Laboratory 2 : Banking Systems

April 27, 2016

Objectives

Explore the bank deposit expansion process, and experiment with debt related flows within a banking system under controlled conditions.

Tips

** Don't forget to save the simulation after you have created it, so that you can reload it. **

In running experiments, keep one bank unchanged, and use it as a control against the behaviour of the other two.

Threadneedle does not support government intervention at this time, so only stages 1 and 2 of loan write-off are supported. If you get the message, " Zombie ", then one or more banks has reached stage 3 and a government bailout is required.

In other words, you have crashed the banking system. Congratulations!

1 Create a Banking System

1. Add three banks to the Threadneedle simulation.

2. Use the "Show Banks" button to bring up the Bank balance display.

3. Using the guidelines below, configure the banks with identical numbers of borrowers, capital, deposits, and reserves.

    - The employer for each borrower should be the bank it has the deposit at.

    - Bank Capital should be added using the *Investor* agent

4. *Save the simulation.*

5. Run the simulation a few times to understand its behaviour.

Bank setup

For this simulation we will use the Borrower agent, which tries to take out a loan, and if it suceeds repays the loan initially using loan funds, and then a salary from the Bank. Borrowers effectively allow us to isolate the banking system from its economy, and concentrate just on banking mechanisms and lending flows.

However, the expansion from initial conditions does create some challenges that require experimental design, otherwise we see some rather strange effects. In particular, we don't want all the loans to start at the same time, since this distorts the monetary behaviour of the system, and we need to have adaquate cash and capital in the system to satisfy regulatory requirements.
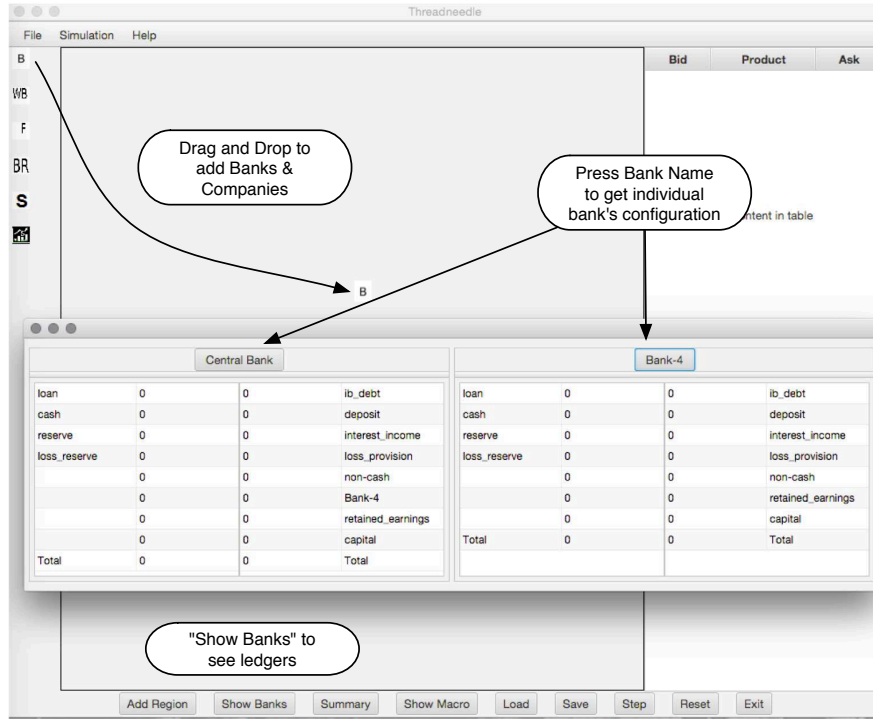
Figure 1: Create Bank and Bring up Ledger

To even out lending over time, we can specify a Loan window. The loan window setting controls when a borrower requests a loan. So if we have a 12 period loan, and we set the loan window to 12, the borrower will only request a loan every 12 steps. (The actual step this occurs on is randomised.)

Guidelines

L = Loan period in steps
D = Average loan amount
R = Central Bank Reserve requirement as a percentage.
C = Capital Reserve requirement as a percentage.

$$\text{Loan Window} = L$$
$$\text{No. of Borrowers} >= 5*L$$
$$\text{Asset Cash} >= L*D*R$$
$$>= Capital*C$$

Allocations			
Duration	12	Asset Cash	12,000
Reserve %	.1	Borrowers	60
Window	12	Deposit	100
Loan	10000	Investment	6000

2

2 Reserve vs Capital Regulation

Reload the simulation defined above, and using the central bank configuration screen, enable capital controls.

1. How does the system's behaviour change?

2. Increase the capital reserve requirement - what happens.

3. Turn on dividend payments on one of the banks - how does its behaviour change with respect to the others?

3 Interbank Flows

Reload the simulation defined above. Add a single additional borrower to each bank, as follows:

Bank 1 Add borrower with employer set to Bank 1 (control)

Bank 2 Add borrower with employer set to Bank 2

Bank 3 Add borrower with employer set to Bank 2

Run the simulation and observe what happens over time. Why?

4 Financial Instruments

Create a two bank system as above, with no interbank flows. Using the loan type, set the borrowers of one bank to take out Compound interest rate loans, and the other to take out Indexed Linked loans.

How does the behaviour of the two banks differ?