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Final Project Progress Report

Overall Description

I'm really interested in applying Multi-Agent Based Modeling in the financial markets. Ideally, I'd like to create a NetLogo model to simulate the conditions that would cause either a market rally or crash. I will focus on the equity index markets; this way, I won't have to worry about particular market structures of specific companies/industries. For example, some industries may be cyclical while others, mature companies, may not be traded as much.

Changes

Agent behavior: The agents will react based on what others around them do. Like in real life, agents will not be able to tell what will happen until it has occurred, so any "information" the agents gets from others will be based on the previous tick's trades. If I were to add networks to this model, I'd like to spread rumors within each network like the virus model, making each agent within a network more bullish or bearish. I have not completely thought out how the network will work, I will brainstorm more on this. I rethought my model for a bit and decided not to introduce new agents or decrease agents within the model. I'd like to have a working "financial market environment" before I add more complicated behaviors such as going existing traders going bankrupt or new traders entering the market. Ideally if time permits, I'd like to add agent behaviors relating to market speculation such as how long to hold on the one's position, risk appetite such as if the agents lose too much they will close out their positions, and

etc.

System behavior: The overall system will work based on decisions each agent makes. The agents can do two things each tick, buy or sell. If more agents buy than sell, the market price of the index rises. If more agents sell than buy, the market price of the index falls. Each agent will have a confidence level which affects whether if it is more prone to buy or sell. This level will be affected by how successful the agent was in the previous period. I will implement this through giving the agents memory using lists or giving agents attributes (turtles-own variables).

Rationale for agent rules: I have not nailed down all the specific rules for the agents. I will do more research on agent behavior in the financial markets based on papers or experience from real traders.

Model output: The overarching model output will be the global price of the market index. This price will be determined by what the agents within the market do (rise if more people buys than sells and falls if more people sells than buys). I believe this provides a good description of the system behavior because we can tell whether if a bubble is starting (if the markets keep rising) or if a crash will occur (if more and more agents begin selling).

Questions: I read through Bryan's feedback and thought many of his suggestions were great. I'd rescope my modeling project to address a specific question involving agent behavior in the financial markets instead of tackling many different ones. In particular, I'd like to model what kind of impact (such as macroeconomic news, terrorist attack, technical malfunction, etc) would start a rally or crash in the markets.

Next steps: Create a system where agents are able to interact and trade. I'd like to see some market activity occur. Once this happens, I'll create specific trading rules for the agents (rules for bulls vs. bears). I'll what happens in this environment when an “event” occurs, through a

separate function which adjusts the index market price.

Considerations: In terms of validation, I'd like to stimulate specific market bubbles or crashes based on historical conditions like the flash crash in 2010.