

Problem set 7 (October 29, 2016)

Question 1 - Demand for liquidity

Suppose Bank A has liquid assets for 50 (bn NOK). In a given day (period 0) Bank A keeps an amount $D_{cb} \geq 0$ in reserves at the Central Bank (CB) and lends overnight the rest $(50 - D_{cb})$ to other banks at the interbank rate r (if $D_{cb} > 50$, then Bank A borrows the amount $D_{cb} - 50$ overnight from other banks). At the end of the day (period 1), Bank A's deposits at the CB decrease by x as a result of transactions with other financial institutions. In period 0, Bank A only knows that x is a random variable distributed uniformly on the interval $[-30, 30]$ (a negative x means that Bank A during the day receives more than it is required to give to other banks). If at the end of the day $x < D_{cb}$, Bank A has an overnight deposit at the CB of size $D_{cb} - x$, on which it receives an interest r_D from the CB. If, on the contrary, at the end of the day $x > D_{cb}$, Bank A must loan overnight $x - D_{cb}$ from the CB; on this loan, Bank A pays an interest r_L to the CB, where $r_L > r_D$.

- (1) Suppose $r > r_L$. What is the optimal D_{cb} ? Do you see any "problem" with $r > r_L$?
- (2) Suppose $r < r_D$. What is the optimal D_{cb} ? Do you see any "problem" with $r < r_D$?

Suppose $r \in (r_D, r_L)$.

- (3) Define Bank A's expected profits if $D_{cb} > 30$.
- (4) Show that it cannot be optimal for Bank A to choose $D_{cb} > 30$.
- (5) Define Bank A's expected profits if $D_{cb} \in [0, 30]$.
- (6) Show that the optimal D_{cb} is a weakly decreasing function of r . What is instead the effect of r_D and r_L on the optimal D_{cb} ?

Question 2

Banks seem to get more attention from governments than most other industries. What makes banks special?