Lecture 11 (revised)
Cryptocurrencies; The Industrial Economics of Banking

Unfortunately I had to cancel Thursday's lecture on very short notice. In view of this, there are some minor changes in the lecture plan, basically reducing the time used on secondary stuff. The present handout is revised accordingly.

We have some outstanding stuff from last Monday, so we begin there, dealing with the fundamental result in the payment cards model and its welfare implications. Then we proceed to the main topics of today.

Then we use a few minutes on my small note on the Eisenberg-Moe model of payments. It may seem abstract but it deals with a fundamental question – how is the position of a bank influenced by that of other banks? If one bank defaults on its payments, then other banks may not have enough so satisfy their own obligations, and we end up with a general crisis. We return to this later when dealing with systemic risk, but is convenient to treat the foundations already here.

After this we move on. We are now on our way to Chapter 11 on competition among banks and – in particular – its effects on risk taking. Before we get there, we have some other topics with which we deal briefly, namely

- islamic banks, where we discuss the principles without going in detail, and
- cryptocurrencies.

I have put a short note on the homepage describing the functioning of blockchains and in particular BitCoin. Our interest in the matter is not so much the computer science aspects (which may be fascinating enough) but rather the impact of all this for financial intermediation, something which is not clear at present, even if some tendencies are visible.

We then go to Chapter 11 dealing with interbank competition. This is a long chapter and we split it in two parts,

(i) standard industrial economics in the financial sector, dealing with competition in interest rates or in amounts of deposits and loans,

(ii) the connection between competition as discussed in (i) and risk-taking, with its implications for the stability of the financial sector.

Clearly (ii) is what interests us most, and (i) can be considered as a warming up for what happens in (ii). In the present lecture we cover most of (i), leaving a treatment of monopolistic competition the the next lecture.

The story begins – as always when discussing competition – with the textbook world of perfect competition. The latter means that *all agents (banks) take the prices (interest rates) as given* and beyond their influence, and they act accordingly. Since this is a far shot from reality, we should not go into much detail, the main point is to fix ideas and notation for what comes. This is of secondary interest to us, and it is used mainly to fix the notation. The further story about equilibrium in the market can be passed over quickly, after all perfect competition is not what we expect to see out there.

Having mastered perfect competition in this easy way, we move to the other extreme, a monopolistic bank. Again, despite its fancy name, nothing happens which was not already known from basic microeconomics, and the various ways of expressing the pricing formula (either as Lerner index or by Amoroso-Robinson) should also be wellknown from previous courses, once again we may pass it over quickly. The same goes for the story about bank levies p.220 which may safely be skipped. It is however worth looking over the final part of the section, on p.221, where the model is extended to treat oligopoly in the Cournot sense, that is where the firms choose quantities (amounts of loans and deposits) knowing the impact on interest rates. As always, the Cournot oligopoly does not look very realistic, but its results are reasonable, and we shall exploit the model (or rather a slight extension of it) later in the chapter when we discuss risk-taking.

We proceed to Section 4, dealing with monopolistic competition, and just in case, I comment upon this here:

The first part of the model is basically a restatement of the Salop model known from Industrial Organization. Depositors are evenly spread over the circle, we normalize so that total mass of deposits is 1. The circle is chosen so that every bank has a competitor to both sides.For a socially optimal number of banks should minimize the sum of transportation cost and fixed cost of keeping banks open. Turning then to the equilibrium allocation, one finds optimal deposit rates depending on the fixed cost f, and adding now a zero-profit condition (new banks spring up when there is positive profit), the equilibrium number of banks turns out to be greater than the social optimum.

The interesting part of the model starts only now. Assume that the individuals not only place deposits but also take loans from the banks. Then there will be competition for loans, and the equilibrium price is found in the same way as for deposits, so the loan rate is the funding rate plus transportation cost divided by number of competitors, but since we assume that the total amount of loans L is less than 1 (total amount of deposits), we need to normalize the transportation rate by this L to get (18).

Having the deposit and loan rates determined by monopolistic competition, one may analyze the effects on the market of different forms of market regulation. Here

we consider *deposit rate ceilings* (something which has not been much used in Europe but is wellknown in the US under the name of "Regulation Q"). To simplify things we assume that the ceiling is 0. In the model this will *not* change the loan rate, since the two types of banking business are independent, so the policy only amounts to a transfer of money from depositors to banks. This is changed if one allows tied-in contracts (loans are only given to depositors), something which any authority for monopoly control would hate and which would typically not be allowed, here the result is in accordance with the intuition behind deposit rate regulation, the loan rate does fall! (This is of course not a sensational result, in particular since deposit rate regulation has been abandoned even in the US and deposit rates are by now close to 0 anyway, but it is nice example of a case, where a small piece of well argumented economic theory can be used to show that routine policy making can work against its intentions.)

We read: Chapter 10, section 4, Chapter 11, sections 1-4.