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Building an Agent-Based Order Book Model in a Financial Market Environment

Financial markets are at the heart of a capitalist economy, and are a major source of money flow around the world. Each day, billions of dollars are exchanged, creating capital for businesses to build on, and personal long term investments are made. This system is of vital importance, and yet we understand very little of its detailed inner workings.

Here we describe an agent-based order book model, built in Netlogo which is able to recreate the stylized facts, a very restricting set of criteria which many financial models hold, and which are the current standard for determining whether or not a model of a financial market is in fact a representative of a real market environment. This model is based off of previous work by Preis and Farmer, but further explores the relationships between parameters such as limit order rate and market order rate.

Through this model we are able to discover some very interesting relationships between liquidity, volume, and volatility. As available liquidity decreases, we find that volatility increases in a nonlinear manner.