

Money

ECO 301: Money and Banking

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1.1 Goals

Goals

- Specific Goals:
 - Learn how quantity of money in the economy is measured.
 - Use supply and demand analysis to determine how changes in money market influence interest rates.
- Learning Objectives:
 - LO2: Define different measures of money, and analyze a market for money to predict changes in interest rates and the quantity of money in the economy.
 - LO3: Predict changes in interest rates using fundamental economic theories including present value calculations, behavior towards risk, and supply and demand models of money and bond markets.

1.2 Reading

Reading

- Chapter 2.

2 Money

2.1 What is money?

What is money?

- Money is a commodity or token that is generally acceptable as a means of payment.
- It may or may not have an inherent value.

- Today the U.S. dollar has no inherent value.
- In prisons cigarettes are sometimes used as money. Cigarettes have an inherent value.
- From 1889-1932 and from 1946-1971 the U.S. would redeem dollars for gold. (Gold Standard).
- Since the late 1970s no country in the world redeems their currency for anything of value.
- Money has three important functions:
 - Medium of exchange
 - Unit of account
 - Store of value

2.2 Functions of money

Functions of money

- Medium of exchange: eliminate the need for a double coincidence of wants
- Unit of account: an agreed measure for stating the relative prices of goods and services
 - Necessary in order for consumers to maximize utility
- Store of value:
 - Money can be held and used for later consumption.
 - Money is not unique in this aspect. Stamps, baseball cards, houses, even computers and TV's can be stores of value.
 - With inflation, the value of money falls. Therefore currencies that undergo hyper-inflation cannot meet this function.

Hyperinflation in Zimbabwe

- The inflation rate in Zimbabwe reached a high November 2008 at 89,700,000,000,000,000,000%
- Prices doubled *every day*
- In 2007, a loaf of bread cost 5 ZWD
- Nine months later loaf of bread cost 50 billion ZWD
- In 2015, 35 quadrillion ZWD (35,000,000,000,000 ZWD) traded for 1.00 USD



Hyperinflation in Venezuela

- The inflation rate in Venezuela in June 2018 was 46,000%
- Prices doubled every 41 days
- Hyperinflation problems continue to this day
- Country in an economic and financial crisis since 2012
- President Nicolas Maduro introduced new 100,000 Bolívar note in November 2017 (Worth \approx 0.4 USD - Sept 2018)
- Sept 2018 exchange rate: 1 USD \approx 250,000 VES



2.3 Forms of Money

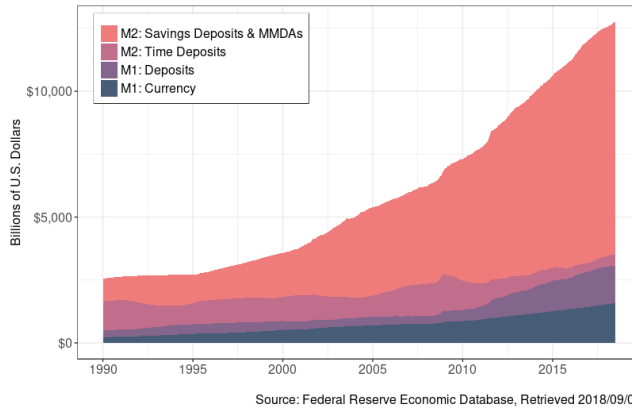
Forms of money

- Two primary forms of money:
 - Currency
 - Deposits at banks and other depository institutions.
 - Stupid trivia:
 - Largest denomination bill the Fed prints is the \$100.
 - Largest denomination ever printed was the \$10,000. Still some in circulation.
 - How many bills do not have presidents on them?
 - * \$10 has Alexander Hamilton (First secretary of the treasury).
 - * \$100 bill has Ben Franklin
 - * \$10,000 bill has Salmon P. Chase (Secretary of the treasury under Lincoln).

Official Measures of money

- Two measures of money called **M1** and **M2**
- M1: currency + checking deposits and traveler's checks.
- These types of assets can be used as immediate means of payment.
- M2: M1 + time deposits, savings deposits, and money market mutual funds.
- The additional items in M2 can *quickly* be converted into a means of payment.
- **Liquidity**: the property of an asset being quickly converted to a means of payment.

Official Measures of Money



What is not included in money

- Checks are not money. The balances in the checking accounts are money.
- Credit cards are not money.
 - When you pay with a credit card, you don't give the merchant money, the credit card company does.
 - Then after some time, you give the credit card company money to pay back the loan.

3 Supply and Demand for Money

3.1 Money Demand

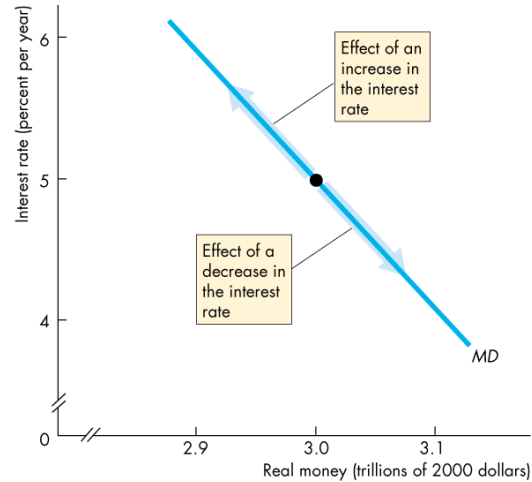
Real vs. nominal money

- **Nominal money**: quantity of money measured in dollars.
- **Real money**: real purchasing power of money.

$$\text{Real money} = \frac{\text{Nominal money}}{\text{Price level}}$$

- What should we use as a price for real money?
What is the opportunity cost of holding money?
[Real interest rate.](#)
- What will be the shape of the money demand curve?

Real money demand

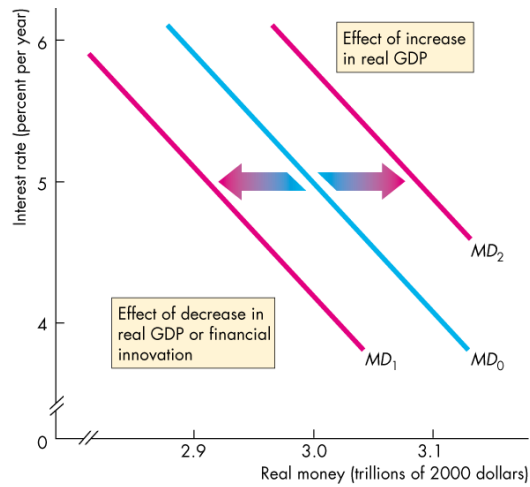


3.2 Influences on Money Demand

Influences of money holding

- The price level: only influences nominal money demand.
- The interest rate. Shift or movement?
- Real GDP.
 - How will an increase in real GDP affect the money demand curve?
- Financial innovation.
 - Examples: ATM's, online banking, automatic transfers between checking and savings accounts, credit and debit cards.
 - How do these affect the money demand curve?

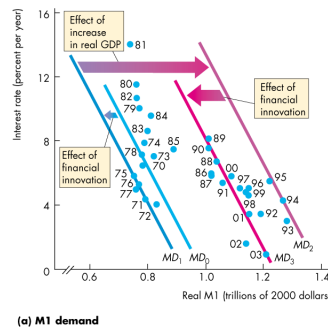
Shifts in money demand



3.3 U.S. experience

Demand for M1 in the U.S.

1. In 1970, MD_1
2. Financial innovation in early 70s $\rightarrow MD_1$
3. Late 80s though the 90s increase in real GDP $\rightarrow MD_2$
4. Financial innovations in the 90s and 2000s $\rightarrow MD_3$



4 Money Market Equilibrium

4.1 Money Supply

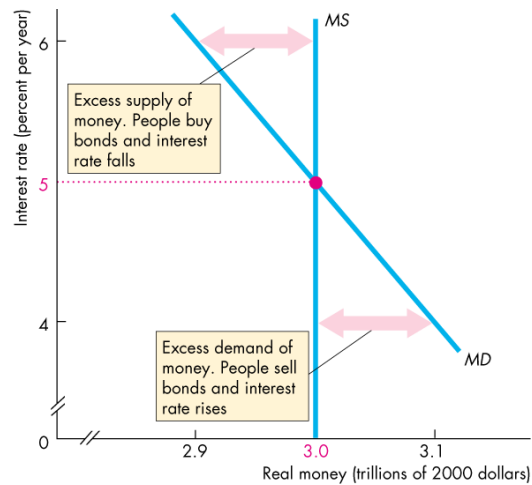
Money Supply

- Nominal money supply determined?
By the Fed.

- What about real money supply?
- In the short run the price level is fixed.
- What is the shape of the money supply curve?

4.2 Interest rate determination

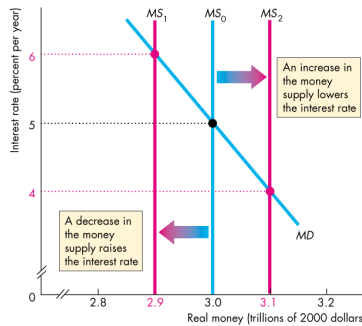
Money market equilibrium



4.3 Monetary policy

Monetary policy

- **Contractionary monetary policy:** decrease in the money supply.
 - Fed conducts an open market _____ of bonds.
 - Shifts money supply from $MS_0 \rightarrow MS_1$.
- **Expansionary monetary policy:** increase in the money supply.
 - Fed conducts an open market _____ of bonds.
 - Shifts money supply from $MS_0 \rightarrow MS_2$.



5 Quantity Theory

5.1 Velocity of Money

Velocity of Money

- **Velocity of money:** the average number of times a dollar is re-spent in a given year to purchase the total amount of goods and services produced in the economy.
- Equation of exchange: total nominal quantity of money exchanged in the economy should equal the nominal value of aggregate production.

$$M_b V = PY$$

- M_b : Monetary base
- V : Velocity of money
- P : Price level
- Y : Real GDP

Quantity Theory of Money

- Quantity Theory of Money: classical theory of the relationship between money, prices, and output
- Assumes velocity of money is fixed: determined by institutions and technology that govern how transactions are conducted
- Assumes wages and prices are perfectly flexible: real GDP is fixed, determined by production possibilities
- If V is fixed, Y is fixed, what must happen if money base doubles?
- Quantity theory of money: increases in money supply lead *only* to an equal percentage increases in prices.

5.2 Money Demand

Quantity Theory of Money Demand

- Rearrange equation of exchange:

$$\frac{M_b}{P} = \frac{1}{V}Y$$

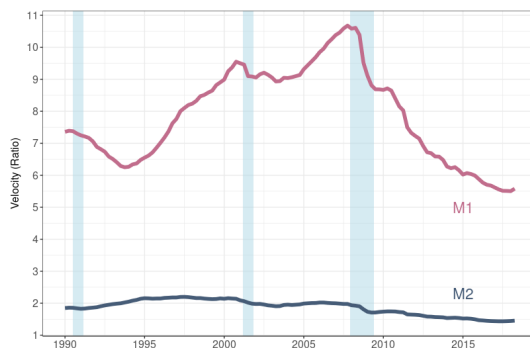
- Money demand depends on:
 - Y : real GDP (aka income)
 - Financial technology
- What will be the shape of the real money demand function?

5.3 Criticisms of Quantity Theory

Quantity Theory and Timing

- Is this a long-run theory or a short-run theory?
- If V is determined by technology, financial institutions, laws, etc - these are likely fixed in the *short run*, but not long run.
- Y is only determined by production possibilities (technology) **if prices, wages, are perfectly flexible** - this is likely only true in the *long run*, but not the short run.

Historical Look at Velocity



- Velocity is *not constant* in short run nor long run.
- Velocity tends to fall during recessions.
- Velocity tends to move in same direction as interest rates.

Quantity Theory and Velocity

- Demand side determinants of velocity.
 - Expected inflation: if people expect money to lose value, they will try to convert money quickly to either goods or interest bearing assets.
 - Interest rate: this is the opportunity cost of holding money. Larger interest rates will cause people to want to convert money more quickly.
- What will be the shape of the real money demand curve?
- What can shift the money demand curve?