TECH AND TACTICS BEHIND HFT COMPANIES

Understanding High-Frequency Trading and its Role in HFT Markets

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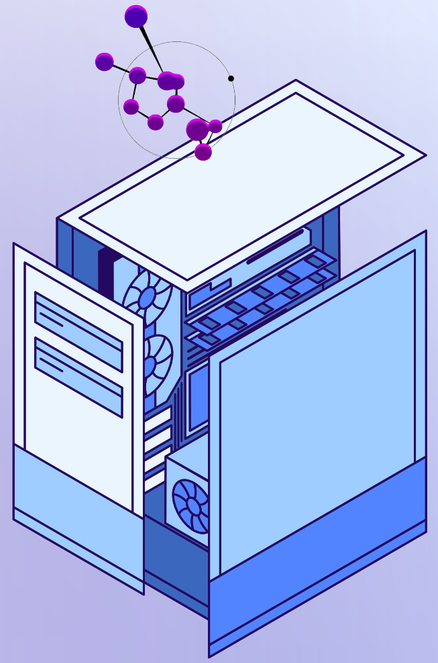
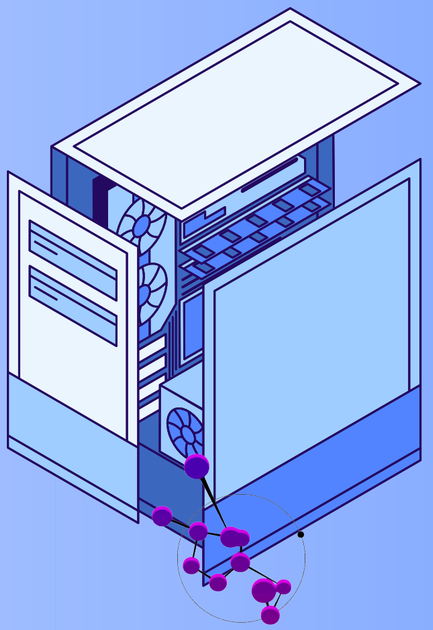
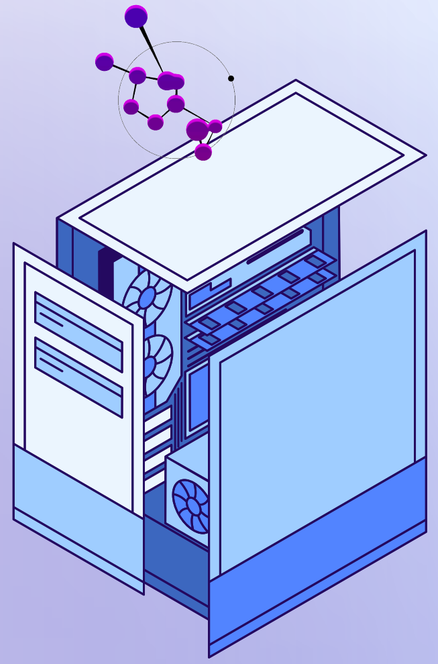
ABSTRACT

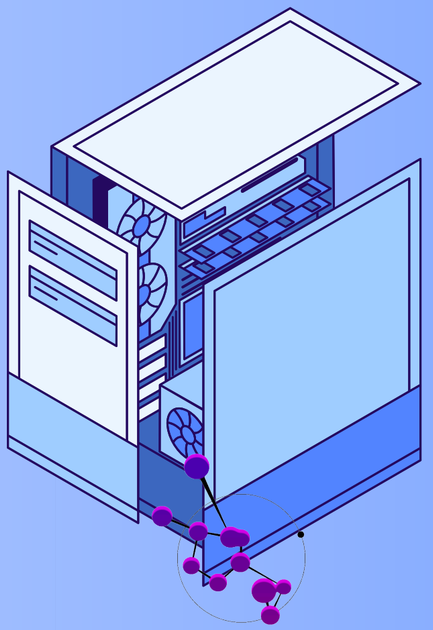




- High-Frequency Trading, or HFT, uses very fast algorithms, powerful computing systems, and low-latency networks to execute thousands of trades every second.
- This research explains how technologies like machine learning and co-location servers help HFT firms stay competitive.
- While HFT improves liquidity and pricing, it also raises risks like manipulation and flash crashes.
- We also explore how regulations and new technologies like AI and quantum computing are shaping HFT's future.

INTRODUCTION





- HFT has reshaped global financial markets through speed and automation.
- Impacts traditional trading strategies, increases liquidity, and improves efficiency.
- Supporters praise its role in reducing bid-ask spreads and enhancing price discovery.
- Critics warn about market fairness, systemic risks, and instability during crises.
- This paper studies HFT's structure, influence, and regulatory response.

LITERATURE REVIEW

PART -1

- Researchers say HFT improves liquidity and price discovery.
- Brogaard's study shows it reduces trading costs.
- Menkveld found HFT firms act as market-makers.
- But some scholars like Biais say speed-based trading can hurt other investors.
- Also, the 2010 flash crash and Knight Capital's $460M loss show HFT risks when algorithms go wrong.

LITERATURE REVIEW PART 2

- Regulators like the SEC and CFTC introduced rules for algorithm control and better transparency.
- In Europe, MiFID II requires surveillance and circuit breakers to stop manipulation.
- Industry experts also warn that HFT can reduce liquidity in unstable markets.
- Today, companies are moving toward machine learning and trading in dark pools or alternative systems.

METHODOLOGY

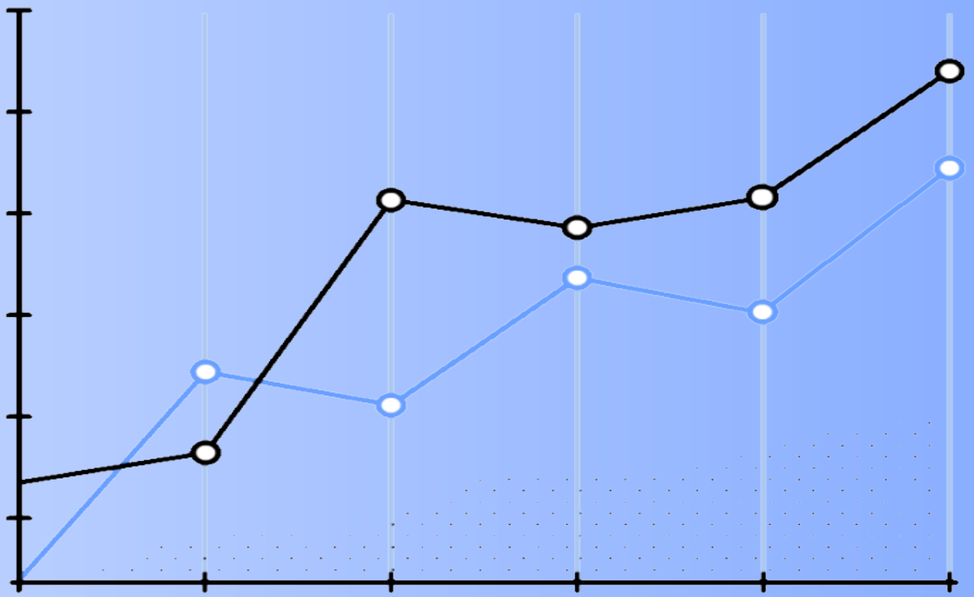
- We used a qualitative approach, analyzing academic papers, case studies, and reports.
- We applied:
- Thematic analysis – to find key patterns like speed and co-location.
- Comparative analysis – to compare views of scholars and regulators.
- Case studies – like the 2010 flash crash and Knight Capital event.

This helped us understand both tech and market impact of HFT.

ASSUMPTIONS & LIMITATIONS

We assumed that public data can give us insight into how firms like Citadel or Jane Street operate.

- **Limitations include:**
- Fast-changing tech may make findings outdated.
- Focus is mainly on U.S. and European markets.
- Limited data on proprietary algorithms.



HFT TECHNIQUES

HFT firms use strategies like:

- Market making – placing both buy and sell orders.
- Statistical arbitrage – spotting small price differences.
- Latency arbitrage – using speed to gain advantage.

These work best in normal markets but can cause issues during stress periods.

MARKET BEHAVIOR TRENDS

After HFT became common, markets saw:

- Faster quote updates
- Lower trading costs
- Higher trading volumes

But problems include a bigger gap between retail and institutional traders.

The 2007 NMS reforms pushed firms to invest in fast tech, leading to a tech race.

REGULATORY & ECONOMIC IMPACT

- HFT firms use co-location to place servers close to exchanges for faster trades.
- This gives them a big speed advantage.
- But HFT also causes many order cancellations, stressing exchange systems.
- Regulators suggest registration, quote limits, and audit trails to manage risk.

RECOMMENDATIONS

To improve HFT practices, we recommend:

- Real-time monitoring systems and kill switches
- Risk testing for algorithms
- Transparent co-location policies
- Ethical rules for AI in trading
- Open data for research
- Global regulation to prevent unfair advantages

Thank You!