

Chapter 14: Money, Banks, and the Federal Reserve

Defining Money and its Functions

Money is defined as any asset that people are willing to accept in exchange for goods and services. Early economies used a *barter* system of trade, where goods were traded for other goods directly. These economies were flawed because in order for a trade to take place, both parties needed to have something of value to the other, called the *double coincidence of wants*. Money allows us to bypass this issue by providing something that most people want. Anything used as money must serve four functions:

- Medium of Exchange
- Unit of Account
- Store of Value
- Standard of Deferred Payment

Broadly speaking, we can characterize money into two categories. *Commodity money* is money which has value independent of its use as money (i.e. gold). *Fiat money*, in contrast, only has value in its use as currency (i.e. US Dollar)

Measuring Money in the United States

To measure money in the United States we use two measures, known as *money aggregates*:

M1: consists of the most liquid forms of money. Includes: currency, checking deposits, and traveler's checks

M2: the broader category of money. *Includes everything in M1* along with other illiquid forms of money, including: savings accounts, time deposits, and money market funds

How banks create money

To understand how banks create money, we first need to understand a bank's balance sheet. On a balance sheet, a bank's *assets* (anything of value that a bank owns, such as the loans it makes), and its *liabilities* (such as the deposits that customers make) on the right. The following terms will also be helpful

- **Reserves:** deposits that a bank has retained rather than loaned out or invested
- **Required reserves:** the amount of reserves banks are required by law to keep at all times
- **Required reserve ratio (RR):** The percentage of deposits banks required by law to hold
- **Excess reserves:** Any reserves the bank holds onto above the required reserves

With these definitions, the following formulas allow us to describe the money creation process:

$$\text{Simple Money Multiplier} = \frac{1}{RR}$$

$$\Delta \text{Checking Deposits} = \text{Money Multiplier} \times \text{Initial Deposit}$$

$$\Delta \text{Money Supply} = \text{Money Multiplier} \times \text{Initial Deposit} - \text{Initial Deposit}$$

The Federal Reserve System

The money creation process relies on the banks lending their excess reserves to individuals and seeing that money return as new checking accounts at a later point. That banks actually create money in this way means that the United States, like most countries, employs a *fractional reserve banking system*. However, the fact that banks keep less than 100% of their deposits as reserves is inherently risky, as if too many people attempt to withdraw their money at once the bank would not have enough money to return it all. When many depositors attempt to withdraw

their money simultaneously, this is called a *bank run*. When multiple bank runs occur in a short period of time it is known as a *bank panic*. In order to address this, *central banks* such as the Federal Reserve were created to act as *lender of last resort*, lending funds to banks that cannot borrow funds elsewhere. Today, the Federal Reserve does much more than this today; namely they pursue macroeconomic objectives via *monetary policy*. In particular, there are three tools that the Fed uses:

The Federal Reserve is able to increase or decrease the money supply in order to affect the interest rate and stabilize the economy. This is referred to as *monetary policy*. There are three ways the Fed can affect the money supply:

1. **Changing reserve requirements:** banks are required to keep a percentage of their deposits on hand at all times as *reserves*. This percent is given by the *reserve ratio*. By decreasing the reserve ratio, banks can lend more money, increasing the amount of currency in circulation leading to the creation of more checking deposits and thus a higher money supply. This also works in reverse.
2. **Changing the Discount Rate:** one of the key roles of the Fed is to act as the *lender of last resort*. When banks are in desperate need of currency, they can borrow funds from the Fed. The interest rate charged on these loans is the *discount rate*. By decreasing this number, the Fed can encourage banks to lend more money, which in turn increases the money supply as prescribed by the money multiplier.
3. **Open Market Operations:** This is the most commonly used form of monetary policy. In an *open-market operation*, the Fed buys or sells US Treasury Bills (T-Bills) to commercial banks in exchange for money. In an *open market sale*, the Fed sells T-Bills to the banks in exchange for currency, decreasing the money supply. In an *open market purchase*, the Fed buys T-Bills from the banks in exchange for currency, increasing the money supply. The new funds can be lent out, which further increases (or decreases in the case of a sale) the money supply via the money multiplier.

The Quantity Theory of Money

In the early 20th century, economist Irving Fisher formalized the connection between money and prices using the *quantity equation*:

$$M \times V = P \times Y$$

Where M is the money supply (measured by M1), V is the velocity of money, P is the price level, and Y is real output. The *velocity of money* is described as the average number of times each dollar of the money supply is used to purchase goods and services included in GDP. We can extend this formula to consider growth rates by remembering that an equation where variables are multiplied by each other is equivalent to an equation where their growth rates are added together:

$$\text{Growth in } M + \text{Growth in } V = \text{Growth in } P + \text{Growth in } Y$$

Noting that the growth in the price level is inflation, and assuming that the velocity of money is constant (thus no growth rate), we can explain the inflation as follows:

$$\text{Growth in } M - \text{Growth in } Y = \text{Inflation Rate}$$

This allows us to explain a phenomenon known as *hyperinflation*, defined as when inflation is 50% per month. When the central bank increases the money supply in great excess of the economic growth rate, this allows for a scenario where the inflation rate is very high.

Practice Questions

- In an economy with barter, there are _____ prices than in an economy with money
 A) More B) Less C) Equal
- Which of the following is included in M2 and in M1?
 A) demand deposits (checking accounts)
 B) corporate bonds
 C) small denomination time deposits
 D) money market mutual funds
- If I withdraw \$500 from my savings account and put it in my checking account, M1 will _____ and M2 will _____.
 A) Increase, decrease
 B) Not change, not change
 C) Not change, increase
 D) Increase, not change
- If a person withdraws \$500 from their checking account and holds it in currency, M1 will _____ and M2 will _____.
 A) Increase, decrease
 B) Not change, increase
 C) Not change, not change
 D) Decrease, increase
- A bank will consider a car loan to a customer as a _____ and a customer's checking account as a _____.
 A) liability, asset B) asset, liability
 C) liability, liability D) asset, liability

Use the following information for the next four (4) questions

Imagine that John deposits \$10,000 of currency into his checking account deposit at Bank A and that the required reserve ratio is 20%.

- Bank A's reserves immediately increase by
 A) 2000 B) 8000 C) 10000 D) 50000

7. Bank A's required reserves increase by
 A) 2000 B) 8000 C) 10000 D) 50000
8. Of the new reserves, Bank A can loan out a maximum of
 A) 2000 B) 8000 C) 10000 D) 50000
9. Checking Account deposits could eventually increase to a maximum of (including the initial deposit)
 A) 8000 B) 10000 C) 50000 D) 100000

Use the following information to answer the next three (3) questions

The Monetary Policy of Tazi is controlled by the country's central bank known as the Bank of Tazi. The local unit of currency is the Taz. Aggregate banking statistics show that collectively the banks of Tazi hold 300 million Tazes of required reserves, 75 million Tazes of excess reserves, have issued 7,500 million Tazes of deposits, and hold 225 million Tazes of Tazian Treasury bonds. Tazians prefer to use only demand deposits (checking accounts) and hold no currency in their wallets.

10. Assume that banks desire to continue holding the same ratio of excess reserves to deposits. What is the reserve ratio for Tazian Banks?
 A) 8 percent B) 4 percent C) 5 percent D) None of the above.
11. Assuming the only other thing Tazian banks have on their balance sheets is loans, what is the value of existing loans made by Tazian banks?
 A) 6,900 million Tazes
 B) 7,125 million Tazes
 C) 7,350 million Tazes
 D) None of the above is correct
12. Suppose the Bank of Tazi loaned the banks of Tazi 10 million Tazes. Suppose also that both the reserve requirement and the percentage of deposits held as excess reserves stay the same. By how much would the money supply change?
 A) 250 million Tazes
 B) 200 million Tazes
 C) 125 million Tazes
 D) None of the above is correct
13. Under which of the following scenarios is a given economy experiencing inflation?
 A) Economic growth of 10%, Growth in the money supply of 5%
 B) Economic growth of 10%, Growth in the money supply of 8%
 C) Economic growth of 10%, Growth in the money supply of 10%
 D) Economic growth of 10%, Growth in the money supply of 15%

Answers:
 1. A) 2. A) 3. D) 4. C) 5. B) 6. C) 7. A) 8. B) 9. C) 10. C) 11. A) 12. B) 13. D)