

Principles of Macroeconomics

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2015

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3. If people want to smooth their consumption over time, what will they tend to do when they win the lottery: Spend most of it within a year or save most of it for later?
4. The typical savings supply curve has a positive slope. If a nation's saving supply curve had a perfectly vertical slope, what would that mean?
 - a People in this country save the same amount no matter what the interest rate is.
 - b People in this country are extremely sensitive to interest rates when deciding how much to save.

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1. Use the instructions in the appendix to Chapter 26 to set up the Solow model in a spreadsheet program with the Investment Share equal to 0.3 and with the Depreciation Rate equal to 0.2. Both numbers are just what was used in the chapter. Now increase the Investment Share to 0.36.

- a What is the new level of steady state capital? (Remember, the level of steady-state capital is where Investment = Depreciation.)
- b At the new steady level of capital what is the level of output Y? Now change the Investment Share back to 0.3 and this time increase the Depreciation Rate to 0.25.
- c What is the new level of steady-state capital?
- d At the steady-state level of capital what is the level of output Y?
- e Fill in the blanks with your conclusions:
An increase in the investment share ... the steady-state level of capital and output.
An increase in the depreciation rate ... the steady-state level of capital and output.

6. If financial intermediation breaks down, what category of GDP will probably fall the most: consumption, investment, government purchases, or net exports?
7. In many poor countries, the banking system just isn't advanced enough to lend money for many large investments. Based on this single fact, where would you expect to see more entrepreneurs coming from rich families rather than poor families: in the rich countries or the poor countries? Why?
8. Who is more likely to lobby the government for fast money growth: people who have mortgages or people who own banks that lent money for those mortgages?

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What is Money?

What is Money?

Money (or the "money supply"): anything that is generally accepted in payment for goods or services or in the repayment of debts.

Currency is a system of money in common use.

Money (a stock concept) is different from:

Wealth: the total collection of pieces of property that serve to store value

Income: flow of earnings per unit of time (a flow concept)

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Money's a matter of functions four, A Medium, a Measure, a Standard, a Store

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The Definition and Functions of Money

- ▶ Money is a highly liquid financial asset that serves as a:
 - ▶ Medium of exchange
 - ▶ Unit of account
 - ▶ Standard of deferred payment
 - ▶ Store of wealth



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Functions of Money: Medium of Exchange

- ▶ Eliminates the trouble of finding a double coincidence of needs (reduces transaction costs)
- ▶ Promotes specialization
- ▶ A medium of exchange must
 - ▶ be easily standardized
 - ▶ be widely accepted
 - ▶ be divisible
 - ▶ be easy to carry
 - ▶ not deteriorate quickly

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Functions of Money: Unit of Account

- ▶ used to measure value in the economy
- ▶ reduces transaction costs
- ▶ A Unit of Account must
 - ▶ be divisible
 - ▶ fungible
 - ▶ countable

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Functions of Money: Standard of Deferred Payment & Store of Value

- ▶ Money is used to save purchasing power over time
 - ▶ other assets also serve this function
 - ▶ Individuals' deposits in savings and checking accounts serve the same function as does currency and are also considered to be money
- ▶ A Standard of Deferred Payment must
 - ▶ be able to act as debt & credit
 - ▶ be (legal) tender
- ▶ A Store of Value must
 - ▶ be savable
 - ▶ be storable
 - ▶ retrievable
 - ▶ valuable upon retrieval

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Evolution of Payments System (Currencies)

- ▶ Commodity Money: valuable, easily standardized and divisible commodities (e.g. precious metals, cigarettes).
- ▶ Fiat Money: paper money decreed by governments as legal tender.
- ▶ Checks: an instruction to your bank to transfer money from your account
- ▶ Electronic Payment (e.g. online bill pay).
- ▶ E-Money (electronic money):
 - ▶ Debit card
 - ▶ Stored-value card (smart card)
 - ▶ E-cash

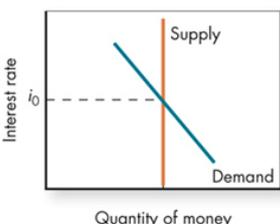
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Are We Headed for a Cashless Society?

- ▶ Predictions of a cashless society have been around for decades, but they have not come to fruition
- ▶ Although e-money might be more convenient and efficient than a payments system based on paper, several factors work against the disappearance of the paper system
- ▶ Still, the use of e-money will likely still increase in the future

Why People Hold (Cash) Money

- ▶ The only reason people would be willing to hold money is if they get some benefit from doing so
 - ▶ The **transactions motive** is the need to hold money for spending
 - ▶ The **precautionary motive** is holding money for unexpected expenses and impulse buying
 - ▶ The **speculative motive** is holding cash to avoid holding financial assets whose prices are falling



- ▶ The demand for money is downward-sloping: as the interest rate falls the cost of holding money falls
- ▶ When interest rates rise, bonds and other financial assets become more attractive, so you hold more financial assets and less money

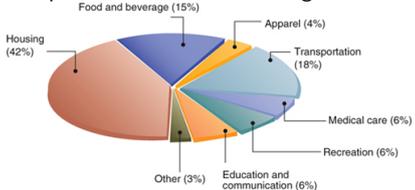
Inflation

- ▶ **Inflation** is a continual rise in the price level
 - ▶ is measured with price indexes
 - ▶ Expectations of inflation can become built into individuals' behavior and economic institutions and cause a small inflation to accelerate
 - ▶ Inflation creates feelings of injustice and destroys the informational value of prices and the market
- ▶ **Deflation** is a continual fall in the price level
- ▶ Inflation and deflation are measured with changes in price indexes
- ▶ **Price index** is a number that summarizes what happens to a weighted composite of prices of a selection of goods over time
- ▶ **Real price** is the price of a good that has been corrected for inflation.

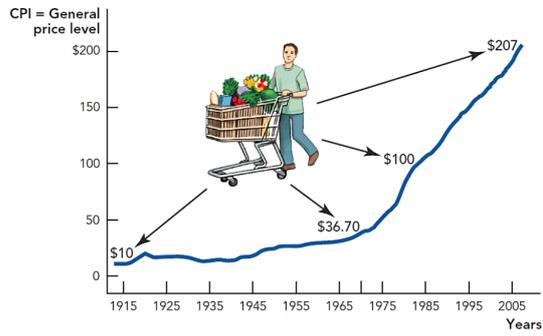
Duck Tales: "Dough Ray Me" (S03E07)

Real World Price Indexes

- ▶ **GDP deflator** is an index of the price level of aggregate output relative to a base year
- ▶ **Consumer price index (CPI)** measures the prices of a fixed basket of consumer goods, weighted according to each component's share of a average consumer's expenditures



- ▶ **Personal consumption expenditure (PCE) deflator** is a measure of prices of goods that consumers buy that allows yearly changes in the basket of goods that reflect actual consumer purchasing habits
- ▶ **Producer price index (PPI)** measures average change in the selling prices received by domestic producers



- ▶ 1982 price of gasoline was \$1.25/gal.
- ▶ 2006 it was double that at \$2.50/gal.
- ▶ CPI was 100 in 1982 and 202 in 2006.
- ▶ The real price of gasoline was about the same in 2006 as it was in 1982.

Hyperinflation: extremely high rates of inflation

- ▶ Many governments have fallen into the trap of inflating their currency in order to pay debts.
- ▶ Hungary's hyperinflation is the highest on record. What cost 1 Hungarian pengo in 1945 cost 1.3 septillion pengos at the end of 1946. Prices doubled every 15 hours!

| Nation | Period | Cumulative Inflation Rate (%) | Maximum Inflation Rate on a Monthly Basis (%) |
|------------|-----------|-------------------------------|---|
| America | 1777-1780 | 2,702 | 1,342 |
| Bolivia | 1984-1985 | 97,282 | 196 |
| Peru | 1987-1992 | 17,991,287 | 1,031 |
| Yugoslavia | 1993-1994 | 1.6×10^9 | 5×10^{15} |
| Nicaragua | 1986-1991 | 1.2×10^{10} | 261 |
| Greece | 1941-1944 | 1.60×10^{11} | 8.5×10^9 |
| Germany | 1919-1923 | 0.5×10^{12} | 3,250,000 |
| Zimbabwe | 2001-2008 | 8.53×10^{23} | 7.96×10^{10} |
| Hungary | 1945-1946 | 1.3×10^{24} | 4.19×10^{16} |

The Quantity Theory of Money and Inflation

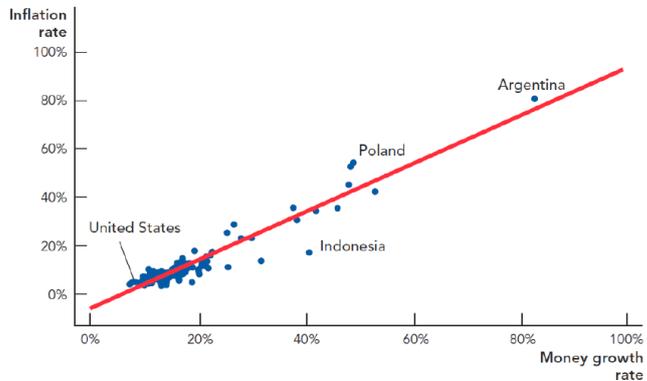
Inflation is always and everywhere a monetary phenomenon

- ▶ The equation of exchange is: $MV = PQ$
 - ▶ M = Quantity of money
 - ▶ Q = Real output
 - ▶ V = Velocity of money
 - ▶ P = Price level
- ▶ Velocity of money is the number of times per year, on average, a dollar goes around to generate a dollar's worth of income

$$\text{Velocity} = \text{Nominal GDP} / \text{Money Supply}$$

- ▶ Three assumptions of quantity theory:
 1. Velocity of money is stable compared to the money supply. It is determined by various factors such
 2. Real output (Q) is stable and independent of money supply
 3. If Output is fixed by real factors of production and Velocity is stable, then it follows that inflation is caused by an increase in the supply of money.
 - ▶ $\% \Delta M \rightarrow \% \Delta P$

Inflation and Money Growth



The empirical evidence that supports the quantity theory of money is most convincing in countries that experience substantial inflation.

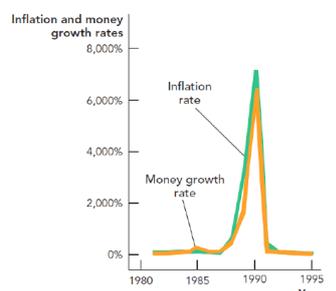
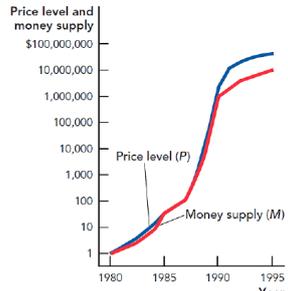
Theories of Inflation

- ▶ Two theories of inflation are the quantity theory and the institutional theory
 - ▶ The **quantity theory** emphasizes the connection between money and inflation; if the money supply rises, the price level rises
 - ▶ The **institutional theory** emphasizes the relationship between market structure and price-setting institutions and inflation
- ▶ The two theories overlap significantly, but they come to different policy conclusions

The Quantity Theory of Money and Inflation

Growth rate of money + growth rate of v equals the rate of inflation + growth rate of real GDP.

- ▶ If the growth rates of Velocity and GDP are small compared to the growth rate of M, the rate of inflation will be approximately equal to the increase in money supply.



The Quantity Theory of Money and Inflation

Some Important Caveats:

- ▶ If M and v grow more slowly than GDP, prices will fall; this is called deflation.
- ▶ Changes in velocity will affect prices.
 - Hyperinflation: People will spend their money faster (increase v) → even faster increase in prices.
 - Great Depression: Fear → less spending (decreased v) → deflation → worse depression.
- ▶ In the long run, money is neutral.
 - ▶ Under some circumstances, changes in M can temporarily change GDP.
 - ▶ Increase in M can boost the economy in the short run but as firms and workers come to expect and adjust to the influx of new money, output (real GDP) will not grow any faster than normal.

Quantity vs. Institutional Theories of Inflation

- ▶ Both quantity theorists and institutionalists agree that money and inflation are positively related, but they have different causes and effects
- ▶ Quantity theorists believe that increases in money cause direct increases in prices
- ▶ Institutionalists believe that increases in prices force government to increase the money supply or cause unemployment
- ▶ According to the quantity theory, changes in money cause changes in prices

$$MV \rightarrow PQ$$

- ▶ According to the institutionalists, increases in prices force the government to increase the money supply

$$MV \leftarrow PQ$$

The Insider/Outsider Model and Inflation

- ▶ The insider-outsider model is an institutionalist story of inflation where insiders bid up wages and outsiders are unemployed
- ▶ If markets were purely competitive, wages, profits, and rents would be pushed down to equilibrium levels
- ▶ Because insiders develop barriers such as unions and brand recognition to prevent outsider competition, outsiders must take dead-end low paying jobs

If all prices (including wages) are going up, then why is inflation a problem?

What are potential costs of inflation to society?

Institutionalist Theories of Inflation

- ▶ The source of inflation is firms who pass on higher wages, rents, taxes, or other costs on to consumers in the form of higher prices
- ▶ If the government increases the money supply so that demand is sufficient to buy the goods at higher prices, inflation is the result
- ▶ If the government doesn't increase the money supply unemployment increases

Demand-Pull and Cost-Push Inflation

- ▶ Demand-pull inflation occurs when the economy is at or above potential output
 - ▶ It is generally characterized by shortages of goods and workers
- ▶ Cost-push inflation occurs when the economy is below potential output
 - ▶ Significant proportions of markets or one very important market experience price increases not related to demand pressure

The Costs of Inflation

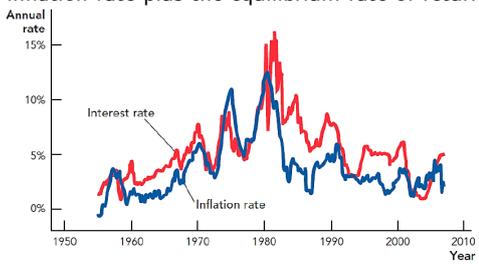
1. Inflation causes price confusion and money illusion.
 - ▶ Money Illusion: when people mistake changes in nominal prices for changes in real prices.
 - ▶ Inflation makes price signals more difficult to interpret. A consumer may not know if the price of a product is increasing...
 - ▶ Because of increased demand? or
 - ▶ As a result of all prices going up with inflation.
2. Inflation interacts with other taxes.
 - ▶ People pay taxes on illusory (nominal not real) capital gains.
 - ▶ Longer-run effect is to discourage investment in the first place.
3. Inflation is painful to stop.
 - ▶ Slowing down the money supply can create a recession.
4. Inflation redistributes wealth.

Inflation redistributes wealth among the public

- ▶ The lender is now losing money on the loan.
- ▶ The borrower gains.

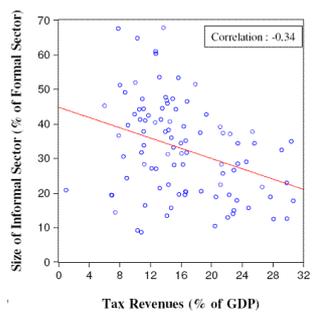
What happens if people expect inflation to go up?

- ▶ Lenders will increase nominal rates of interest.
- ▶ Fisher effect: the tendency for nominal interest rates to rise with expected inflation.
- ▶ The nominal rate of interest will be equal to expected inflation rate plus the equilibrium rate of return.



Inflation is a type of tax

- ▶ Inflation transfers wealth to the government that prints money to pay its bills.
- ▶ Monetizing the debt: when the government pays off its debts by printing money.
- ▶ Why don't they always inflate their debt away?
 - ▶ The Fisher effect: if banks know the government is doing this, they will simply raise interest rates.
 - ▶ Political cost: People who buy government bonds usually vote.



Workers and firms are affected by inflation

Wage agreements are often made several years in advance.

- ▶ Underestimating inflation: wages are too low → supply of labor: too low.
- ▶ Overestimating inflation: wages are too high → demand for labor: too low.
- ▶ Errors in estimating the rate of inflation: a misallocation of resources → lower economic growth.

Expected and Unexpected Inflation

- ▶ Expected and unexpected inflations affect behavior differently
- ▶ **Expected inflation** is inflation people expect to occur
 - ▶ Rational expectations are the expectations that the economists' models predict
 - ▶ Adaptive expectations are expectations based in some way on the past
 - ▶ Extrapolative expectations are expectations that a trend will continue
- ▶ **Unexpected inflation** is inflation that surprises people
 - ▶ may redistribute income from lenders to borrowers
 - ▶ If lenders charge a nominal rate of 5% and expect inflation to be 2%, the expected real rate is 3%
 - ▶ If inflation is actually 4%, the real rate is only 1%
 - ▶ People who do not expect inflation and who are tied to fixed nominal contracts will likely lose in an inflationary period
- ▶ Expectations of inflation play an important role in any ongoing inflation
 - ▶ Inflationary expectations can accelerate large inflation

- ▶ If inflation is moderate and stable
 - ▶ Lenders and borrowers can forecast well.
 - ▶ Loans can be signed with rough certainty regarding the value of future payment.
- ▶ Unexpected inflation redistributes wealth throughout society in arbitrary ways

| Unexpected inflation ($E\pi < \pi$) | Unexpected disinflation ($E\pi > \pi$) | Expected inflation = Actual inflation ($E\pi = \pi$) |
|--|---|---|
| Real rate less than equilibrium rate | Real rate greater than equilibrium rate | Real rate equal to equilibrium rate |
| Harms lenders Benefits borrowers | Benefits lenders Harms borrowers | No redistribution of wealth |

- ▶ When inflation is high and volatile Unexpected inflation is difficult to avoid.
 - ▶ Long-term risk becomes high and loans may not be signed at all.
 - ▶ Financial intermediation breaks down.
 - ▶ Long-term contracting grinds to a halt.
 - ▶ Economic growth suffers.

Are there any benefits from moderate and stable inflation?