


**Macroeconomics: Principles & Applications**

CHAPTER 7

*The Price Level and Inflation*

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**Measuring the Price Level and Inflation**

- **Price level**
  - Average level of prices in the economy
- **Index**
  - A series of numbers used to track a variable's rise or fall over time

$$\frac{\text{Value of measure in current period}}{\text{Value of measure in base period}} \times 100$$

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**Measuring the Price Level and Inflation**

- **Consumer Price Index, CPI**
  - An index of the cost, through time, of a market basket of goods
  - Purchased by a typical household
  - Base period = July 1983

$$\text{CPI} = \frac{\text{Cost of market basket in current period}}{\text{Cost of market basket in July 1983}} \times 100$$

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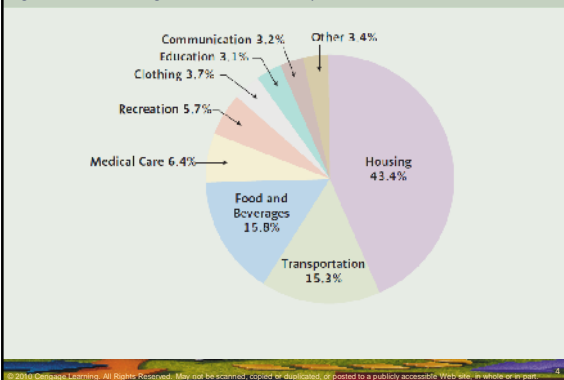
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Figure 1: Broad categories and relative importance in CPI, December 2008




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Table 1: Consumer Price Index, December, Selected Years, 1970–2008

Year	Consumer Price Index (December)
1970	39.8
1980	86.3
1990	133.8
2000	174.0
2005	196.8
2006	201.8
2007	210.0
2008	210.2

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### Measuring the Price Level and Inflation

- **Inflation rate**
  - Percentage change in the price level from one period to the next
- **Deflation**
  - A decrease in the price level from one period to the next

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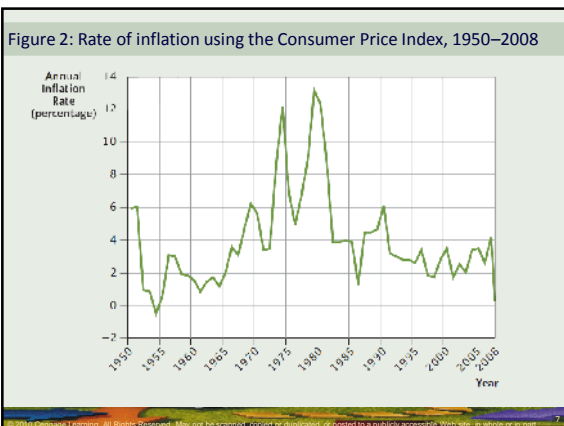
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### How the CPI Is Used

1. As a policy target
2. To index payments
3. To translate from nominal to real values

- Indexed payment
  - A payment that is periodically adjusted in proportion with a price index

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### How the CPI Is Used

- **Nominal wage**
  - Number of dollars you earn
- **Real wage**
  - Purchasing power of your wage

$$\text{Real wage in any year} = \frac{\text{Nominal wage in that year}}{\text{CPI in that year}} \times 100.$$

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Table 2: Nominal and Real Wages (in December of Each Year)

Year	Nominal Wage (dollars per hour)	CPI	Real Wage (1983 dollars per hour)
1975	4.87	55.5	8.77
1980	7.13	86.3	8.26
1985	8.87	109.3	8.12
1990	10.35	133.8	7.74
1995	11.81	153.5	7.69
2000	14.28	174.0	8.21
2005	16.37	196.8	8.32
2008	18.40	210.0	8.76

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### How the CPI Is Used

- Comparing dollar values over time
  - Don't care about the number of dollars
  - Care about their purchasing power

$$\text{Real Value} = \frac{\text{Nominal Value}}{\text{Price Index}} \times 100$$

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### How the CPI Is Used

- GDP price index
  - An index of the price level for all final goods and services included in GDP
- CPI
  - Prices of all goods and services bought by U.S. households

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### The Costs of Inflation

- **The inflation myth**
  - Inflation - by making goods and services more expensive - erodes the average purchasing power of income in the economy
- **Inflation**
  - Can redistribute purchasing power from one group to another
  - It does not directly decrease the average real income in the economy

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### The Costs of Inflation

- **Inflation**
  - Redistribute purchasing power within society
  - Can shift purchasing power
    - Away from those who are awaiting future payments specified in dollars
    - Toward those who are obligated to make such payments

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### The Costs of Inflation

- **Expected inflation**
  - Does not shift purchasing power
- **The approximation rule:**
  - Percentage change in a real value (% Real) is approximately equal
    - Percentage change in associated nominal value (% Nominal)
    - Minus the percentage change in price level (% P)

**% Real = % Nominal - % P**

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**The Costs of Inflation**

- **If inflation is correctly anticipated**
  - And if both parties take it into account,
  - Then inflation will not redistribute purchasing power
- **Nominal interest rate**
  - Annual percent increase in a lender's dollars from making a loan
- **Real interest rate**
  - Annual percent increase in a lender's purchasing power from making a loan

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**The Costs of Inflation**

- **Real interest rate**
  - = Nominal interest rate - Rate of inflation
- **Unexpected inflation**
  - Shift purchasing power
- **Inaccurate inflationary expectations**
  - Purchasing power is shifted between
    - Those obliged to make future payments
    - Those waiting to be paid

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**The Costs of Inflation**

- **Inflation rate higher than expected**
  - Harms those awaiting payment
  - Benefits the payers
- **Inflation rate lower than expected**
  - Harms the payers
  - Benefits those awaiting payment

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### The Costs of Inflation

- **Resource cost of inflation**
  - Opportunity cost on society and its members
  - Consumers
  - Producers
  - Wealth management

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### Is the CPI Accurate?

- **Sources of bias in CPI**
  - Substitution bias
  - New technologies
  - Changes in quality
  - Growth in discounting

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### Is the CPI Accurate?

- **Upward bias in the CPI**
  - Depends on what we are trying to measure
    - Cost of the typical consumer's market basket
      - Upward bias , 1 percentage point per year
    - Cost of achieving a given standard of living
      - Upward bias - substantially greater
- **Consequences of CPI bias**
  - Calculating real wages
  - Indexing

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Using the Theory

**Controversy: indexing social security benefits**

- **Social Security system**
  - Benefits to about 55 million retired workers in U.S.
    - Important supplement to other sources of retirement income
    - The only source of income
      - For more than 10 million retirees
  - One of the largest and most expensive of all federal government programs
    - More than \$600 billion in 2008

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Using the Theory

**Controversy: indexing social security benefits**

- **Social Security system**
  - Baby-boom generation - retires over the next decade or so
    - Costs of the system will balloon
  - Payments – indexed to CPI
- **CPI overstate inflation**
  - Benefits are over-indexed
  - Nominal payment rises by more than the actual rise in the price level
  - Real benefit payment rises over time

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**Table 3: Indexing and “Overindexing” Social Security Benefits**

Year	(1) Accurate Price Index (2006 = 100)	Benefits Indexed to Accurate CPI (rising at 2%)		Benefits Indexed to Overstated CPI (rising at 3%)	
		(2) Nominal Annual Benefit (indexed at 2% per year)	(3) Real Annual Benefit, [(2) ÷ (1)] × 100	(4) Nominal Annual Benefit (indexed at 3% per year)	(5) Real Annual Benefit, [(4) ÷ (1)] × 100
2006	100.00	\$25,000	\$25,000	\$25,000	\$25,000
2007	102.00	\$25,500	\$25,000	\$25,750	\$25,245
2008	104.04	\$26,010	\$25,000	\$26,523	\$25,493
2009	106.12	\$26,532	\$25,000	\$27,318	\$25,742
...	...	...	...	...	...
2026	146.59	\$37,149	\$25,000	\$45,153	\$30,388

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APPENDIX

### Calculating the Consumer Price Index

- CPI in the base period = 100
- CPI in period t =
 
$$= \frac{\text{Cost of market basket at prices in period t}}{\text{Cost of market basket at 2009 prices}} \times 100$$

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Table A.1: Prices and Weekly Quantities in a Two-Good Economy

	December 2009		December 2010	
	Price (per lb)	Quantity (lbs)	Price (per lb)	Quantity (lbs)
Hamburger Meat	\$5.00	30	\$6.00	10
Oranges	\$1.00	50	\$1.10	100

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Table A.2: Calculations for the CPI

	At December 2009 Prices	At December 2010 Prices
Cost of 30 lbs of Hamburger	$\$ 5.00 \times 30 = \$150$	$\$ 6.00 \times 30 = \$180$
Cost of 50 lbs of Oranges	$\$ 1.00 \times 50 = \$50$	$\$ 1.10 \times 50 = \$55$
Cost of Entire Market Basket	$\$150 + \$50 = \$200$	$\$180 + \$55 = \$235$

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