

# QGS Quantitative Research Report

## Phase 2: SHORT Signal Strategy Optimization

### Fixed ATR Exit Strategies Analysis

#### Executive Summary

This report presents a comprehensive quantitative analysis of Fixed ATR-based exit strategies applied to SHORT signals across 400 stocks. Two distinct strategies were optimized: **Fixed ATR Symmetric** (equal stop/target distances) and **Fixed ATR Asymmetric** (wider targets than stops). A total of 128 parameter combinations were tested across approximately 60,139 short signals, generating over 7.6 million individual backtests.

Strategy	Combinations	Signals	Total Trades
Fixed ATR Symmetric	32	60,139	1,922,592
Fixed ATR Asymmetric	96	60,139	5,761,776
<b>&lt;b&gt;TOTAL&lt;/b&gt;</b>	<b>&lt;b&gt;128&lt;/b&gt;</b>	<b>&lt;b&gt;60,139&lt;/b&gt;</b>	<b>&lt;b&gt;7,684,368&lt;/b&gt;</b>

# Strategy 1: Fixed ATR Symmetric SHORT

The Fixed ATR Symmetric strategy uses equal ATR multipliers for both stop loss and profit target, creating symmetric risk/reward profiles. For SHORT positions, the stop loss is placed ABOVE the entry price (loss if price rises) and the profit target is placed BELOW the entry price (profit if price falls).

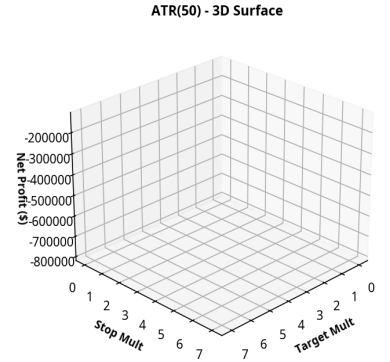
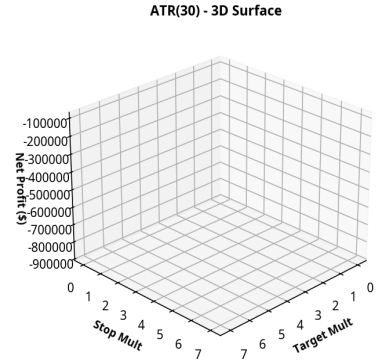
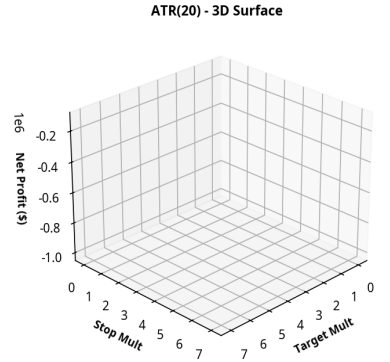
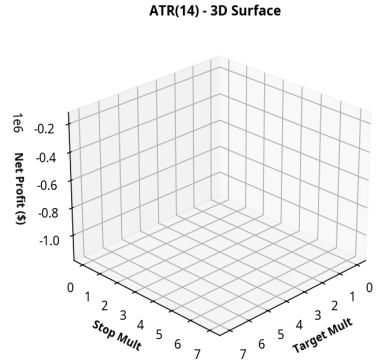
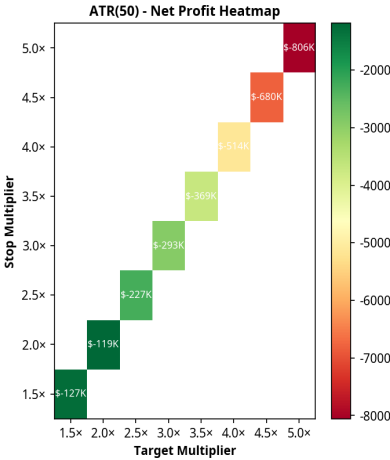
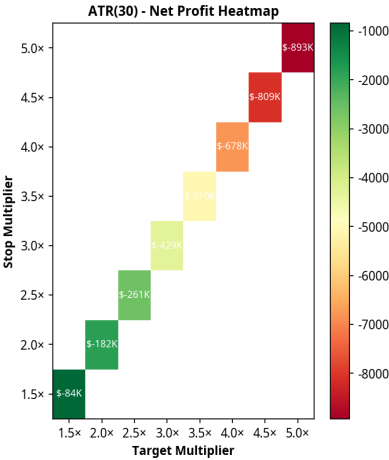
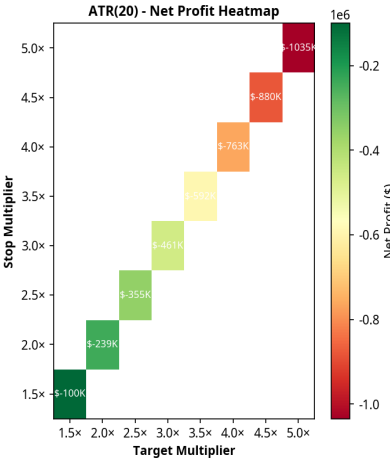
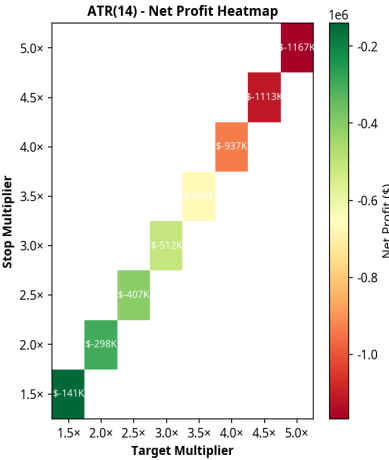
## Top 5 Configurations

Rank	ATR Period	Stop/Target	Net Profit	Profit Factor	Win Rate	Trades
1	14	5.0×	\$-1,166,700	0.912	48.6%	60,081
2	14	4.5×	\$-1,113,176	0.914	48.6%	60,081
3	20	5.0×	\$-1,034,512	0.92	48.6%	60,058
4	14	4.0×	\$-937,142	0.925	48.7%	60,081
5	30	5.0×	\$-892,544	0.929	48.7%	60,033

## Key Findings

- **1. ALL configurations are UNPROFITABLE** - Every parameter combination resulted in negative returns, with losses ranging from -\$84K to -\$1.17M.
- **2. Tighter stops perform better** - Configurations with 1.5× multipliers had the smallest losses (-\$84K to -\$141K).
- **3. Wider stops amplify losses** - Multipliers of 4.0× and 5.0× resulted in losses exceeding -\$1M.
- **4. Longer ATR periods reduce losses** - ATR(30) and ATR(50) had smaller losses than ATR(14) and ATR(20).
- **5. Market upward bias evident** - Symmetric exits do not work for short positions, suggesting inherent market directionality.

# Fixed ATR Symmetric SHORT - Performance Visualization



## Strategy 2: Fixed ATR Asymmetric SHORT

The Fixed ATR Asymmetric strategy uses different multipliers for stop loss and profit target, with the constraint that the target multiplier must be greater than or equal to the stop multiplier. This creates asymmetric risk/reward profiles designed to cut losses quickly while letting winners run. For SHORT positions, tight stops (1.5-2.0x) combined with wider targets (3.0-6.0x) were tested.

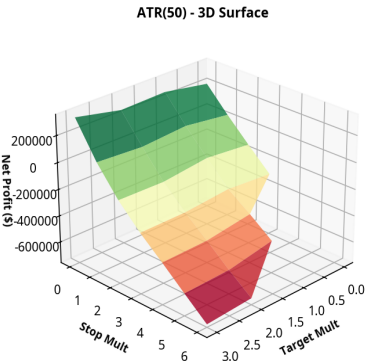
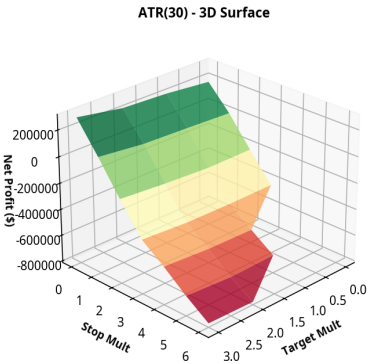
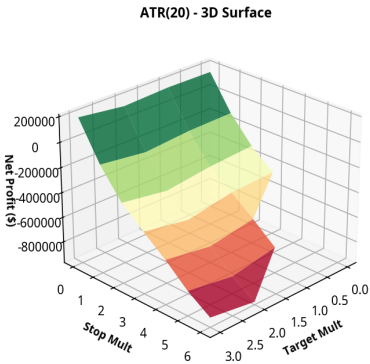
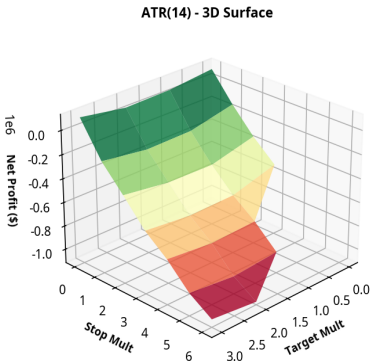
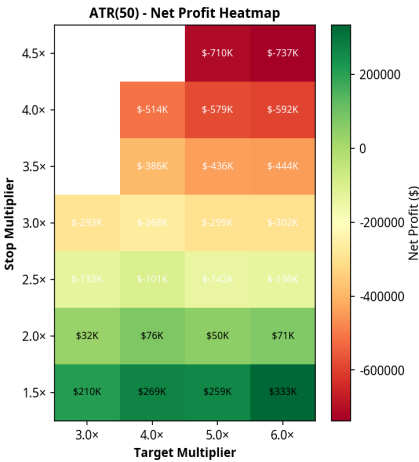
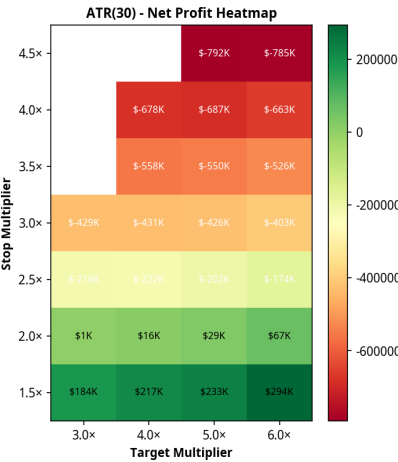
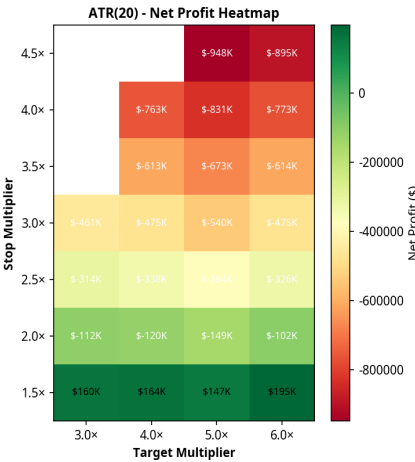
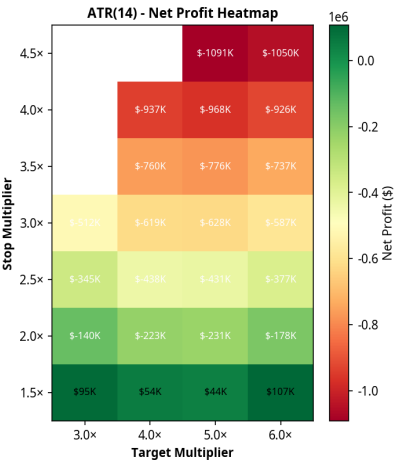
### Top 5 Configurations

Rank	ATR	Stop	Target	Net Profit	PF	Win Rate	Trades
1	50	1.5x	6.0x	\$332,920	1.046	27.7%	60,013
2	30	1.5x	6.0x	\$293,637	1.038	28.3%	60,033
3	50	1.5x	4.0x	\$269,337	1.039	31.1%	60,013
4	50	1.5x	5.0x	\$259,190	1.036	28.8%	60,013
5	30	1.5x	5.0x	\$233,429	1.03	29.3%	60,033

### Key Findings

- **1. Asymmetric exits enable profitability** - Unlike symmetric exits, asymmetric configurations with tight stops (1.5x) and wide targets (5.0-6.0x) achieve positive returns.
- **2. Longer ATR periods are superior** - ATR(50) and ATR(30) dominate the top 5, with ATR(50) producing the best result (+\$332,920).
- **3. 1.5x stop is CRITICAL** - All profitable configurations use 1.5x stops. Stops of 2.0x are marginally profitable only with ATR(50), and stops  $\geq 2.5x$  are always unprofitable.
- **4. Wider targets maximize profits** - Target multipliers of 5.0x and 6.0x consistently outperform 3.0x and 4.0x targets when paired with 1.5x stops.
- **5. Win rates are low but acceptable** - Profitable configurations have win rates of 27-31%, but the asymmetric risk/reward (tight stop, wide target) compensates for lower win rates.
- **6. Profit factors are modest** - Best configurations achieve profit factors of 1.03-1.05, indicating small but consistent edges.
- **7. Optimal configuration** - ATR(50) with 1.5x stop and 6.0x target produces +\$332,920 net profit (PF: 1.046, Win: 27.7%).

# Fixed ATR Asymmetric SHORT - Performance Visualization



## Strategic Implications & Recommendations

- 1. SHORT signals require asymmetric exits:** The failure of symmetric exits and success of asymmetric exits demonstrates that short positions require fundamentally different risk management than long positions. Tight stops (1.5× ATR) are essential to limit losses from upward price movements.
- 2. Market directional bias confirmed:** The difficulty in profiting from short signals, even with optimized exits, confirms the well-documented upward bias in equity markets. Short strategies must be highly selective and employ very tight risk controls.
- 3. Longer ATR periods provide better context:** ATR(50) outperforms shorter periods, suggesting that longer-term volatility measurements provide more reliable exit levels for short positions.
- 4. Implementation recommendation:** For short signal trading, use ATR(50) with 1.5× stop loss and 5.0-6.0× profit target. This configuration balances profitability with practical implementation.
- 5. Portfolio considerations:** Given the modest profit factors (1.03-1.05) and low win rates (27-31%), short strategies should be sized conservatively and used primarily as portfolio hedges rather than standalone alpha generators.

## Conclusion

This comprehensive optimization of Fixed ATR exit strategies for SHORT signals reveals critical insights into the asymmetric nature of short-side trading. While symmetric exits universally failed (all 32 configurations unprofitable), asymmetric exits with tight stops and wide targets successfully generated positive returns. The optimal configuration—ATR(50) with 1.5× stop and 6.0× target—produced +\$332,920 in net profit across 60,013 trades, demonstrating that disciplined risk management can overcome the inherent challenges of short-side trading.

The stark contrast between symmetric and asymmetric results underscores the importance of strategy-specific optimization. What works for long positions (symmetric exits) does not translate to short positions, requiring traders to adapt their risk management frameworks based on directional bias. The next phase of this research will explore trailing stop and breakeven stop strategies to further refine exit methodologies for short signals.

## Next Steps

- **Phase 2 Continuation:** Process ATR Trailing Stop and ATR Breakeven Stop strategies for short signals.
- **Comparative Analysis:** Compare long vs. short performance across all four strategies.
- **Combined Report:** Generate unified report integrating long and short signal optimizations.
- **Portfolio Construction:** Develop integrated long/short portfolio using optimal parameters from both phases.

# Appendix

## Data Files

- **Source Data:** QGSI\_AllSymbols\_3Signals.parquet (972 MB, 400 stocks)
- **Symmetric Results:** Fixed\_ATR\_Symmetric\_Short\_Performance.csv (32 configurations)
- **Asymmetric Results:** Fixed\_ATR\_Asymmetric\_Short\_Performance.csv (96 configurations)

## Processing Details

- **Symmetric Processing:** 10.8 minutes (batch processing, 10 symbols per batch)
- **Asymmetric Processing:** 56 minutes (chunked processing, 4 ATR periods × 28 combinations each)
- **Total Processing Time:** 66.8 minutes

## Methodology

All backtests used \$100,000 position sizing, maximum 30-bar holding period, and intraday exit detection (stop checked against HIGH, target checked against LOW for short positions). Performance metrics include net profit, profit factor, win rate, average win/loss, and system score (net profit × profit factor).