Chapter 2 Data of Macroeconomics

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I Gross domestic products (GDP)

1 Definition

Gross Domestic Product (GDP) is the market value of all final goods and services produced within an economy in a given period of time.

Concepts must be noticed

- Market value: reflect the value of the goods
- of all: all items produced in the economy and sold legally in markets excluding most items produced and sold illicitly or produced and consumed at home
- Final goods and services: Value of intermediate goods is already included in the prices of the final goods
- Produced within an economy: Goods and services produced domestically, regardless of the nationality of the producer

I Gross domestic products (GDP)

2 Methods of computing GDP

Let's examine Circular-flow diagram with two assumptions:

+ All goods and services – bought by households (economy includes only firms and households

+ Households - -spend all of their income (no saving)
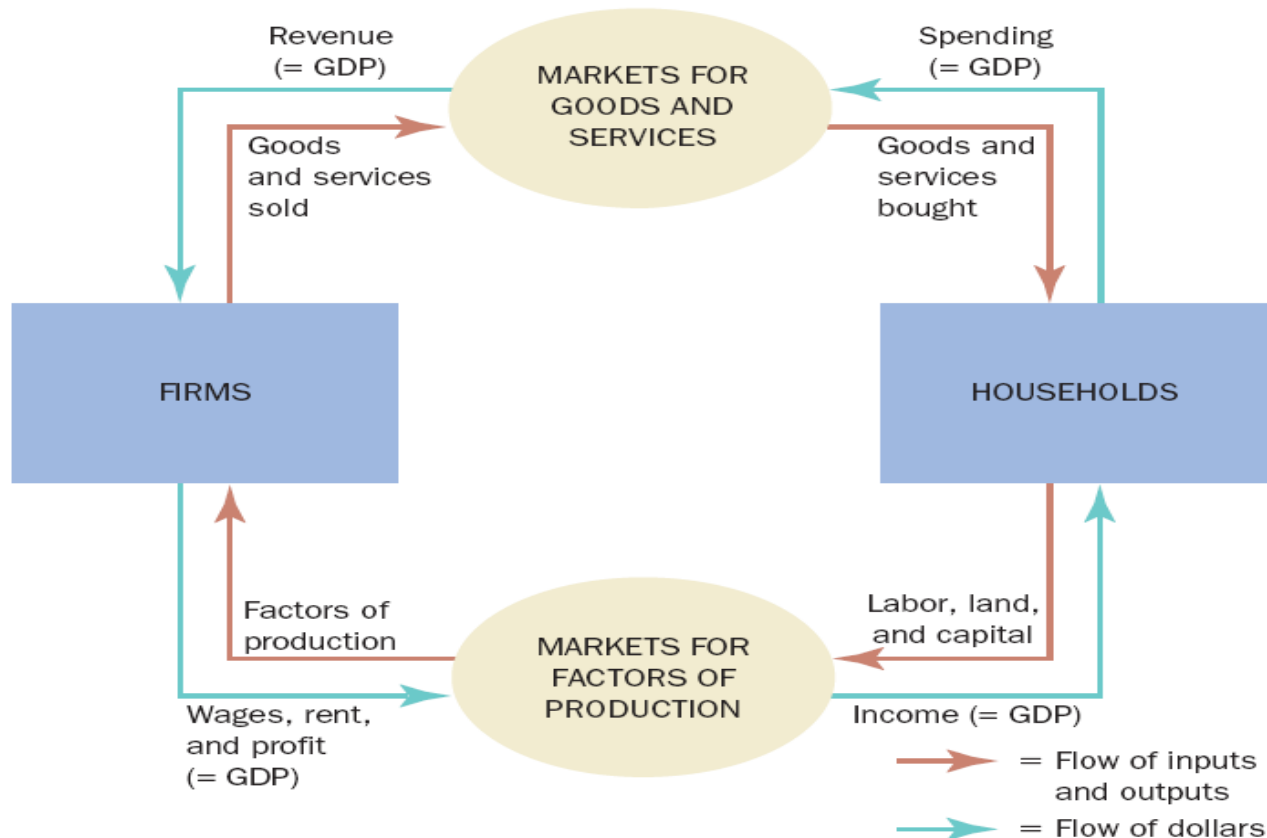
Households buy goods and services from firms, and firms use their revenue from sales to pay wages to workers, rent to landowners, and profit to firm owners. GDP equals the total amount spent by households in the market for goods and services. It also equals the total wages, rent, and profit paid by firms in the markets for the factors of production.

I Gross domestic products (GDP)

2 Methods of computing GDP

There are 2 ways of viewing GDP

→ **Total income of everyone in the economy**

→ **Total expenditure on the economy's output of goods and services**

For the economy as a whole, *income must equal expenditure*.

I Gross domestic products (GDP)

2 Method of computing GDP

+ *Expenditure approach* – GDP as aggregate expenditure

$$GDP = C + I + G + (X\text{-}M)$$

$$= C + I + G + NX$$

Component of aggregate expenditure

C: consumption spending by households except purchases of new houses

I: investment spending by business (capitals, inventories) and households (houses)

G: government purchases of goods and services except transfer payment

NX (X –M): net export or net foreign demand for domestic goods. X is spending on domestically produced goods by foreigners (export), M is spending on foreign goods by

I Gross domestic products (GDP)

2 Method of computing GDP
+ *Income approach* - GDP as aggregate income

$$\mathbf{GDP = w + R + i + \prod + D + Te}$$

Component of aggregate expenditure

w: wage paying for workers who contribute labor for production

R: rent paying for capital owners who contribute capital including land for production

i: interest paying for lender who contribute finance for production

$\prod$: profit paying for stockholder who contribute finance for production

D: depreciation of old machines

Te: net indirect tax paying for government who contribute business environment for production

I Gross domestic products (GDP)

2 Method of computing GDP

+ *Production approach* - GDP as aggregate/total output

Total value added = total revenue – total cost

GDP = $\sum$ Value added in all industries

E

Steel mill– steel	100	
Car producer - cars	100	600

Total output (GDP)= 700 = value added by steel mill + value added by car producer = 100 + 600

I Gross domestic products (GDP)

3 Other measurements of national income

GNP (gross national products) is the market value of all the products and services produced in one year by labour and property supplied by the citizens of a country.

or the equivalent measurement

GNP (gross national products) or GNI (gross national income) is the total factor income owned by domestic residents from selling final goods and services

$$GNP (GDP) = GDP + NFA$$

NFA: net factor income from abroad

NNP (net national product): GNP excludes Depreciation

NI (national income): NNP excludes tax

DPI (disposable personal income): NI excludes income tax and adds transfer payment and other payment items from government.

I Gross domestic products (GDP)

3 Other measurements of national income

	DOLLARS (BILLIONS)
GDP	**10,446.2**
Plus: receipts of factor income from the rest of the world	+278.0
Less: payments of factor income to the rest of the world	−287.6
Equals: **GNP**	**10,436.7**
Less: depreciation	−1,393.5
Equals: **net national product (NNP)**	**9,043.2**
Less: indirect taxes minus subsidies plus other	−703.1
Equals: **national income**	**8,340.1**
Less: corporate profits minus dividends	−353.6
Less: social insurance payments	−746.5
Plus: personal interest income received from the government and consumers	+394.3
Plus: transfer payments to persons	+1,288.0
Equals: **personal income**	**8,922.2**
Less: personal taxes	−1,111.9
Equals: **disposable personal income**	**7,810.3**

I Gross domestic products (GDP)

4 Nominal GDP, real GDP and GDP deflator

Total spending rises from one year to the next

+ Economy - producing a larger output of goods and services

+ And/or goods and services are being sold at higher prices

Nominal GDP reflects both changes of output and price, whereas real GDP only reflect change of output

I Gross domestic products (GDP)

4 Nominal GDP, real GDP and GDP deflator

Nominal GDP

- Production of goods and services
- Valued at current prices

Real GDP

- Production of goods and services
- Valued at constant prices
- Designate one year as base year
- Not affected by changes in prices

<u>Notice</u>: For the base year   Nominal GDP = Real GDP

I Gross domestic products (GDP)

4 Nominal GDP, real GDP and GDP deflator

The GDP deflator

- Measure of the price level
- Ratio of nominal GDP to real GDP times 100
- =100 for the base year
- Measures the current level of prices relative to the level of prices in the base year

Inflation

- Economy's overall price level is rising
- Inflation rate: Percentage change in some measure of the price level from one period to the next

$$\text{Inflation in year } 2 = \frac{\text{GDP deflator in year } 2 - \text{GDP deflator in year } 1}{\text{GDP deflator in year } 1} \times 100$$

Example: Real and Nominal GDP

Prices and Quantities

Year	Price of hot dogs	Quantity of hot dogs	Price of hamburgers	Quantity of hamburgers
2008	$1	100	$2	50
2009	$2	150	$3	100
2010	$3	200	$4	150

Calculating Nominal GDP

2008	($1 per hot dog × 100 hot dogs) + ($2 per hamburger × 50 hamburgers) = $200
2009	($2 per hot dog × 150 hot dogs) + ($3 per hamburger × 100 hamburgers) = $600
2010	($3 per hot dog × 200 hot dogs) + ($4 per hamburger × 150 hamburgers) = $1,200

Calculating Real GDP (base year 2008)

2008	($1 per hot dog × 100 hot dogs) + ($2 per hamburger × 50 hamburgers) = $200
2009	($1 per hot dog × 150 hot dogs) + ($2 per hamburger × 100 hamburgers) = $350
2010	($1 per hot dog × 200 hot dogs) + ($2 per hamburger × 150 hamburgers) = $500

Calculating the GDP Deflator

2008	($200 / $200) × 100 = 100
2009	($600 / $350) × 100 = 171
2010	($1,200 / $500) × 100 = 240

This table shows how to calculate real GDP, nominal GDP, and the GDP deflator for a hypothetical economy that produces only hot dogs and hamburgers

I Gross domestic products (GDP)

5 GDP and net economic welfare

GDP – good measure of economic well - being

GDP – "single measure of the economic well-being of a society"

- Economy's total income
- Economy's total expenditure
- Larger GDP
  - Good life
  - Better healthcare
  - Better educational systems
- Measure - ability to obtain many of the inputs into a worthwhile life

I Gross domestic products (GDP)

5 GDP and net economic welfare

But GDP – not a perfect measure of well-being

- Doesn't include
  - Leisure
  - Value of almost all activity that takes place outside markets
  - Quality of the environment
- No distribution of income

Net economic welfare (NEW)

$$NEW = GDP(\text{or } GNP) + V1 - V2$$

V1: value of rest, value of goods and services which are not sold, revenue from transactions in black market…

V2: negative externality for natural resource, environment such as noise, traffic jam, air pollution…

NEW reflects welfare better than GNP but it is very difficult to have enough data to compute NEW. Therefore, economists still use GDP and GNP

GDP and the quality of life

Country	Real GDP per person (2005)	Life expectancy	Adult literacy (% of population)	Internet usage (% of population)
United	$41,890	78 years	99%	63 %
States	31,267	82	99	67
Japan	29,461	79	99	45
Germany	10,845	65	99	15
Russia	10,751	76	92	18
Mexico	8,402	72	89	19
Brazil	6,757	72	91	9
China	3,843	70	90	7
Indonesia	3,452	64	61	3
India	2,370	65	50	7
Pakistan	2,053	63	47	0.3
Bangladesh	1,128	47	69	4
Nigeria				

The table shows GDP per person and three other measures of the quality of life for twelve major countries.

II Consumer price index

1 Definition

The **consumer price index (CPI)** is a measure of the overall cost of the goods and services bought by a typical consumer. Each month, the General Statistic Office (GSO), which is part of the Ministry of Finance, computes and reports the consumer price index.

Concepts must be noticed

- Overall cost
- Typical consumer

II Consumer price index

2 Method of computing of CPI

How the consumer price index is calculated

1. Fix the basket

2. Find the prices

3. Compute the basket's cost

4. Chose a base year and compute the CPI

Price of basket of goods & services in current year

Divided by price of basket in base year

Times 100

5. Compute the inflation rate

Percentage change in the price index from the preceding period

$$\text{Inflation rate in year } 2 = \frac{\text{CPI in year } 2 - \text{CPI in year } 1}{\text{CPI in year } 1} \times 100$$

Calculating the CPI and the inflation rate: an example

Step 1: Survey consumers to determine a fixed basket of goods

Basket = 4 hot dogs, 2 hamburgers

Step 2: Find the price of each good in each year

Year	Price of hot dogs	Price of hamburgers
2008	$1	$2
2009	2	3
2010	3	4

Step 3: Compute the cost of the basket of goods in each year

2008	($1 per hot dog × 4 hot dogs) + ($2 per hamburger × 2 hamburgers) = $8
2009	per basket
2010	($2 per hot dog × 4 hot dogs) + ($3 per hamburger × 2 hamburgers) = $14
	per basket
	($3 per hot dog × 4 hot dogs) + ($4 per hamburger × 2 hamburgers) = $20
	per basket

Step 4: Choose one year as a base year (2008) and compute the CPI in each year

2008	($8 / $8) × 100 = 100
2009	($14 / $8) × 100 = 175
2010	($20 / $8) × 100 = 250

Step 5: Use the consumer price index to compute the inflation rate from previous

Typical basket of goods and services
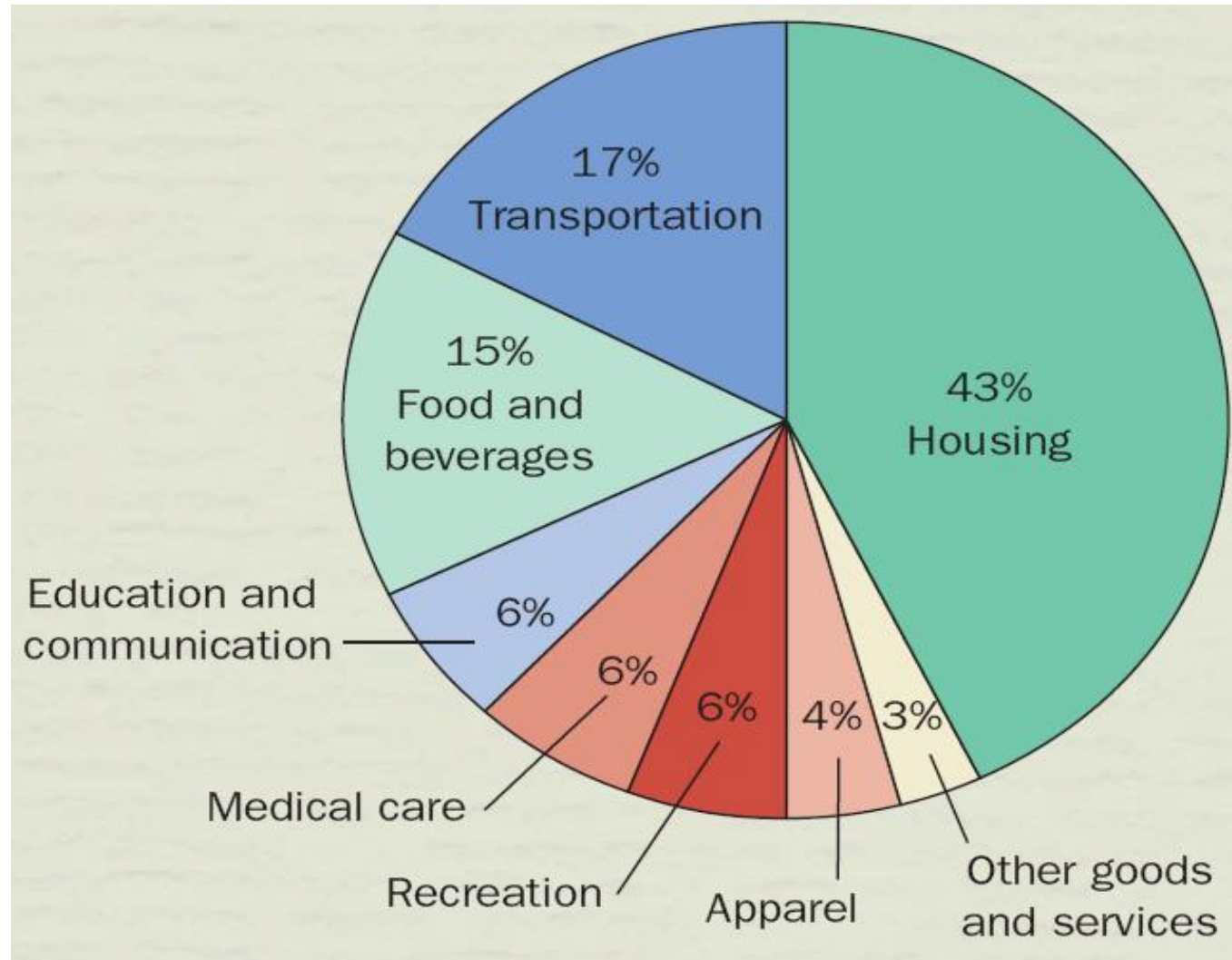
II Consumer price index

3 Problems in measuring CPI

- *Substitution bias*: overstate cost of living by fixing goods baskets as consumers change consumption behavior from buying high price goods to low price substitute goods

- *Introduction of new goods*: overstate cost of living by ignoring new introduced goods with lower price

- *Unmeasured quality change*: increase cost of living does not mean we are more miserable

II Consumer price index

4 CPI versus GDP deflator

- GDP deflator
  - Ratio of nominal GDP to real GDP
  - Reflects prices of all goods & services produced domestically
- CPI
  - Reflects prices of goods & services bought by consumers
- GDP deflator
  - Compares the price of currently produced goods and services
  - To the price of the same goods and services in the base year
- CPI

II Consumer price index

5 Apply CPI in practice

Correcting Economic Variable for the effects of Inflation

$$\text{Amount in today's dollars} = \text{Amount in year T dollars} \times \frac{\text{Price level today}}{\text{Price level in year T}}$$

| Rank	Title	Studio	Adjusted Gross	Unadjusted Gross	Year^
1	**Gone with the Wind**	MGM	**$1,594,132,100**	$198,676,459	1939^
2	**Star Wars**	Fox	**$1,405,363,600**	$460,998,007	1977^
3	**The Sound of Music**	Fox	**$1,123,657,300**	$158,671,368	1965
4	**E.T.: The Extra-Terrestrial**	Uni.	**$1,119,230,700**	$435,110,554	1982^
5	**The Ten Commandments**	Par.	**$1,033,590,000**	$65,500,000	1956
6	**Titanic**	Par.	**$1,012,649,000**	$600,788,188	1997
7	**Jaws**	Uni.	**$1,010,541,900**	$260,000,000	1975
8	**Doctor Zhivago**	MGM	**$979,428,700**	$111,721,910	1965
9	**The Exorcist**	WB	**$872,386,800**	$232,671,011	1973^
10	**Snow White and the Seven Dwarfs**	Dis.	**$860,010,000**	$184,925,486	1937^

II Consumer price index

5 Apply CPI in practice

Nominal and real interest rate

- Nominal interest rate
  - Interest rate as usually reported
  - Without a correction for the effects of inflation
  - Implies the growth of money value of an amount of money over time
- Real interest rate
  - Interest rate corrected for the effects of inflation
  - = Nominal interest rate – Inflation rate
  - Implies the growing of purchasing power of an amount of money over time

Nominal and real interest rate of the US from 1965 to 2005
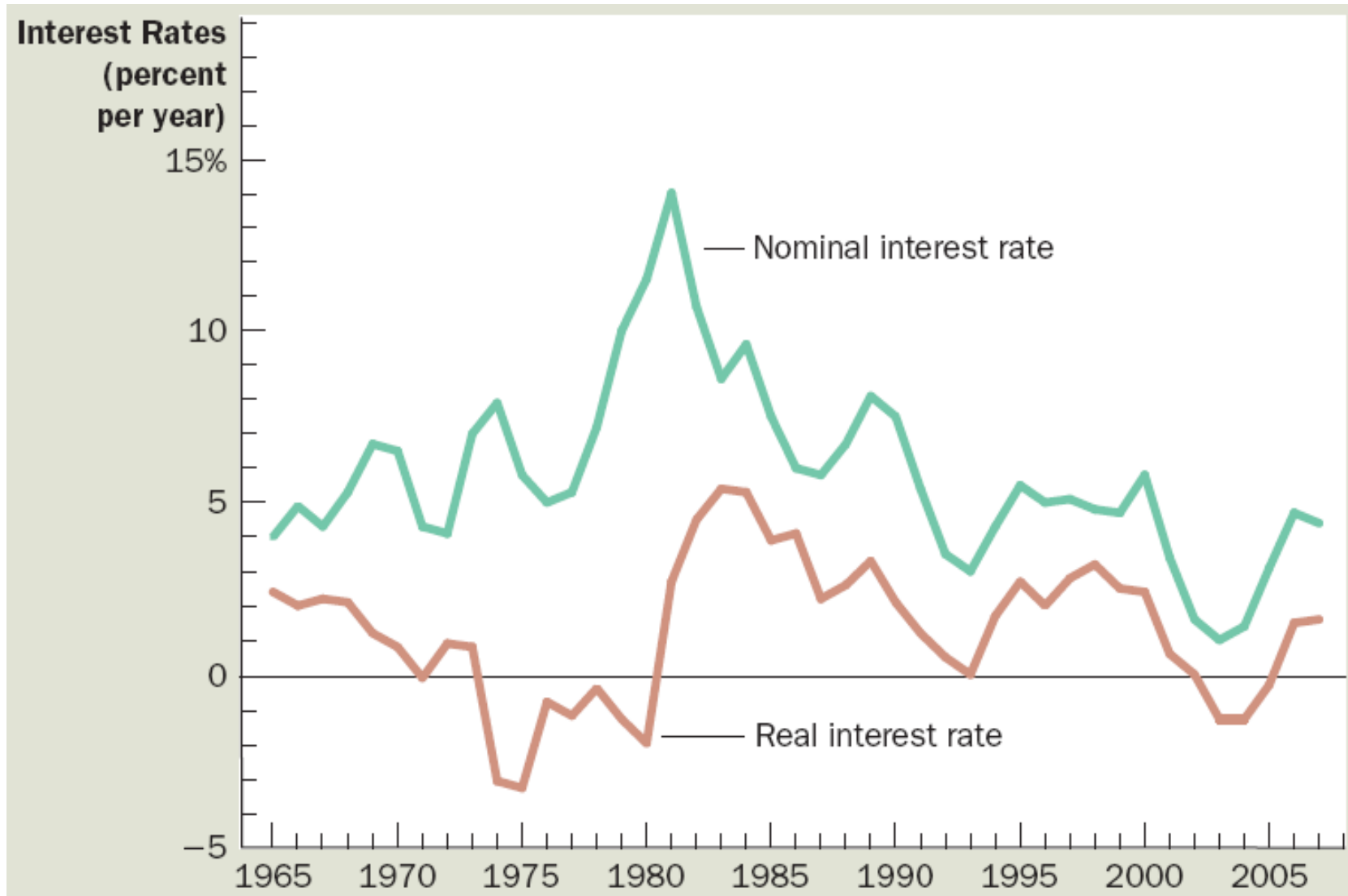
Key concepts

- Gross domestic products (GDP)
- Gross national products (GNP)
- Nominal GDP, real GDP, GDP deflator
- Consumer price index (CPI)
- Inflation rate
- Nominal interest rate, real interest rate