Seminar 8

Question 1.

1) Expected relation between the interest rates on central bank deposits, T-bills, F-loans and interbank loans.

T-bills vs. central bank deposits:
The interest rate given from the central bank and from T-bills must be equal or else the banks would substitute towards the best alternative: the one with the highest interest rate. Because the bank knows the interest rate on the T-bills, there may be a hedge opportunity since the bank knows the interests rate at maturity. As a result the policy rate is set for a certain period, and the hedge advantage of investing in the T-bills disappears.

Central bank vs. the interbank market:
The interest rate at the central bank is slightly less than the interbank interest rate. If the interest rate at the central bank were above, no bank would lend in the interbank market. When the interbank market has a higher interest rate than

the central bank, the bank will prefer the interbank market. Therefore in this case it has to be equal.

2.) Banks want to keep T-bills and deposits at the central bank as liquidity reserves in fixed proportion to their customer deposits:

(1) $D_{cb} + B_b = \phi D_h \qquad 0 < \phi < 1$

From the balance sheet we have:

(2) $D_{cb} - L_{cb} - D_h + L + B_b = W_b$

which gives:

$\phi D_h - L_{cb} - D_h + L = W_b$

(3) $D_h = [L - W_b - L_{cb}] \frac{1}{1-\phi}$

Insert (3) in (1):

$$D_{cb} + B_b = \frac{\phi}{1-\phi} [L - W_b - L_{cb}]$$

3.) Minimum value of F-loans (L_{cb}) needed:

We assume the bank is able to buy all the bonds.

From the balance sheet:

$-W_g = B$ (do not include)

$$L_{cb} = \left(\frac{1-\phi}{\phi}\right)\left[D_{cb} + B_b - \overbrace{B_h}^{0} - B_{cb}\right] + L - W_b$$

$$L_{cb} = \frac{1-\phi}{\phi}\left(D_{cb} + B_b\right) + L - W_b$$

If the central bank does not lend enough in this way, the banks will be forced to borrow the H-loans. 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, but here the banks have no choise. The interest rate on the F-loan will increase because of high demand.

Question 2

1) Borrowing is increased by ΔL:

The flow of funds is given by
$S_p + \Delta L = Q\Delta K + \Delta D + \Delta B_h$

The change in L will increase real capital (QK) which will result in a real return for the firms. Since the firms and the banks earnings are distrabuted to the households their wealth (W_h) will increase.
From the balance sheet we can see that
$W_h = D_h + B_h \rightarrow \Delta W_h = \Delta D_h + \Delta B_h$

2) (1) $C = \bar{C} + (1 - s(i_d))\, Y$ $\quad 0 < s(i_d) < 1 \quad s' > 0$
(2) $I = I(i_l)$ $\quad I' < 0$
(3) $Y = C + I$
(4) $Q = Q(i_l)$ $\quad Q' < 0$

Solving the system for Y:
$Y = \bar{C} + (1 - s(i_d))\, Y + I(i_l)$
$Y = (\bar{C} + I(i_l))/s(i_d)$

If the interest rate is increased, investments will be reduced (due to higher i_l , $I'(i_l) < 0$), which will reduce Y.
Households are more eager to save since $s'(i_d) > 0$, which reduces consumption and will therefore reduce Y.

I⇓ and C⇓ leads to Y⇓, which makes sY⇓ holding s constant.
Since investement ⇓, sY⇓ as well, since we are in a closed economy.

3) Increase in interest rate affect the balance sheet at the end of period 1:

4) If banks increase i_l without changing i_d we will get a slightly different result:
$Y = (\bar{C} + I(i_l))/s(i_d)$

Since $s(i_d)$ doesn't change we will have a larger impact on Y, decreasing it even more. Investment will also go ⇓ even more.

Question 3.

1.) We have: (from question 1)

$$D_h = [L - W_b - L_{cb}] \frac{1}{1-\phi}$$

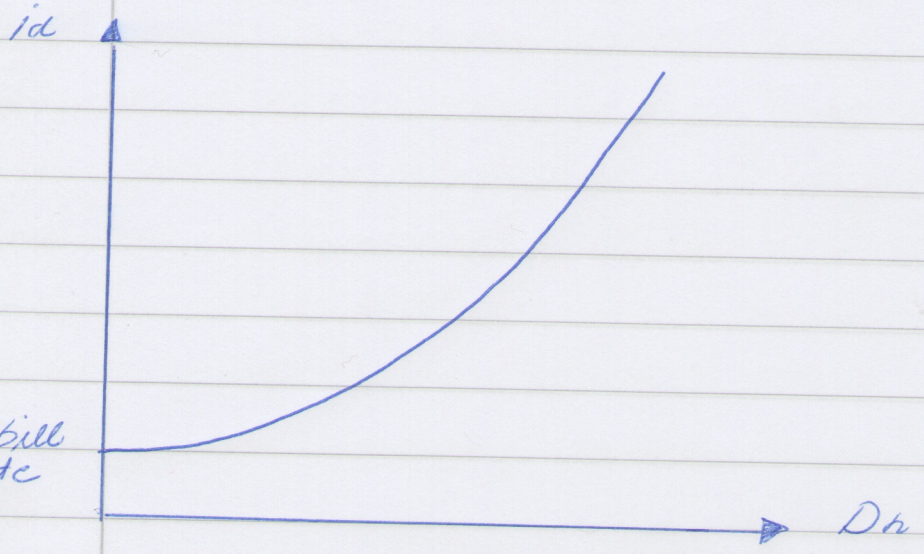
Demand function:

$$D = g(i_d - i_b - x) W_h$$

We get:

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

The relationship between the interest rate on deposits, i_d, and the demand for deposits from the household sector is shown in the graph:



By assumption, the households are risk-averse and their required margin increase in i_d will be higher for higher values of D_h (from the graph) due to the default risk of banks which they want to hedge against.

2.) If the banks choose to raise θ, this means that they will demand more liquidity reserves. This will result in less risk of a bank-run, which will push the required interest rate on deposits down. At the same time the banks may want to reduce their lending / raising liquidity reserves by selling lending rates higher. This leads to higher interest rate margins.