The 3mTSHSUHC.*rp2*: Stress Test & Evaluating the Three-minute Timeframe Stoporder Hedging Strategy Using Heatmap Candles

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https://github.com/algorembrant/QAT-QuantitativeAlgorithmicTrading
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Abstract

This study evaluates the performance of the 3mTSHSUHC algorithmic trading model on 500 three-minute candles using a fully automated strategy with 0.25 price unit precision and tick-volume-based decision execution scaled 0–1. The analysis incorporates stress parameters including a 0.30 price unit spread (to simulate unfair fills), 1 price unit maximum slippage (random latency of order execution), 1% commission per trade (increasing losses and reducing profits), and a 5% risk per position. The study aims to identify the Optimal Metric Threshold for trade signal execution that achieved a favorable outcome of profitability, risk, and trade frequency in the ranging Gold Forex Market.

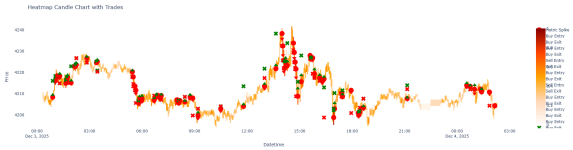

Figure 1: *HCC with Trade Executions Example During Ranging Market*

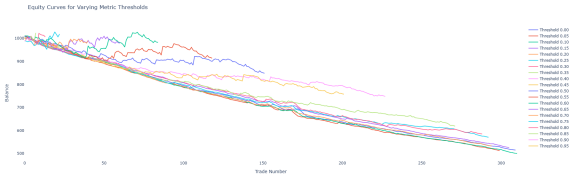

Figure 2: *Twenty Equity Curve Profiles with varying Metric Threshold*

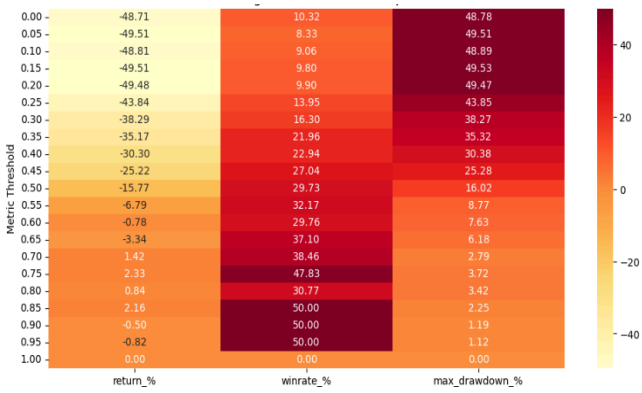

Figure 3: *Scouting Equity Profiles Metric Heatmap*

Results indicate that in ranging markets, metric thresholds of 0.70 to 0.75 produce a small number of trades (23–62) with slightly positive returns (1.4–2.3%), high win rates (38–48%), and low maximum drawdowns (2.8–3.7%), representing the optimal trade-off between profitability, risk, and trade frequency. Conversely, thresholds between 0.00 and 0.20 generate excessive trades (303–312) with large losses (-49%), low win rates (8–10%), and high drawdowns (48–49%), making them unsuitable for ranging markets. Thresholds above 0.80 produce very few trades (2–13) with mixed returns (-0.8% to 2.1%), win rates of 30–50%, and minimal drawdowns (1–3%), but these results are statistically unreliable due to the small sample size. Overall, low thresholds perform poorly, but adjusting the metric scale can improve performance and support the development of adaptive metric-scaling algorithms for varying market conditions.

Introduction

The study aims to answer the following question:

What is the performance of 3mTSHSUHC [1] during the ranging market condition backtest multiple times with different metric_threshold values (from 0 to 1, incrementing by 0.05) with Stress parameter is used this time, spread of 0.30 price units, max slippage of 1 price unit (latency of filling orders), and commission of 1% per trade (more loss when losing, and less profits when winning) and 5% risk per trade executions?

Methodology

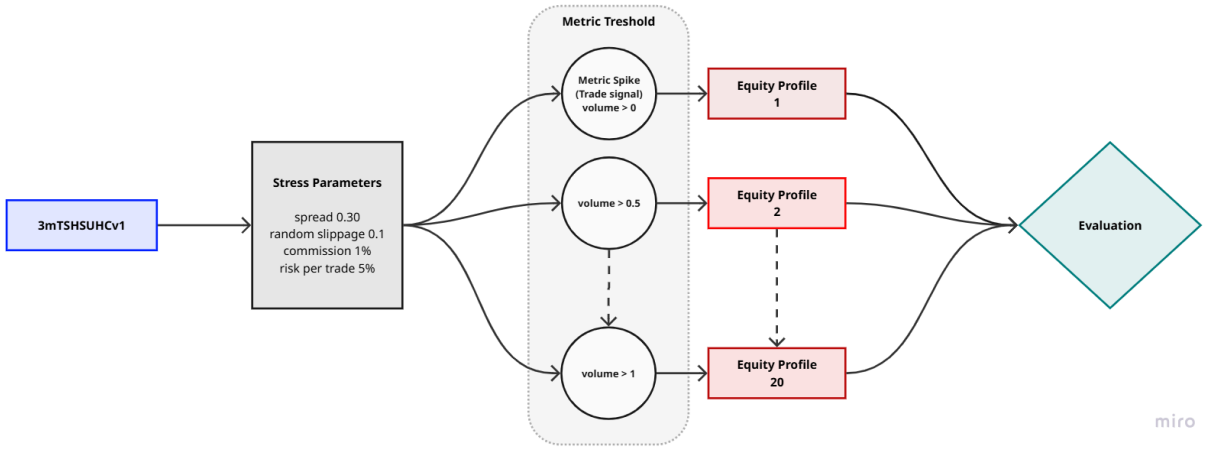

Figure 4: *Flow and Process of 3mTSHSUHC test*

This study is the continuation and stress test for the Three-minute Timeframe Stoporder Hedging Strategy Using Heatmap Candles (3mTSHSUHC) trading model. There are no massive revision of the model aside from adding a Stress parameters, spread of 0.30 price units, max slippage of 1 price unit (latency of filling orders), and commission of 1% per trade (more loss when losing, and less profits when winning) and 5% risk per trade executions.

Data set

Similar to the first study of this model, 500 3m-timeframe candles are used at testing data but the market condition is different, it is deployed in ranging intraday in gold forex, at December 3, 2025 UTC+8 timezone.

Testing, Trading Signals, and Trade Execution

Each test run has a varying metric threshold for the trade signals, trades will execute if it meets the condition that the volume of the candle is less than the metric scale. Read the first study of this model for further details. Equity profiles, each having a different metric threshold, will be evaluated after all tests are finished and conclude meaningful insights.

Results

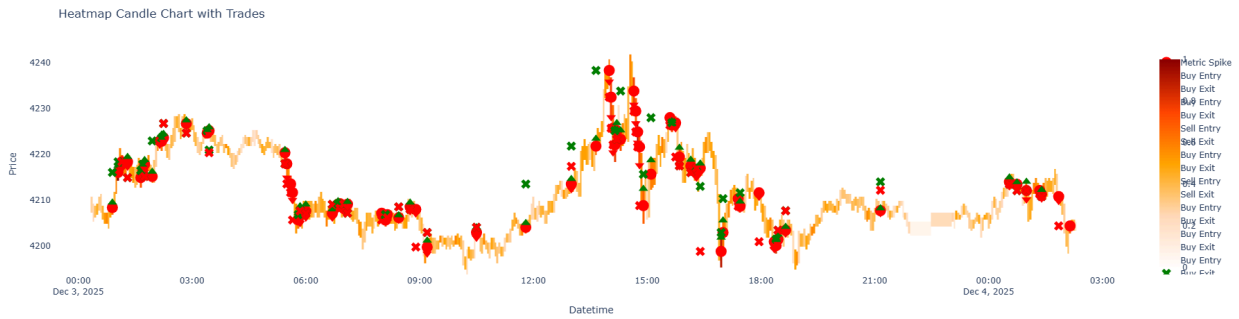

Figure 5: *Heatmap Candles Chart with Trade Executions Example During Ranging Market*

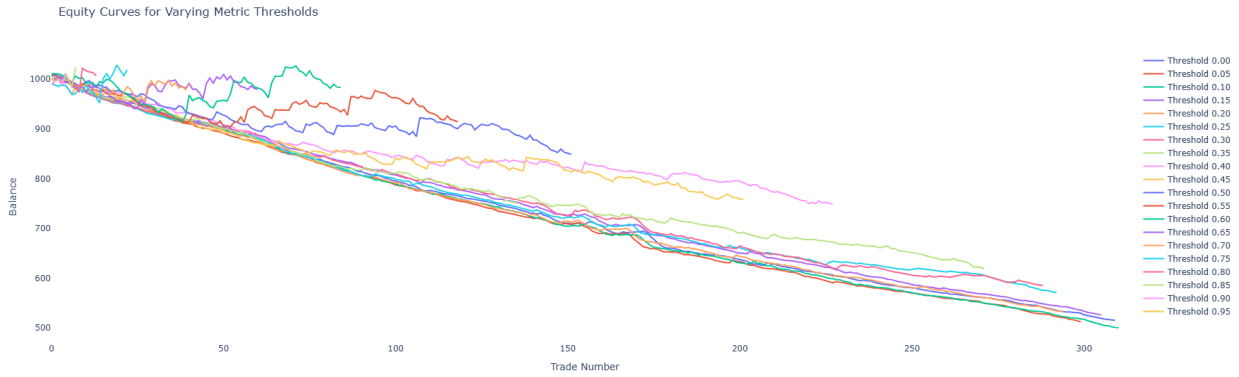

Figure 6: *Twenty Equity Curve Profiles with varying Metric Threshold*

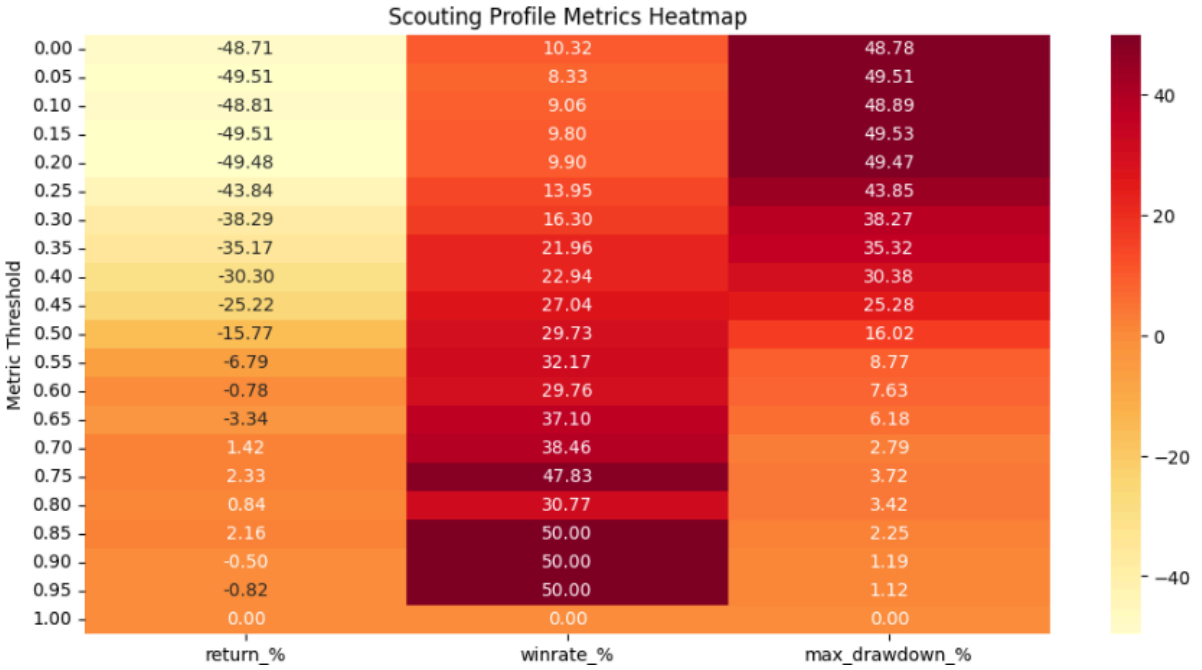

Figure 7: *Scouting Equity Profiles Metric Heatmap*

Discussions

Table 1: *Observations from the Data*

Threshold	Num Trades	Return %	Winrate %	Max Drawdown %	Comment
0.00–0.20	303–312	-49%	8–10%	48–49%	Very frequent trades, but massive losses → not suitable. Overtrading in small-range conditions.
0.25–0.45	196–294	-43% to -25%	14–27%	25–44%	Slightly better, fewer trades, but still negative returns and high drawdowns.
0.50–0.60	84–148	-15% to -0.7%	29–32%	7–16%	Losses are much smaller, fewer trades → more selective, reducing exposure.
0.65–0.75	23–62	-3% to 2.3%	38–48%	2–6%	Positive or near-zero returns, higher win rates, very low drawdown → good for ranging market.
0.80–0.95	2–13	-0.8% to 2.1%	30–50%	1–3%	Very few trades → statistically unreliable despite low drawdowns and some positive returns.
1.00	0	0%	0%	0%	No trades → obviously useless.

Statements of observations

1. The best metric thresholds for a ranging market are 0.70 to 0.75, as they produce a small number of trades with low drawdowns and slightly positive returns. These thresholds are selective enough to avoid overtrading, making them suitable for markets with limited price movement.

2. The worst metric thresholds are 0.00 to 0.20, which generate a very high number of trades but result in heavy losses and large drawdowns. These thresholds are overly sensitive and tend to trigger trades in almost every small price fluctuation, which is detrimental in a ranging market.

3. Thresholds above 0.80 are too restrictive, leading to very few trades. While drawdowns are minimal and some returns are positive, the low trade count makes the results statistically unreliable.

Overall, for a ranging market, a balanced metric threshold (0.70–0.75) offers the optimal trade-off between profitability, risk management, and trade frequency.

Conclusion

The study found that the 3mTSHSUHC trading model performs poorly in ranging markets, as low metric thresholds result in excessive trades, high losses, and large drawdowns. However, this study demonstrates that adjusting the metric scale, which governs trade execution, can significantly influence the model's performance. Future research should focus on developing methods for the algorithm to automatically adapt to varying market conditions, such as ranging markets, in order to optimize profitability while managing risk.

Recommendations

The author recommends developing the algorithm to automatically adjust the metric scale for trade signal execution in response to changing market conditions. This adaptive approach could help avoid overtrading during low-volatility periods and increase trading opportunities when conditions are favorable, thereby optimizing overall performance.

Future improvements may also include integrating volume-based and volatility-based filters, dynamic risk management, and real-time monitoring of market regimes to further enhance profitability and reduce drawdowns. Implementing such adaptive mechanisms would make the strategy more robust across ranging, trending, and mixed market conditions, ultimately improving its reliability and efficiency in live trading.

References

[1]. Albeos, Rembrant. (December 4, 2025). *The 3mTSHSUHC.rp1: Design and Optimization of Three-minute Timeframe Stoporder Hedging Strategy Using Heatmap Candles*. GitHub. https://github.com/algorembrant/QAT-QuantitativeAlgorithmicTrading/tree/main/Research%20Papers/The%203mTSHSUHC.rp1%3A%20Design%20and%20Optimization%20of%20Three-minute%20Timeframe%20Stoporder%20Hedging%20Strategy%20Using%20Heatmap%20Candles%20