Lecture 12:  
Competition and Risk Taking

We proceed where we stopped last time, namely with Section 4 of Chapter 11, dealing with monopolistic competition, where we consider a version of the well-known Salop model from industrial organization, now transplanted to banking. Monopolistic competition is a market structure with many small firms, with customers having some preference for this firm, but where entry is so easy that essentially no profits can be sustained, since nonzero profits would spur further entry. This market form fits pizzerias better than banks, but we shall live with this for the moment.

The first part of the model is basically a restatement of the Salop model. Depositors are evenly spread over the circle, we normalize so that total mass of deposits is 1. The reason that we put everything on a circle is that we want to have \( n \) banks attracting the closest customers (there is transportation cost), and if we use a line segment rather than a circle, then two of the banks will have neighbours only to one side whereas the other banks have competitors at both sides. This is avoided using a circle.

For the social optimum one must select the number of banks which minimizes total travel cost (with \( n \) banks spread evenly, each bank has customers to the distance \( 1/2n \) in both directions, and average cost is half this distance times \( t \), that is \( t/4n \)) and cost of keeping \( n \) banks, which is \( nf \), and the minimum is found as \( \frac{1}{2} \sqrt{\frac{t}{f}} \). To find the number of banks in the market equilibrium, one needs to find equilibrium prices, and here one first finds demand by the condition that the limiting consumer is indifferent between the two closest banks. As always in models of this type (we saw a similar one in the Rochet-Tirole model), equilibrium price is marginal cost plus the transportation cost divided by number of competitors (you don’t need to memorize the derivation of the equilibrium price, but it may be instructive to have a look at it), and using this one finds an expression for the profit, which is 0 (this is the no-entry condition of monopolistic competition) at \( \sqrt{\frac{t}{f}} \) banks. We see that the equilibrium differs from the optimal solution (also a standard property of monopolistic competition), and this calls for some intervention.

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 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 now proceed to part (ii) of the Chapter 11 (according to what was said in the previous handout), dealing with the role of competition between banks in determining the overall stability of the financial sector. Intuitively, a banking sector with many independent banks competing to catch the costumers might result in less careful consideration of the projects according to which loans are granted, so that the amount of credits which are not repaid may increase. But one might as well argue that lack of competition leads to large monopoly profits and again the less careful treatment of the loan applications. Thus, there is no simple argument for either positive or negative effects of competition.

We skip part of the section, reading only subsections 11.5.1 and 11.5.4. The Matutes-Vives model in 11.5.1 is quite simple once you get the basic idea: The model is such that current expected profits are independent of the risk level chosen by the bank, this level of risk only influences the probability of survival (so that if high risk is chosen, then the probability of default is large, but then the profits when not defaulting is correspondingly higher). Where does competition come in? Actually it comes only through the franchise value of the bank (the value of having a bank which may earn money in the future), if there is sufficiently fierce competition, then this franchise value is 0, so that banks do not care at all about risk.

To obtain that current expected profits is independent of risk, this risk must of course enter in a specific way, and indeed it does: We introduce a riskiness parameter $\sigma$, and all possible loans have a the same mean repayment $\mu$, but dispersion increases with $\sigma$. Banks cover all loans by deposits, and repayment $r_D(\sigma)$ on deposits depend
on $\sigma$, since expected repayment to depositors, including the case of default, where depositors get only the repayment on the loans of the defaulted bank, should be equal to what depositors could get elsewhere (here assumed to be 1). Given this situation, on gets that the total expected income (of bank and depositors taken together) is $\mu D$ (here $D$ is the size of the engagement), and since the depositors get the mean repayment $D$, the bank gets expected profit $\mu D - D = (\mu - 1)D$ which is independent of $\sigma$.

Taken together, we have that a state of competition which make the banks neglect their franchise values may result in a very large level of risk (although strictly speaking the banks have no special preference for risk, so it will happen only if extension of business can occur only if more and more risky loans are taken on).

The simple model becomes more blurred if it is taken into account that depositors cannot see the value of $\sigma$ chosen by the bank (which of course they cannot in the real world). This is discussed in the large couple of paragraphs of the subsection, and it is enough to know that the situation then is less clear-cut then in the simple version.

Subsection 11.5.4 treats the standard model of competition and risk, the Allen-Gale model. It is basically a model of the type that we saw when dealing with quantity-choosing oligopoly banks, extended with a couple of new features. The first of these is the risk-payoff tradeoff in choosing projects, this tradeoff takes a form which looks like a demand curve, with $s$ (average project payoff) on the horizontal axis and $p(s)$ (probability of getting the payoff $s$) on the vertical (draw such a curve!).

Expected profit is at the bottom of p.233, and it looks more or less like (12) on p.221, except for the payment $\alpha$ of an insurance premium on deposits. We shall have much more to say about deposit insurance later, take it just as add-on at this point, but it serves a purpose: Since deposits are insured, depositors do not care about the risk taken on by the bank, they get their money anyway, and in terms of our model, we get that the deposit rate depends only on the overall amount of deposits (not in the risks chosen by the banks, which would have made the model much more complicated).

On p.234 the equilibrium is analyzed using the first-order conditions in the two decision variables, demand and riskiness (and assuming that all choose the same, which is reasonable here). It is important that the number $n$ of banks enter into the equilibrium conditions, as we also know from section 11.3 that it does. It is less important to follow the computations, what comes out is fairly intuitive: When the number of banks increases, then the competition for deposits gets more fierce, and deposit rates go down. This disturbs the overall equilibrium so that banks then to counteract in a way so as to increase the income from their projects, and the result is an increase in $s$ and therefore a higher level of riskiness of the banks.

This conclusion may be considered as supporting the argument that more competition leads to higher riskiness, but it should be taken with some salt, as shown by
Boyd and de Nicoló and described from the the bottom of p.234 and onwards. You should concentrate on the description around formula (35) and down to around (37), and the basically skipping the rest of the formalism in order better to enjoy the logic: They argue – and rightly so – that banks do not select projects themselves but rather provide credits for entrepreneurs who then engage in projects, so following the setup in Allen-Gale we must add a loan market, where the demand for loans is derived from the connection between mean payoff and probability of success, so that higher loan rate forces entrepreneurs to choose projects with larger $s$ and therefore smaller $p(s)$ (this is what is shown in (35) of you doubt). Banks of course are influenced by the choices of the entrepreneurs and their expected profits will look as in the formula on the top of p.235.

Using the same intuitive reasoning as in the Allen-Gale model, we now get the opposite conclusion: When the number of banks increases, competition for deposits will lower the deposit rate as before, but since they are also competing in their loan business, the larger number of banks will result in a lower loan rate, which will transplant through the entrepreneurs to a lower level of risk, so now increased competition gives a less risky financial sector.

Who, then is right? This is perhaps not the right question to ask, both models are simplifications and may be neglecting some important features of both competition and risk-taking. The morale – if there is any – is rather that what will happen depends very much on the particular circumstances of the case (here the increase in the number of financial intermediaries). The importance of using economic theory and models is that it forces you to check thoroughly the background for your forecasts of what will happen.

**We read:** Chapter 11, sections 4, 5.1 and 5.4.