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An agent-based computational model for bank formation and interbank networks

We introduce a simple framework where banks emerge as a response to a natural need in a society of individuals with heterogeneous liquidity preferences. We examine bank failures and the conditions for an interbank market to be established.

We start with an economy consisting of a group of individuals arranged in a 2-dimensional cellular automaton and two types of assets available for investment. Because of uncertainty, individuals might change their investing preferences and accordingly seek their surroundings neighbours as trading partners to satisfy their new preferences. We demonstrate that the individual uncertainty regarding preference shocks coupled with the possibility of not finding a suitable trading partners when needed give rise to banks as liquidity providers. Using a simple learning process, individuals decide whether or not to join the banks, and through a feedback mechanism we illustrate how banks get established in the society. We then show how the same uncertainty in individual investing preferences that gave rise to banks also causes bank failures. In the second level of our analysis, in a similar fashion, banks are treated as agents and use their own learning process to avoid failures and create an interbank market.

In addition to providing a bottom up model for the formation of banks and interbank markets, our model allows us to address under what conditions bank oligopolies and frequent banks failures are to be observed, and when an interbank market leads to a more stable system with fewer failures and less concentrated market players.