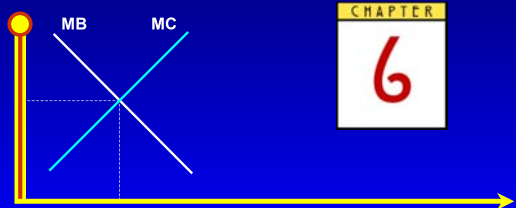
Measuring the Price Level and Inflation



CHAPTER 6

The Consumer Price Index: Measuring the Price Level

- Consumer Price Index (CPI)
  - For any period, measures the cost in that period of a standard basket of goods and services relative to the cost of the same basket of goods and services in a fixed year, called the *base year*

Cost of Reproducing the 1995 (Base-Year) Basket of Goods and Services in Year 2000

Constructing a Hypothetical CPI

Item	Cost (in 2000)	Cost (in 1995)
Rent, two-bedroom apartment	\$630	\$500
Hamburgers (60 at \$2.00 each)	150	120
Movie tickets (10 at \$6.00 each)	70	60
Total expenditure	\$850	\$680

$$\text{Cost of Living} = \frac{850 - 680}{680} = \frac{170}{680} = 25\%$$

The Consumer Price Index: Measuring the Price Level

- Constructing the CPI
  - Bureau of Labor Statistics (BLS)
    - Pick a base year
    - Conduct the *consumer expenditure survey* to determine the base-year basket of goods and services
    - Measure the current prices of the base-year basket

$$\text{CPI} = \frac{\text{Cost of base - year basket of goods and services in current year}}{\text{Cost of base - year basket of goods and services in base year}}$$

Cost of Reproducing the 1995 (Base-Year) Basket of Goods and Services in Year 2000

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- The CPI in year 2000 = $850/$680 = 1.25
- Base year = 1.00
- The cost of living increased by 25% from 1995 to 2000

The Consumer Price Index: Measuring the Price Level

- Constructing the CPI
  - The CPI for a given period measures the cost of living for that period relative to the base year

The Consumer Price Index: Measuring the Price Level

- Constructing the CPI
  - The CPI is a *price index*.
- Price Index
  - A measure of the average price of a given class of goods or services relative to the price of the same goods and services in a base year

Inflation

- CPI
  - Measures the average *level* of prices relative to prices in the base year
- Inflation
  - Measures how fast the average price level is *changing* over time

Inflation

- Rate of Inflation
  - The annual percentage rate of change in the price level

Calculating Inflation Rates: 1972 - 1976

Year	CPI
1972	0.418
1973	0.444
1974	0.493
1975	0.538
1976	0.569

$$\text{Inflation rate: 1972 - '73} = \frac{0.444 - 0.418}{0.418} = 0.062 \times 100 = 6.2\%$$

$$\text{Inflation rate: 1973 - '74} = \frac{0.493 - 0.444}{0.444} = 0.110 \times 100 = 11.0\%$$

Calculating Inflation Rates: 1929 - 1933

Year	CPI
1929	0.171
1930	0.167
1931	0.152
1932	0.137
1933	0.130

$$\text{Inflation rate: 1929 - '30} = \frac{0.167 - 0.171}{0.171} = -0.023 \times 100 = -2.3\%$$

$$\text{Inflation rate: 1930 - '31} = \frac{0.152 - 0.167}{0.167} = -0.090 \times 100 = -9.0\%$$

Inflation

- Deflation
  - A situation in which the prices of most goods and services are falling over time so that inflation is negative

Adjusting for Inflation

- Deflating a Nominal Quantity
  - Nominal Quantity
    - A quantity that is measured in terms of its current dollar value
  - Real Quantity
    - A quantity that is measured in physical terms -- for example, in terms of quantities of goods and services

Adjusting for Inflation

- Deflating a Nominal Quantity
  - Deflating (a nominal quantity)
    - A process of dividing a nominal quantity by a price index (such as the CPI) to express the quantity in real terms

Comparing the Real Values of a Family's Income in 1995 and 2000

Year	Nominal family income	CPI	Real family income = Nominal family income/CPI
1995	$20,000	1.00	$20,000/1.00 = $20,000
2000	$22,000	1.25	$22,000/1.25 = $17,600

Adjusting for Inflation

- Example
  - Home run hitters drive Cadillacs
    - 1930 Babe Ruth's salary was $80,000
    - 1998 Mark McGwire's salary was $8.3 million
    - CPI (1982 - 84 = 100)
      - 1930 = 0.167
      - 1998 = 1.64
      - Babe Ruth's real salary = $80,000/0.167 = $479,000
      - Mark McGwire's real salary = $8.3 million/1.64 = $5.06 million

Adjusting for Inflation

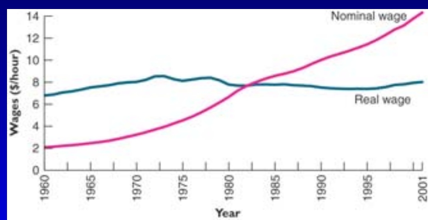
- Real Wage
  - The wage paid to workers measured in terms of real purchasing power
  - The real wage for any given period is calculated by dividing the nominal (dollar) wage by the CPI for that period

Adjusting for Inflation

- Real Wages of U.S. Production Workers
  - An example:

	Nominal Wages	CPI (1982 - 84 = 100)	Real Wage
1970	$3.23	0.388	$3.23/0.388 = $8.32
1990	$10.01	1.307	$10.01/1.307 = $7.66

Nominal and Real Wages for Production Workers' 1960 - 2001



Adjusting for Inflation

- Indexing
  - The practice of increasing a nominal quantity each period by an amount equal to the percentage increase in a specified price index
  - Indexing prevents the purchasing power of the nominal quantity from being eroded by inflation

Does the CPI Measure "True" Inflation?

- 1996 report by the Boskin Commission estimated that the CPI overstates inflation by as much as 1 to 2 percentage points a year.
- Overstating Inflation
  - Would unnecessarily increase government spending
  - Underestimate the improvements in the standard of living

The Costs of Inflation: Not What You Think

- Price Level
  - A measure of the overall level of prices at a particular point in time as measured by a price index such as the CPI
- Relative Price
  - The price of a specific good or service *in comparison* to the prices of other goods and services

The Costs of Inflation: Not What You Think

- The Price Level, Relative Prices, and Inflation

	CPI	% change in oil prices	Inflation	Relative price of oil
2000	1.20			
		8% (2000 - 2001)	10%	-2%
2001	1.32			
		8% (2001 - 2002)	6%	+2%
2002	1.40			

The True Costs of Inflation

- "Shoe-Leather" Costs
  - The use of resources to economize on holding cash during periods of high inflation

The True Costs of Inflation

- “Shoe-Leather Costs at Woodrow’s Hardware
  - Need $5,000 cash/day
  - May withdraw $25,000 on Monday or $5,000/day
  - Cost of a withdraw = $4/trip

The True Costs of Inflation

- “Shoe-Leather Costs at Woodrow’s Hardware
  - Zero inflation
    - Withdraw $25,000
    - Shoe-leather cost = $4/week

The True Costs of Inflation

- “Shoe-Leather Costs at Woodrow’s Hardware
  - 10% inflation
    - Withdraws $25,000
      - Average cash holding/day = $15,000
      - 25/20/15/10/5 ← each day holdings , take the average
      - Cost of holding cash = $15,000 x 10% = $1,500

The True Costs of Inflation

- "Shoe-Leather Costs at Woodrow's Hardware
  - 10% inflation
    - Withdraws $5,000 daily
      - Average cash holding/day = $5,000
      - Cost of holding cash = $5,000 x 10% = $500
      - Shoe-leather cost = $4/trip x 200 trips (50 wks) = $800 / year
      - Benefit of $1,000 (1,500 every week – 500 every day)
      - Cost of $800

The True Costs of Inflation

- Observation
  - Inflation may distort the incentives provided by the tax system for people to work, save, and invest and reduce economic growth.

The True Costs of Inflation

- Unexpected Redistribution of Wealth
  - From workers to employers if wages are not indexed to inflation
  - From lenders to borrowers

The True Costs of Inflation

- Interference with Long-Run Planning
  - Retirement planning
  - Investment and business strategies

Inflation and Interest Rates

- Nominal Interest Rate (market interest rate)
  - The annual percentage increase in the nominal value of a financial asset

Inflation and Interest Rates

- Real Interest Rate
  - The annual percentage increase in the purchasing power of a financial asset
  - The real interest rate on any asset equals the nominal interest rate on that asset minus the inflation rate

Inflation and Interest Rates

- Inflation and the Real Interest Rate
- THE FISHER EQUATION

Real Interest Rate (r) = nominal interst (i) - the inflation rate(π)

$$r = i - \pi$$

Inflation and Interest Rates

Year	Real Interest	=	Nominal Interest	-	Inflation
1970	0.80		6.5		5.7
1975	-3.3		5.8		9.1
1980	-2.0		11.5		13.5
1985	3.9		7.5		3.6
1990	2.1		7.5		5.4
1995	2.7		5.5		2.8
2000	2.2		4.7		2.5

The Real Interest Rate in the United States, 1960 - 2001

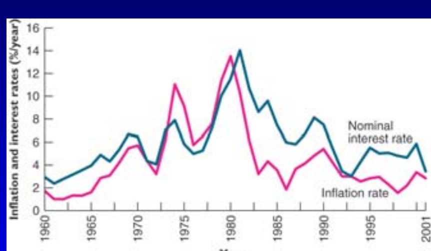
Inflation and Interest Rates

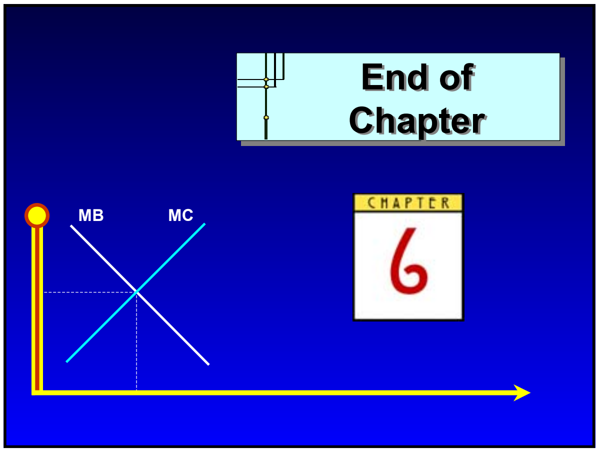
- Observations
  - Unexpected inflation will benefit borrowers and hurt lenders
  - Expected inflation may not hurt lenders if they can adjust the nominal interest rates

Inflation and Interest Rates

- Fisher-Effect
  - The tendency for nominal interest rates to be high when inflation is high and low when inflation is low

Inflation and Interest Rates in the United States, 1960 - 2001

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