Study. Available at SSRN: https://ssrn.com/abstract=5218200 or http://dx.doi.org/10.2139/ssrn.5218200

Fake It Till You Fund It: The Rise of Exploitative Practices in Online Crowdfunding Marketplaces

Online crowdfunding platforms enable creators to raise funds but are vulnerable to manipulation, distorting backers' perceptions and undermining trust. This paper develops a game-theoretic model to explore platforms' incentives to manipulate project appeal -- through tolerating fraudulent reviews, fake backers, misleading descriptions, or engaging in biased endorsements and algorithmic exploitation. Creators set crowdfunding prices and, upon success, establish regular prices for their funded products (e.g., via Indiegogo's InDemand program). We find that platforms may artificially boost the appeal of inferior creators to maximize crowdfunding sales, intensifying post-campaign competition. Manipulation operates through two channels: altering crowdfunding prices (price effect) and reshaping regular market dynamics (competition effect). We also highlight the critical role of creators' price commitments in shaping the stakeholders' incentives to manipulate. Notably, platform manipulation can yield a Pareto improvement under static pricing, benefiting all creators and the platform, while superior creators suffer under responsive pricing due to artificially diminished appeal. Our findings indicate that regulatory measures (e.g., banning fake backers or algorithmic exploitation) may be ineffective in curbing manipulation unless they address the platform's underlying incentives.

Hu, Xinru and Li, Jianbin and Lu, Lijian, Fake It Till You Fund It: The Rise of Exploitative Practices in Online Crowdfunding Marketplaces (April 28, 2025). HKUST Business School Research Paper No. 2025-206, Available at SSRN: https://ssrn.com/abstract=5233113 or http://dx.doi.org/10.2139/ssrn.5233113

Learning the Spoofability of Limit Order Books With Interpretable Probabilistic Neural Networks

This paper investigates real-time detection of spoofing activity in limit order books, focusing on cryptocurrency centralized exchanges. We first introduce novel order flow variables based on multiscale Hawkes processes that account both for the size and placement distance from current best prices of new limit orders. Using a Level-3 data set, we train a neural network model to predict the conditional probability distribution of mid price movements based on these features. Our empirical analysis highlights the critical role of the posting distance of limit orders in the price formation process, showing that spoofing detection models that do not take the posting distance into

account are inadequate to describe the data. Next, we propose a spoofing detection framework based on the probabilistic market manipulation gain of a spoofing agent and use the previously trained neural network to compute the expected gain. Running this algorithm on all submitted limit orders in the period 2024-12-04 to 2024-12-07, we find that 31% of large orders could spoof the market. Because of its simple neuronal architecture, our model can be run in real time. This work contributes to enhancing market integrity by providing a robust tool for monitoring and mitigating spoofing in both cryptocurrency exchanges and traditional financial markets.

Fabre, Timothée and Challet, Damien, Learning the Spoofability of Limit Order Books With Interpretable Probabilistic Neural Networks (April 18, 2025). Available at SSRN: https://ssrn.com/abstract=5230047 or http://dx.doi.org/10.2139/ssrn.5230047

Agent-based modeling of cooperative manipulation between futures market and spot market

This paper aims to enhance understanding of how price formation and investors' returns are affected by (cooperative) market manipulation. In doing this, this paper constructs an agent-based model of cooperative manipulation between futures market and spot market with continuous double auction and heterogeneous agents, who are noise traders, technical traders, hedgers and manipulators. Noise traders use a zero-intelligence strategy. Technical traders use moving average and exponential smoothing strategies. Hedgers use a moving average strategy. The manipulator uses a pump-and-dump strategy to manipulate the spot prices and make profits in the futures market. The experimental results show that: 1. The higher initial budget or higher initial spot assets of the noise trader lead to the rising or falling of the spot price, respectively. 2. The manipulator's profit decreases when the number of noise traders or technical traders increases. 3. Collusion among market manipulators significantly increases their profits and their market impact. The actions of noise traders can mitigate the effects of manipulation even in the presence of collusion.

Zhang, Junhuan and Chen, Junchao and Chen, Jing and He, He, Agent-based modeling of cooperative manipulation between futures market and spot market (May 28, 2023). Available at SSRN: https://ssrn.com/abstract=5234901 or http://dx.doi.org/10.2139/ssrn.5234901

Whale Traps: Protecting Retail Investors from Market Manipulation

The cryptocurrency and stock markets are often perceived as vehicles for wealth creation accessible to all. However, they harbour hidden dangers that disproportionately affect smaller investors. Institutional players, or "big whales," exploit their resources, technology, and market influence to manipulate prices, creating traps that leave retail investors at significant risk. This research paper examines the mechanics of these traps, particularly pump-and-dump schemes, and provides actionable strategies for retail investors to navigate these challenges. By analysing case studies, including crypto scams and penny stock manipulations, and detailing preventive measures, this study equips investors with tools to avoid common pitfalls and protect their portfolios.

Vyas, Anshul, Whale Traps: Protecting Retail Investors from Market Manipulation (February 10, 2025). Available at SSRN: https://ssrn.com/abstract=5257523 or http://dx.doi.org/10.2139/ssrn.5257523

Market Manipulation and Corporate Culture

Corporate culture has been measured in literature using words from 10-K reports and machine learning models on analysts' conference calls. We propose that these culture measures will be impacted for firms experiencing market manipulation. Market manipulation brings about negative financial market consequences, reduced investor confidence, and litigation risk; as such, it affects communications in firms' 10-k reports and in analysts' conference calls. We test this idea using suspected market manipulation cases from NASDAQ surveillance software for U.S. publicly traded firms. The data show that for firms with a history of market manipulation, corporate culture measures- such as compete and control orientations- shrink, and this effect is not temporary. Therefore, we cannot rely on traditional corporate culture metrics presented in annual reports for firms involved in market manipulation. We also show that the presence of common ownership moderates the impact of market manipulation on corporate culture measures by improving information environment.

Akter, Maimuna and Cumming, Douglas J. and Verdoliva, Vincenzo and Yu, Yimeng, Market Manipulation and Corporate Culture. Available at SSRN: https://ssrn.com/abstract=5273661 or http://dx.doi.org/10.2139/ssrn.5273661

AI-Based Detection of Microsecond-Level Spoofing in High-Frequency Trading: A Revolutionary Approach to Market Manipulation

The rise of high-frequency trading (HFT) has generated significant controversy, particularly due to its potential for manipulation. One form of manipulation that has attracted attention is spoofing - placing large orders to influence market prices, only to cancel them before execution. However, current methods for detecting such practices have significant limitations, especially with respect to microsecond-level spoofing, a form of manipulation that occurs so rapidly it evades traditional detection systems. This paper leverages artificial intelligence (AI) to analyze market data on a microsecond scale and reveals new, previously undetected spoofing patterns. Through the use of long short-term memory (LSTM) neural networks, our model demonstrates high accuracy in identifying these manipulations, potentially reshaping how HFT activity is monitored and regulated.

Pageaud, Malone, AI-Based Detection of Microsecond-Level Spoofing in High-Frequency Trading: A Revolutionary Approach to Market Manipulation (April 04, 2025). Available at SSRN: https://ssrn.com/abstract=5205080 or http://dx.doi.org/10.2139/ssrn.5205080

Timing the Trap: A Study of Stop Hunt Zones and Price Manipulation Patterns in Forex Market & US Indices

This research explores the unstated systems of liquidity-based price manipulation perpetuated in the Forex market and the US stock indices. We focus on how institutional players design traps around demand and supply levels to catch retail traders offside. By combining chart analysis, Inner Circle Trading (ICT) methodology, and Elliott Wave Theory concepts, we identify typical patterns of behavior such as stop hunts, false breaks, and inducement phases tied to high-impact announcements. With backtesting leveraged with TradingView setups, in conjunction with data from Forex Factory, we suggest how "smart money" strategies are able to self-exploit market structure and trading psychology to target retail traders. This paper unites applied trading experience with academic research knowledge, which can be valuable for traders, academics, or those initiating a career in academia who wish to study and understand institutional behaviour in the market.

Gokarna Bhusal, Gokarna Bhusal, Timing the Trap: A Study of Stop Hunt Zones and Price Manipulation Patterns in Forex Market & US Indices (May 30, 2025). Available at SSRN: https://ssrn.com/abstract=5276088

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