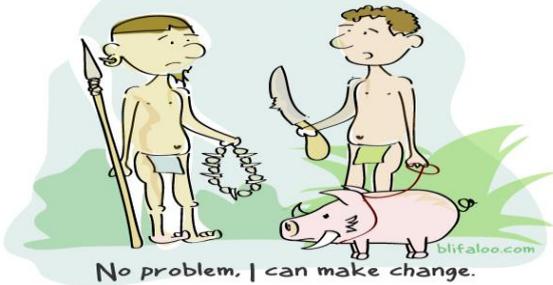


Chapter 7 Lecture - The Asset Market, Money, and Prices

Chapter 7 Lecture - The Asset Market, Money, and Prices

The Advent of Currency...



What is Money? - The Functions of Money

Money: assets that are widely used and accepted as payment

- ▶ Medium of exchange
 - Barter is inefficient—double coincidence of wants
 - Money allows people to trade their labor for money, then use the money to buy goods and services in separate transactions
 - Money thus permits people to trade with less cost in time and effort
 - Money allows specialization, so people don't have to produce their own food, clothing, and shelter

7-2

The Functions of Money

- ▶ Unit of account
 - Money is basic unit for measuring economic value
 - Simplifies comparisons of prices, wages, and incomes
 - The unit-of-account function is closely linked with the medium-of-exchange function
 - Countries with very high inflation may use a different unit of account, so they don't have to constantly change prices
- ▶ Store of value
 - Money can be used to hold wealth
 - Most people use money only as a store of value for a short period and for small amounts, because it earns less interest than money in the bank

7-3

What Is Money?

- ▶ In Touch with Data and Research:
 - Money in a prisoner-of-war camp
 - Radford article on the use of cigarettes as money
 - Cigarette use as money developed because barter was inefficient
 - Even nonsmokers used cigarettes as money
 - Characteristics of cigarettes as money: standardized (so value was easy to ascertain), low in value (so "change" could be made), portable, fairly sturdy
 - Problem with having a commodity money like cigarettes: can't smoke them and use them as money at the same time

<https://www.npr.org/sections/thesalt/2016/08/26/491236253/ramen-noodles-are-now-the-prison-currency-of-choice>

7-4

Chapter 7 Lecture - The Asset Market, Money, and Prices

Measuring Money—Monetary Aggregates

- ▶ Distinguishing what is money from what isn't money is sometimes difficult
 - For example, MMMFs allow check writing, but give a higher return than bank checking accounts: Are they money?
 - There's no single best measure of the money stock

http://www.federalreserve.gov/faqs/money_12845.htm

- ▶ The M1 monetary aggregate
 - Currency and traveler's checks held by the public
 - Transaction accounts on which checks may be drawn
- ▶ All components of M1 are used in making payments, so M1 is the closest money measure to our theoretical description of money

7-5

M2 Aggregate

$M2 = M1 + \text{less moneylike assets}$

- ▶ Additional assets in M2:
 - savings deposits
 - small (< \$100,000) time deposits
 - noninstitutional MMMF balances
 - money-market deposit accounts (MMDAs)
 - Savings deposits include passbook savings accounts
 - Time deposits bear interest and have a fixed term (substantial penalty for early withdrawal)
 - MMMFs invest in very short-term securities and allow limited checkwriting
 - MMDAs are offered by banks as a competitor to MMMFs

7-6

Table 7.1 U.S. Monetary Aggregates (April 2015)

TABLE 7.1

U.S. Monetary Aggregates (May 2015)

| | |
|-----------------------------------|-----------------|
| M1 | 2975.0 |
| Currency | 1294.7 |
| Travelers' checks | 2.7 |
| Transaction accounts | 1677.6 |
| M2 | 11,888.6 |
| Components of M1 | 2975.0 |
| Savings deposits, including MMDAs | 7834.6 |
| Small-denomination time deposits | 474.3 |
| MMMFs (noninstitutional) | 604.7 |

Note: Numbers may not add to totals shown owing to rounding.
Source: Federal Reserve Statistical Release H.6, June 11, 2015.
 Data are not seasonally adjusted.

<http://research.stlouisfed.org/fred2/categories/24>

7-7

Where is the Money?

In Touch with Data and Research:

- ▶ Where have all the dollars gone?
 - In 2012, U.S. currency averaged about \$3300 per person, but surveys show people only hold about \$100
 - Some is held by businesses and the underground economy, but most is held abroad
 - Foreigners hold dollars because of inflation in their local currency and political instability
- Since currency is 1/2 of M1 and over half of currency is held abroad, foreigners hold over 1/4 of M1
 - The data show large fluctuations in M1 when major events occur abroad, like military conflicts

7-8

Chapter 7 Lecture - The Asset Market, Money, and Prices

What Is Money?

The money supply – will be denoted as M

- ▶ Money supply = money stock = amount of money available in the economy
- ▶ How does the central bank of a country increase the money supply?
 - Use newly printed money to buy financial assets from the public—an open-market purchase
 - To reduce the money supply, sell financial assets to the public to remove money from circulation—an open-market sale
 - Open-market purchases and sales are called open-market operations
 - Could also buy newly issued government bonds directly from the government (i.e., the Treasury)
 - This is the same as the government financing its expenditures directly by printing money
 - This happens frequently in some countries (though is forbidden by law in the United States)

7-9

Portfolio Allocation and the Demand for Assets

- ▶ How do people allocate their wealth among various assets?
The portfolio allocation decision
- ▶ Expected return
 - Rate of return = an asset's increase in value per unit of time
 - Bank account: Rate of return = interest rate
 - Corporate stock: Rate of return = dividend yield + percent increase in stock price
 - Investors want assets with the highest expected return (other things equal)
 - Returns not known in advance, so people estimate their *expected return*

7-10

Portfolio Allocation and the Demand for Assets

- ▶ Risk
 - Risk is the degree of uncertainty in an asset's return
 - People don't like risk, so they prefer assets with low risk (other things equal)
 - Risk premium: the amount by which the expected return on a risky asset exceeds the return on an otherwise comparable safe asset
- ▶ Liquidity
 - Liquidity: the ease and quickness with which an asset can be traded
 - Money is very liquid
 - Assets like automobiles and houses are very illiquid— long time and large transaction costs to trade them
 - Stocks and bonds are fairly liquid
 - Investors prefer liquid assets (other things equal)

7-11

Portfolio Allocation and the Demand for Assets

- ▶ Time to maturity
 - Time to maturity: the amount of time until a financial security matures and the investor is repaid the principal
 - Expectations theory of the term structure of interest rates
 - The idea that investors compare returns on bonds with differing times to maturity
 - In equilibrium, holding different types of bonds over the same period yields the same expected return
 - Because long-term interest rates usually exceed short-term interest rates, a risk premium exists: the compensation to an investor for bearing the risk of holding a long-term bond

7-12

Chapter 7 Lecture - The Asset Market, Money, and Prices

Portfolio Allocation and the Demand for Assets

- ▶ Types of assets and their characteristics
 - People hold many different assets, including money, bonds, stocks, houses, and consumer durable goods
 - ▶ Money has a low return, but low risk and high liquidity
 - ▶ Bonds have a higher return than money, but have more risk and less liquidity
 - ▶ Stocks pay dividends and can have capital gains and losses, and are much more risky than money
 - ▶ Ownership of a small business is very risky and not liquid at all, but may pay a very high return
 - ▶ Housing provides housing services and the potential for capital gains, but is quite illiquid

7-13

Table 7.2

Household Assets, 2006, 2009, and 2015

TABLE 7.2

Household Assets, 2006, 2009, and 2015

| | Amounts in trillions of dollars | | | Percentages of total assets | | |
|--|---------------------------------|--------|--------|-----------------------------|--------|--------|
| | 2006Q4 | 2009Q1 | 2015Q1 | 2006Q4 | 2009Q1 | 2015Q1 |
| Real estate | 24.9 | 19.0 | 24.1 | 31.2 | 27.5 | 24.3 |
| Consumer durables | 4.3 | 4.6 | 5.1 | 5.4 | 6.6 | 5.2 |
| Currency and checkable deposits | 0.2 | 0.3 | 1.2 | 0.3 | 0.4 | 1.2 |
| Time, savings, and other deposits | 6.7 | 7.9 | 9.1 | 8.4 | 11.4 | 9.2 |
| Bonds | 4.0 | 5.7 | 4.1 | 5.0 | 8.2 | 4.1 |
| Stocks | 14.2 | 8.1 | 21.6 | 17.8 | 11.8 | 21.8 |
| Proprietors' investment in unincorporated businesses | 8.8 | 7.1 | 10.2 | 11.1 | 10.2 | 10.3 |
| Pension funds | 14.5 | 14.1 | 21.0 | 18.2 | 20.4 | 21.2 |
| Other assets | 2.2 | 2.3 | 2.8 | 2.8 | 3.3 | 2.8 |
| Total Assets | 79.8 | 69.1 | 99.1 | 100.0 | 100.0 | 100.0 |

Note: Numbers may not add to totals owing to rounding.
Source: Federal Reserve Flow of Funds Accounts of the United States, Statistical Release Z.1, June 11, 2015.

7-14

Portfolio Allocation and the Demand for Assets

- ▶ In touch with data and research: the housing crisis of 2007 to 2011
 - People gained tremendous wealth in their houses in the 2000s
 - As house prices rose, houses became increasingly unaffordable, leading mortgage lenders to create subprime loans for people who wouldn't normally qualify to buy houses
 - Most subprime loans had adjustable interest rates, with a low initial interest rate that would later rise in a process known as mortgage reset

7-15

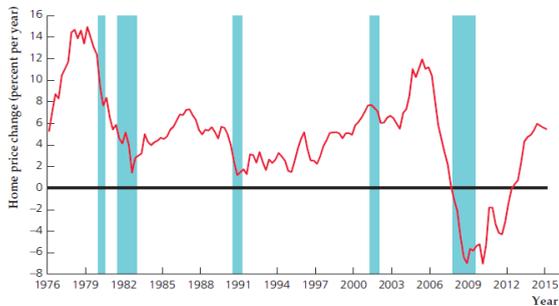
Portfolio Allocation and the Demand for Assets

- ▶ The housing crisis that began in 2007
 - As long as housing prices kept rising, both lenders and borrowers thought the subprime loans would work out, as the borrowers could always sell their houses to pay off the loans
 - But housing prices stopped rising as much, leading more subprime borrowers to default, so banks began to tighten their lending standards, reducing the demand for housing and leading housing prices to start falling

7-16

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Figure 7.1: Change in home prices from one year earlier, 1976Q1–2015Q1



Source: Federal Housing Finance Agency, downloaded from Federal Reserve Bank of St. Louis FRED database, research.stlouisfed.org/fred2/series/USSTHPI.

7-17

Portfolio Allocation and the Demand for Assets

- ▶ The housing crisis that began in 2007
 - Many homeowners lost their homes and financial institutions lost hundreds of billions of dollars because of mortgage loan defaults
 - Because many mortgage loans had been securitized and were parts of mortgage-backed securities, the increased default rate on mortgages led to a financial crisis in Fall 2008, as many investors simultaneously tried to sell risky assets, including mortgage-backed securities and stocks

<https://www.youtube.com/watch?v=Bzc8ZO5XYyo>

7-18

Portfolio Allocation and the Demand for Assets

- ▶ Asset Demands
 - Trade-off among expected return, risk, liquidity, and time to maturity
 - Assets with low risk and high liquidity, like checking accounts, have low expected returns
 - Investors consider diversification: spreading out investments in different assets to reduce risk
 - The amount a wealth holder wants of an asset is his or her demand for that asset
 - The sum of asset demands equals total wealth

7-19

The Demand for Money

- ▶ The demand for money is the quantity of monetary assets people want to hold in their portfolios
 - Money demand depends on expected return, risk, and liquidity
 - Money is the most liquid asset
 - Money pays a low return
 - People's money-holding decisions depend on how much they value liquidity against the low return on money

7-20

Chapter 7 Lecture - The Asset Market, Money, and Prices

The Demand for Money

- ▶ Key macroeconomic variables that affect money demand
 - Price level
 - Real income
 - Interest rates
- ▶ Price level
 - The higher the price level, the more money you need for transactions
 - Prices are 10 times as high today as in 1935, so it takes 10 times as much money for equivalent transactions
 - Nominal money demand is thus proportional to the price level

7-21

The Demand for Money

- ▶ Real income
 - The more transactions you conduct, the more money you need
 - Real income is a prime determinant of the number of transactions you conduct
 - So money demand rises as real income rises
 - But money demand isn't proportional to real income, since higher-income individuals use money more efficiently, and since a country's financial sophistication grows as its income rises (use of credit and more sophisticated assets)
 - Result: Money demand rises less than 1-to-1 with a rise in real income

7-22

The Demand for Money

- ▶ Interest rates
 - An increase in the interest rate or return on nonmonetary assets decreases the demand for money
 - An increase in the interest rate on money increases money demand
 - This occurs as people trade off liquidity for return
 - Though there are many nonmonetary assets with many different interest rates, because they often move together we assume that for nonmonetary assets there's just one nominal interest rate, i

7-23

The Demand for Money

The money demand function

- ▶ $M^d = P \times L(Y, i)$
 - M^d is nominal money demand (aggregate)
 - P is the price level
 - L is the money demand function
 - Y is real income or output
 - i is the nominal interest rate on nonmonetary assets
- As discussed above, nominal money demand is proportional to the price level
- A rise in Y increases money demand; a rise in i reduces money demand
- We exclude i^m since it doesn't vary much

7-24

Chapter 7 Lecture - The Asset Market, Money, and Prices

The Demand for Money

▶ The money demand function

- Alternative expression:

$$M^d = P \times L(Y, r + \pi^e)$$

A rise in r or π^e reduces money demand

- Alternative expression:

$$M^d / P = L(Y, r + \pi^e)$$

7-25

The Demand for Money

▶ Other factors affecting money demand

- Wealth: A rise in wealth may increase money demand, but not by much
- Risk
 - ▶ Increased riskiness in the economy may increase money demand
 - ▶ Times of erratic inflation bring increased risk to money, so money demand declines
- Liquidity of alternative assets: Deregulation, competition, and innovation have given other assets more liquidity, reducing the demand for money
- Payment technologies: Credit cards, ATMs, and other financial innovations reduce money demand

7-26

Summary

SUMMARY 9

Macroeconomic Determinants of the Demand for Money

| An increase in | Causes money demand to | Reason |
|---------------------------------------|--|---|
| Price level, P | Rise proportionally | A doubling of the price level doubles the number of dollars needed for transactions. |
| Real income, Y | Rise less than proportionally | Higher real income implies more transactions and thus a greater demand for liquidity. |
| Real interest rate, r | Fall | Higher real interest rate means a higher return on alternative assets and thus a switch away from money. |
| Expected inflation, π^e | Fall | Higher expected inflation means a lower real return on money and thus a switch away from money. |
| Nominal interest rate on money, r^m | Rise | Higher return on money makes people more willing to hold money. |
| Wealth | Rise | Part of an increase in wealth may be held in the form of money. |
| Risk | Rise, if risk of alternative asset increases Fall, if risk of money increases | Higher risk of alternative asset makes money more attractive. Higher risk of money makes it less attractive. |
| Liquidity of alternative assets | Fall | Higher liquidity of alternative assets makes these assets more attractive. |
| Efficiency of payments technologies | Fall | People can operate with less money. |

7-27

The Elasticities of Money Demand

How strong are the various effects on money demand?

- Income elasticity of money demand
 - ▶ Positive: Higher income increases money demand
 - ▶ Less than one: Higher income increases money demand less than proportionately
 - ▶ Goldfeld's results: income elasticity = 2/3
- Interest elasticity of money demand
 - ▶ Small and negative: Higher interest rate on nonmonetary assets reduces money demand slightly
- Price elasticity of money demand is unitary, so money demand is proportional to the price level

7-28

Chapter 7 Lecture - The Asset Market, Money, and Prices

Velocity of Money

- ▶ Velocity and the quantity theory of money
 - Quantity theory of money: Real money demand is proportional to real income
 - If so,

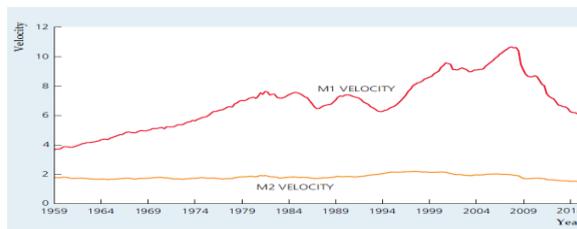
$$M^d / P = kY$$
 - Assumes constant velocity, where velocity isn't affected by income or interest rates
- ▶ Velocity and the quantity theory of money
 - But velocity of M1 is not constant; it rose steadily from 1960 to 1980 and has been erratic since then
 - Part of the change in velocity is due to changes in interest rates in the 1980s
 - Financial innovations also played a role in velocity's decline in the early 1980s
 - M2 velocity is closer to being a constant, but not over short periods

7-29

Figure 7.2 Velocity of M1 and M2, 1959-2015

- Velocity and the quantity theory of money
 - Velocity (V) measures how much money "turns over" each period
 - $V = \text{nominal GDP} / \text{nominal money stock}$
 - $V = PY / M$

<http://research.stlouisfed.org/fred2/series/M2V>



Source: Board of Governors of the Federal Reserve System, downloaded from FRED database of the Federal Reserve Bank of St. Louis, research.stlouisfed.org/fred2/, series M1SL, M2SL, and GDP.

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Velocity & Quantity Theory Of Money Once Again

- ▶ Velocity
 - Speed – at which money circulates
 - Number of times per year An "average dollar" is spent
 - Ratio of
 - Nominal gross domestic product (GDP)
 - To number of dollars in money stock

$$\text{Velocity} = \frac{\text{Value of transactions}}{\text{Money stock}} = \frac{\text{Nominal GDP}}{M} = \frac{P \times Y}{M}$$

$$\text{Money supply} \times \text{Velocity} = \text{Nominal GDP}$$

- ▶ Equation of exchange

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

7-31

Velocity & Quantity Theory Of Money

- ▶ Quantity theory of money
 - Equation of exchange
 - Economic model
 - Changes in velocity – minor
 - Velocity - constant
 - Nominal GDP
 - Proportional to money stock

$$\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Y$$

- ▶ If Velocity is constant, what is monetary policy if price stability is goal?

$$\% \Delta P = \% \Delta M - \% \Delta Y$$

7-32