

Paper Summary Agent-Based Market Simulation

Title: An Overview of Agent-Based Modelling with Applications in Finance and Economics

Author: Jahed Ullah

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Objective

To build an artificial stock market using Agent-Based Modelling (ABM) that captures how investor behaviours influence price formation, volatility, and market stability especially in the presence of adaptive learning and technical trading strategies.

Model Structure

The market contains one traded asset and the following agent types:

- NA (Normal Agent): Trades based on fixed weights of fundamental and technical signals
- NA2 (Learning Agent): Adjusts signal weights over time via performance feedback
- TA-m (Momentum Agent): Buys when prices rise, sells when they fall (trend follower)
- TA-r (Reversal Agent): Buys when prices fall, sells when they rise (contrarian)

Market operates via a continuous double auction with prices adjusted based on total demand/supply and agent order sizes.

Key Findings

- Baseline (NA only): Stable price dynamics around fundamental value
- NA + NA2: Increased volatility and long-term downward drift
- NA + TA-m: Price bubbles emerge due to feedback loops
- NA + TA-r: Market crashes from aggressive shorting
- NA + TA-m + TA-r: Market re-stabilises due to opposing forces

Research Value

This project demonstrates that:

- Agent heterogeneity and adaptive learning introduce non-linear dynamics in markets
- Technical traders can destabilise markets depending on their strategy and influence
- ABM is a powerful alternative to classical equilibrium models for simulating realistic behaviour

Repository

Full code and simulation results are available on GitHub:

github.com/Jahed-U/abm-market-simulation