Extending Financial Credit Network Model: Default Prediction and Strategic Improvement

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FCN Model Overview

Financial Credit Network (FCN) is a multiagent model. Each agent, a bank, repeats the following during each period:

Decides to invest a certain portion of its money.

Extends credit lines to fellow banks.

Invest in assets according to the plan (through borrowing if needed).
Lend out money if requested.

Receives asset payoff (stochastic).

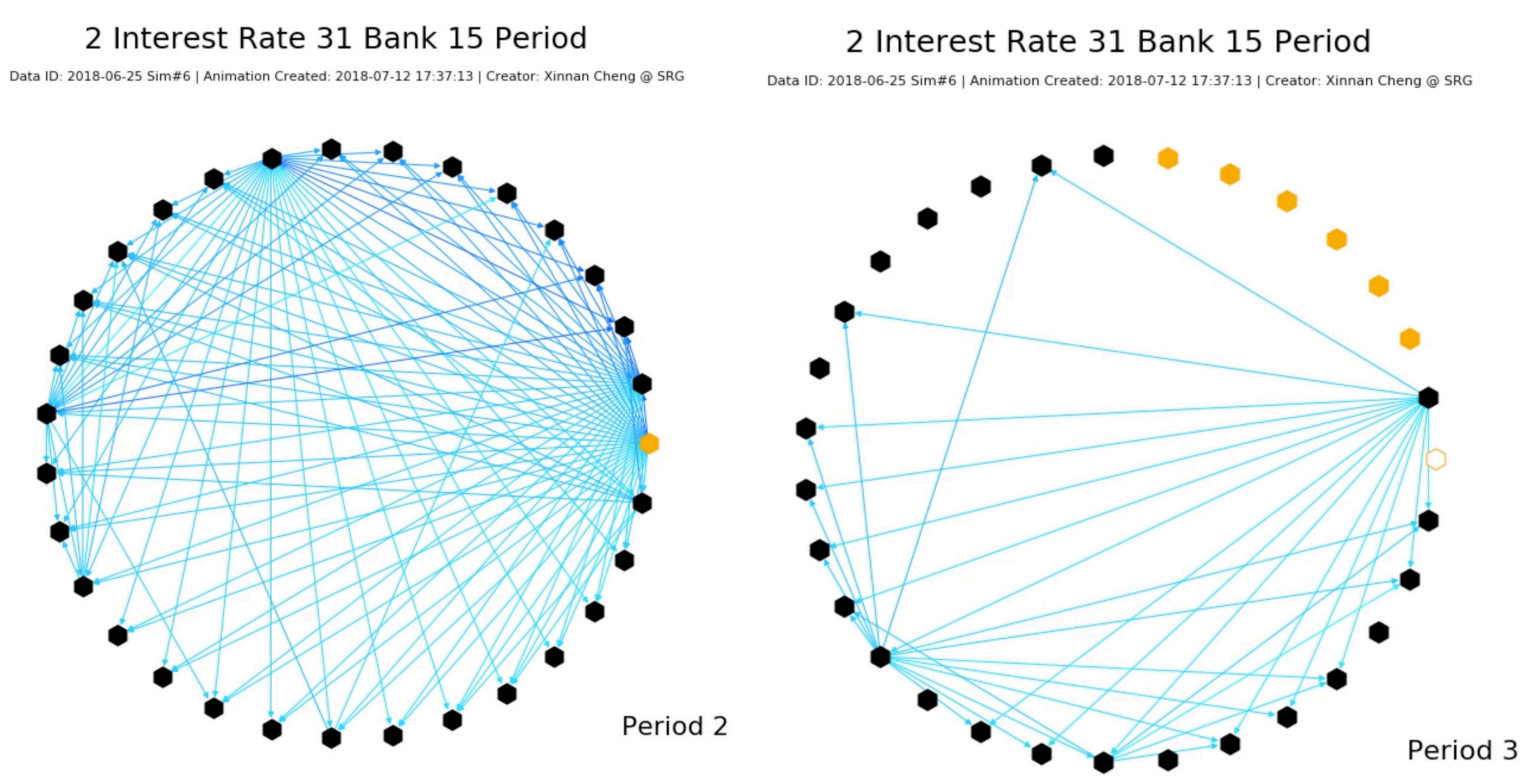
Repays debts and receives debt repayments.

Its incoming deposit changes stochastically.

A bank might default during the events on the right.

Visualization

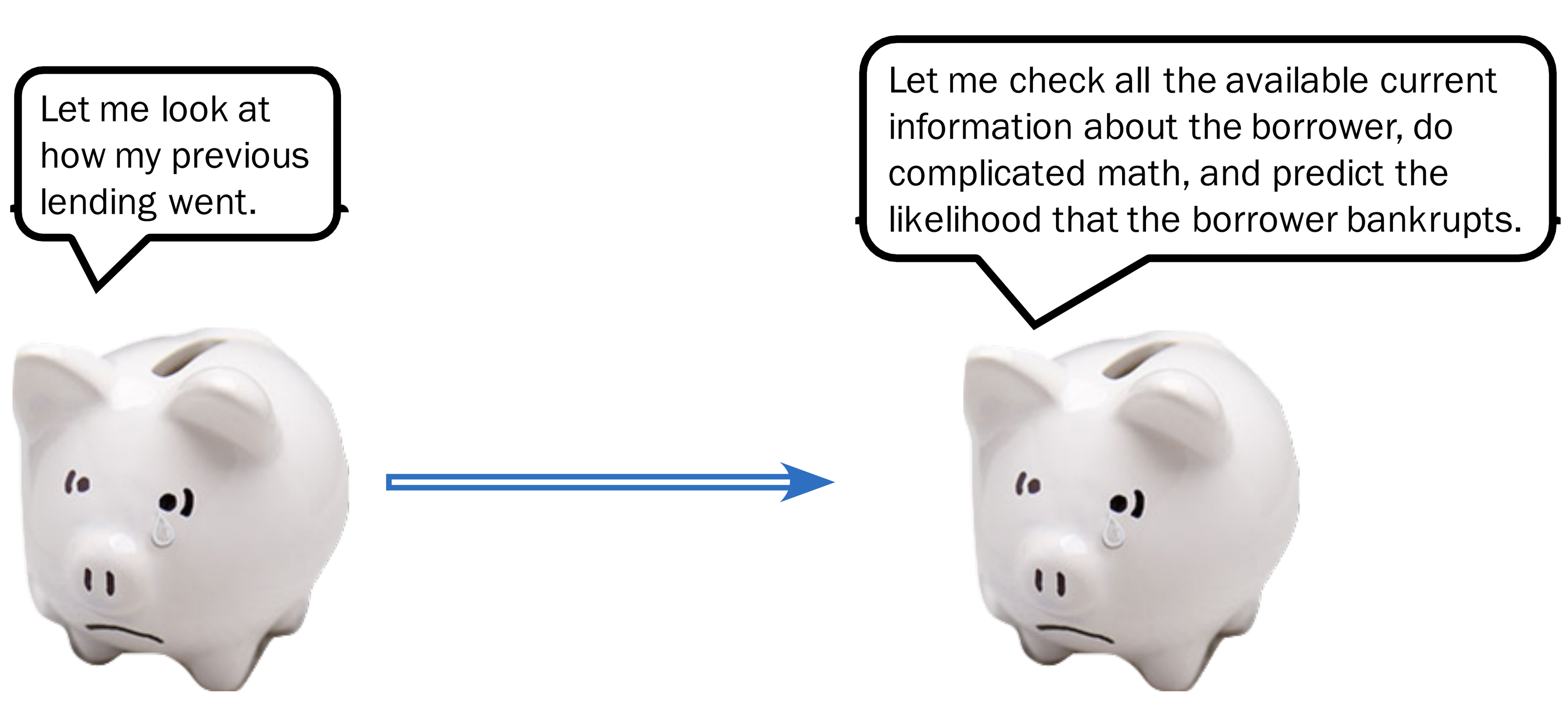
Here is the visualization of the debt networks during one simulation.



FCN Model Improvement

Problem: there is little lending activity after a few defaults.

Cause: bank agents' simple credit decision processes.



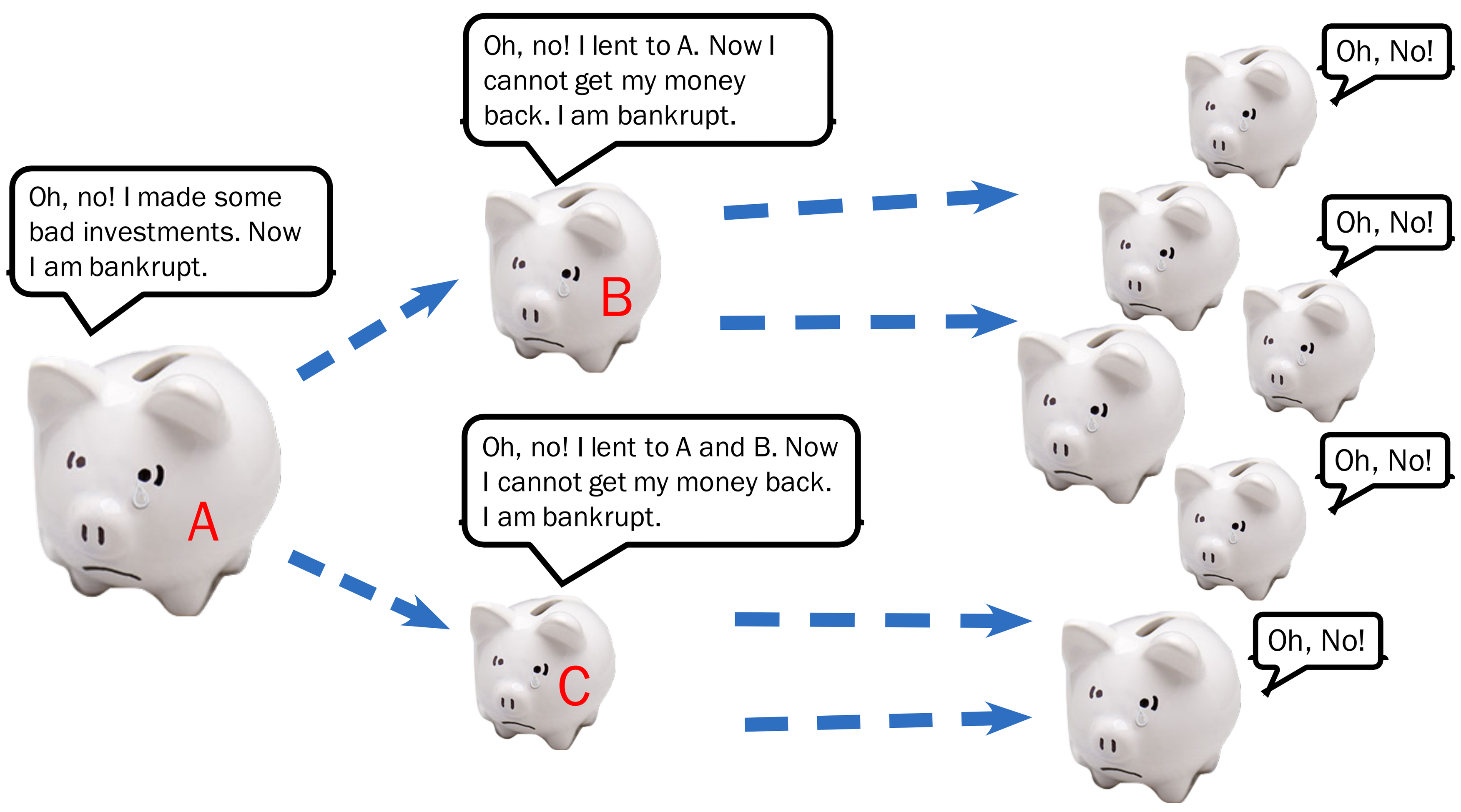
Solution: provide bank agents with default prediction and more realistic/ sophisticated credit decision process.

Predicting Bank Defaults

Bankruptcy due to deposit shocks, bad investments, taking too much risk, etc.	Bankruptcy due to others' bankruptcy.
Balance sheet information: cash, asset, leverage, etc.	Network structure (debt relationships)
Logistic regression	PageRank algorithm

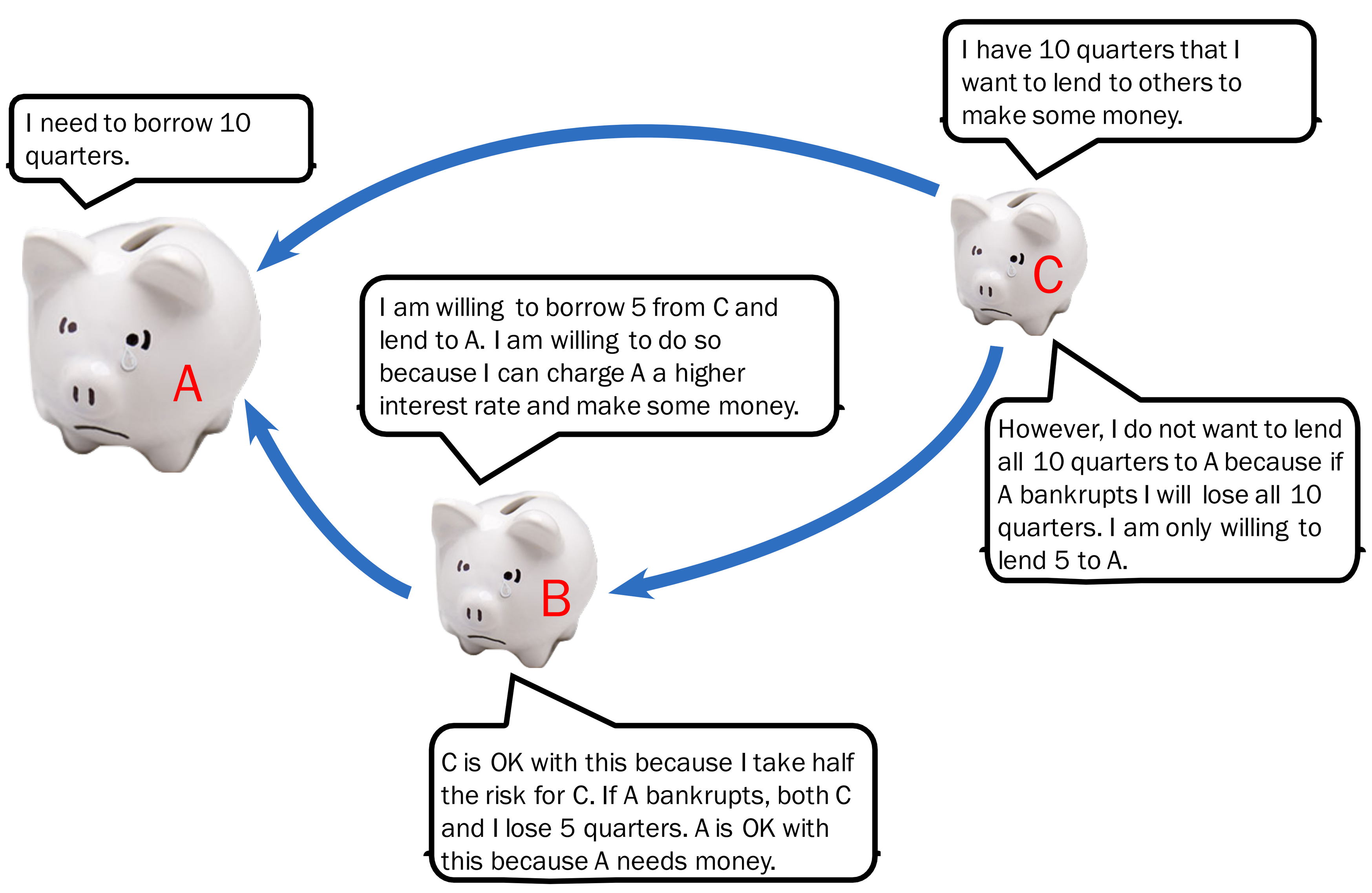
Experiment / Simulation

Financial Concept: Financial Contagion



The spread of financial difficulties is called **financial contagion**.

Financial Concept: Financial Intermediation

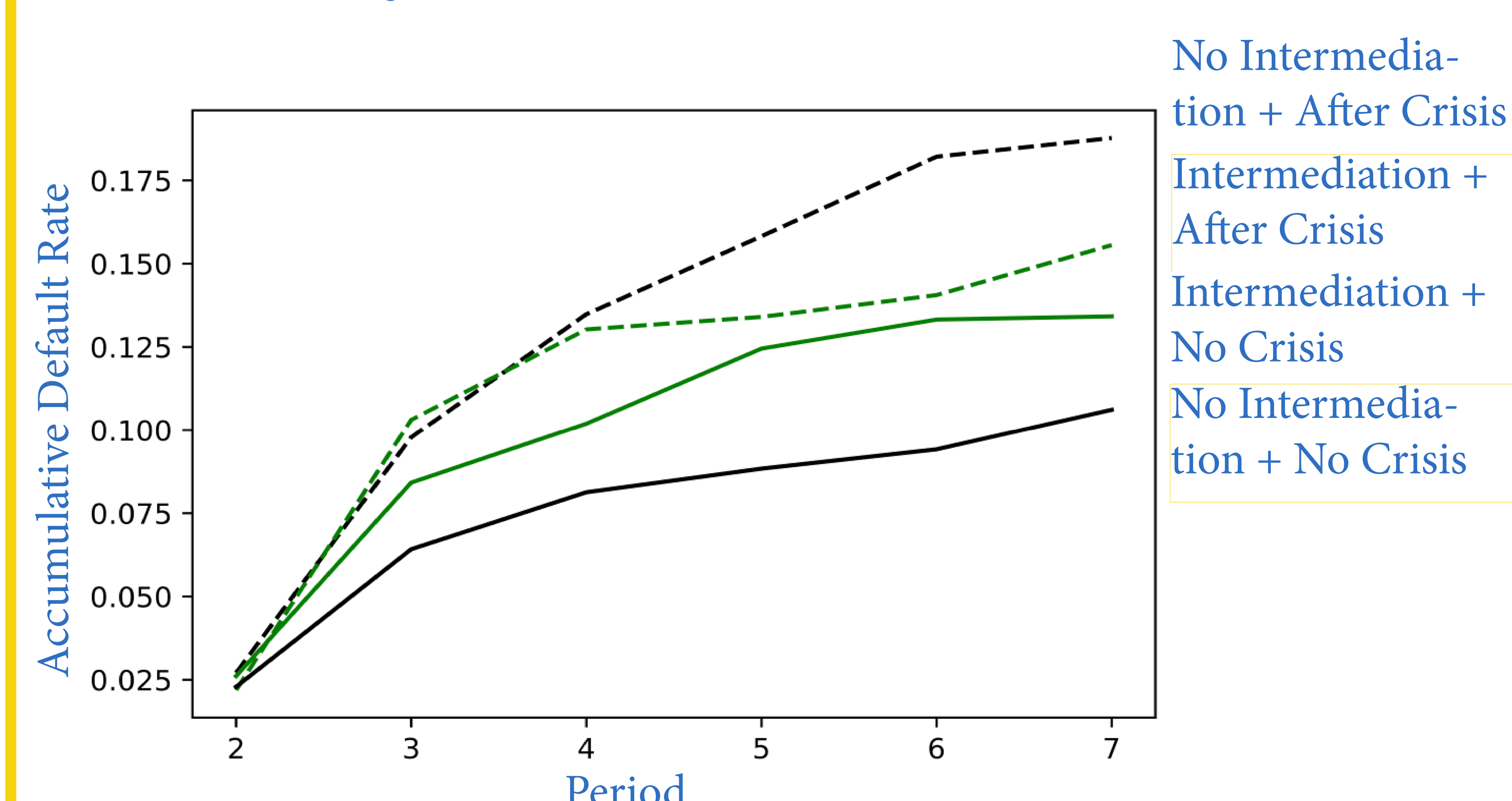


Bank B acts as a **financial intermediary** for bank A and C.

Research Questions

- How does financial intermediary change the effect of financial contagion?
- What can policy-makers do to limit the effect of financial contagion?

Preliminary Results



- Financial intermediation helps financial contagion to spread under normal operation.
- Financial intermediation magnifies the effect of financial contagion immediately after crises, but help to contain the effect of financial contagion in the long term.