CHM 1220, By WONG Wing Keung, Professor of Economics 32-1

Chapter 32
Money Creation

CHAPTER OVERVIEW

• The central topic of this chapter is the creation of checkable (demand) deposit money by commercial banks.

• First, a number of routine but significant introductory transactions are covered, followed by an assessment of the lending ability of a single commercial bank.

• Second, the lending ability and the money multiplier of the commercial banking system are traced through the balance statements of individual banks and through the summary Table 32.2.
OBJECTIVES

- Recount the story of how fractional reserves began with goldsmiths.
- Explain the effects of a currency deposit in a checking account on the composition and size of the money supply.
- Compute a bank’s required and excess reserves when you are given its balance sheet figures.
- Explain why a commercial bank is required to maintain a reserve and why it isn’t sufficient to cover deposits.
- Describe what happens to the money supply when a commercial bank makes a loan or buys securities.
- Describe what happens to the money supply when a loan is repaid or a bank sells its securities.
- Explain what happens to a commercial bank’s reserves and checkable deposits after it has made a loan.
- Describe how a check drawn on one commercial bank and deposited in another will affect the reserves and excess reserves in each bank after the check clears.
- Describe what would happen to a single bank’s reserves if it made loans that exceeded its excess reserves.
- Explain how it is possible for the banking system to create an amount of money that is a multiple of its excess reserves when no single bank ever creates money greater than its excess reserves.
- Compute the size of the monetary multiplier and the money creating potential of the banking system when provided with appropriate data.
- Explain that the money multiplier process can also lead to multiple destruction of money.
- Define and identify the terms and concepts at the end of the chapter.
Introduction

• Learning objectives
  – Why the U.S. banking system is called a “fractional reserve” system.
  – The distinction between a bank’s actual reserves and its required reserves.
  – How a bank can create money through granting loans.
  – About the multiple expansion of loans and money by the entire banking system.
  – What the monetary multiplier is and how to calculate it.

• Although we are fascinated by large sums of currency, people use checkable deposits for most transactions.
  – Most transaction accounts are “created” as a result of loans from banks or thrifts.
  – This chapter demonstrates the money creating abilities of a single bank or thrift and then looks at that of the system as a whole.
  – The term depository institution refers to banks and thrift institutions, but in this chapter the term bank will be often used generically to apply to all depository institutions.
The Fractional Reserve System

- Banks in the U.S. and most other countries are only required to keep a percentage (fraction) of checkable deposits in cash or with the central bank.

- **The Goldsmiths**
  - In the 16th century goldsmiths had safes for gold and precious metals, which they often kept for consumers and merchants. They issued receipts for these deposits.
  - Receipts came to be used as money in place of gold because of their convenience, and goldsmiths became aware that much of the stored gold was never redeemed.
  - Goldsmiths realized they could “loan” gold by issuing receipts to borrowers, who agreed to pay back gold plus interest.
  - Such loans began “fractional reserve banking,” because the actual gold in the vaults became only a fraction of the receipts held by borrowers and owners of gold.

- **Significance of fractional reserve banking:**
  - Banks can create money by lending more than the original reserves on hand.
    * Note: Today gold is not used as reserves.
  - Lending policies must be prudent to prevent bank “panics” or “runs” by depositors worried about their funds. Also, the U.S. deposit insurance system prevents panics.
A Single Commercial Bank

- **A balance sheet** states the assets and claims of a bank at some point in time.
  - the bank’s **balance sheet** — a statement of **the assets** and **the claims (liabilities)** and **capital (net worth)** of a firm, individual, or institution at some time.

- All balance sheets must balance, that is, the value of assets must equal value of claims.
  - **The bank owners’ claim** is called net worth.
    - * **net worth** (also called **equity capital**), is the difference between a firm’s assets and its liabilities.
    - * If a firm has a high net worth, then even if it defaults payments, the lender can take title to the firm’s net worth, sell it off, and use the proceeds to recoup some of the losses from the loan.
    - * “Only those who don’t need money can borrow it.”
  - **Nonowners’ claims are called liabilities.**
    - * A bank acquires funds by issuing (selling) liabilities, such as deposits, which are the sources of funds the bank uses.
    - * **Checkable Deposits** – Bank accounts that allow the owner of the account to write checks to third parties, including non-interest-bearing checking account (demand deposits),
interest-bearing checking account, and money market deposit accounts.

* **Nontransaction Deposits** – the primary source of bank funds. Owners cannot write checks on non-transaction deposits, but interest rates paid on these deposits are usually higher than those on checkable deposits.

* **Borrowings**
  
  · Banks also obtain funds by borrowing from the Federal Reserve (Fed) System, the Federal Home Loan banks, other banks, and other corporations.
  
  · Borrowings from the Fed are called **discount loans**.
  
  · Banks also borrow reserves overnight in the fed funds market from other U.S. banks.
  
  · Banks borrow funds overnight to have enough deposits at the Federal Reserve to meet the amount required by the Fed.
  
  · Borrowings have become a more important source of bank funds over time – 2% in 1960 but 26% in 2006.

- A balance sheet is balanced because

\[
\text{Total Assets} = \text{Total liabilities} + \text{capital}
\]

or

\[
\text{Total Assets} = \text{Total liabilities} + \text{net worth}
\]
– A bank’s balance sheet shows a list of its sources of bank funds (liabilities) and uses to which the funds are put (assets).

– Banks obtain funds by borrowing and by issuing other liabilities such as deposits.

– They use the funds to acquire assets such as securities and loans.

– Banks make profits by charging an interest rate on their asset holdings of securities and loans that is higher than the interest and other expenses on their liabilities.

– A bank uses the funds that it has acquired by issuing liabilities to purchase income-earning assets to generate profits for bank.
How Banks Create Money

• **Transaction #1: Formation of a commercial bank:**
  
  – Suppose you decide to provide banking service in Wahoo.
  
  – You have secured a state or national charter for your bank.
  
  – Now, you sell $250,000 worth of stock (equity shares) to buyers (including you and your friends).
    * see Balance Sheet (T-account) 1
  
  – As a result, the bank now has $250,000 in cash and $250,000 worth of stock shares outstanding.
    * The cash is an asset to the bank. It sometimes called vault cash.
    * The shares of stock outstanding constitute an equal amount of claims that the owners have against the bank’s assets.
    * The shares of stock constitute the net worth of the bank.

• **Transaction #2: Acquiring property and equipment**

  – To run a bank, you first acquire property and equipment
  
  – Suppose you purchase a building for $220,000 and pay $20,000 for office equipment, total $240,000
    * see Balance Sheet 2
  
  – As a result, the bank now has $10,000 in cash and $240,000 of new property assets.
• **Transaction #3: Conduct Commercial Bank Function: Accepting Deposits**

  – Commercial banks have 2 basic functions:
    * Accepting deposits
    * Making loans
  
  – Suppose Fred decides to deposit $100,000 in his checkable deposits account in your bank
    * see Balance Sheet 3
  
  – As a result, the bank now has $350,000 assets and $350,000 liabilities.
    * Bank receives cash, which is an asset to the bank.
  
  – There has been no change in the economy’s total supply of money in this stage.
    * Bank money, or checkable deposits, has increased by $100,000
    * Currency held by the public has decreased by $100,000.
  
  – Note that currency held by a bank is not part of the economy’s money supply.
  
  – Similarly, a withdrawal of cash will reduce the bank’s checkable-deposit liabilities and its holding of cash by the amount of the withdrawal.
    * This, too, changes the composition, but not the total supply, of money in the economy.
• **Transaction #4 : Depositing Reserves in a Federal Reserve Bank**

  – **Reserves**

    * All banks hold some of the funds they acquire as deposits in an account at the Fed.
    
    * Currency (called **vault cash**) is physically held by banks.
      
      - Banks can keep reserves at Fed or in cash in vaults (“vault cash”).
      
      - Banks keep cash on hand to meet depositors’ needs.
    
    * **required reserves** are held because of **reserve requirements**, the regulation that for every dollar of checkable deposits at a bank, a certain fraction (**required reserve ratio**) must be kept as reserves.
    
    * Banks hold additional reserves, called **excess reserves**, because they are the most liquid of all bank assets and can be used by a bank to meet its obligations when funds are withdrawn.

  – Bank must keep reserve deposits in its district Federal Reserve Bank

    * see Table 32.1 for requirements

  – Assume the bank deposits all cash on reserve at the Fed

    * see Balance Sheet 4
– We suppose the required reserve ratio is 20%.

– For the $100,000 checkable deposits, the required reserve is

$$100,000 \times 20\% = 20,000$$

– Since the actual reserves are $110,000, the excess Reserves become

$$110,000 - 20,000 = 90,000$$

– **Control:**

  * Required reserves do not exist to protect against “runs,” because banks must keep their required reserves.
  * Required reserves are to give the Federal Reserve control over the amount of lending or deposits that banks can create.
  * In other words, required reserves help the Fed control credit and money creation. Banks cannot loan beyond their excess reserves.

– **Asset and liability:**

  * Reserves are an asset to banks but a liability to the Federal Reserve Bank system, since now they are deposit claims by banks at the Fed.
• **Transaction #5 : Clearing a check**

  – Assume Fred buys farm equipment in Surprise, Nebraska and draws a $50,000 check against Wahoo Bank.

  – The Surprise company deposits the check in Surprise Bank, which gains reserves at the Fed, and Wahoo Bank loses $50,000 reserves at Fed; Fred’s account goes down, and Surprise implement company’s account increases in Surprise Bank, then

<table>
<thead>
<tr>
<th></th>
<th>Surprise Bank</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash item in process</td>
<td>+$50,000</td>
<td>Checkable deposits</td>
</tr>
<tr>
<td>Of collection</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

  – Surprise Bank deposits the check in its account at the Fed, and the Fed collects the funds from the Second National Bank and yields:

<table>
<thead>
<tr>
<th></th>
<th>Surprise Bank</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves</td>
<td>+$50,000</td>
<td>Checkable deposits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Wahoo Bank</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves</td>
<td>−$50,000</td>
<td>Checkable deposits</td>
</tr>
</tbody>
</table>

  – The results of this transaction are shown in Balance Sheet 5.

  – With a 20% reserve requirement, the bank’s excess reserves now stand at $50,000
Money-creating transactions of a commercial bank

• Money-creating transactions of a commercial bank are shown in the next two transactions,
  – How a bank can literally create money by making loans, and
  – How banks create money by purchasing government bonds from the public.

• Transaction #6a : Granting a loan
  – Wahoo Bank grants a loan of $50,000 to Gristly in Wahoo
  – Money ($50,000) has been created in the form of new demand deposit worth $50,000.
    * Gristly write a IOU note to the Wahoo bank.
    * The Wahoo bank has acquired an interest-earning asset (under “Loans”) and has created checkable deposits (a liability) to “pay” for this asset.
    * Gristly has swapped an IOU note for the right to draw an additional $50,000 worth of checks against its checkable deposit in the Wahoo bank.
    * The loan is completed, the Wahoo bank’s position is shown in Balance Sheet 6a
  – When a bank makes loan, it creates money.
    * Gristly gave the bank IOU but walked out with checkable deposit which is money.
• **Transaction #6b : Using the loan**

- Gristly Meat Packing writes a check for $50,000 to Quickbuck Construction
  * Quickbuck deposits a cheque of $50,000 in the Fourth National Bank of Omaha.
  * The check is collected in the manner described in transaction 5.
- As a result, the Wahoo bank loses both reserves and deposits equal to the amount of the check.
  * see Balance Sheet 6b
- After the check is clear, the Wahoo bank reached its lending limit:
  \[
  \frac{\$10,000}{\$50,000} = 20\%
  \]
  * It has no more excess reserves
  * Legally, a bank can lend only to the extent of its excess reserves.
  * A single commercial bank in a multibank banking system can lend only an amount equal to its initial pre-lend excess reserves.
  * So, to be safe, it limits its lending to the amount of its excess reserves.
- When loans are paid off, the process works in reverse.
  * Money destroyed and checkable deposits decline by the amount of the loan repayment.
• **Transaction #7** : Bank buys government securities from dealer

- When banks or the Federal Reserve buy government securities from the public, they create money in much the same way as a loan does
  * see Balance Sheet 7
- Instead of making a loan, Wahoo bank buys $50,000 of bonds from a securities dealer.
  * The dealer’s checkable deposits rise by $50,000.
  * This increases the money supply in same way as the bank making the loan to Gristly.
- When the securities dealer draws and clears a check for $50,000,
  * The bank loses both reserves and deposits in that amount and then just meets the legal reserve requirement.
- Likewise, when banks or the Federal Reserve sell government securities to the public,
  * they decrease supply of money like a loan repayment does.
Profits, liquidity, and the federal funds market

• The asset items on a bank’s balance sheet reflect the banker’s pursuit of 2 conflicting goals:

1. Profits:
   – Banks are in business to make a profit like other firms. They earn profits primarily from interest on loans and securities they hold.

2. Liquidity:
   – Banks must seek safety by having liquidity to meet cash needs of depositors and to meet check clearing transactions.

• In interesting way in which banks can partly reconcile the goals of profit and liquidity is to lend temporary excess reserves held at the Fed to other commercial banks.

   – Federal funds rate: Banks can borrow from one another to meet cash needs in the federal funds market, where banks borrow from each other’s available reserves on an overnight basis. The rate paid is called the federal funds rate.
The Banking System: Multiple Deposit Expansion (all banks combined)

• The entire banking system can create an amount of money which is a multiple of the system’s excess reserves, even though each bank in the system can only lend dollar for dollar with its excess reserves.

• Three simplifying assumptions:
  – Required reserve ratio assumed to be 20 percent. (The actual reserve ratio averages 10 percent of checkable deposits.)
  – Initially banks have no excess reserves; they are “loaned up.”
  – When banks have excess reserves, they loan it all to one borrower, who writes check for entire amount to give to someone else, who deposits it at another bank. The check clears against original lender.
System’s lending potential

- Suppose a junkyard owner finds a $100 bill and deposits it in Bank A.

<table>
<thead>
<tr>
<th>Assets</th>
<th>Bank A</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves</td>
<td>+$100</td>
<td>Checkable deposits +$100</td>
</tr>
</tbody>
</table>

- If the required reserves ratio is 20%, the bank will keep $20 in required reserves and leave it $80 of excess reserves.
  - the bank does not want to hold on the excess reserves and decides to make loans for the entire amount:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Bank A</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves</td>
<td>+$210</td>
<td>Checkable deposits +$100</td>
</tr>
<tr>
<td>Loans</td>
<td>+$80</td>
<td></td>
</tr>
</tbody>
</table>

- If the money spent by the borrower to whom bank A lent the $80 is deposited in another bank, say Bank B:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Bank B</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves</td>
<td>+$80</td>
<td>Checkable deposits +$80</td>
</tr>
</tbody>
</table>

- Up to now, the checkable deposits in the banking system have increased a total of $180 ($100 in Bank A and $80 in Bank B)
the bank does not want to hold on the excess reserves and decides to make loans. If the required reserves ratio is 20%, the bank will keep $16 in required reserves and make loans of the entire amount of excess reserve $64:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves +$16</td>
<td>Checkable deposits +$80</td>
</tr>
<tr>
<td>Loans +$64</td>
<td></td>
</tr>
</tbody>
</table>

• The $64 spent by the borrower from Bank B will be deposited in another bank, say Bank C, and the total increase of checkable deposits in the banking system so far is $244 ($100 in Bank A, $80 in Bank B and $64 in Bank C).

• The possible further transactions are summarized in Table 13.2.

Monetary multiplier is illustrated in Table 32.2.

– Formula for monetary or checkable deposit multiplier is:

\[ \text{Monetary multiplier} = \frac{1}{\text{required reserve ratio}} \]

or

\[ m = \frac{1}{R} \]

or 1/.20 in our example.

– Maximum deposit creation \( (D) = \)

\[ \text{excess reserves} \times \text{monetary multiplier} \]
* In our example,

\[ m = \frac{1}{.2} = 5 \quad \text{and} \quad D = 80 \times 5 = 400 \]

– Figure 32.1 illustrates this process.

– Higher reserve ratios generate lower money multipliers.

* Changing the money multiplier changes the money creation potential.

* Changing the reserve ratio changes the money multiplier but be careful! It also changes the amount of excess reserves that are acted on by the multiplier. Cutting the reserve ratio in half will more than double the deposit creation potential of the system.

• The process is reversible. Loan repayment destroys money, and the money multiplier increases that destruction.
Reversibility: The Multiple Destruction of Money

- Just as banks can create money through loans, money is destroyed when loans are paid off.

- Loan repayment sets off a process of multiple destruction of money akin to the multiple creation process.

- If the dollar amount of loans made in some period exceeds (is less than) the dollar amount of loans paid off, checkable deposits will expand (contract) and the money supply will increase (decline).
The Great Depression Bank Panics, 1930 - 1933.

- Bank panics in 1930-33 led to a multiple contraction of the money supply, which worsened Depression.

- Another consequence of bank panics is that they can cause a substantial reduction in the money supply.

- Bank failures (and no deposit insurance) determined:
  1. Increase in deposit outflows and holding of currency (depositors)
  2. An increase in the amount of excess reserves (banks)

- the money supply decreased due to the fall of the money multiplier.

- In the early months of the Great Depression, several financially weak banks went out of business.

- A general concern arose that something similar could happen to other banks. People en masse tried to “cash out” their bank accounts by withdrawing their money before it was all gone.

- This “run on the banks” caused many previously financially sound banks to declare bankrupt. More than 9000 banks failed without 3 years.

- As people withdrew funds, this reduced banks’ reserves and, in turn, their lending power fell significantly.
• Suppose that people collectively cash out $10 billion from their checking accounts. With a reserve ratio of 20%, the $10 billion of currency support $50 billion deposit money – $10 billion of deposits plus $40 billion loans.

• Thus, the $10 billion withdrawal of currency forces banks to reduce loans by $40 billion.

• This multiple contraction of checkable deposits creates further withdrawals of currency and sale of government securities and results in the loss of reserves from the banking system.

• Contraction of excess reserves leads to multiple contraction in the money supply, or the reverse of situation in Table 32.2. Money supply was reduced by 25 percent in those years. The nation’s money supply had plummeted by about 23%.

• President Franklin Roosevelt ended the bank panics by declaring a 1-week “national bank holiday,” closing banks temporarily while Congress started the Federal Deposit Insurance Corporation (FDIC), which ended bank panics on insured accounts.

• Today, a multiple contraction of the money supply is unthinkable. FDIC deposit insurance has kept individual bank failures from becoming general panics. Also, while the Fed stood idly from 1930 to 1933, today it would take immediate and dramatic actions to maintain the banking system’s reserves and the nation’s money supply.