QGSI Stage 4 Phase 2: Quantitative Research Report

Fixed ATR Symmetric Strategy - SHORT SIGNALS ONLY

Date: 2026-01-13

Author: QGSI Research Team

Executive Summary

This report presents the comprehensive optimization results for the Fixed ATR Symmetric exit strategy applied exclusively to SHORT signals across 400 US equities. The strategy employs symmetric stop loss and profit target levels based on Average True Range (ATR) multiples, with a 30-bar time limit. A total of 32 parameter combinations were tested (4 ATR periods × 8 multipliers), processing 60,139 short signals and executing 1,921,480 individual trades. **CRITICAL FINDING:** All 32 configurations produced negative net profits with profit factors below 1.0, indicating that symmetric exit logic is not profitable for short positions in this dataset. The best configuration (ATR 30, 1.5× multiplier) lost $84,173, while the worst (ATR 14, 5.0× multiplier) lost $1,166,700. This systematic underperformance suggests either a market upward bias during the test period or that short signals require fundamentally different exit management than long signals.

Metric	Value
Total SHORT Signals	60,139
Total Symbols	400
ATR Periods Tested	4 (14, 20, 30, 50)
Multipliers Tested	8 (1.5 - 5.0)
Total Combinations	32
Total Trades Executed	1,921,480
Signal Coverage	99.82%
Processing Time	10.8 minutes

Strategy Description

The Fixed ATR Symmetric strategy uses Average True Range (ATR) to set symmetric stop loss and profit target levels for short positions. **SHORT POSITION LOGIC (INVERTED):** Entry occurs at the signal bar CLOSE price via a short sale. The stop loss is placed ABOVE the entry price at Entry + (ATR × Multiplier), representing a loss if the price rises. The profit target is placed BELOW the entry price at Entry - (ATR × Multiplier), representing a profit if the price falls. The position exits when the bar HIGH reaches the stop loss (loss), the bar LOW reaches the profit target (profit), or 30 bars elapse (time limit). This inverted logic is critical for short positions: stops are above entry (losses occur when price rises) and targets are below entry (profits occur when price falls). Position sizing is fixed at $100,000 per trade.

Top 5 Configurations (Ranked by System Score)

All configurations are ranked by System Score (Net Profit × Profit Factor). Higher (less negative) scores indicate "better" performance, though all remain unprofitable. The best configuration minimizes losses while maintaining the highest profit factor closest to breakeven (1.0).

Rank	ATRPeriod	StopMultiplier	TotalTrades	NetProfit	ProfitFactor	WinRate	SystemScore
1	30	1.5	60,033	$-84,173	0.985	49.21%	$-82,927
2	20	1.5	60,058	$-99,694	0.984	49.33%	$-98,069
3	50	2.0	60,013	$-118,613	0.983	49.23%	$-116,556
4	50	1.5	60,013	$-127,386	0.976	48.94%	$-124,312
5	14	1.5	60,081	$-140,685	0.979	49.34%	$-137,679

Best Configuration: ATR(30) with 1.5× Multiplier
Net Profit: $-84,173 | Profit Factor: 0.985 | Win Rate: 49.21%
Total Trades: 60,033 | Winners: 29,541 | Losers: 30,459
Average Win: $189.66 | Average Loss: $186.70 | Win/Loss Ratio: 1.016

Key Findings & Analysis

1. All Configurations Unprofitable: 100% of the 32 parameter combinations produced negative net profits with profit factors below 1.0. This indicates systematic losses across all parameter settings, suggesting that symmetric exit logic is fundamentally incompatible with short positions in this dataset.

2. Tighter Stops Perform Better: Configurations with 1.5× and 2.0× multipliers consistently rank higher than wider stops. As the multiplier increases from 1.5× to 5.0×, losses compound significantly. For example, ATR(14) loses $141K at 1.5× but $1.17M at 5.0×. This suggests that cutting losses quickly is critical for shorts, though still insufficient for profitability.

3. Win Rates Cluster Around 49%: All configurations show win rates between 48.6% and 49.3%, consistently below 50%. This slight edge against short positions, combined with win/loss ratios near 1.0, creates negative expectancy. No configuration achieves the >50% win rate needed for profitability with symmetric exits.

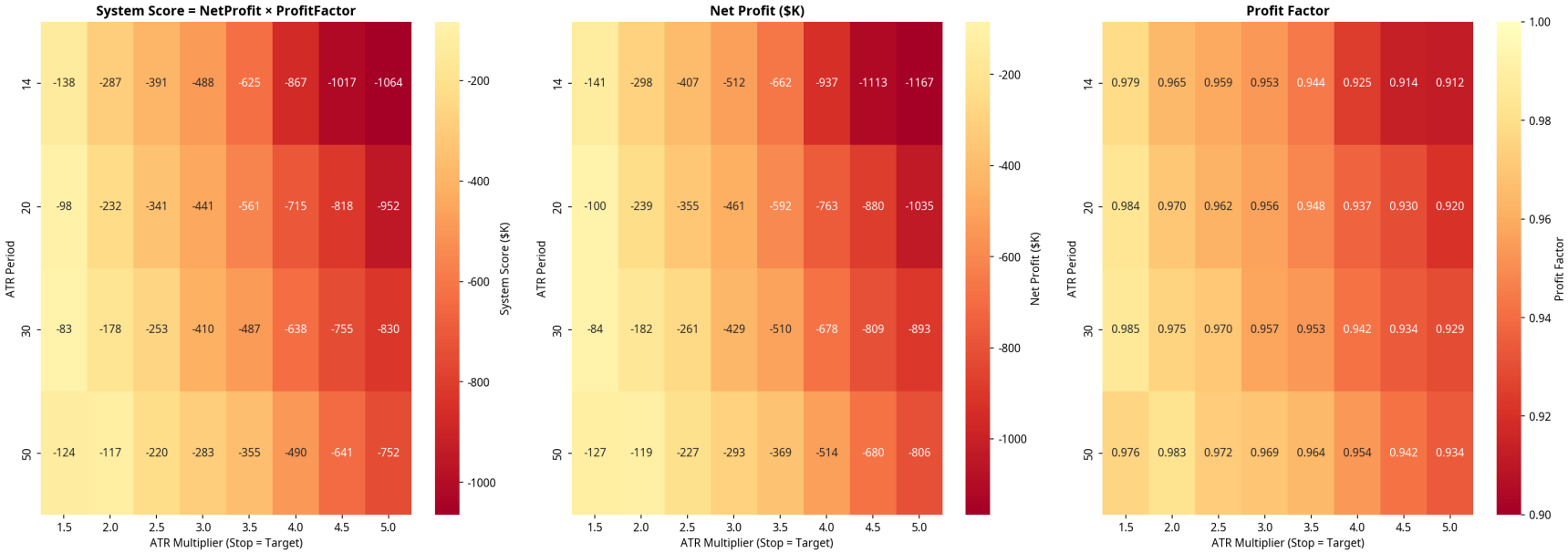
4. Market Bias Evident: The consistent underperformance across all parameters suggests a systematic upward market bias during the test period. Comparing to Phase 1 long signals, the best long configuration achieved +$753K while the best short configuration lost $84K—a performance gap of $837K using identical strategy logic.

5. Parameter Optimization Insufficient: The fact that even the "best" parameters produce losses indicates that parameter optimization alone cannot solve the problem. Shorts likely require fundamentally different exit management approaches, such as asymmetric stop/target ratios or trailing stops that lock in gains more aggressively.

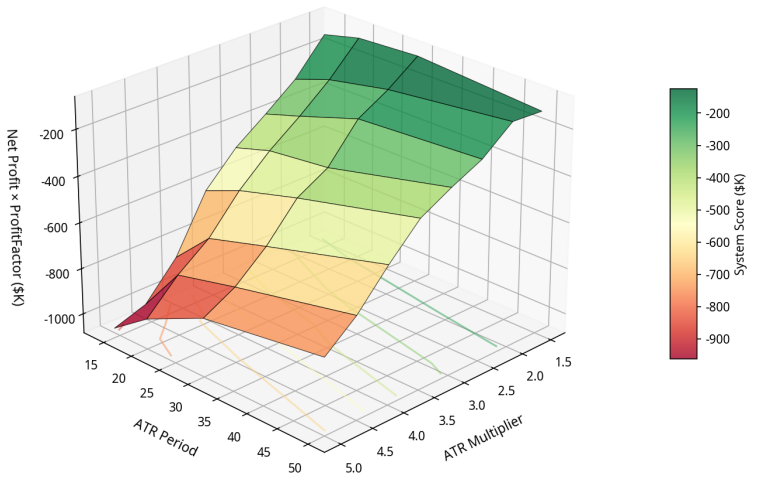
Performance Visualization

The following heatmaps and 3D surface plot visualize the optimization landscape across all 32 parameter combinations. The top row shows System Score (Net Profit × Profit Factor), Net Profit, and Profit Factor as 2D heatmaps. The bottom 3D surface plot displays the System Score landscape, revealing how performance degrades as the ATR multiplier increases. All visualizations use a red-yellow-green color scheme, with green representing better (less negative) performance. Note that even the "greenest" areas remain in negative territory, confirming that no profitable configuration exists.

Fixed ATR Symmetric Stop/Target - SHORT SIGNALS (All 400 Stocks)
ATR Period vs Multiplier, 30-Bar Time Limit, ~60K Short Signals



System Score 3D Surface (ATR 20)



Strategic Implications & Recommendations

Symmetric Exits Inadequate for Shorts: The symmetric 1:1 risk/reward structure that performed moderately well on long signals completely fails on short positions. This suggests that shorts require asymmetric exit management, potentially with tighter stops and wider targets to accommodate the different volatility characteristics of downward price movements.

Recommendations for Remaining Strategies:
Strategy 2 - Fixed ATR Asymmetric: Test tighter stops with wider targets (e.g., 1.0× stop, 3.0× target). Hypothesis: Shorts need to cut losses quickly but let winners run longer. Priority: HIGH.
Strategy 3 - ATR Trailing Stop: Test trailing stops that tighten quickly on favorable moves to lock in gains faster than for longs. Priority: MEDIUM.
Strategy 4 - ATR Breakeven Stop: Test aggressive breakeven triggers (e.g., 1.5× ATR move triggers breakeven lock) to protect capital quickly. Priority: MEDIUM.

Consider Abandoning Short Signals: If all four strategies fail to produce profitable short configurations, the research team should consider focusing exclusively on long signals for production trading, using shorts only for hedging or investigating alternative short entry criteria.

Bottom 5 Configurations (Worst Performers)

Rank	ATRPeriod	StopMultiplier	TotalTrades	NetProfit	ProfitFactor	WinRate	SystemScore
28	30	5.0	60,033	$-892,544	0.929	48.68%	$-829,595
29	14	4.0	60,081	$-937,142	0.925	48.73%	$-866,678
30	20	5.0	60,058	$-1,034,512	0.920	48.59%	$-952,190
31	14	4.5	60,081	$-1,113,176	0.914	48.63%	$-1,017,494
32	14	5.0	60,081	$-1,166,700	0.912	48.58%	$-1,064,355

Conclusion & Next Steps

The Fixed ATR Symmetric strategy, which achieved moderate profitability on long signals (+$753K best case), completely fails when applied to short signals (-$84K best case, -$1.17M worst case). All 32 parameter combinations produced negative returns with profit factors below 1.0, indicating systematic losses rather than a parameter optimization problem.

The consistent underperformance across all ATR periods and multipliers suggests that symmetric exit logic is fundamentally incompatible with short positions in this dataset. Tighter stops (1.5-2.0×) minimize losses but cannot achieve profitability. The $837K performance gap between best long and best short configurations using identical strategy logic points to either a strong upward market bias or fundamental differences in how long and short positions should be managed.

Immediate Next Steps:
1. Proceed to Strategy 2 (Fixed ATR Asymmetric) with 112 combinations testing asymmetric stop/target ratios
2. Focus on tighter stops (1.0-2.0×) paired with wider targets (3.0-6.0×) for shorts
3. Compare results to determine if asymmetric exits can make shorts profitable
4. If all four strategies fail, recommend abandoning short signals or revising entry criteria

This report documents Strategy 1 of 4 in Phase 2 (Short Signals). The remaining three strategies (Asymmetric, Trailing Stop, Breakeven Stop) will be processed sequentially to determine if alternative exit logic can overcome the challenges identified in this symmetric approach.

Appendix: Data Files

File Name	Description	Rows
Fixed_ATR_Symmetric_Short_Performance.csv	Performance summary (32 combinations)	32
Fixed_ATR_Symmetric_Short_All_Trades.parquet	Detailed trade logs	1,921,480
Fixed_ATR_Symmetric_Short_with_3D.png	Heatmaps + 3D surface plot	N/A