LIQUIDITY MANAGEMENT

Liquidity management is recognized as one of the fundamental problems in banking in practice. These lecture notes explain how monetary policy is implemented by central banks through the liquidity management of banks.

To clarify the ideas, consider the balance sheet of a bank depicted in the left panel of Figure 1. A bank in the real world holds central bank reserves and loans as part of their assets and demand deposits and equity as liabilities. When a bank provides a loan to a potential borrower, that bank is effectively granting credit in the form of checks, electronic checks or electronic credit lines. Credit is a fantastic innovation of modern economies. Credit enables borrowers to perform transactions with minimal transaction costs. When a bank grants credit, this allows commodities to flow with ease because trading parties don’t have to worry about each other’s creditworthiness. As long as a party is confident that his bank will accept the funds transferred by the borrower, the transaction takes place. This aspect of credit creation is essential for the fluent operation of the economy. However, when a bank provides a loan against a credit line, the credit line is also a liability for the bank and a potential source of risk. After the borrower executes a payment, whoever receives payments from that credit line holds the liabilities of the lender bank. In turn, the holder can make further payments, and so on, so the lending bank’s credit flows from one hand to another. The bank does not really care who holds the liability. What matters for the bank is that when it provides a loan, it is simultaneously creating a liability that may be potentially transferred. Of course, for every one dollar that a bank provides as credit it earns an interest on that loan which seems as a great deal for the bank. Banks take on a liability by issuing their own liabilities—credit lines— but charge an interest rate for that operation. This deal increases the bank’s equity simply by issuing a liability at a lower interest rate than what it will earn from the loan.

The right panel of Figure 1 shows the balance sheet of a bank after a loan is made. The accounts in the figure show how loan creation is profitable. This balance sheet shows that when a loan is created, a liability is created by the bank, but the bank increases its equity because it earns an interest rate. The increment in assets is more than one for one the increment in liabilities.

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1 In practice, banks can also raise deposits from other banks but they can’t do this for the whole system.
Liquidity Risk: A critical feature that makes banking special is that deposits can be withdrawn from banks immediately. Often, large withdrawals occur before loans mature. An important detail is that when a large withdrawal occurs, deposits are transferred from one bank to another. The bank that receives those deposits is literally taking over the liabilities issued originally by another bank. Thus, by allowing this, banks are unique institutions. They are the only institutions whose liabilities may suddenly become the liabilities of other institutions. This is a great system because it allows credit to flow with ease. This allows borrowers to execute transactions without worrying about where the money came from, or what bank granted the initial credit line. The depositor only worries about the shape of his own bank -- or whether he is FDIC insured. This allows deposits to be a medium of exchange. Nobody needs to bother gathering information about creditworthiness. This is the reason why deposits are part of the monetary aggregates.

However, since banks take on the liabilities of other banks when deposits are transferred to them, they also request assets from the other bank to settle the transaction. The first bank could, in
theory, transfer loans or issue loans against other banks but usually this takes some time. For the most part, banks rely on reserves issued by the Central Bank to settle transactions among them. This settlements system is called the payments system and has an old historical tradition in the United States which predates the existence of the Federal Reserve.

Banks do not necessarily hold reserves to settle withdrawals under all possible contingencies. On the contrary, they are frequently short of reserves. When reserves are insufficient to settle transactions across banks, banks borrow reserves from other banks or from the Central Bank (the Fed in the case of the US). The fact that a bank may be short of reserves and must incur in costly borrowing constitutes a potential illiquidity risk. Figure 2 describes this possibility. Suppose there is a withdrawal that exceeds the level of currency reserves at the bank. Banks must rely on costly overnight borrowing to compensate this withdrawal. These costs induce a reduction in bank equity, and an overall shrinkage of the bank’s balance sheet.

Compare equity before the loan expansion in the left panel of Figure 3 with the equity in the right panel of Figure 3. The equity on the right is smaller. This shortfall in equity results from the losses that occur if the bank suffers a large withdrawal after the bank expanded its loans. If withdrawals scale with the size of the bank’s deposits, the higher the amount of lending, the higher the deposits and the higher the liquidity risk. To see this, notice that the bank’s ratio of reserves to deposits falls with the amount of lending (see Figure 1 once again). With fewer reserves, the bank is forced to use more borrowing to finance the shortage of liquidity and this may be very expensive.

Liquidity risk affects the bank’s decisions to lend because it exposes the bank to more risk. Banks can foresee the possibility of liquidity risk and thus take into account how lending reduces their liquidity ratio and how this increases the risk of incurring additional costs. If the cost of running short of reserves is low, they will lend more. If the cost is high, they will lend less. This trade-off should be clear by comparing the size of equity in the left and right of Figure 3.

Naturally, if banks become more cautious for any reason, this has effects on the supply of credit. Credit bears real effects because it may induce effects in economic activity by decreasing the availability of mediums of exchange in the economy. Most of the time, monetary policy has the power to affect this trade off. The next section of these notes explains how.

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2 The issuer bank may be a specialist on a particular sector, there may be private information or moral-hazard concerns. Transferring loans may be costly due to transaction costs or the bank may fear losing the client. Another possibility is securitization, but often this requires complicated structuring to align the incentives of the seller bank.
Figure 2: Balance Sheet Liquidity Shock

Withdrawal in excess of existing

Figure 3: Liquidity Loss
Policy Instruments

In practice, there is a plethora of monetary policy instruments that central banks use to alter the liquidity management trade-off described above. However, most central banks rely only on three: conventional open-market operations, discount window lending, and reserve requirements. These three monetary policy tools affect the liquidity management trade-off in different ways, but they all carry the same effect.

Open market operations are purchases of loans by the Fed funded by reserves. In practice, these purchases are transactions on Treasury Bonds (T-Bills) which can be seen as liquid loans. In our framework, the exchange of liquid assets for illiquid assets will cause a reduction in the liquidity risk faced by those institutions participating in the bond sale. Since at least part of the banking system will have more reserves, some institutions will be inclined to do more lending after an open market operation.

The discount window operates differently. The discount window is the rate at which central banks lend reserves to banks on an overnight basis. This, in turn, through competition forces, affects the rate at which banks lend to one another in the interbank market. Thus, lowering this rate affects the financial losses incurred after a withdrawal because banks that lack the reserves will be able to borrow at a lower rate. A reduction in the discount window thus stimulates lending because banks are more inclined to lend more if by doing so they risk lower financial losses.

Finally, reserve requirements operate by determining the minimum level of reserves after which banks have to start borrowing reserves.

Current Policy Issues

The conduct of monetary policy around the world is changing. The past five years have witnessed banking systems bearing unprecedented losses together with frozen interbank markets. Banks cut back on their lending as these events threatened their survival. In an attempt to preserve financial stability and reinvigorate lending, the central banks of the US and Europe have reduced policy rates to almost zero, and continuously purchased private loans issued from banks. In reaction to these unprecedented policy interventions, banks seem to have mostly accumulated central bank reserves without renewing lending as intended by policy. Why and what can central banks do about this remains an open question.

Not surprisingly, the role of banks in the transmission of monetary policy has been at the centerpiece of policy debates. Unfortunately, these are issues that are circumvented in most macroeconomics classes. Although skipping these details seemed reasonable prior to the Great Recession, studying these details is very important to understand current policy debates.
A very important question for current and future policy is why haven’t the monetary stimuli of the last several years not translated into more lending. Four common hypotheses have been postulated as reasons that explain why banks have not been providing credit as desired. This hypothesis were brought up in class by several students.

- **Hypothesis 1 - Bank Equity Losses:** Banks are not lending in response to their increased leverage which followed from their large equity losses in 2008. This hypothesis has been informally promulgated by Columbia University economist and Nobel Laureate, Joseph Stiglitz.

- **Hypothesis 2 - Interbank Uncertainty:** Banks are holding on to more reserves relative to their lending because substantial uncertainty remains about potential costs of accessing the interbank market. This hypothesis has been informally promulgated by renowned macroeconomist Robert Lucas Jr, Professor of Economics at the University of Chicago.

- **Hypothesis 3 - Capital Requirements:** The effectiveness of monetary policy is limited by the new international financial regulation that banks are facing. Under this hypothesis, financial regulators are forcing banks to hold more reserves and lend less relative to their capital holdings.

- **Hypothesis 4 - Weak Demand:** A final hypothesis is that banks are facing weaker demand for loans. The lack of creditworthy borrowers or the low number of investment projects is causing this weak credit demand.