

# Money

Throughout history, a wide variety of items have served as money. These include gold, silver, large stone wheels, tobacco, beer, dog teeth, porpoise teeth, cattle, metal coins, paper bills and checks. All of these types of money should be judged on how well they accomplish the functions of money. Money is what money does!

## The functions of money are to serve as a medium of exchange, a standard of value and a store of value.

- To be a good medium of exchange, money **must be accepted** by people when they buy and sell goods and services. It should be **portable** or easily carried from place to place. It must also be **divisible** so that large and small transactions can be made. It must also be **uniform** so that a particular unit such as a quarter represents the same value as every other quarter.
- To be a good standard of value, or unit of account, money must be useful for quoting prices. To accomplish this, money must be **familiar**, divisible and accepted.
- To be a good store of value, money must be **durable** so it can be kept for future use. It also should have a **stable value** so people do not lose purchasing power if they use the money at a later time.

Money is any item or commodity that is **generally accepted in payment for goods and services** or in repayment of debts, and serves as an asset to its holder.

## Money Defined

The first steps in the formulation of monetary policy involves defining it and measuring the money supply. Defining and measuring money has become an increasingly difficult task because of reforms in the financial system, and because people and banks hold money in myriad different forms.

The Federal Reserve defines monetary aggregates by grouping assets that the public uses in roughly similar ways. In defining these measures of money, the Fed draws somewhat arbitrary lines between groups of assets that serve in varying degrees as both the medium-of-exchange and store-of-value functions of money.

Depository institutions such as banks, savings and loan associations and credit unions report to the Fed the value of their time and savings deposits, vault cash and transaction accounts such as checkable deposits.

The data on checkable deposits are the primary source for the calculation of required reserves and the construction of the monetary aggregates. The Fed's Board of Governors and the Federal Open Market Committee use this information in the formulation of monetary policy.

## Money Measured

- **M1** is the narrowest definition and measure of the money supply. It includes assets used primarily for transactions or as a medium of exchange. M1 includes currency and coin held by the nonbank public, demand deposits, other checkable deposits and traveler's checks.
- **M2** is a broader measure of money stock. In addition to the items included in M1, M2 includes the amount held in savings and small time deposits, money market deposit accounts (MMDAs), non-institutional money market mutual funds (MMMMFs) and certain other short-term money market assets.

- **M3** is an even broader definition of the money supply. It includes all of the components of M2 plus a number of financial assets and instruments generally employed by large businesses and financial institutions.

We can look at the three definitions of money in the following terms:

- M1 includes items that are primarily used as a **medium of exchange**.
- M2 includes items that are used as a **store of value**.
- M3 includes items that serve as a **unit of account**.

The Fed considers a number of factors when it measures the monetary aggregates, but ultimately what matters is how the public uses the different forms of money available. For example, depositors can write checks on their MMDAs or their MMMFs. The public, however, primarily uses these types of accounts for savings and only secondarily for transactions. Therefore, these accounts are typically placed in M2 with savings accounts and time deposits, which also primarily serve the store-of-value function of money.

On the other hand, deposits in NOW (negotiable order of withdrawal) accounts are included in M1 because they are primarily used as a medium of exchange, even though they earn interest and depositors use them for savings.

## The Monetary Equation of Exchange

Economists use an equation made famous by *Irving Fisher* to show the relationship among money, price and real output. This equation is called the **equation of exchange**, and it typically takes the following form:

$$MV = PQ$$

M	=	the amount of money in circulation
V	=	the income velocity of money
P	=	the average price level
Q	=	real GDP or real value of all final goods and services

This equation attempts to show the balance between "money," which is represented on the left side of the equation, and goods and services, which are represented on the right side. For a given level of income velocity, if the supply of money grows faster than the rate of real output (changes in Q), then there will be inflation in the economy.

Classical economists assumed that the velocity of money was stable (constant) over time because institutional factors — such as how frequently people are paid — largely determine velocity.

## Exercises

1. Use table 1 below to evaluate how well each item would perform the functions of money in today's economy. If an item seems to fulfill the function, put a + sign in the box; if it does not fulfill a function in your opinion, place a — sign in the box. Put a ? sign in the box if you are unsure whether the item fulfills the functions of money. The item with the most + signs would be the best form of money for you. In the space below the table, list the top six forms of money, according to your evaluation.

Table 1

Item	Medium of Exchange	Store of Value	Standard of Value
Salt			
Large stone wheels			
Cattle			
Gold			
Copper coins			
Beaver pelts			
Personal checks			
Savings account passbook			
Prepaid phone card			
Debit card			
Credit card			
Cigarettes			
Playing cards			
Bushels of wheat			
\$1 bill			
\$100 bill			

Your top six forms of money:

1. \_\_\_\_\_, 2. \_\_\_\_\_, 3. \_\_\_\_\_  
 4. \_\_\_\_\_, 5. \_\_\_\_\_, 6. \_\_\_\_\_

2. After you finish the evaluation in Question 1, rate the various items in the table 2 below. Evaluate how well they meet the characteristics of money. Again, if an item seems to fit a characteristic, use a + sign; if the item does not seem to fit a characteristic, use a - sign. If there is a difference of opinion or if you are uncertain, use a ? sign. The item with the most + signs would best fit the characteristics of money. In the space below the table, list your six top items.

3. Why might factors such as ease of storage, difficulty in counterfeiting and security of electronic transfer of funds also be characteristics that you might use in evaluating money?

**Table 2**

<b>Item</b>	<b>Portability</b>	<b>Uniformity</b>	<b>Acceptability</b>	<b>Durability</b>	<b>Stability in Value</b>
Salt					
Large stone wheels					
Cattle					
Gold					
Copper coins					
Beaver pelts					
Personal checks					
Savings account passbook					
Prepaid phone card					
Debit card					
Credit card					
Cigarettes					
Playing cards					
Bushels of wheat					
\$1 bill					
\$100 bill					

Your top six items:

1. \_\_\_\_\_, 2. \_\_\_\_\_ 3. \_\_\_\_\_  
 4. \_\_\_\_\_, 5. \_\_\_\_\_ 6. \_\_\_\_\_

1. What are the three basic functions of money?
2. Why is it important for the Fed to know the size and rate of growth of the money supply?

(A) What are the effects if the money supply grows too slowly?

(B) What are the effects if the money supply grows too rapidly?

3. Name a type of money that serves primarily as a medium of exchange.
  
4. Name a type of money that serves primarily as a store of value.
  
5. With the use of credit cards becoming more prominent and the availability of credit broader than ever, why are credit cards not included in the Ms?
  
6. Why is it difficult for the Fed to get an accurate measure of the money supply?
  
7. Why must the Fed continue to develop new ways to track the money supply?
  
8. Use the data in the table below to calculate M1, M2 and M3. Assume that all items not mentioned are zero. Show all components for your answers.

<b>Checkable deposits</b> (demand deposits, NOW, ATM and credit union share draft accounts)	<b>\$850</b>
<b>Currency</b>	<b>\$200</b>
<b>Large time deposits</b>	<b>\$800</b>
<b>Noncheckable savings deposits</b>	<b>\$302</b>
<b>Small time deposits</b>	<b>\$1,745</b>
<b>Institutional money market mutual funds</b>	<b>\$1,210</b>

M1 = \_\_\_\_\_

M2 = \_\_\_\_\_

M3 = \_\_\_\_\_

## Exercises-Equation of Money

### Part A

1. Define (in your own words and in one or two sentences each) the four variables in the equation of exchange.
2. The product of velocity ( $V$ ) and the money supply ( $M$ ) equals  $PQ$ . How can  $PQ$  be defined?
3. Suppose velocity remains constant, while the money supply increases. Explain how this would affect nominal GDP.
4. During the past 30 years, the use of credit cards has increased, and banks and financial institutions increasingly use computers for transactions. Explain how these changes might affect velocity.
5. As the result of legislative and regulatory reform throughout the 1980s and 1990s, banks and other financial institutions began paying interest on a significant proportion of the checkable deposits in the M1 definition of the money supply. Explain how these changes might be expected to affect the velocity of M1.

### Part B

6. The following tables give data on money supply, prices, real GDP and velocity for the U.S. economy for 14 recent years. Because of rounding, some totals may not come out exactly. Complete the tables by filling in the blanks.

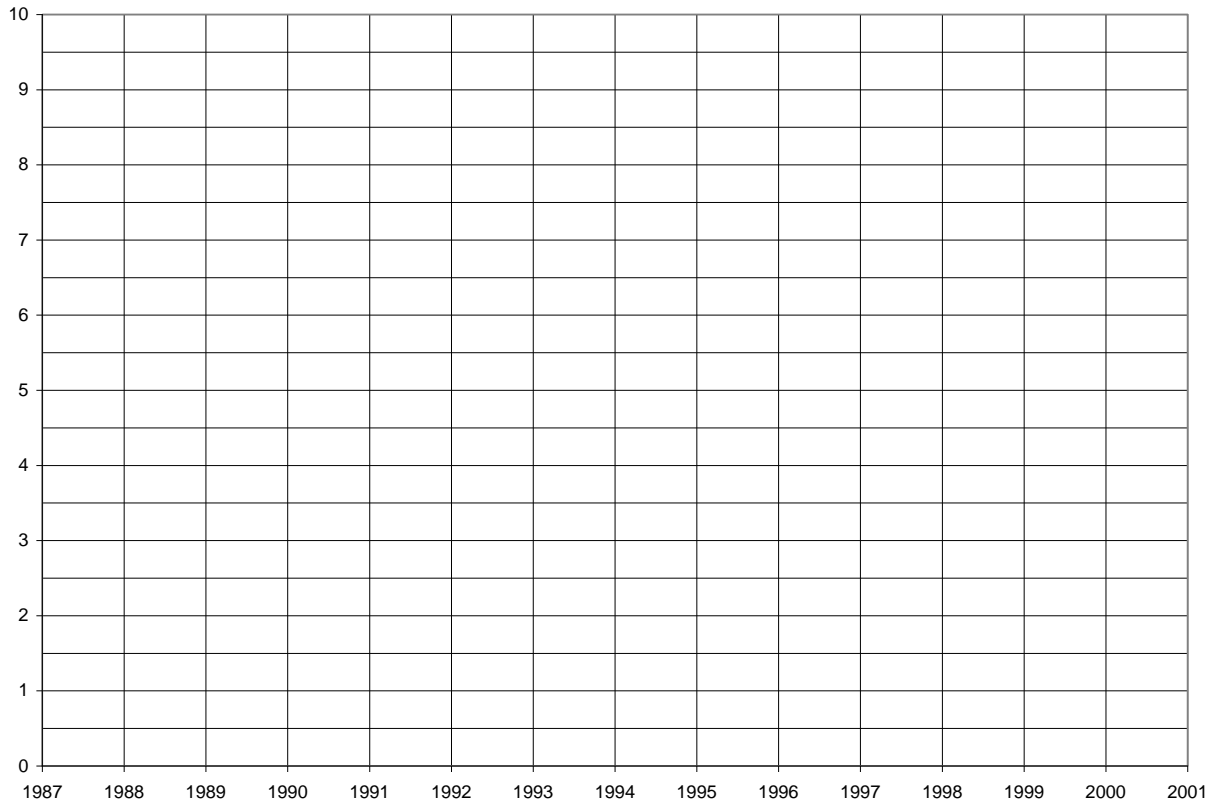
## MI Chart

Year	M1 (Billions)	V	P Implicit Price Deflator for GDP	Q Real GDP (Billions)	PQ Nominal GDP (Billions)
1987	\$750	6.36	0.780	\$6,114	\$4,768.90
1988	786	6.48	0.800	6,370	5,096.00
1989	792			6,592	5,489.00
1990	824	7.00	0.860	6,707	5,768.00
1991	896	6.71	0.90	6,677	6,009.30
1992	1,024	6.18	0.920	6,880	6,329.60
1993	1,129	5.88	0.940	7,063	6,639.20
1994	1,150	6.13	0.960		7,054.30
1995		6.57	0.980	7,544	7,393.10
1996	1,080		1.000	7,813	7,813.00
1997	1,073		1.020	8,160	8,323.20
1998	1,097	7.99	1.030	8,510	
1999	1,125		1.050	8,876	9,319.80
2000	1,088		1.0691	9,320	9,768.90

## M2 Chart

Year	M2 (Billions)	V	P Implicit Price Deflator for GDP	Q Real GDP (Billions)	PQ Nominal GDP (Billions)
1987	\$2,830	1.68	0.78	\$6,114	\$4,769
1988	2,994	1.70	0.80	6,370	5,096
1989	3,158			6,592	5,489
1990	3,277	1.76	0.86	6,707	5,768
1991	3,377	1.78	0.90	6,677	6,009
1992	3,431	1.84	0.92	6,880	6,330
1993	3,484	1.91	0.94	7,063	6,639
1994	3,500	2.02	0.96	7,348	7,054
1995	3,642	2.03	0.98	7,544	
1996	3,815	2.05	1.00	7,813	7,813
1997	4,032	2.06	1.02		8,318
1998		2.00	1.03	8,510	8,790
1999	4,653		1.05	8,876	9,299
2000	4,945	2.01		9,319	9,963

7. Use the Grid below and the M1 and M2 data to graph the income velocity from 1987 to 2000



(A). What trends do you see?.

(B). What is the difference in the M1 Velocity and the M2 velocity? Explain why they are different.

8. For a given money supply growth, a(n) (increase/decrease) in velocity will (increase/decrease) inflationary pressure.