

Primary Objectives

#1: Agent Parameterization

The basic model of the generalized agent will be developed. This model will include a number of features, or parameters, which will determine agent behavior.

Analytical Parameters

Analytical parameters will be designed to closely resemble the analytical process of “rational” human traders. These will include valuation techniques, which will provide the agent with a “rational” analysis of the current market conditions.

Emotional Parameters

These parameters will be designed to resemble the emotional factors which affect human behavior. Possible parameters include: risk tolerance, optimism, contrarianism, adaptability, and regret.

#2: Model Implementation

Agents will be implemented in Python, using the Mesa agent-based modeling framework. Additionally, the market response to agent behavior will be implemented.

Agent Behavior

Agents will be implemented to take input and give output. Each agent will take as input the current market conditions: stock price, volume, volatility, dividends, etc. Each agent will respond differently to this input, as determined by their unique parameters.

Market Response

Basic market movements will be modeled as responses to the discrepancy between supply and demand (more demand=price increase, and vice versa). This will be calculated at the start of each simulated day.

#3: Population Assessment

A variety of agent populations will be generated. Each population will have an accompanying simulated environment, including a market. Each population’s behavior will be assessed.

Population Generation

For each emotional parameter, a set of agent populations will be generated, which will vary only in regard to that specific parameter. By keeping all other parameters constant, the impact of varying one particular parameter can be assessed.

Real-world Stock Analysis

To model a specific real-world stock, the past performance of that stock could be simulated by several populations. Whichever population causes similar market behavior could be utilized to model future stock performance.