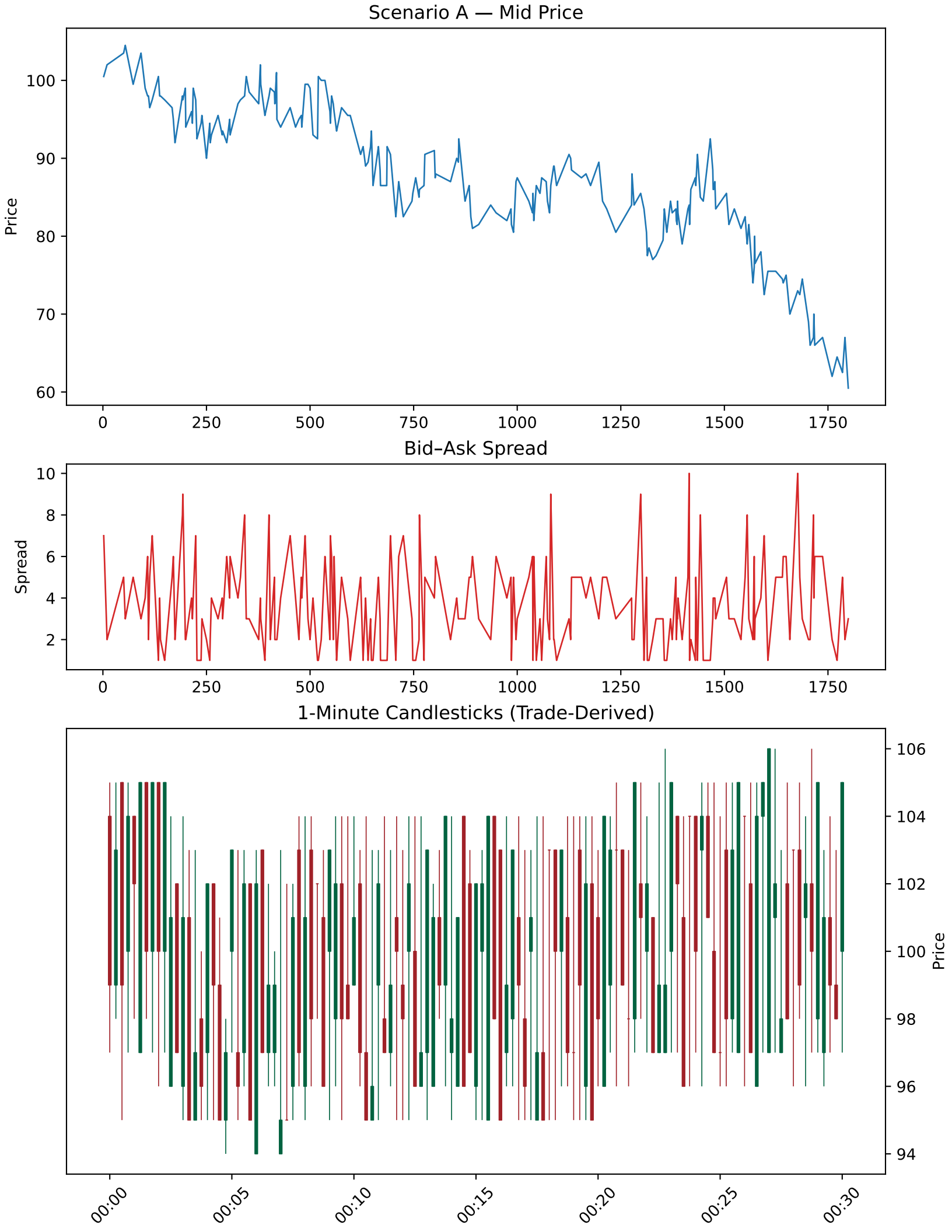
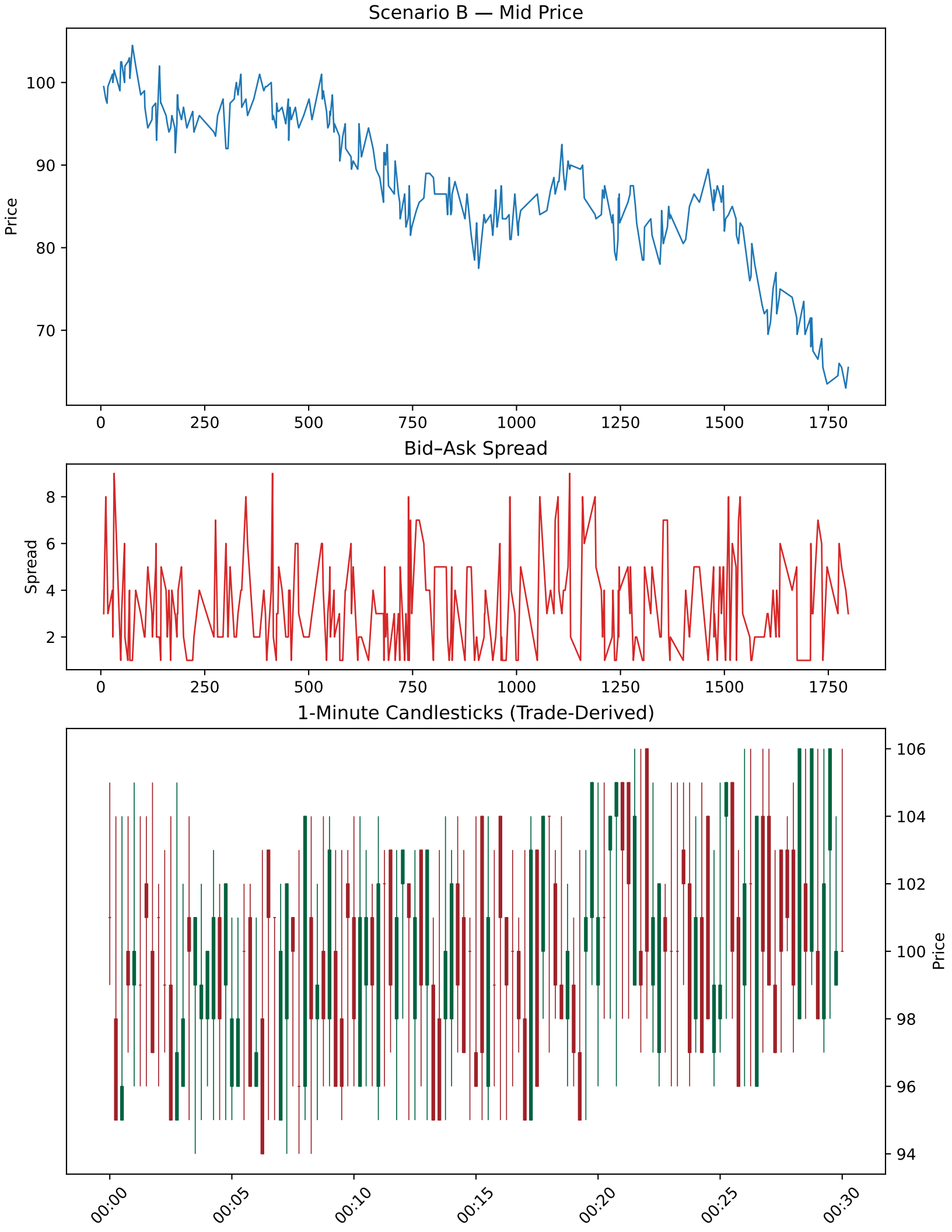
MARKET REPORT — EXPERIMENTAL SETUP

Simulation length : 1800 time units (30 minutes)
Random seed : 42
Snapshot interval : 1.0 second
Tick size : 1
Latency model : Exponential (mean = 1.0)
Matching engine : Price–Time Priority
Fair value : Random walk (σ = 0.5)

Agent Types
-Noise Trader: Zero-intelligence trader using market and aggressive limit orders
-Market Maker: Posts bid and ask quotes with inventory-dependent skew
-Momentum Trader: Trend-following agent using SMA crossover

Scenarios
-Scenario A: 100 Noise Traders
-Scenario B: 80 Noise + 20 Market Makers
-Scenario C: 80 Noise + 20 Momentum Traders


Scenario A — Mid Price
Price
100
90
80
70
60
0
250
500
750
1000
1250
1500
1750
Bid–Ask Spread
Spread
10
8
6
4
2
0
250
500
750
1000
1250
1500
1750
1-Minute Candlesticks (Trade-Derived)
106
104
102
100
98
96
94
Price
00:00
00:05
00:10
00:15
00:20
00:25
00:30


Scenario B — Mid Price
Price
100
90
80
70
0
250
500
750
1000
1250
1500
1750
Bid–Ask Spread
Spread
8
6
4
2
0
250
500
750
1000
1250
1500
1750
1-Minute Candlesticks (Trade-Derived)
106
104
102
100
98
96
94
Price
00:00
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00:15
00:20
00:25
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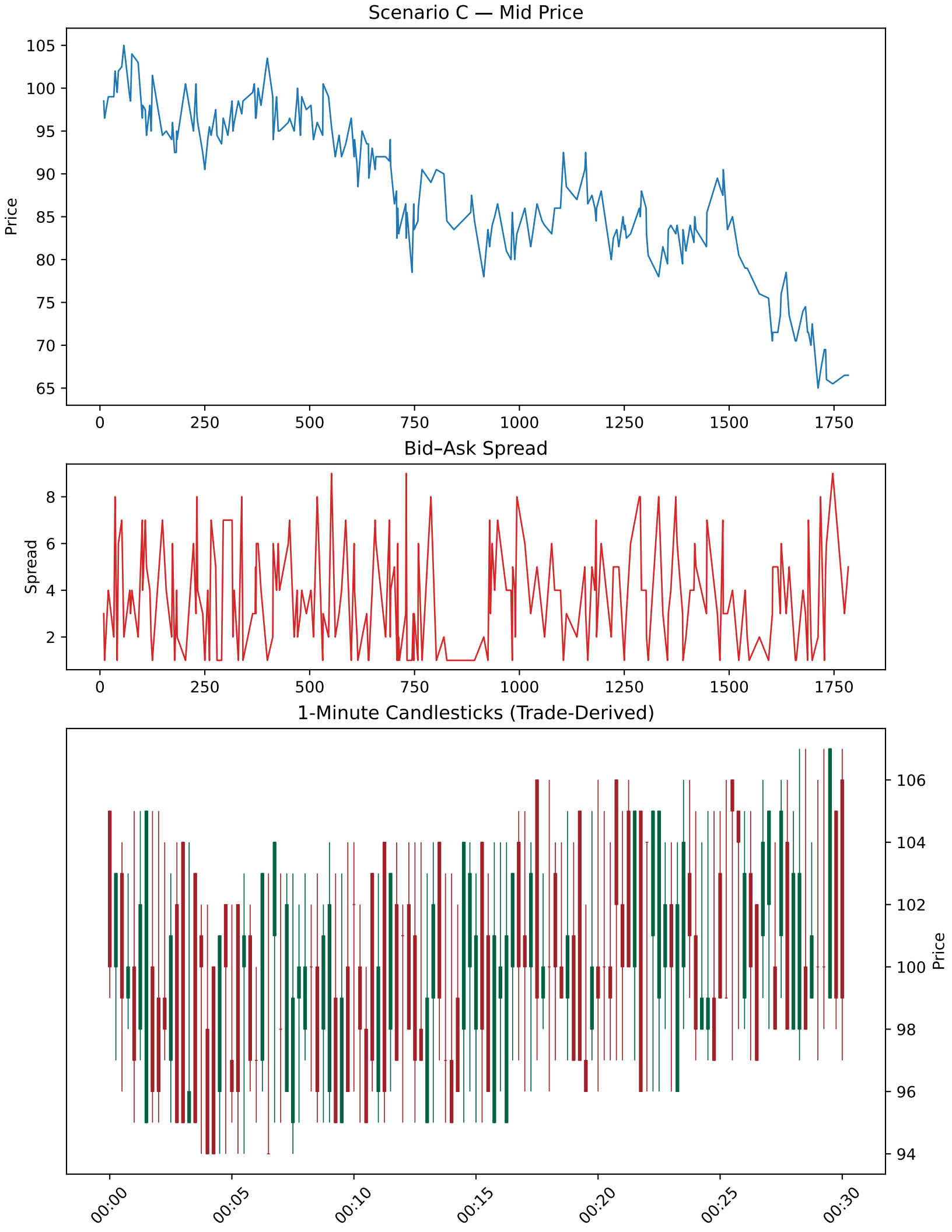
Scenario C — Mid Price
Price
105
100
95
90
85
80
75
70
65
0
250
500
750
1000
1250
1500
1750
Bid–Ask Spread
Spread
8
6
4
2
0
250
500
750
1000
1250
1500
1750
1-Minute Candlesticks (Trade-Derived)
Price
106
104
102
100
98
96
94
00:00
00:05
00:10
00:15
00:20
00:25
00:30

COMPARATIVE ANALYSIS

	Avg Spread	Volatility
A	3.6197	0.0353
B	3.3154	0.0314
C	3.6771	0.0362

EXPECTED INEQUALITIES

Spread:
Scenario B < Scenario A < Scenario C

Volatility:
Scenario B < Scenario A < Scenario C

INTERPRETATION

Liquidity Provision

Market makers continuously supply both sides of the book, converting random order flow into predictable execution prices. This compresses spreads and dampens volatility without predicting price direction.

Feedback Loops

- Momentum traders amplify trends by reinforcing recent price moves
- This creates endogenous volatility, not noise
- When combined with insufficient liquidity, this leads to instability

Inventory Risk & Stability

Market makers absorb order flow at the cost of inventory risk. Inventory-based quote skew prevents runaway exposure and enables continuous participation.

Without this mechanism:

- Liquidity vanishes
- Spreads explode
- Price becomes discontinuous