

# Principles of Macroeconomics

## Guest Lecture: Our World of Money

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Department of Business & Economics

March 25, 2021

# Outline

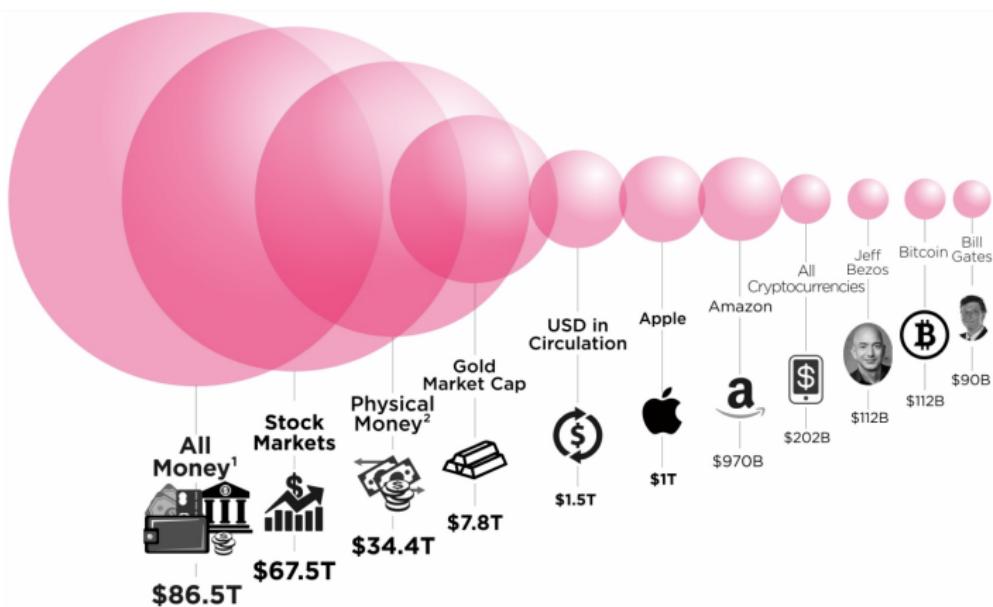
① What is Money?

② How Money Evolves?

③ How to Measure Money?

④ Central Bank Money Policy

## Global Money in Perspective, 2018 (w)



\* All figures are shown as of latest available data on September 17th, 2018

### **Article & Sources:**

**Articles & Sources:**  
<https://howmuch.net/articles/worlds-money-in-perspective-2018>  
<https://coinmarketcap.com>  
<https://www.forbes.com>  
<https://www.federalreserve.gov>  
<https://www.cia.gov>

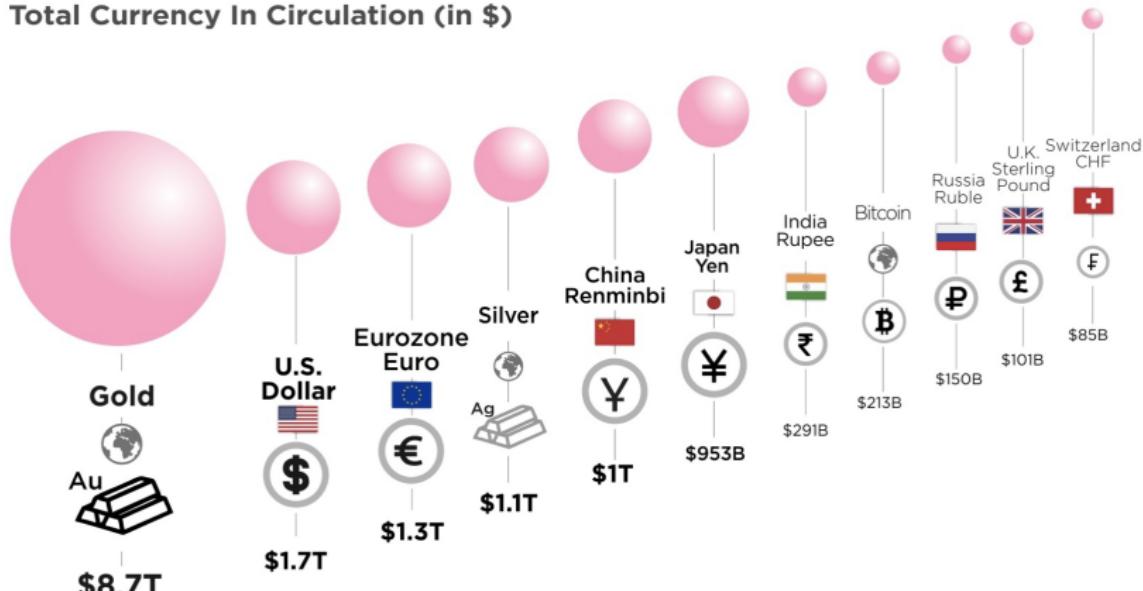
<sup>1</sup> All Money = money in any form including bank or other deposits as well as notes and coins.

<sup>2</sup> Physical Money = money in forms that can be used as a medium of exchange, generally notes, coins, and certain balances held by banks.

howmuch.net

# Global Currencies, 2019 (w)

Total Currency In Circulation (in \$)



Article & Sources:  
<https://howmuch.net/articles/how-much-currencies-are-worth>  
<https://howmuch.net/sources/how-much-currencies-are-worth>

howmuch<sup>net</sup>

## Global Reserve Currencies, 2019 (w)

Central banks hold foreign exchange reserves are for international payments and to support a national currency.

- ① U.S. Dollar: \$6.74 trillion (61.82%)
  - ② Euro: \$2.21 trillion (20.24%)
  - ③ Japanese Yen: \$572 billion (5.25%)
  - ④ Pound Sterling: \$495 billion (4.54%)
  - ⑤ Chinese Renminbi: \$213 billion (1.95%)



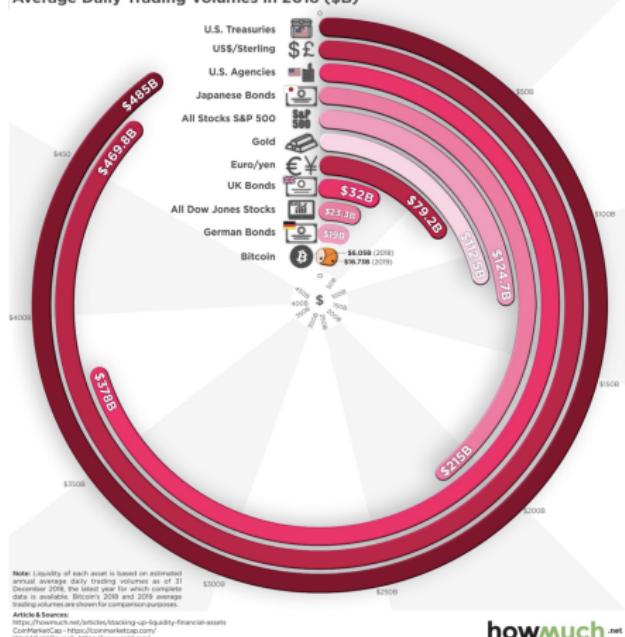
### **Article & Sources:**

<https://howmuch.net/articles/worlds-top-reserve-currencies-2019>  
International Monetary Fund - <http://data.imf.org>

howmuch .net

# Global Financial Assets Trading Liquidity <sup>(w)</sup>

Average Daily Trading Volumes in 2018 (\$B)



- ① U.S. treasuries are by far the most liquid class of assets, averaging some \$485B per day in 2018.
- ② Gold remains a highly liquid asset even in the age of fiat and crypto, topping \$112.5B in 2018.
- ③ Bitcoin's average daily liquidity surged from 2018 to 2019, rising from \$6.05B to \$16.73B.
- ④ Despite its volatility, bitcoin sees almost as much daily liquidity as German bonds (\$16.7B vs \$19B).

# What Does the Bible say about Money? (w)

## Bible Verses about Money (w) (w)

- 1 out of 10 verses in the Gospels deal with money
- 16 out of 38 of Jesus' parables deal with money and possessions
- Nearly 25% of Jesus' words in the NT deal with biblical stewardship
- There are more than 2,000 scriptures on tithing in the Bible, money, and possessions in the Bible, which is twice as many as faith and prayer combined.
- When it comes to breaking down what the Bible has to say about money, there are nine principles about money students can learn:
  - 1) God owns everything;
  - 2) Money is a tool;
  - 3) Worship with your money;
  - 4) Get that money;
  - 5) Fight for contentment;
  - 6) Kill greed in your heart;
  - 7) Be mindful of debt;
  - 8) Manage your finances;
  - 9) Mo' money, mo' problems.

## Definition and Functions of Money in Economics

- Definition: Money is a standardized medium of exchange.
- Money, as a medium of exchange, evolves from society's persistent endeavor to reduce transaction cost.
- Money, as a unit of account, measures the value of the goods and services being exchanged. Prices are expressed in monetary units.
- Money, as a store of value, enables its owner to finance inter-temporal exchange, balancing consumption over time.
- In history, any good being chosen and developed as a universal medium of exchange can be defined as money. Other functions of money are derived henceforth. In a modern economy, however, money carries a more vital role — credit and debt instrument.
- Money stores joint memories of income and wealth in human society.

*All money is a matter of belief. —Adam Smith*

# Properties of Money (w)

Are these money?

- Checks
- Pensions
- Gold and silver
- Checking accounts
- Savings accounts
- Credit card
- Debit card
- Diamond
- Bitcoin



<https://sunnyclo.ipower.com/pearls of liberty/>

# Outline

- ① What is Money?
- ② How Money Evolves?
- ③ How to Measure Money?
- ④ Central Bank Money Policy

# The Evolution of Money (w)

## Medium of Exchange (Commodities)



During the period of early human civilization, any commodity that was demanded and chosen by common consent was used as a form of currency.

Goods like furs, salt, rice, wheat, weapons, animals, and much more were used as an exchange which was known as 'Barter Exchange.'

## Metallic



With the progress of human civilization, commodity exchange transitioned into metallic money. Metals like gold, silver, copper, nickel, and much more were used as they could be easily handled and their quantity can be readily ascertained.

## Paper



The inconveniences of carrying metallic currency seemed too dangerous and difficult because of thefts and the weight of the money. The invention of banknotes marked a very important stage in the development of money.

Paper money is regulated and controlled by a Central Bank of the country. Today, the vast majority of money consists mainly of currency notes or paper money issued by the Central Bank.

## Plastic



The next type of money was the plastic payment money such as credit cards and debit cards. The aim was to remove the need for carrying cash when making transactions. With the debit card, the money comes directly from your bank account unlike the credit cards, which is a loan from the bank institution with a promise to pay back the amount used with interest each month.

## Crypto



Cryptocurrency is a new revolutionary type of currency. Like any other currency or unit of account, they only have value because people give it value. Cryptocurrencies were designed as a unit of exchange and as a place to store assets without relying on a Central Bank, thus cutting out the middle person with lower fees and faster transaction times.

A move towards a more direct money transaction without having other people take a cut of your hard-earned cash.

<https://blog.coinpayments.net/news-features/the-evolution-of-money>

# A Brief History of Money (w)



Source: PublishOX.

- In the beginning: Barter
- 9000 - 6000 B.C.: Cattle
- 1200 B.C.: Cowrie shells
- 1000 B.C.: First metal money and coins
- 500 B.C.: Modern coinage
- 118 B.C.: Leather money
- 806: Paper currency
- 1816: The gold standard
- 1930: End of the gold standard
- The present: Fiat money
- The future: Digital money

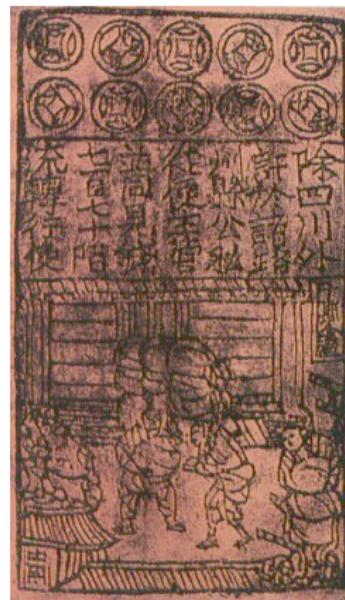
# The Island Of Stone Money (w)



Source: [NPR Planet Money](#).

## The Earliest Paper Money - Banknote <sup>(w)</sup>

Development of the banknote began in the Tang dynasty during the 7th century, with local issues of paper currency, although true paper money did not appear until the 11th century, during the Song dynasty. Before the use of paper, the Chinese used coins that were circular, with a rectangular hole in the middle. Several coins could be strung together on a rope. Merchants in China, if they became rich enough, found that their strings of coins were too heavy to carry around easily. To solve this problem, coins were often left with a trustworthy person, and the merchant was given a slip of paper recording how much money they had with the person. Eventually, the Song Dynasty paper money called "jiaozi" originated from these promissory notes.

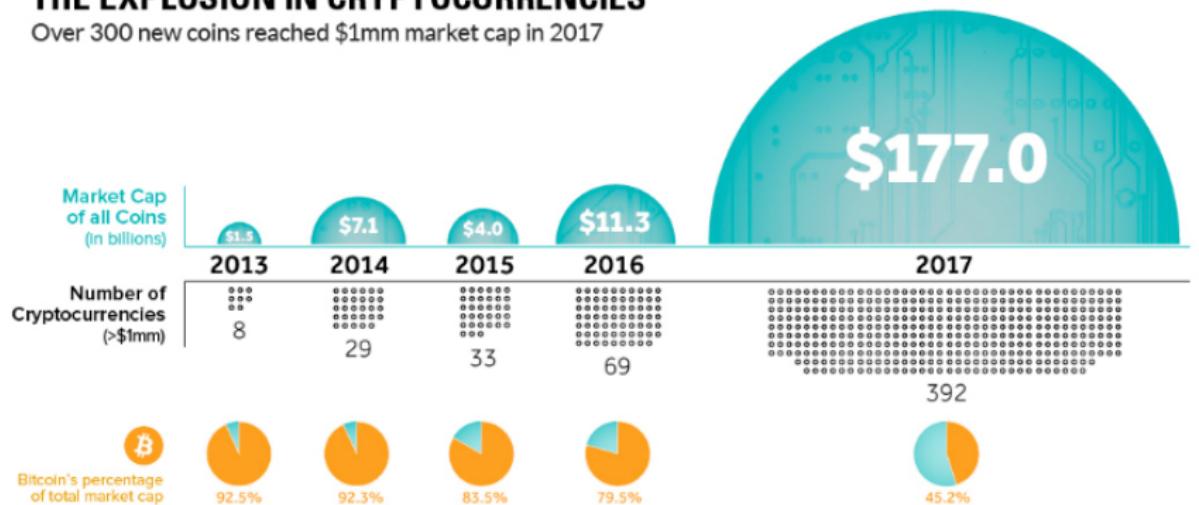


Wiki: Song Dynasty "Jiaozi."

# Expllosion in Cryptocurrencies (w)

## THE EXPLOSION IN CRYPTOCURRENCIES

Over 300 new coins reached \$1mm market cap in 2017



SOURCE: Coinmarketcap.com, last week of August 2017 each year

visualcapitalist.com



## Case Study: Is Bitcoin Money? (w)

*Bitcoin is an innovative payment network and a new kind of money.*

— Bitcoin.org

- What is Bitcoin? Let's watch a short video. (w)
- For an introduction, read its [white paper](#) or [Wikipedia](#).
- To examine whether Bitcoin functions as money, let's check its performance based on the definition and standards.
- Medium of exchange? Is it popular?
- Unit of account? Is it a good yardstick?
- Store of value? Is it secure and reliable?
- What determines the value of the Bitcoin?

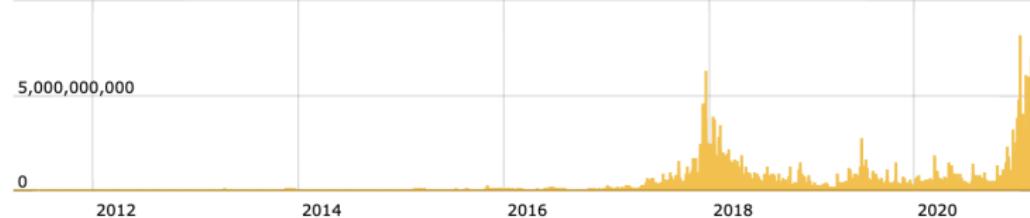
# Case Study: Is Bitcoin Money? Price and Volume (w)

From  To

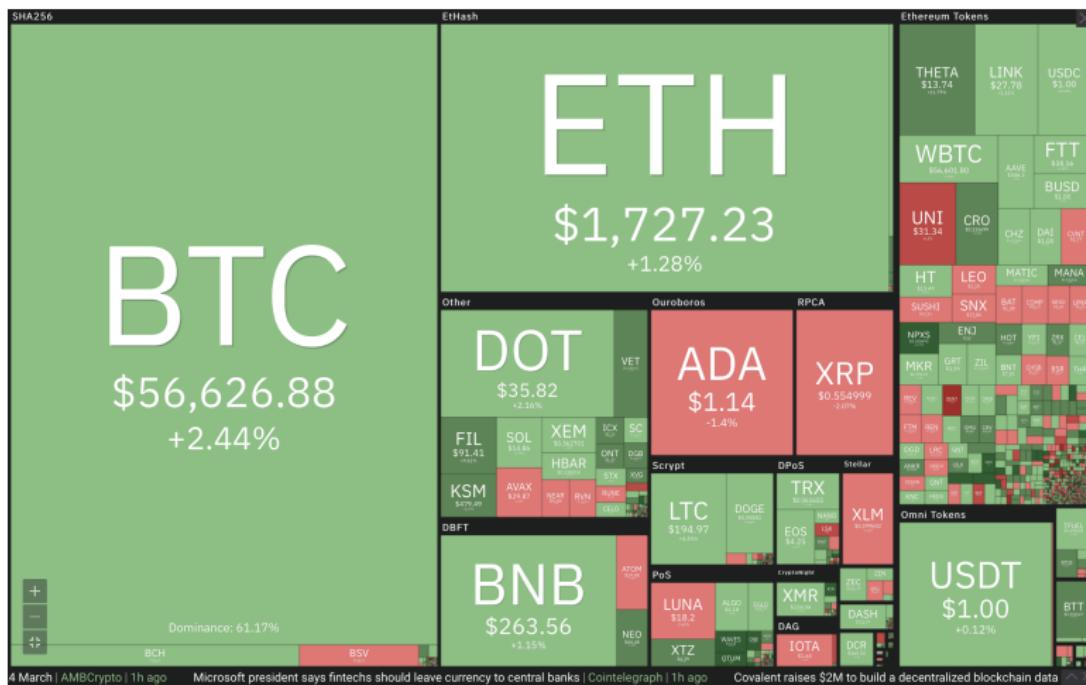
**Value** █ USD 57,356



**Volume** █ USD 782,740,385.35



# Cryptocurrency Heatmap (w)



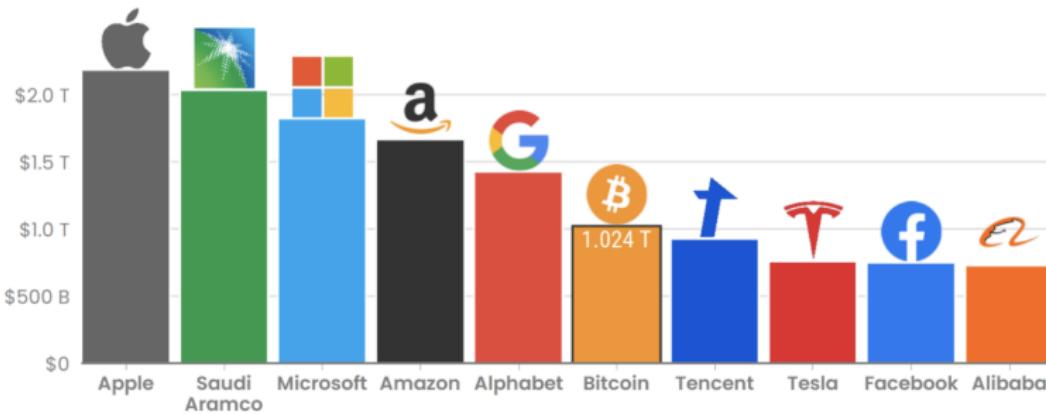
<https://coin360.com/>

# Case Study: Is Bitcoin Money? Market Capitalization (w)



## Bitcoin Passes Tencent In Market Cap

The cryptocurrency's market cap would rank #6 in the world among publically traded companies.



Source: CompaniesMarketCap.com

## Case Study: Bitcoin and Blockchain (w)

- The world's first cryptocurrency, Bitcoin is stored and exchanged securely on the internet through a digital ledger known as a blockchain. Bitcoins are divisible into smaller units known as satoshis—each satoshi is worth 0.00000001 bitcoin.
- The block chain is a shared public ledger on which the entire Bitcoin network relies. All confirmed transactions are included in the block chain.
- It allows Bitcoin wallets to calculate their spendable balance so that new transactions can be verified thereby ensuring they're actually owned by the spender. The integrity and the chronological order of the block chain are enforced with cryptography.
- A transaction is a transfer of value between Bitcoin wallets that gets included in the block chain. All transactions are broadcast to the network and usually begin to be confirmed within 10-20 minutes, through mining.

<https://bitcoin.org/en/how-it-works>

## Money and Financial Innovation

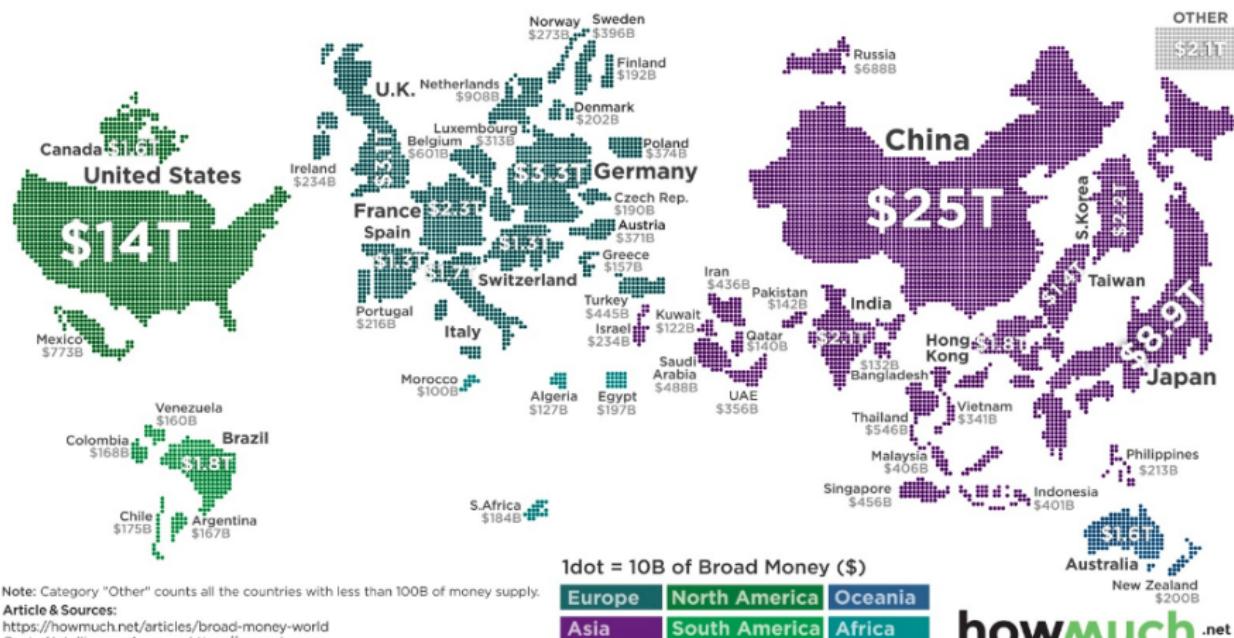
Watch the videos below to be amazed by the financial innovations in the recent years and consider their impacts on our world of money, more specifically, the measurements of money and challenges to monetary policy.

- 201703 What is Blockchain? | CNBC 4:52 (w)
- 201806 What is Fintech? | CNBC 3:47 (w)
- 201901 How Robinhood Makes Money | CNBC 9:00 (w)
- 201904 How Venmo Makes Money | CNBC 11:29 (w)
- 201910 How Square Makes Money | CNBC 13:40 (w)
- 201910 Why Facebook's Libra Is In Trouble | CNBC 14:51 (w)

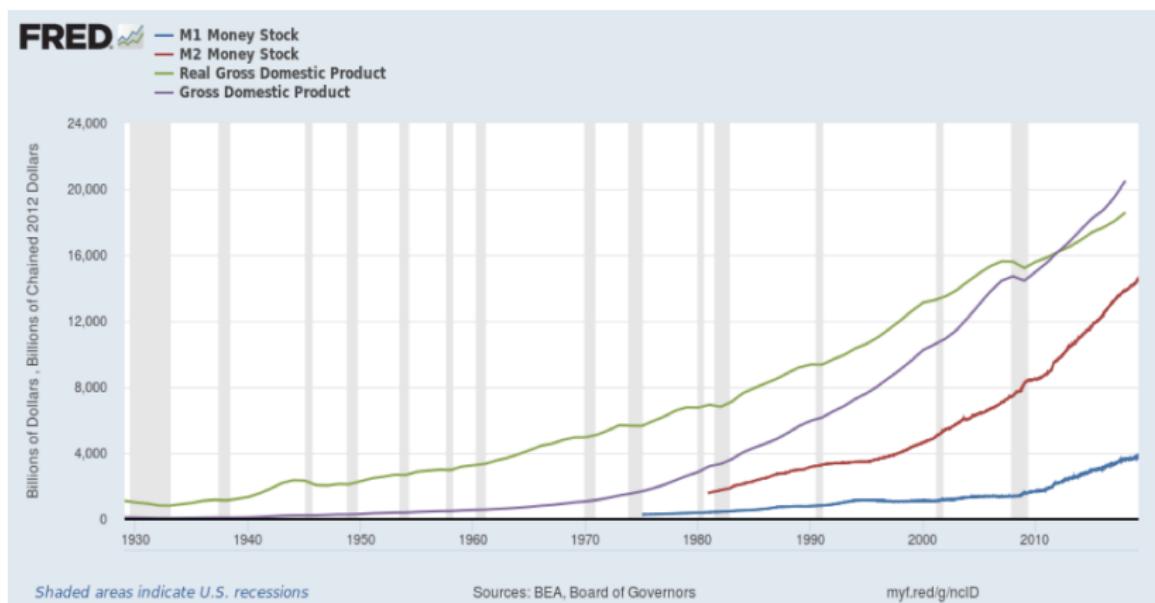
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## Global Money Stock in Circulation, 2019 (w)



# Money Stocks vs U.S. Economy



## U.S. Money Stock Measures: Background (w)

- The Central Bank of the United States, Federal Reserve System, has constructed and published monetary statistics since 1914.
- Timely and accurate data on the monetary aggregates are needed by the Board of Governors and the Federal Open Market Committee for use in monetary policy deliberations and by the public in assessing financial flows and conditions and their implications for the economy.
- Concepts and definitions of the money stock have evolved over time, reflecting changes in the regulatory and institutional environment.

## U.S. Money Stock Measures: H.6 Release (w)

- The H.6 release, published monthly, provides measures of the monetary aggregates (M1 and M2) and their components.
- M1, the more narrowly defined measure, consists of the most liquid forms of money, namely currency and checkable deposits. Beginning May 2020, M1 also includes other liquid deposits.
- The non-M1 components of M2 are primarily household holdings of savings deposits, small-denomination time deposits, and retail money market funds (MMFs) and Keogh balances at MMFs.
- H.6 (money stocks) statistical release website:  
<https://www.federalreserve.gov/releases/h6/current/>
- H.3 (aggregate reserves and monetary base) website:  
<https://www.federalreserve.gov/releases/h3/current/>

# U.S. Money Stock H.6 Statistics (w)

[Add to Data List](#) [Add to Graph](#)[Expand All](#)[Collapse All](#)

Jan 1919

Nov 2020

Dec 2020

Jan 2021

**Feb 2021**

<input type="checkbox"/> Name	Feb 2021	Jan 2021	Feb 2020	Units
<b>▼ Seasonally Adjusted</b>				
<input type="checkbox"/> M1.....	18,412.0	18,120.6	4,027.6	Bil. of \$
<input type="checkbox"/> M2.....	19,669.8	19,400.1	15,473.4	Bil. of \$
<b>▼ Not Seasonally Adjusted</b>				
<input type="checkbox"/> ▼ Monetary base.....	5,446,900	5,248,000	3,454,500	Mil. of \$
<input type="checkbox"/> Currency in circulation.....	2,101,000	2,094,300	1,797,500	Mil. of \$
<input type="checkbox"/> Reserve Balances.....	3,345,900	3,153,800	1,657,000	Mil. of \$
<input type="checkbox"/> M1.....	18,299.2	18,112.5	3,940.3	Bil. of \$
<input type="checkbox"/> M2.....	19,571.4	19,416.7	15,405.7	Bil. of \$
<b>▼ Memorandum: Reserves</b>				
<input type="checkbox"/> Total reserves.....	3,345.9	3,153.8	1,726.9	Bil. of \$
<input type="checkbox"/> Total borrowings from the Federal Reserve.....	53.4758	52.5908	0.0032	Bil. of \$
<input type="checkbox"/> Nonborrowed Reserves.....	3,292,500	3,101,200	1,726,900	Mil. of \$

Source: FRED - H.6 Money Stock Measures, Release Tables.

## U.S. Money Stock Measures (w) (w)

### Base Money (M0)

M0 consists of currency in circulation, and reserve balances.

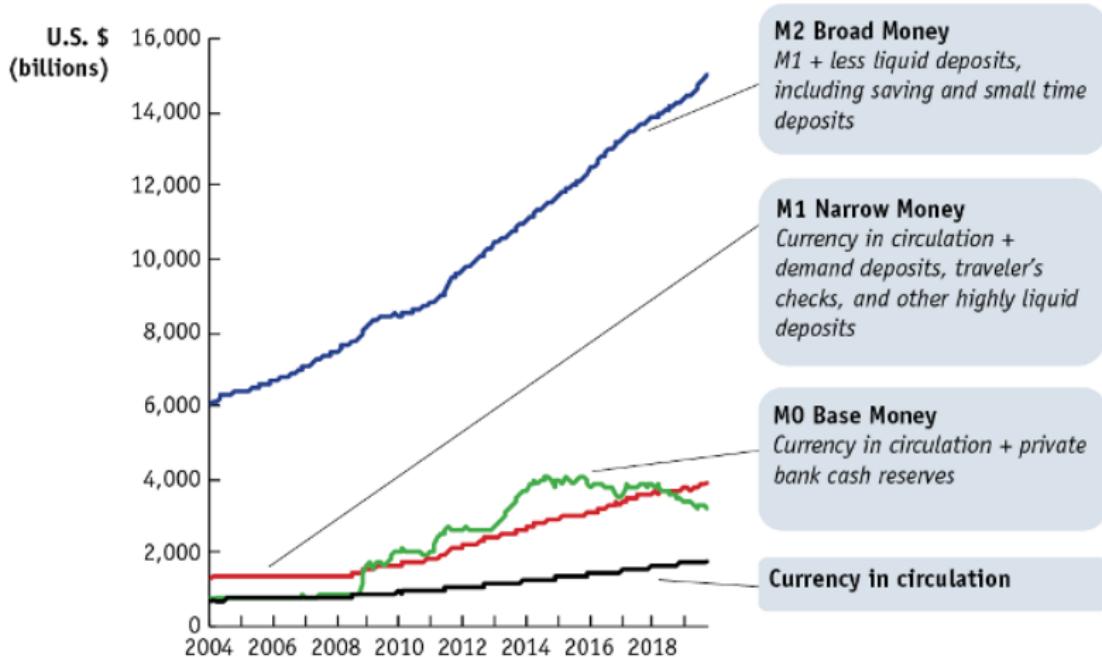
### Narrow Money (M1)

M1 consists of (1) currency in circulation; (2) demand deposits at commercial banks less cash items in the process of collection and Federal Reserve float; and (3) other liquid deposits, consisting of other checkable deposits (OCDs) and savings deposits (including money market deposit accounts).

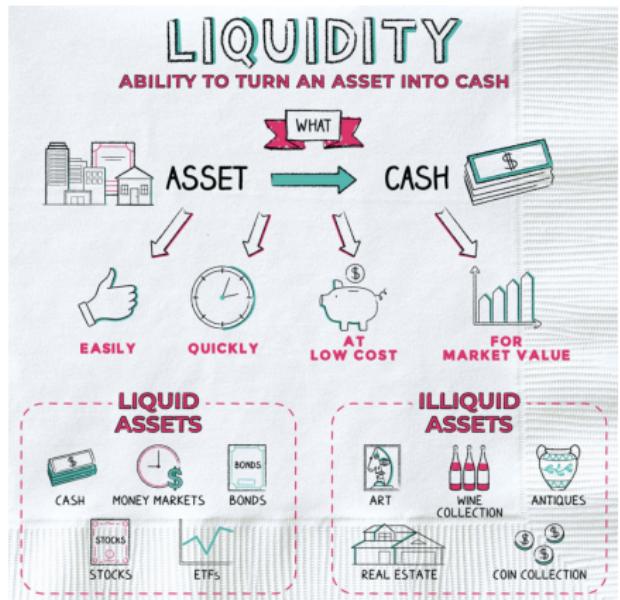
### Broad Money (M2)

M2 consists of M1 plus (1) small-denomination time deposits (in amounts of less than \$100,000) less IRA and Keogh balances at depository institutions; and (2) balances in retail MMFs less IRA and Keogh balances at MMFs.

# U.S. Money Stock Measures, 2000 to 2020



# Money, Asset, and Liquidity (w)



<https://napkinfinance.com/napkin/liquidity/>

Assets are liquid if they can be exchanged for cash:

- Easily and quickly
- At little or no transaction cost
- At their fair market values, i.e., without having to entice a buyer with a big discount

Cash (money) is the most liquid asset because you can easily turn it into other assets.

# Financial Markets and Assets: Classification

Financial market is an institution where financial assets are exchanged.

## ① By Nature

- Debt market
- Equity market

## ② By Maturity

- Money market
- Capital market

## ③ By Seasoning

- Primary market
- Secondary market

## ① By Delivery

- Cash (spot) market
- Derivatives market

## ② By Organization

- Auction market
- Over-the-counter market

## ③ By Trading System

- Order-driven market
- Quote-driven market

# Which is the Most Liquid Asset in the World?



# Outline

- ① What is Money?
- ② How Money Evolves?
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What is Money?  
oooooooooo

How Money Evolves?  
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How to Measure Money?  
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Central Bank Money Policy  
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## Central Bank History and Origins

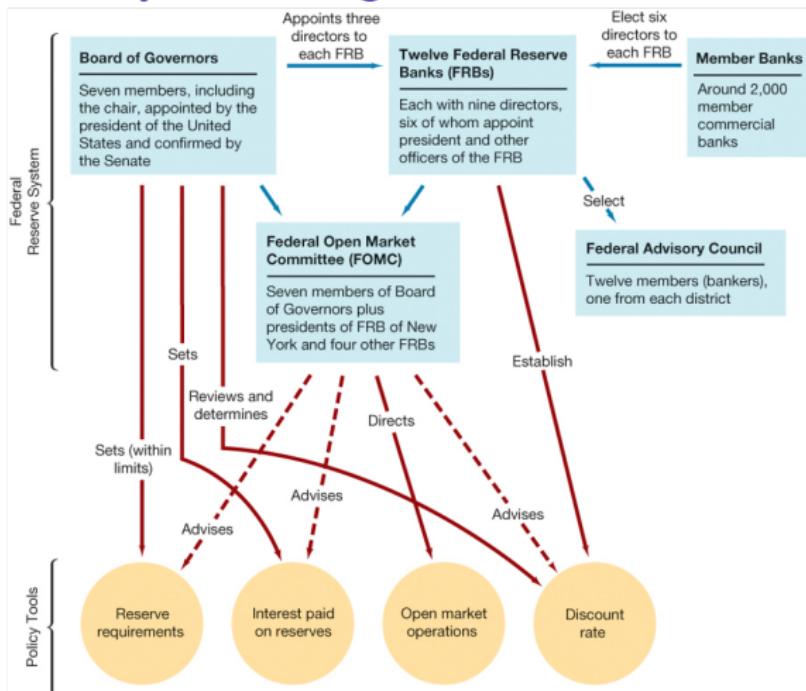
- The earliest central banks were in Sweden, England, and France.
- Established in 1668 as a joint stock bank, the Swedish Riksbank was chartered to lend the government funds and to act as a clearing house for commerce.
- A few decades later (1694), the most famous central bank of the era, the Bank of England, was founded also as a joint stock company to purchase government debt.
- Early central banks typically began as private institutions; over time, governments increasingly took on central banking functions.
- An important responsibility of these central banks was issuing paper money, usually backed by gold.
- In the 19th century, central banks also began to serve as the lender of last resort during financial panics.

## U.S. Central Bank - Federal Reserve System (w)



Source: Mishkin (2019)

# Federal Reserve System: Organizational Structure



Source: Mishkin (2019).

# Federal Reserve System: Geographical Structure



Source: Mishkin (2019).

# Central Bank Mission and Policy Tools

*A central bank is not an ordinary commercial bank, but a government agency. Central banks stand at the center of a nation's financial system and have played a key role in the development of the modern monetary system. Virtually all countries have a central bank.*

—Ben S. Bernanke (2012)

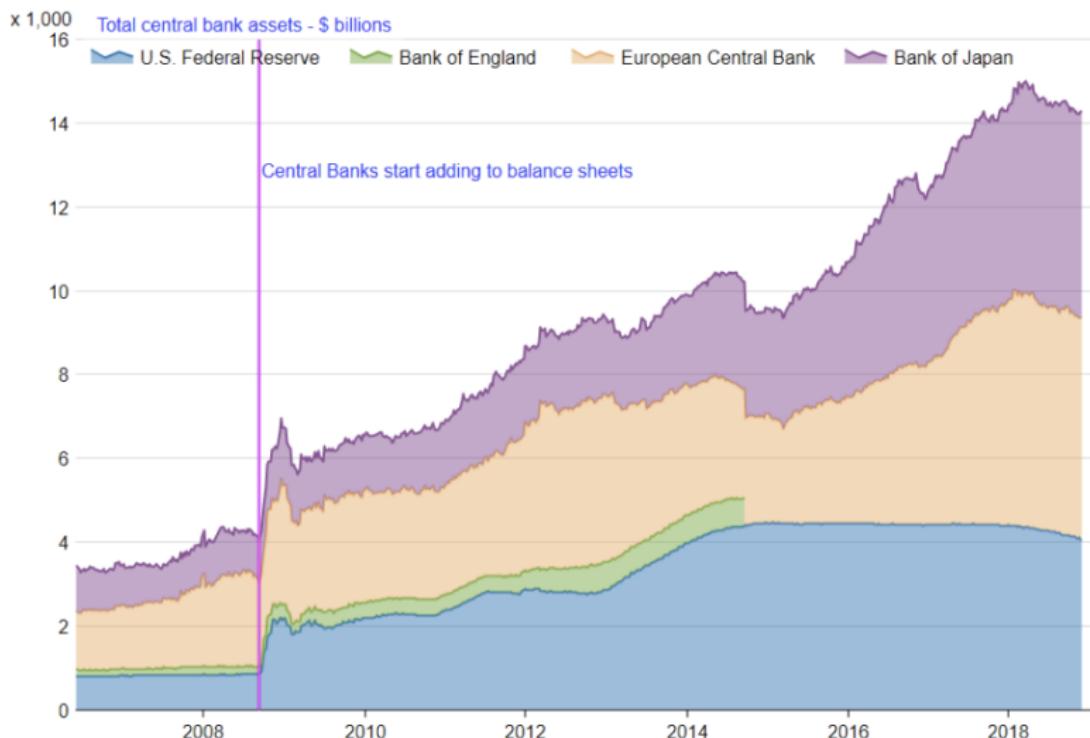
## Mission

- ① Macroeconomic stability
  - Price stability
  - Output and employment
- ② Financial stability
  - Prevent or mitigate financial panics or crises

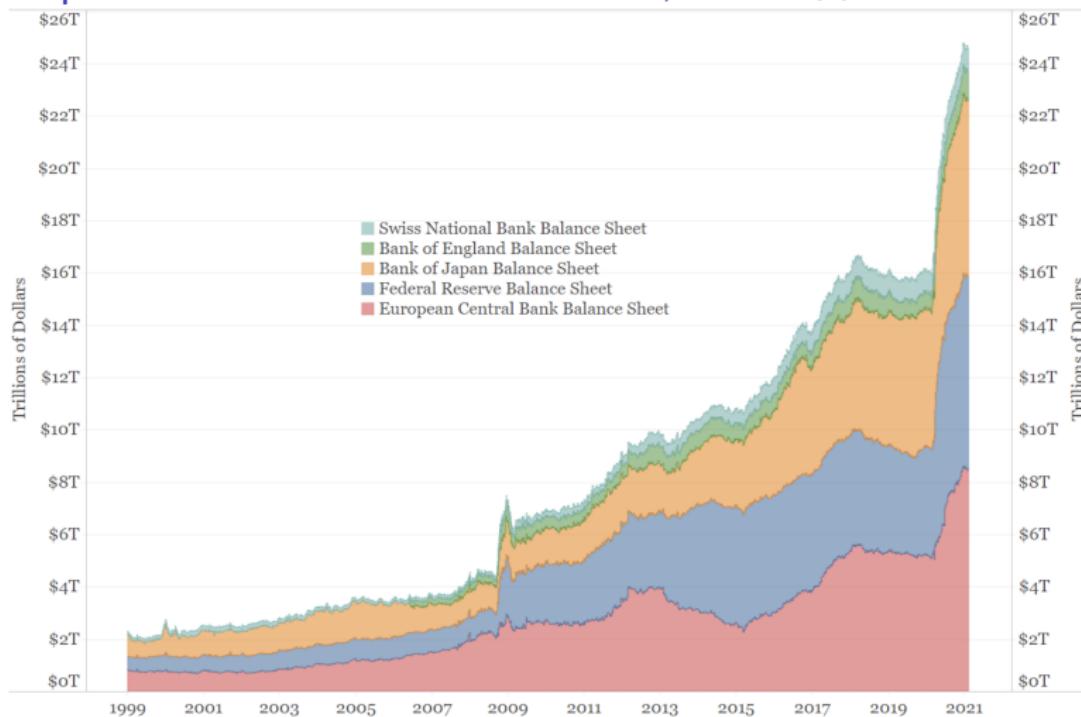
## Policy Tools

- ① Monetary policy
- ② Provision of liquidity
- ③ Financial regulation and supervision

## CB Responses to Global Financial Crisis, 2008 (w)



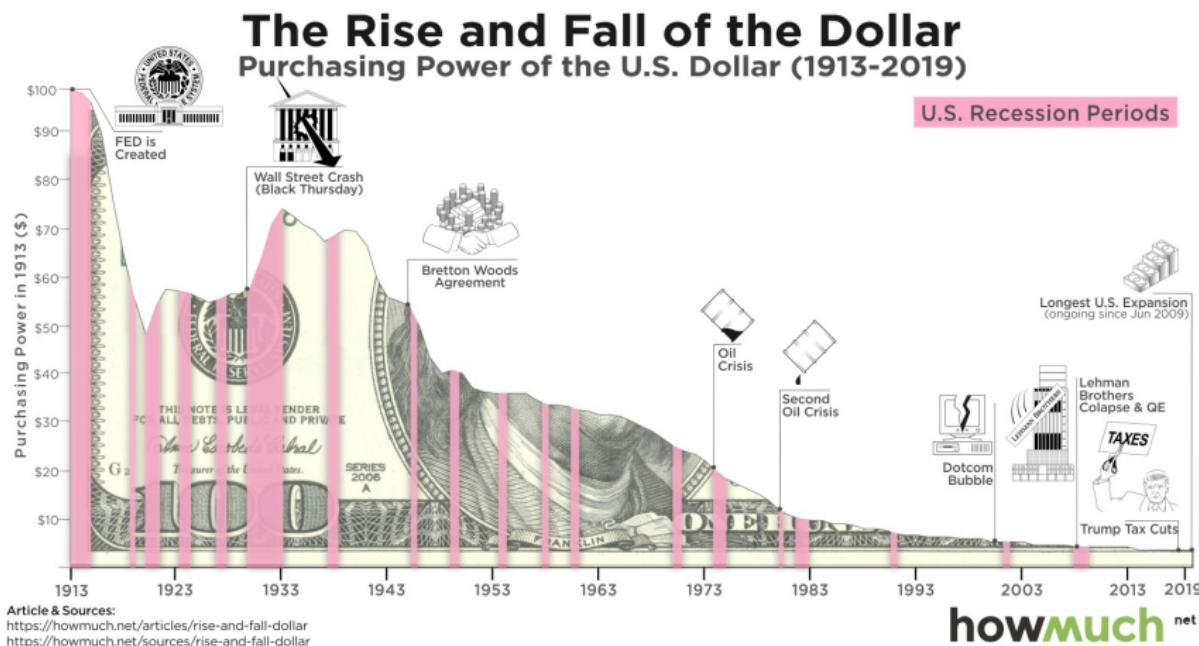
## CB Responses to Global Pandemics, 2020 (w)



Data Source: Fed, ECB, BoJ, BoE, SNB, Bloomberg

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<https://www.biancoresearch.com/>

# Purchasing Power of the U.S. Dollar <sup>(w)</sup>



# Should We Trust in the U.S. Dollars?



## References

- [1] Wikipedia: Money (w) Banknote (w) History of Banking (w)
- [2] NPR Planet Money: The Island Of Stone Money. 2010-12-10. (w)
- [3] Feenstra & Taylor (2021) International Macroeconomics, 4e, Worth.
- [4] Frederic Mishkin (2022) The Economics of Money, Banking, and Financial Markets. 13e. Pearson.
- [5] Bryan, Michael F., 2004. "Island Money," Federal Reserve Bank of Cleveland, Economic Commentary. (w)
- [6] Bordo, Michael D., 2007. "A Brief History of Central Banks," Federal Reserve Bank of Cleveland, Economic Commentary. (w)
- [7] Robert E. Lucas, Jr., "Liquidity: Meaning, Measurement, Management," Federal Reserve Bank of St. Louis Review, Third Quarter 2014, pp. 199-212. (w)
- [8] Federal Reserve Bank of Minneapolis: A History of American Central Banking (w)

☺ Thank you! ☺



This lecture is dedicated to students at  
Houghton College. ...☺...

## Bible Verses About Money for Life Wisdom (w)

Proverbs 22:7 The rich rule over the poor, and the borrower is servant to the lender.

Philippians 4:19 And my God will meet all your needs according to his glorious riches in Christ Jesus.

Timothy 6:10 For the love of money is a root of all kinds of evil. Some people, eager for money, have wandered from the faith and pierced themselves with many griefs.

Acts 20:35 In everything I did, I showed you that by this kind of hard work we must help the weak, remembering the words the Lord Jesus himself said: "It is more blessed to give than to receive."

Malachi 3:10 "Bring the whole tithe into the storehouse, that there may be food in my house. Test me in this," says the LORD Almighty, "and see if I will not throw open the floodgates of heaven and pour out so much blessing that you will not have room enough for it."