

MASTERING TESLA'S INTRADAY MARKET RISK: STRATEGIES FOR STABILITY & PROFIT

Leveraging AR-GARCH, ARIMA, and Hybrid Models
for Optimized Risk Management

May 17, 2025 Bernardia Vitri Arumsari

TESLA



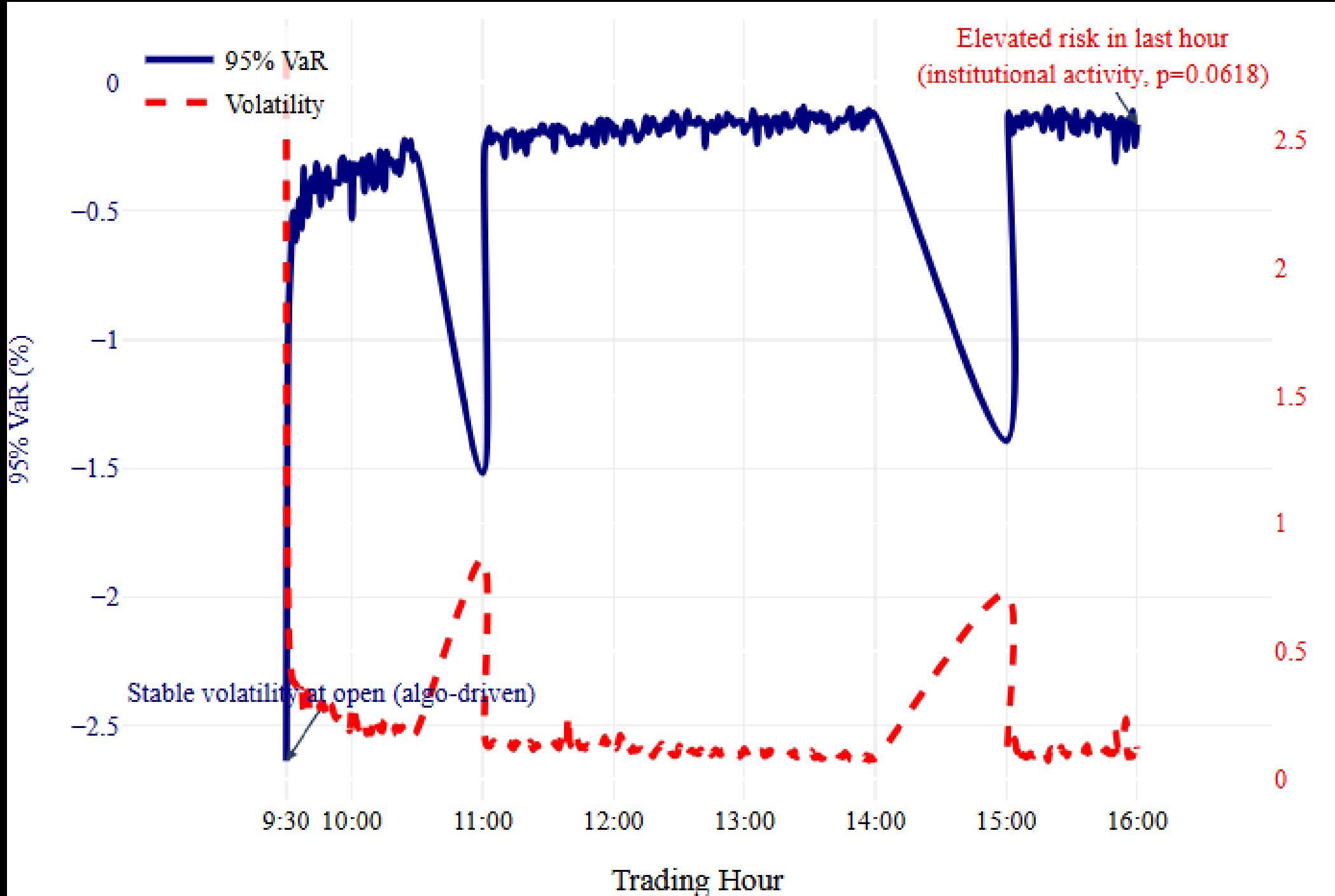
Navigate Tesla's Intraday Volatility

- Key Insight
 - Flattened U-shape risk profile;
 - Muted open-hour volatility,
 - Elevated last-hour risks.
- Strategic Impact
 - Reduce losses with precise VaR forecasting.
 - Optimize trade timing for lower costs.
 - Gain competitive edge in retail-driven market.





Tesla's Unique Risk Profile



Finding

- Flattened U-shape VaR;
- no open-hour spike ($p = 0.9583$);
- last-hour risk ($p = 0.0618$).

Driver

- Retail sentiment and algorithmic trading.

Implication

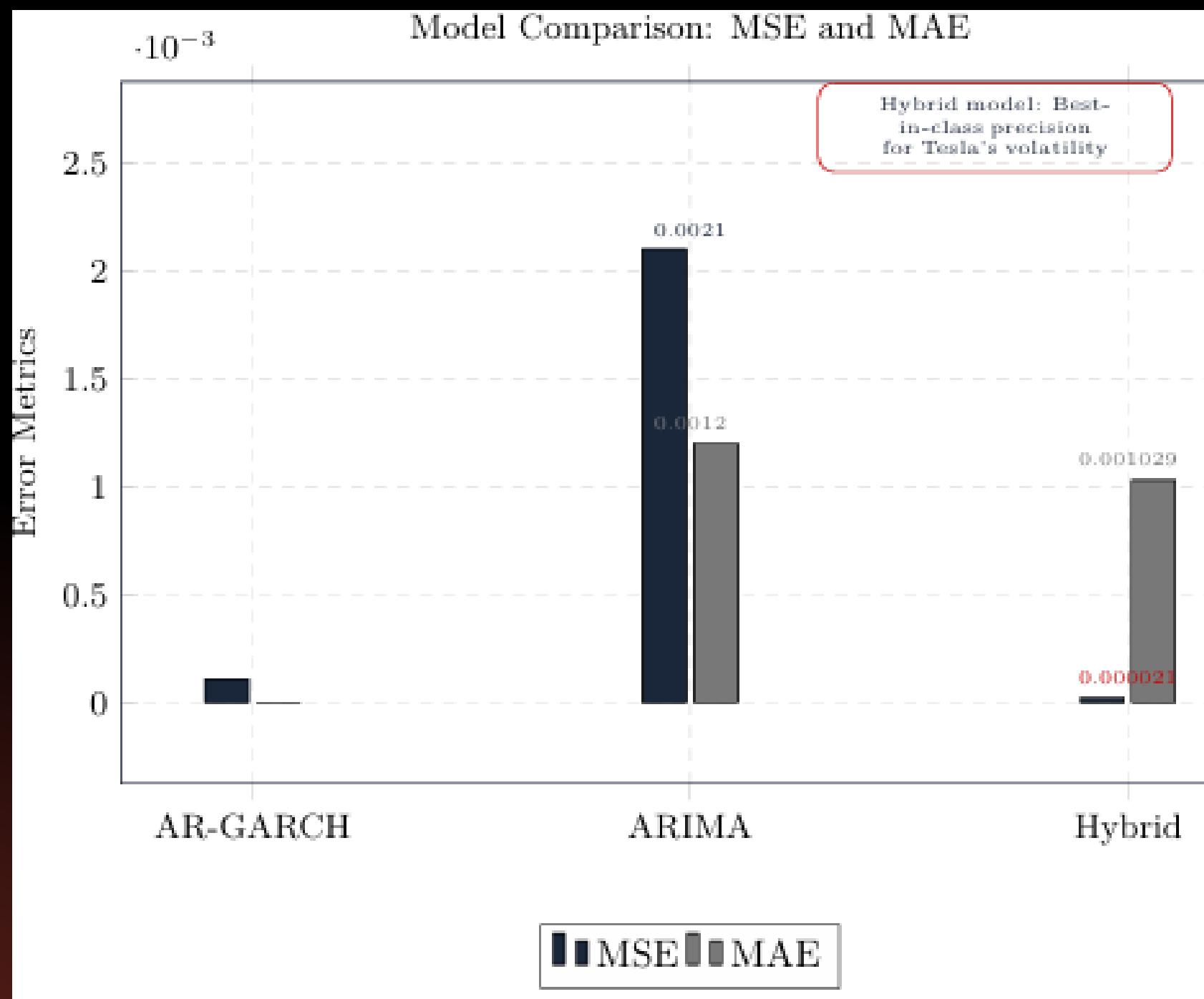
- Traditional models underestimate Tesla's “meme stock” dynamics.

This difference does not manifest in the 95% VaR, which remains similar between the last hour and midday (~ -0.015).

This discrepancy indicates that the elevated risk in the last hour arises from other parts of the distribution, such as more frequent moderate losses, rather than extreme tail events captured by VaR.



Model Performance and **Insight**



AR-GARCH

Captures volatility clustering; real-time monitoring (MSE = 0.000108), ideal for immediate risk management.

ARIMA

Strong magnitude prediction (MAE = 0.0012); poor directional accuracy.

Hybrid AR-GARCH-LSTM

Exceptional accuracy (MSE = 0.000021); needs computational upgrades.





Strategic Recommendation



Enhance Risk Management
GARCH-based systems; fat-tailed models for last-hour risks.



Optimize Trading
Midday trades (11 AM–2 PM); dynamic stop-loss in last hour.

Build Scalability
Pilot hybrid AR-GARCH-LSTM; invest in infrastructure.



Business Impact



Financial Resilience

Accurate VaR reduces losses



Trading Efficiency

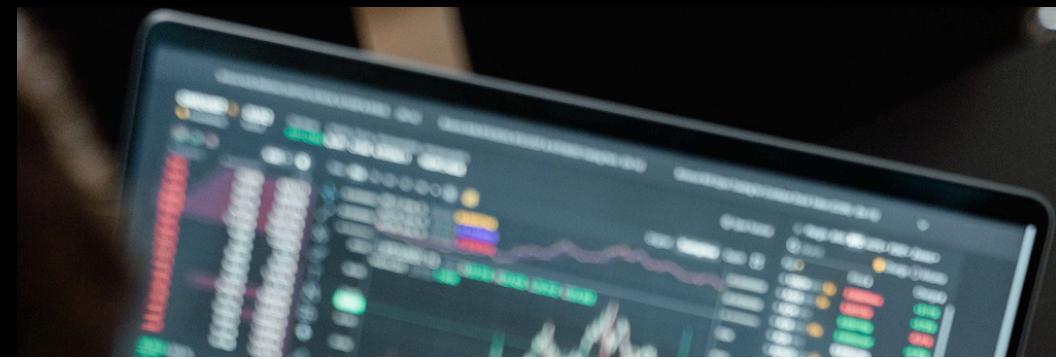
Midday execution lowers costs



Competitive Edge

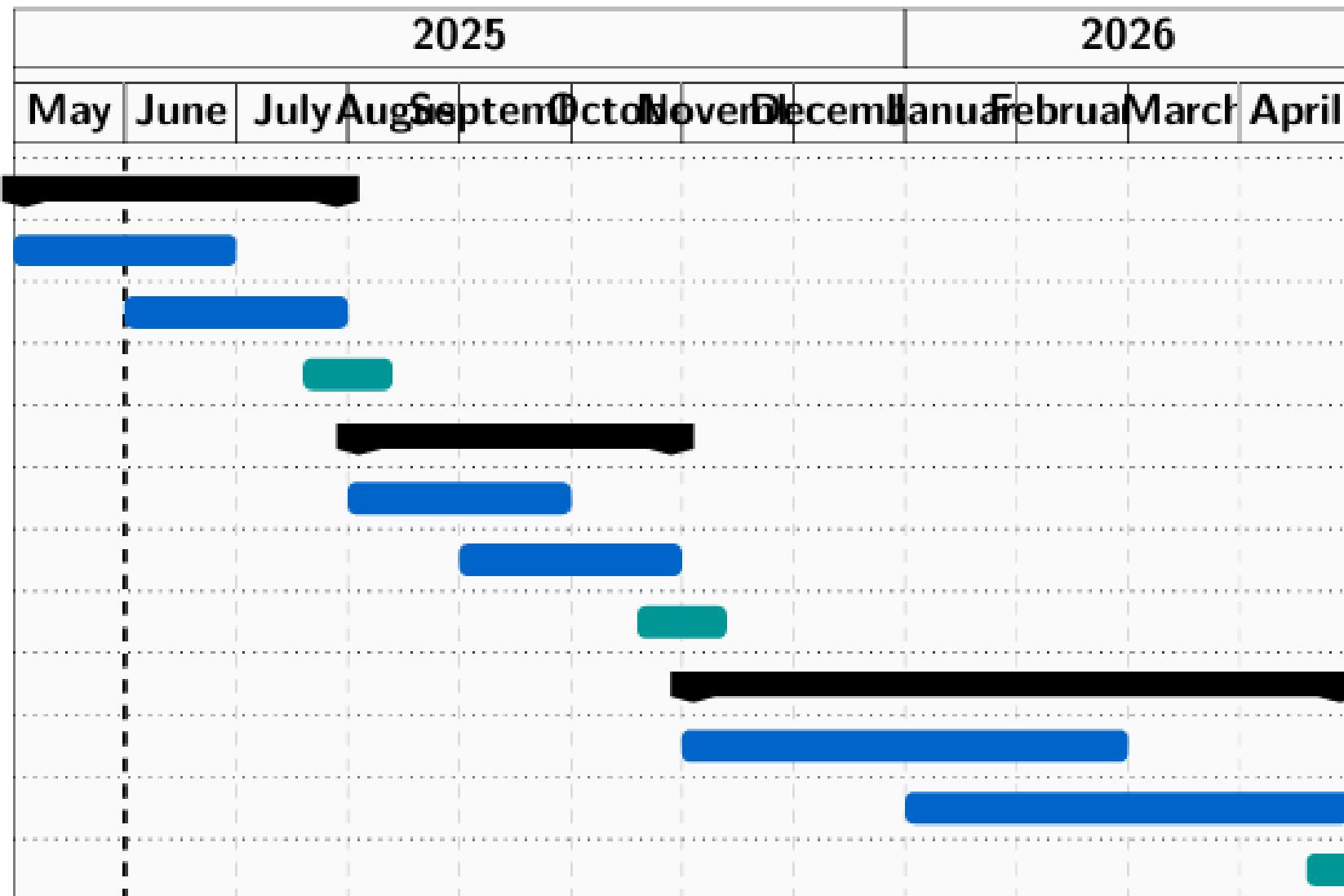
Advanced analytics for market leadership.





Action Plan

Gantt Chart



Immediate (0–3 Months):

GARCH-based VaR; midday trading protocols.

Short Term

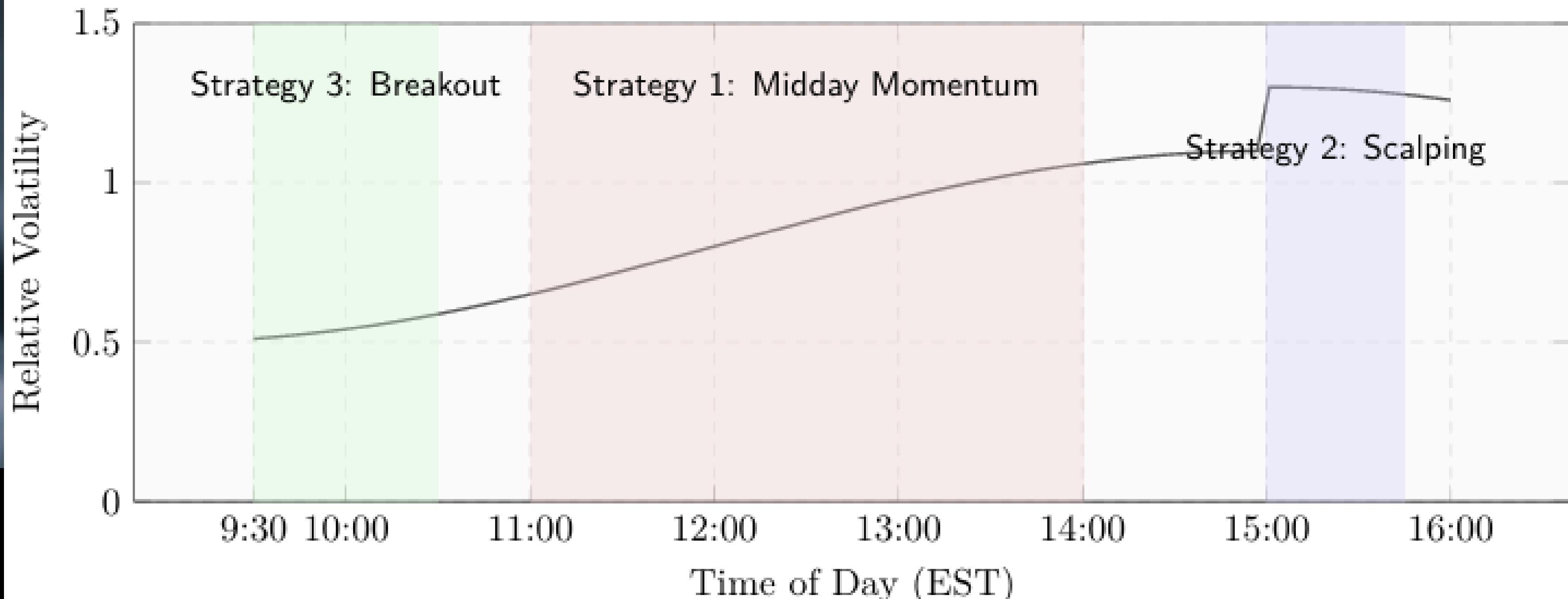
Fat-tailed models; hybrid model testing.

Long Term

Infrastructure upgrades; expand analytics.



TSLA Intraday Volatility and Strategy Trading Windows



Why It Matters?



Market Context: Tesla's retail-driven volatility requires tailored strategies.



Opportunity: Proactive risk management unlocks capital efficiency.

Call to Action: Approve GARCH integration; allocate resources for hybrid pilot.





Conclusion

Key Findings

- **Unique Risk Profile:** Tesla exhibits a flattened U-shape VaR with no significant open-hour spike ($p=0.9583$) but elevated last-hour risk ($p=0.0616$), driven by higher volatility at market open and close.
- **Model Limitations:** Traditional risk models underestimate Tesla's "meme stock" dynamics, necessitating advanced approaches like AR-GARCH and hybrid models.
- **Business Impact:** Accurate VaR modeling enhances financial resilience, trading efficiency, and competitive edge by reducing losses and optimizing execution.

TESLA



THANK
YOU.

