Week 15

Bank runs, the interbank market

We begin with a few words about Operational risk, which was commented upon in last week’s handout. After that, we turn to a fundamental part of banking theory, namely bank runs and what to do to prevent them.

Having treated cases where banks perform not exactly as they were intended to do, we now enter the (long) final part of economics of banking, dealing with banks in trouble and what to do about it. We begin with a short recapitulation of Diamond-Dybvig model of liquidity insurance from chapter 1, but now our viewpoint is another one, since we are interested in what may go wrong. This leads to a more detailed discussion of the sunspot equilibria of the model, which can be seen as a theoretical explanation of bank runs: the patient consumers demand their money back at the early stage because they are afraid of not getting them in the next period, thereby causing the bank to default on its obligations.

Bank runs caused by subjective panics have occurred for centuries, and several ways of avoiding them have been proposed. We discuss a few; the one called narrow banking appears as very unreasonable, but this is partly due to the very simplicity of our model – what is behind is a separation of financial intermediaries to some which take deposits and invest basically in very liquid securities, and others which do ordinarly lending business but are funded via the market.

We proceed with a short treatment of liquidity risk, discussing a model for the determination of the optimal liquidity reserve in a bank. The model uses a classical model from operations research, determining the optimal inventory, but the result is not quite convincing, suggesting that something is missing in the model. The discussion is concluded with a short consideration of the changes in the liquidity insurance model caused by the presence of several banks with different composition of consumers.

Then we continue with the Bhattacharya-Gale model of the interbank market: Not much happens in this model, where we only show that interbank loans makes it possible to sustain the social optimum when there are several banks. However, it serves as a framework for the discussion of the interbank market freeze in Section 14.6 (the HHH-model): If we add that banks’ investments may turn out to be good or bad, and in particular if this is private information, then lenders will be more reluctant and credit more expensive, with the result that good banks turn away from the market, and in the final event, there may be no lending whatsoever.

We then return to bank runs with the Diamond-Rajan model in 14.5, which shows
how bank runs (which may happen even if banks are fundamentally sound) can spread and cause a more widespread downturn. Notice that the crucial step is that a bank closure means that entrepreneurs lose their money and then there will not be enough funds for financing the needs for liquidity of other banks, which may then default, etc..

The final section in Chapter 14 deals with repo runs. At a first sight, the model looks complicated, but it is basically another version of the Diamond-Dybvig (DD) model, where we now allow for several periods. The first part (subsections 14.7.1 and 14.7.2) sets up the model and the equilibrium, which now is a steady-state equilibrium repeating itself year after year, and then in some bank, there is a liquidity shock, caused by patient depositors who nevertheless choose not to continue their engagement. The new aspect of this model is that such a run can be accommodated to a certain extent by the bank, since liquidity is can be obtained by postponing investment, a possibility which was not there in the DD model. The remaining part of the section explores the extent to which such accommodation is possible.

If time permits, we proceed with the discussion of deposit insurance. As it was mentioned in the discussion of bank runs, one of the ways of avoiding bank panics is to have a system of deposit insurance, and we look into this in some more detail. The main problems arising are: (1) who should pay and how much, and (2) are there any side effects of deposit insurance?

We begin the treatment of (1) with the Merton approach, seeing the deposit insurance as a put option – the bank can “sell” its assets (loans) at some date T at the price $D e^{r_0 T}$ (value of deposits plus interest payment on deposits). This makes it possible to use option pricing to assess the value of the insurance, and in this way one gets a proposal for what should be paid. The idea is more important than the formula, since anyway the BS formula depends on its assumptions, in particular that the assets follow a geometric Brownian motion, which is not a good description of reality.

The general approach to (1) is the idea of a fair premium, which may be estimated as above or in some other way, but in (2) we see that this may cause some problems. The formalism is quite simple, and so is the intuition – if the losses of the bank are covered by some outside agent, then the bank may be more – and perhaps too – willing to take risk.

This is as far as we get in this week (if we get there at all), leaving the rest of the chapter to next week.

We read: Chapter 14.