Lecture 16
Lenders of last resort

The first section in Chapter 16 carries on where we stopped in Chapter 15, since it also deals with deposit insurance most of the time. In the model considered, deposit insurance may have defects which can be overcome using another instrument, namely the *lender of last resort.* As usual, banks invest in a technology, this time it is risky, succeeding only with a probability q chosen by the investor, but such that expected repayment is constant. Otherwise the model is more or less the same as the Diamond-Dybvig model, and therefore the deposit contracts look more or less the same. Since households are risk averse and banks compete for depositors, they will choose the version with $q = 1$. Thus the choice of investment type is optimal, but of course the financial system is subject to bank runs.

When there is deposit insurance, the risk of bank runs is no longer there. But now the risk averse depositors look differently at their prospects, since losses are covered by the deposit insurance. If initially the investment satisfied $q = 1$, then a small downwards deviation in a single bank may be interesting for its depositors, since they isolated will benefit from the higher reward if the investment succeeds and will be covered by the insurance if it fails, and given that they are only one out of many banks they do not expect that the insurance premium will change. As a result the previous equilibrium with $q = 1$ is upset, and the financial sector will choose more risky investments.

Read the first part (pp.311-312) to get an understanding of the model. The problem with deposit insurance is described on p.313, it is ok to stick to the intuition as outlined above and to skip the derivation. The advantage of loans instead of insurance is straightforward and no formalism is needed.

We skip some of the material which follows and move directly to Section 16.3 presenting the Ratnovski model of a world with two banks. The time span is as usual from $t = 0$ to $t = 2$, and in between, at $t = 1$, something happens which may give rise to a problem for the bank: The investment made at $t = 1$ turns out to demand additional outlays (it could be a building project, such things always happen there). If the bank has kept reserves for this, everything is well, but of course, this liquidity was not used for investment at $t = 0$, so the bank loses some potential earnings. If it had no reserves, it goes bankrupt if the liquidity event happens. With reasonable parameter values the banks will prefer to keep the liquid reserve.

Now a lender of last resort is introduced. However, this new institution will step in with a loan only if there is a real crisis, that is if both banks need liquidity (otherwise it probably assumes that the banks should solve their problems themselves). Moreover,

it will assist only one bank. In this situation, what one bank does depends on what the other bank will do, so either both will be illiquid or both are liquid. From society's point of view, there is a welfare loss since for some parameter values both banks choose to be illiquid whereas they would have been liquid if there had been no lender of last resort.

It is fine if you read the first two pages (pp.317-318) where the model is set up and analyzed without a lender og last resort, and then skim quickly through p.319, where the formalism is less easily digested – and doesn't improve things that I have made a typo in the text, explained on my homepage.

There is some confusion in the text on p.319, as explained in the comment on the course homepage. Sorry for that.

In Section 16.4 we consider a model which explains that lenders of last resort perform an important role, not only for society (preventing losses of deposits after bank runs) but also for the banks themselves, and they would create such a lender if it wasn't there already.

In the model, banks are vulnerable to bank runs based on random signals in the market, since depositors may become afraid of not getting their money back. The signals have to do with the payoff of the bank's investments which consists of two parts, one depending on general market conditions (observable) and on the bank (not observable to the depositor). Since depositors are pessimistic, they will assume that the bank part of the payoff is low. The reason that they want their money back is that the bank may commit fraud if payoffs are low, running away with the money and not paying back deposits, and to prevent this they want their money after having got the signal. The bank can prevent this only by having sufficient liquid reserves since the loss of these reserves will then be larger than the gain from committing fraud. Unfortunately, large reserves means the earnings are foregone.

If all the banks are merged into a single one consisting of many small branches, then the large bank can counteract the pessimism of the depositors by closing down and liquidate all branches with insufficient payoff, this act signals to the depositors that the remaining branches are sufficiently strong so that none of the local bank directors will commit fraud (and the model is such that liquidating a bank is no drama, every depositor gets the money back, only the investment payoffs are of course lost, but they were small anyway). The advantage of this policy is that the reserves which must be kept to convince depositors that no fraud is committed will be much smaller now.

Creating one bank (with the power to order liquidation of any branch) is smart in this respect, but it means that banking becomes a monopoly, and one would want to avoid this. But the banks could make a voluntary agreement with respect to liquidation of banks with bad investments. The banks which are asked to liquidate can do no better than following this suggestion, since otherwise there will be a run on

them. But those banks which are not asked to liquidate but have rather small payoffs would be tempted to commit fraud if they were left to themselves, so the agreement must also pertain to division of payoffs between banks, the banks with large payoffs compensating those with smaller payoffs, thereby making it more advantageous to follow the rules than to commit fraud. As a result, the coalition can keep reserves reasonably low, if not quite as low as if they had all merged into one bank. This profit-sharing arrangement can be seen as a liquidity transfer to banks which would otherwise have been subject to a run, so that the coalition acts as a lender of last resort.

The model is quite detailed, in particular the coalition arrangement which has to take the form of voluntary participation. Our emphasis will be on the two first parts, discussing the case of many small banks and of a big bank, leaving the rest to more intuitive discussion.

If time permits, we begin the discussion of when to close down a bank. By now we have dealt with troubled banks and discussed ways to avoid that trouble ever arises. Unfortunately, trouble may arise anyway, perhaps due to mismanagement, perhaps not, and the question is what should be done when this happens.

Chapter 17 deals with these problems, and in several steps, taking into account that banks may be closed or reorganized either by themselves, that is by the shareholders, or by other institutions, basically those which we have already seen. The first line of regulation would be the owners of the bank, and Section 17.2 deals with this situation using the Dewatripont-Tirole model. Basically this is an example of academic recycling – the model deals more with manager incentives than with banking theory, but nevertheless it touches upon a crucial detail, namely the problem of *signals* and how to act on them. We assume (reasonably enough) that the day-to-day business of a bank is conducted not by its owners (shareholders) but by a manager, and if there is a sign of troubles, then it might be appropriate to sack the manager and reorganize the bank.

We read: Chapter 16, sections 1, 3 and 4. Chapter 17, sections 1 and 2.