Soochow University International Programs

2021 SCUIP Winter Session I
ECON202

Lecture 9: The Monetary System

ECON202: Macroeconomics
Soochow University

Barter System to Monetary System

- Economic transactions originally used the barter system.
  ▻ In a barter system, people exchange goods and services for other goods and services.
- But this was inconvenient, as it required a double coincidence of wants.
- Eventually we invented money.
- Thereafter, economic transactions have used the monetary system.

Different Kinds of Money

- Money is the set of assets that people commonly use in shopping.

- Historically money has been of two kinds:
  - ▹ Commodity money: takes the form of a commodity with intrinsic value
    e.g. gold coins, cigarettes
  - ▹ Fiat money
    i) has no intrinsic value
    ii) consists of coins, currency notes, and checks

Fiat Money Runs on Faith

- Nowadays we use fiat money.
- Fiat money is not directly useful (the way a pair of shoes is useful).
- Nevertheless, it is universally accepted by sellers of goods and services as payment.
- Why?

Fiat Money Runs on Faith (Cont'd)

- An apple seller accepts money from her customers because she has faith the money would be accepted by the banana seller when she needs to buy bananas.
- The banana seller will accept money from his customers because he has faith that when he needs to buy clothes and cloth seller will accept money as payment … and so on and on.
- A fiat money-based monetary system is a faith-based system.

The Functions of Money

- Our faith in money makes it useful.

- Money has three uses:
  - ▹ Medium of exchange
    -> Money is the item that buyers give to sellers when they want to purchase goods and services
  - ▹ Unit of account
    -> Money is the yardstick people use to post prices and record debts
  - ▹ Store of value
    -> Money is an item that people can use to transfer purchasing power from the present to the future.

Measuring the Quantity of Money

- The quantity of money in an economy needs to be measured.
- Initially, this was easy: quantity of money = currency with the public
- But things changed when banking began
  - ▹ The role of bank has been discussed in the earlier topic.

Measuring the Quantity of Money (Cont'd)

- Suppose you need to buy a new laptop.
- You could go to the store with cash.
- Alternatively, on the way to the store you could stop at a bank, open a checking account, deposit your cash in the account, ask for a checkbook, go to the store, and pay for the laptop with a check.
- There really is no difference between your cash and your checkbook when it comes to paying for a laptop.

Measuring the Quantity of Money (Cont'd)

- A basic measure of the quantity of money is M1. It is:
  - ▹ Currency: the paper bills and coins in the hands of the public, plus
  - ▹ Demand deposits: balances in bank accounts that depositors can use as payment by writing a check.

  -> And a few other less important things, such as travellers' checks.

- Nowadays, another measure, M2, is more widely used.

Measuring the Quantity of Money: Feb 2018

	$ Billions
Currency	1,540.3
+ Traveler's Checks	1.9
+ Demand Deposits	1,474.0
+ Other Checkable Deposits	597.9
= M1	**3,614.0**
+ Savings Deposits	9,121.9
+ Small-denomination Time Deposits	415.8
+ Retail Money Market Mutual Funds	706.6
= M2	**13,858.3**

Measuring the Quantity of Money: Liquidity

- Whether a particular asset should be counted as money depends on the asset's liquidity.

- Every asset has some amount of liquidity.

  ▹ Liquidity is the ease with which an asset can be converted into the economy's medium of exchange.

- When computers made it easy for banks to transfer cash from a person's savings account to that person's checking account, both types of accounts could be used to buy a laptop.

- So, it made sense to include savings accounts in M2.

Central Banks

- In any monetary system today, currency is created by an institution called a central bank.

- Using its currency creation ability, a central bank can increase or decrease the economy's quantity of money.

- The central bank has other functions:
  - ▹ It sets the regulations that banks and other financial institutions must obey.
  - ▹ It serves as a clearing house for checks and other money transfers between banks.

The Federal Reserve System

- The Federal Reserve (The Fed) is the central bank of the United States.
  - ▷ It monitors and regulates the banking system (regulation policy)
  - ▷ It adjusts the quantity of money in the economy (monetary policy)

How Monetary Policy Works

- Suppose the Fed – that is, the U.S. central bank – prints $100 and buys some financial securities from Bank A.
- So, Bank A's securities decrease by $100 and its reserves increase by $100.
- Does this affect the economy's quantity of money (say, M1)?

How Monetary Policy Works (Cont'd)

- Recall that the economy's quantity of money (*M*) = currency with public + checkable bank deposits
- When the Fed prints $100 and buys financial securities from a bank, Bank A, neither currency with public nor checkable bank deposits are immediately affected.
- So, so far, there is no change in *M*.
- But Bank A now has an additional $100 in cash reserves.

How Monetary Policy Works (Cont'd)

- Bank A could continue to hold $100 of additional reserves.
- Or it could make new loans with some of that money.
  - ▹ After all, lending is what banks do.
- How much of the additional reserves of $100 the bank will lend depends on the bank manager's sense of the risks and rewards of making a loan.
- This is referred in Bank A's reserve-deposit ratio or reserve ratio.
- The higher the reserve ratio the lower the lending.

Bank Lending

- Suppose Bank A, which now has $100 in additional reserves, gives $80 as a loan to Joe, a customer.
- Now currency with the public increases by $80.
- And checkable bank deposits, the other component of *M*, remains unchanged.
- Therefore, *M* (= currency with public + checkable bank deposits) increases by $80.
- Several lessons can be extracted from this example.

How Monetary Policy Works (Cont'd)

- When banks make new loans, the economy's quantity of money increases.
- The bigger the new loans – say, $90 instead of $80 – the bigger the increase in the quantity of money.
  - ▹ The lower the reserve ratio, the higher the economy's quantity of money.
- The central bank can increase the economy's quantity of money by printing cash and buying financial securities from a bank.
  - ▹ This is called open market operations.

Let's Continue the Example

- We just saw that Joe got an $80 loan from Bank A and this made *M* increased by $80.
- So, if he soon decides to repay the loan, the economy's quantity of money would decrease by $80 and return to its pre-loan level.
- We saw before that when loans are made *M* increases, and now we see that when loans are repaid *M* decreases.
- Therefore, if banks make new loans at a faster rate than the rate at which old loans are repaid, *M* increases.

How Monetary Policy Works (Cont'd)

- Let's get back to Joe, who get the $80 loan from Bank A.
- Let's say Joe buys $80 of food from Alice.
- If Alice keeps the $80 in her purse, the transaction between Joe and Alice has no effect on the economy's quantity of money (*M*).
- But what happens to *M* if Alice deposits the $80 in her checking account in, say, Bank B?

How Monetary Policy Works (Cont'd)

- Alice's bank deposit does not change *M*, because currency with the public decreases by $80 and money in checking accounts increase by the same $80.
- But Bank B, where Alice just deposited $80, now has $80 of additional cash reserve.
- If Bank B is so inclined, it could make a new loan of $60 to Jim, one of its customers.
- And, as was the case when Joe got a loan from Bank A, this loan too would cause *M* to increase.

How Monetary Policy Works (Cont'd)

- So, we see that *M* does not increase when Alice takes the $80 she got by selling food to Joe and keeps it in her purse, but *M* does increase when she deposits the $80 in her bank account (and thereby triggers Bank B's loan to Jim).

- The lesson is that the economy's quantity of money is higher when people keep their money in their bank accounts (as opposed to in their purses).
  - The technical term is Alice's currency-deposit ratio.
  - The lower this ratio, the higher the economy's quantity of money.

To Sum Up

- When banks make new loans at a faster rate than the rate at which old loans are paid, *M* increases.
- When banks' reserve ratio decreases – that is, when banks keep fewer reserves and, so, make more loans – *M* increases.
- When the central bank prints cash and buys financial securities from banks, *M* usually increases.
- When the currency-deposit ratio of people decreases – that is, when people keep more of their wealth in bank deposits rather than in currency – *M* increases.

Fractional-Reserve Banking

- When one bank loans money, that money generally ends up as a deposit in a second bank.
- This creates more deposits and more reserves to be lent out by the second bank.
- When the second bank makes a loan from its reserves, the money supply increases again.
- And the process continues …

The Money Multiplier

- How much money is eventually created in this economy?

- The money multiplier is the amount of money the banking system generates with each dollar of money created by the Fed.
  - ▹ It can easily be greater than one.
  - ▹ In my example, the central bank got the ball rolling by printing $100.
  - ▹ And we just saw that in a mere two steps the quantity of money increased by $80 + $60 = $140. And I could have kept the story going on and on with additional increase in *M*.
  - ▹ That's the miracle of the money multiplier.

The Money Multiplier (Cont'd)

- We just saw that the money multiplier is the amount of money the banking system generates with each dollar of money created by the Fed.
- We also saw that the money created is higher when banks' reserve ratios are lower and people's cash-deposit ratios are lower.
- This implies that the money multiplier is higher when banks' reserve ratios are lower and people's cash-deposit ratios are lower.

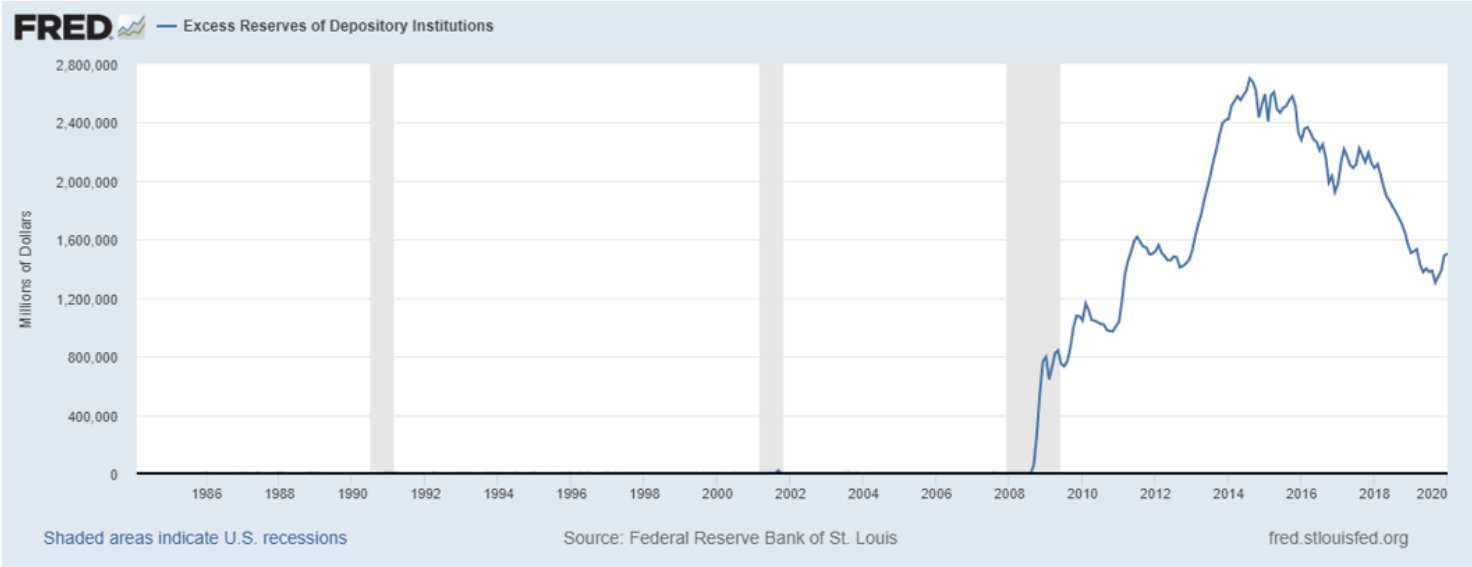
The Money Multiplier (Cont'd)

- Reserve Ratio
  - ▹ The reserve ratio is the fraction of total deposits that bank hold as reserves.
  - ▹ The fraction of its total deposits that a bank is required by the Fed to keep as reserves is called the required reserve ratio.
  - ▹ When banks hold reserves in excess of the required reserves, those reserves are called excess reserves.
  - ▹ Reserves = Required Reserves + Excess Reserves

The Money Multiplier (Cont'd)

- In normal situations excess reserves are zero.
- So, in normal situations, reserve ratio = required reserve ratio

Excess Reserves, in normal and abnormal situations



Normal situation (before the 2008 financial crisis): reserve ratio = required reserve ratio
Abnormal situation (after the 2008 financial crisis): reserve ratio > required reserve ratio

The Fed’s Tools of Monetary Control

- The Fed influences the quantity of reserves in bank by:
  - ▹ Open-market operations
  - ▹ Fed lending to banks
- The Fed influences the reserve ratio of banks by:
  - ▹ Varying reserve requirements
  - ▹ Paying interest on reserves

Fed’s Tools of Monetary Control (Cont’d)

- Open-market operations
  - ▹ Purchase and sale of U.S. government bonds by the Fed
  - ▹ To increase the money supply
    -> The Fed buys U.S. government bonds
  - ▹ To reduce the money supply
    -> The Fed sells U.S. government bonds

Fed's Tools of Monetary Control (Cont'd)

- Fed can print money and lend to banks:
  - ▷ At the discount window

    -> Banks borrow and pay an interest rate called the discount rate.

    - ▸ Lower discount rate leads to more borrowing by banks from the Fed which leads to higher quantity of money in the economy.
    - ▸ Conversely, a higher discount rate leads to a lower quantity of money in the economy.
  - ▷ Through its term auction facility

    -> The money goes to the highest bidders – that is, to the banks who offer to pay the highest interest rate to the Fed. This money leads to more lending by banks, which increases the quantity of money in the economy.

Fed's Tools of Monetary Control (Cont'd)

- We saw earlier that the economy's quantity of money is inversely related to the banks' reserve ratio.
- We also saw that, for banks in normal situations, the reserve ratio = the required reserve ratio that is set by the central bank.
- It follows that, in normal situations, a central bank can increase *M* by decreasing the required reserve ratio.
  - ▹ Conversely, a central bank can decrease M by increasing the required reserve ratio.

Fed's Tools of Monetary Control (in Crises)

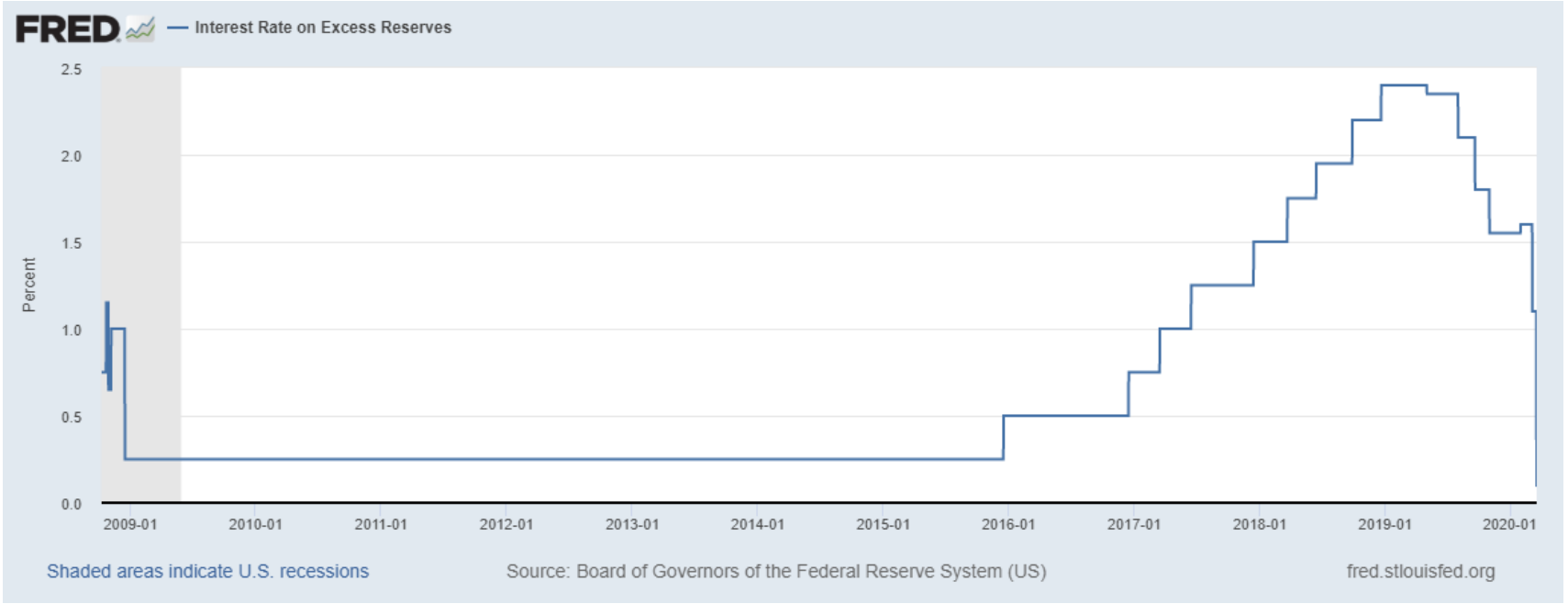
- But for banks in abnormal situations, the reserve ratio > the required reserve ratio. So varying the required reserve ratio will have no effect.

- So, since the 2008 financial crisis, the Fed has been paying bank interest on their reserves.

▹ The higher this interest rate on reserves, the more reserve banks will choose to hold. This will:

-> Increase the reserve ratio
-> Lower the money multiplier
-> Lower the money supply

Fed's Tools of Monetary Control (in Crises)



Problems in Controlling the Money Supply

- The Fed's control of the money supply is not precise.

- The Fed must wrestle with two problems that arise.

  ▹ The Fed does not control the amount of money that households choose to hold as deposits in banks (the cash-deposits ratio).

  ▹ The Fed does not control the amount of money that bankers choose to lend (the reserve ratio).

Problems in Controlling the Money Supply (Cont'd)

- If people lose confidence in the banking system and decide to withdraw cash from their bank accounts to hold as currency, the banks would have less cash to lend and they will be forced to cut back on lending.
- This would cause the money supply to decrease.
- This actually happened during the Great Depression of the 1930s.

Problems in Controlling the Money Supply (Cont'd)

- If bank lose confidence in the economy they may be afraid to lend, fearing that in a bad economy borrowers would default on their loans.
- So, banks may decide to make fewer loans and hold more reserves.
- The rise in the reserve ratio would reduce the money multiplier and cause the money supply to decrease.
- This too actually happened during the Great Depression of the 1930s.

Problems in Controlling the Money Supply (Cont'd)

- During the Great Depression both factors discussed in the two previous slides were in play.
- From 1929 to 1933, the US money supply fell by 28 percent, without the Federal Reserve doing anything to deliberately reduce the quantity of money.
- This emphasizes the point that the Fed's control of the economy's quantity of money (*M*) is imprecise.

What's Next?

- In this topic, we have discussed how an economy's quantity of money is determined.
- Next, we need to see why the quantity of money matters.

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