

Gross Domestic Product

Two definitions:

1. Total expenditure on **final** goods and services
2. Total income earned by **factors of production**

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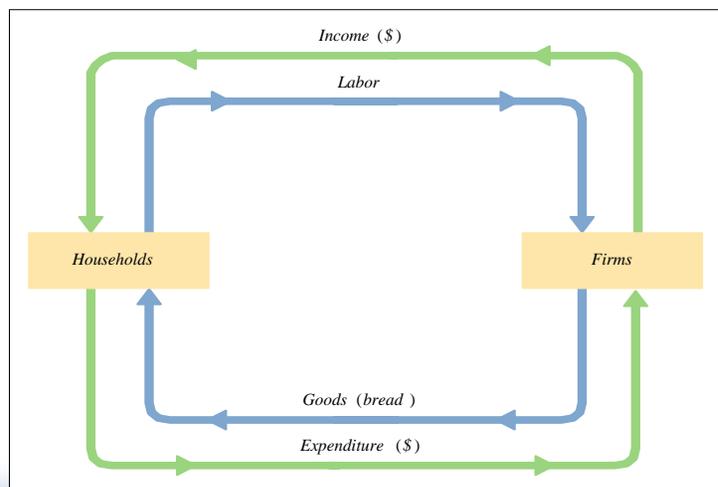
Why expenditure = income

In every transaction, the buyer's expenditure becomes the seller's income.

Thus, the sum of all expenditure equals the sum of all income.

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The Circular Flow



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Circular flow

Inner: hholds sell labor to firms, firms sell bread to hholds; outer: hholds pay firms for bread, firms pay wages and profit to hholds

GDP = total income from production of bread
= total expenditure on bread

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Value added

definition:

A firm's **value added** is the value of its output

minus

the value of the intermediate goods the firm used to produce that output.

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Final goods, value added, and GDP

- GDP = value of final goods produced
= sum of value added at all stages of production
- The value of the final goods already includes the value of the intermediate goods, so including intermediate goods in GDP would be double-counting.

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Exercise: (Problem 2, p.38)

- A farmer grows a bushel of wheat and sells it to a miller for \$1.00.
- The miller turns the wheat into flour and sells it to a baker for \$3.00.
- The baker uses the flour to make a loaf of bread and sells it to an engineer for \$6.00.
- The engineer eats the bread.

Compute

- *value added at each stage of production*
- *GDP for this simple economy*

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Answer

- Each person's value-added (VA) equals the value of what he/she produced minus the value of the intermediate inputs he/she started with.
- Farmer's VA = \$1
 - Miller's VA = \$2
 - Baker's VA = \$3
 - GDP = \$6
 - Note that GDP = value of final good = sum of value-added at all stages of production.

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The expenditure components of GDP

- consumption
- investment
- government spending
- net exports

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Consumption (C)

def: the value of all goods and services bought by households. Includes:

- **durable goods**
last a long time
ex: cars, home appliances
- **non-durable goods**
last a short time
ex: food, clothing
- **services**
work done for consumers
ex: dry cleaning, air travel.

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U.S. Consumption, 2001

	\$ billions	% of GDP
Consumption	\$7,064.5	69.2%
Durables	858.3	8.4
Nondurables	2,055.1	20.1
Services	4,151.1	40.7

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Services

- Share of manufacturing has fallen (< 20%) in all major economies.
- Services and manufacturing have become intertwined: BCBS; GM financial; Sony

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Investment (I)

def1: spending on newly produced capital.

def2: spending on goods bought for future use.

Includes:

- **business fixed investment**
spending on plant and equipment that firms will use to produce other goods & services
- **residential fixed investment**
spending on housing units by consumers and landlords
- **inventory investment**
the change in the value of all firms' inventories

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U.S. Investment, 2001

	\$ billions	% of GDP
Investment	\$1,633.9	16.0%
Business fixed	1,246.0	12.2
Residential fixed	446.3	4.4
Inventory	-58.4	-0.6

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Investment

- In definition #1, note that aggregate investment equals total spending on newly produced capital goods.
- If I pay \$1000 for a used computer for my business, then I'm doing \$1000 of investment, but the person who sold it to me is doing \$1000 of disinvestment, so there is **no net impact** on aggregate investment.

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Housing

- think of a house as a piece of **capital** which is used to produce a consumer service, called "housing services". Thus, **spending on the house** counts in "investment", and the **value of the housing services** that the house provides counts under "consumption" (regardless of whether the housing services are being consumed by the owner of the house or a tenant).

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Investment vs. Capital

- Capital is one of the factors of production. At any given moment, the economy has a certain overall stock of capital.
- Investment is spending on **new** capital.
- It is new additions to the existing capital stock.

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Investment vs. Capital

Example

- 1/1/2002: economy has \$500b worth of capital
- during 2002:
investment = \$37b
- 1/1/2003:
economy will have \$537b worth of capital

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Inventories

- If total inventories are \$10 billion at the beginning of the year, and \$12 billion at the end, then **inventory investment** equals \$2 billion for the year.
- Note that inventory investment can be negative.

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Government spending (G)

- **G** includes all government spending on goods and services.
- **G** excludes transfer payments (e.g. unemployment insurance payments), because they do not represent spending on goods and services.
- People who receive transfer payments use these funds to pay for their consumption.
- avoid double-counting by excluding transfer payments from **G**.

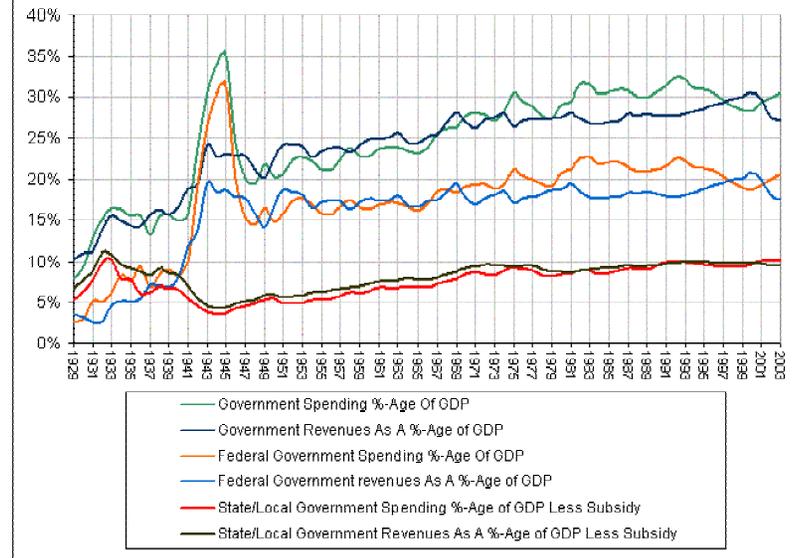
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Government spending, 2001

	\$ billions	% of GDP
Gov spending	\$1,839.5	18.0%
Federal	615.7	6.0
Non-defense	216.6	2.1
Defense	399.0	3.9
State & local	1,223.8	12.0

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U.S. Spending/Taxation In Relation To GDP: 1929-2003 Q2
(Source: BEA NIPA Tables 1.1 and 3.1 through 3.3)



An important identity

$$Y = C + I + G$$

where

$Y = \text{GDP}$ = the value of total output

$C + I + G$ = aggregate expenditure

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GDP review

We have now seen that GDP measures

- total income
- total output
- total expenditure
- the sum of value-added at all stages in the production of final goods
- $Y = C + I + G$

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Real vs. Nominal GDP

- GDP is the value of all final goods and services produced.
- **Nominal GDP** measures these values using current prices.
- **Real GDP** measure these values using the prices of a chosen **base** year.

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Real GDP controls for inflation

Changes in nominal GDP can be due to:

- changes in prices
- changes in quantities of output produced

Changes in real GDP can only be due to changes in quantities, because real GDP is constructed using constant base-year prices.

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Practice problem, part 1

	2001		2002		2003	
	P	Q	P	Q	P	Q
good A	\$30	900	\$31	1,000	\$36	1,050
good B	\$100	192	\$102	200	\$100	205

- Compute nominal GDP in each year
- Compute real GDP in each year using 2001 as the base year.

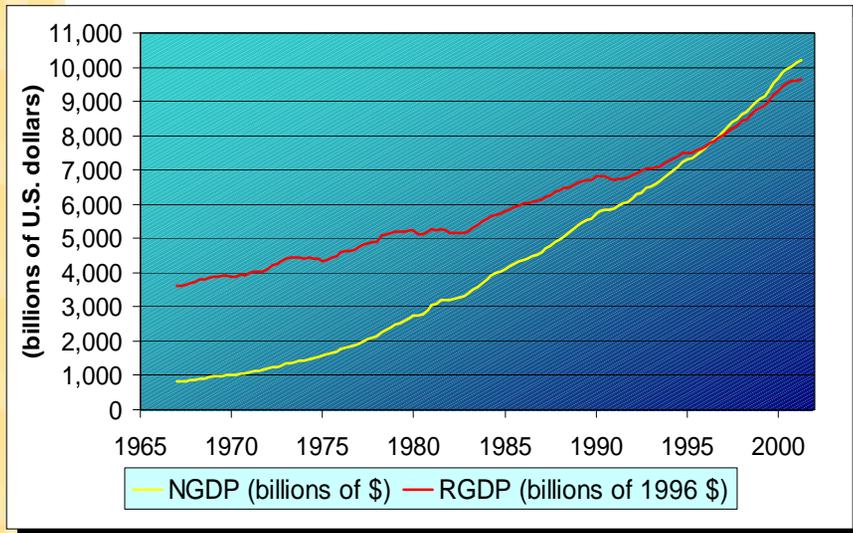
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Answers to practice problem, part 1

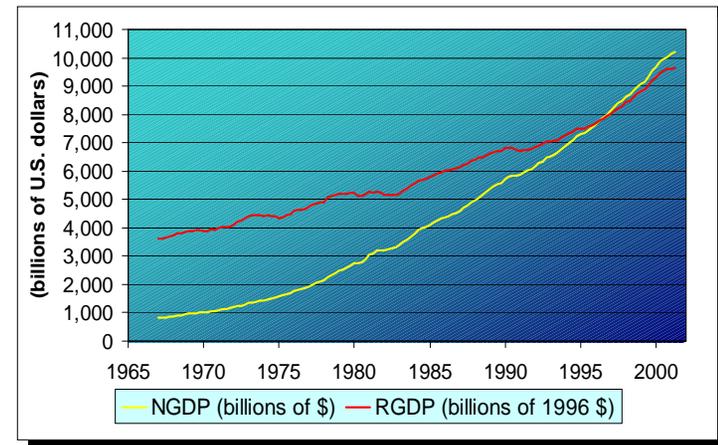
- **Nominal GDP** *multiply Ps & Qs from same year*
 2001: $\$46,200 = \$30 \times 900 + \$100 \times 192$
 2002: $\$51,400$
 2003: $\$58,300$
- **Real GDP** *multiply each year's Qs by 2001 Ps*
 2001: $\$46,300$
 2002: $\$50,000$
 2003: $\$52,000 = \$30 \times 1050 + \$100 \times 205$

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U.S. Real & Nominal GDP, 1967-2001



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Take 1970. When the economy's output of 1970 is measured in the (then) current prices, GDP is about \$1 trillion. Between 1970 and 1996, most prices have risen. Hence, if you value the country's 1970 using 1996 prices (to get real GDP), you get a bigger value than if you just measure 1970's output in 1970 prices (nominal GDP).

1980: \$ 1; 1990: \$ 2; 2000: \$ 3

1980: 100 apples; 1990: 200 apples; 2000: 300 apples

In current prices:

GDP (1980) = \$ 100; GDP (1990) = \$ 400; GDP (2000) = \$ 900

In 1990 prices:

GDP (1980) = \$200; GDP (1990) = \$400; GDP (2000) = \$ 600

Since prices rose over time, output to the left of base year has higher value and output to right of base year has smaller value

Explains why nominal GDP is lower than real GDP to the left of the base year and higher than real GDP to the right

The IS curve

Equilibrium in the goods market

Chapter 3.3-3.5

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