

ECON 4335 Questions for seminar 8 Spring 2014

We are looking at a closed economy. The balance sheet in table 1 shows the structure of the asset markets. Entries that are zero remain zero. The line for interbank loans is there to remind us that they are present in the background but net out in the aggregate.

The central bank's policy rate, i_p , is the rate on deposit there. The central bank can lend to the other banks in two different ways. F-loans are sold to the banks that make the highest bids at an auction. The central bank decides the amount of these loans, L_{cb} . "H-loans" the banks can get in the amount they want, but the interest rate is far above the policy rate. Hence, H-loans are normally not used. The policy rate is set for a certain time period. F-loans and T-bills mature before that period is over. The central bank decides what amount of T-bills it will buy.

The markets for bank loans and bank deposits are competitive. The interest rates banks pay on loans and deposits are i_l and i_d respectively. Until further notice you can assume that there is no default risk anywhere.

Question 1

In this question we are interested in what goes on at a point in time (a period so short that saving and investment in real capital does not have time to affect stocks significantly). You may also take Q as given.

1. What do you expect to be the relation between the interest rates on central bank deposits, T-bills, F-loans and interbank loans.
2. Suppose banks want to keep T-bills and deposits at the central bank as liquidity reserves in fixed proportion to their customer deposits :

$$D_{cb} + B_b = \phi D_h \quad 0 < \phi < 1$$

Table 1: Sectoral balance sheets in model 1

Instrument	Government	Central bank	Banks	Firms	Households	Sum
Deposits at CB		$-D_{cb}$	D_{cb}			0
F-Loans from CB		L_{cb}	$-L_{cb}$			0
Deposits at banks			$-D_h$		D_h	0
Loans from banks			L	$-L$		0
T-bills	$-B$	B_{cb}	B_b		B_h	0
Interbank loans						
Real capital					QK	QK
Sum=Net assets	W_g	W_{cb}	W_b	W_f	W_h	QK

Show how you can express the desired level of reserves as a function of the volume of outstanding loans, L , instead of deposits.

3. What is the minimum value of F-loans (L_{cb}) that the central bank needs to lend if banks are to get their desired reserves. What will happen to the different interest rates, if the central bank does not lend enough in this way? What would happen if the central bank tries to lend more than strictly needed to satisfy the banks?

Question 2

We now turn from looking at a point in time, to discussing changes from the end of one period to the end of the next.

1. Suppose that from the end of period 0 to the end of period 1 firms increase their borrowing by ΔL which is used to finance net investment in fixed capital. How does the balance sheet change from period 0 to 1? You are free to assume that all saving take place in the household sector (meaning that the government and central bank budgets are balanced and that the net incomes of banks and firms are distributed to the households).
2. Now we want to go beyond the balance sheet and look at the determination of investment and saving. Suppose for simplicity the following model consisting of a consumption function, an investment function, a national accounting equation and a relation stating the value of existing capital depends on the interest rate:

$$C = \bar{C} + (1 - s(i_d))Y \quad 0 < s(i_d) < 1, s' > 0 \quad (1)$$

$$I = I(i_l) \quad I' < 0 \quad (2)$$

$$Y = C + I \quad (3)$$

$$Q = Q(i_l) \quad Q' < 0 \quad (4)$$

Suppose that at the start of period 1 the policy interest rate is increased. Discuss briefly the effect this will have on investment, saving and output in the period.

3. How will the increase in the interest rate affect the balance sheet at the end of period 1?
4. Suppose that the banks have learned that entrepreneurs are usually too optimistic about their projects. The banks therefore decide to reject all projects that have an estimated return which is not at least Δi above the lending rate. What effect will this have?

Question 3

We now open up for possible defaults in the existing loan portfolio of banks while we go back to looking at the financial side of the economy in isolation.

Suppose a certain fraction of the outstanding loans will not be repaid. The banks have added a premium to i_l that covers the expected losses. However,

individual banks can be hit unevenly, and in rare cases a bank will default. Which bank and when is unpredictable. Depositors therefore become sensitive to the interest rate difference between T-bills and loans. Suppose they are also risk-averse. Then their demand for deposits and T-bills will be something like

$$D = g(i_d - i_b - x)W_h, \quad , B_h = (1 - g(i_d - i_b - x))W_h$$

where x is expected loss from bank default and $g' > 0$, $g(-x) = 0$. Suppose the volume of loans is given (loans are long term).

1. Show that equilibrium in the markets for deposits and t-bills requires that

$$D_h = g(i_d - i_b - x)W_h = \frac{1}{1 - \phi}(L - L_{cb} - W_b)$$

This equation obviously determines the interest rate differential between deposits and t-bills and makes it positive. Is it the t-bill rate or the deposit rate or both that will have to change if there is a shift in the demand for deposits?

2. Default risk makes the interbank market work less smoothly. Suppose banks react by raising ϕ . What is the effect of this on the interest rate margin? What will the interest rate cost of the bank be if it extends a new loan?