Day 8: Herding Analysis – Written Insight

This analysis investigates whether herding behaviour emerges endogenously in the simulated market under stress conditions. The study focuses on momentum (trend-following) agents and examines the evolution of correlation in their net positions, aligned with price dynamics and volatility.

When does herding begin?

Herding begins during periods of heightened market stress, characterized by sharp price movements and a significant increase in rolling volatility. In calm market regimes, the correlation between momentum agent positions remains low and unstable, indicating diverse and independent behaviour. However, as volatility rises and prices experience abrupt declines or rapid movements, the correlation between momentum agents' positions spikes sharply toward extreme values. This temporal alignment indicates that herding emerges specifically during stress regimes rather than being present continuously.

What agent type triggers herding?

Herding is primarily triggered by **momentum (trend-following) agents**. These agents rely on past price trends rather than private information, causing them to react similarly when strong price movements occur. Under stress, their synchronized responses amplify collective behaviour, leading to high correlation in positions. Other agents, such as noise traders and the market maker, do not exhibit this synchronized behaviour and therefore do not directly trigger herding.

Is herding reversible?

Yes, herding in the simulated market is largely reversible. After periods of extreme volatility subside and price movements stabilize, the correlation between momentum agent positions decreases and returns toward lower levels. This indicates that herding is not permanently locked in but is instead a transient phenomenon driven by market stress. However, prolonged or repeated stress episodes can sustain elevated correlation levels, increasing market fragility.

Overall, the results demonstrate that herding behaviour **emerges endogenously** from agent interactions under stress, rather than being imposed by design. The presence of low correlation during normal periods and sharp correlation spikes during volatile regimes confirms realistic behavioural dynamics and validates the simulator at the behavioural level.