Welcome to Econ20B
The Principle of Macroeconomics

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Announcement

- No Aplia for week 1;
- No lecture this coming Thursday;
- Temporary Aplia couse key: EPPE-42QP-XU6P

TAs

- David Conway
- Chris Elias
- Brent Lutes
- Yingjie Zhang

What determine your grades?

- **Two midterms: 25% each of your total score.**
- **Final: 40% of your total score.**
- **Problem Sets: 10% of your total score.**
  econ.aplia.com
  Notice: two purchase options as listed in the syllabus.
  Notice: Aplia assignments are usually due on Sundays at 11:45 pm.
- **Three types of exam questions (similar to those in the additional problem sets):**
  - **Multiple choices;**
  - **calculations;**
  - **Short essay.**

How to get an A?

- Attend lectures.
- Attend discussion sessions.
  - Additional problem sets are very helpful.
- Visit us during our office hours.
- Let us know if you are having trouble.
- Let us know if you have any suggestions for the class.

Any Questions?

What is Macroeconomics?

- **Economics is the study of how society manages its scarce resources.**

- **Micro-economics and Macro-economics differ only in terms of the details of the subject.**

Micro vs. Macro

- *Microeconomics*:
  The study of how individual households and firms make decisions, interact with one another in markets.
  - How much does a firm produce? How much profit does a firm make? How does a firm allocate its revenue?

- *Macroeconomics*:
  The study of the economy as a whole.

  - What is the total amount of output of an economy? What is the total amount of income of all the individuals in this economy? How do individuals and firms spend their income?

Typical Micro vs Macro Questions

- Micro:

  How did my friend lose his job?

- Macro:

  Are we entering a recession? Or are we already in a recession?

  Additional Reading: "The Great Recession of 2008?"

First Step into Macroeconomics

We begin our study of macroeconomics with the country's total output, total income and total expenditure.

They are measured by Gross Domestic Product (GDP):

What has been produced?

Who has received income by producing them?

Where do those products go?

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23 Measuring a Nation's Income

PRINCIPLES OF

ECONOMICS

FOURTH EDITION

N. GREGORY MANKIW

**PowerPoint® Slides
by Ron Cronovich**

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In this chapter, look for the answers to these questions:

- What is Gross Domestic Product (GDP)?

- How is GDP related to a nation's total income and spending?

- What are the components of GDP?

- How is GDP corrected for inflation?

- Does GDP measure society's well-being?

Income and Expenditure

- **Gross Domestic Product (GDP)** measures total output in the economy.

- GDP also measures total income of everyone in the economy.

- GDP also measures total expenditure on the economy's output of goods and services (g&s).

For the economy as a whole,
Output = income= expenditure, *because*
every dollar of expenditure by a buyer
is a dollar of income for the seller.

The Circular-Flow Diagram

- is a simple depiction of the macroeconomy.

- illustrates GDP as spending, revenue, factor payments, and income.

- First, some preliminaries:
  - **Factors of production** are inputs like labor, land, capital, and natural resources.
  - **Factor payments** are payments to the factors of production. (*e.g.*, wages, rent)
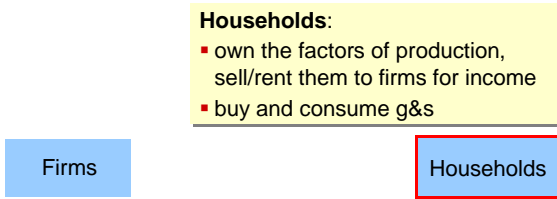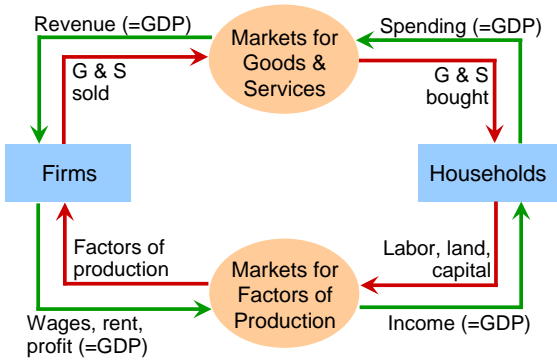
FIGURE 1: The Circular-Flow Diagram

Households:
- own the factors of production, sell/rent them to firms for income
- buy and consume g&s

Firms   Households

FIGURE 1: The Circular-Flow Diagram

Firms   Households

Firms:
- buy/hire factors of production, use them to produce g&s
- sell g&s

FIGURE 1: The Circular-Flow Diagram

Revenue (=GDP)   Markets for Goods & Services   Spending (=GDP)

G & S sold   G & S bought

Firms   Households

Factors of production   Markets for Factors of Production   Labor, land, capital

Wages, rent, profit (=GDP)   Income (=GDP)

What This Diagram Omits

- The government
  - collects taxes
  - purchases g&s

- The financial system
  - matches savers' supply of funds with borrowers' demand for loans

- The foreign sector
  - trades g&s, financial assets, and currencies with the country's residents

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Gross Domestic Product (GDP) Is…

…the <mark>market value</mark> of all final goods & services produced within a country in a given period of time.

Goods are valued at their market prices, so:

- *GDP measures all goods using the same units (e.g., dollars in the U.S.), rather than "adding apples to oranges."*

- *Things that don't have a market value are excluded, e.g., housework you do for yourself.*

Gross Domestic Product (GDP) Is…

…the market value of all <mark>final</mark> goods & services produced within a country in a given period of time.

Final goods *are intended for the end user.*

Intermediate goods *are used as components or ingredients in the production of other goods.*

GDP only includes final goods, as they already embody the value of the intermediate goods used in their production.

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

GDP includes tangible goods
(like DVDs, mountain bikes, beer)

and intangible services
(dry cleaning, concerts, cell phone service).

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

GDP includes currently produced goods,
not goods produced in the past.

Gross Domestic Product (GDP) Is…

…the market value of all final goods & services produced within a country in a given period of time.

GDP measures the value of production that occurs within a country's borders, whether done by its own citizens or by foreigners located there.

Gross Domestic Product (GDP) Is...

…the market value of all final goods & services produced within a country in a given period of time.

usually a year or a quarter (3 months).

The Components of GDP

- Recall: GDP is total spending.
- Four components:
  - Consumption (**C**)
  - Investment (**I**)
  - Government Purchases (**G**)
  - Net Exports (**NX**)
- These components add up to GDP (denoted **Y**):

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

Consumption (C)

- is total spending by households on g&s.
- Note on housing costs:
  - For renters, consumption includes rent payments.
  - For homeowners, consumption includes the imputed rental value of the house, but not the purchase price or mortgage payments.

Investment (I)

- is total spending on goods that will be used in the future to produce more goods.

- includes spending on
  - capital equipment (*e.g.*, machines, tools)
  - structures (factories, office buildings, houses)
  - inventories (goods produced but not yet sold)

> *Note: "**Investment**" does not mean the purchase of financial assets like stocks and bonds.*

Government Purchases (G)

- is all spending on the g&s purchased by govt at the federal, state, and local levels.

- **G** excludes **transfer payments**, such as Social Security or unemployment insurance benefits.

  These payments represent transfers of income, not purchases of g&s.

Net Exports (NX)

- **NX** = exports – imports
- Exports represent foreign spending on the economy's g&s.
- Imports are the portions of **C**, **I**, and **G** that are spent on g&s produced abroad.
- Adding up all the components of GDP gives:

$$Y \ = \ C \ + \ I \ + \ G \ + \ NX$$

GDP and its components

In each of the following cases, determine how much GDP and each of its components is affected (if at all).

A. Debbie spends $200 to buy her husband dinner at the finest restaurant in Boston.

B. Sarah spends $1800 on a new laptop to use in her publishing business. The laptop was built in China.

C. Jane spends $1200 on a computer to use in her editing business. She got last year's model on sale for a great price from a local manufacturer.

D. General Motors builds $500 million worth of cars, but consumers only buy $470 million worth of them.

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Answers

A. Debbie spends $200 to buy her husband dinner at the finest restaurant in Boston.

Consumption and GDP rise by $200.

B. Sarah spends $1800 on a new laptop to use in her publishing business. The laptop was built in China.

Investment rises by $1800, net exports fall by $1800, GDP is unchanged.

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Answers

C. Jane spends $1200 on a computer to use in her editing business. She got last year's model on sale for a great price from a local manufacturer.

Current GDP and investment do not change, because the computer was built last year.

D. General Motors builds $500 million worth of cars, but consumers only buy $470 million of them.

Consumption rises by $470 million, inventory investment rises by $30 million, and GDP rises by $500 million.

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Review

Gross Domestic Product: the market value of all final goods & services produced within a country in a given period of time.

- Product Approach;
- Income Approach;
- Expenditure Approach.

More: GNP? Unemployment compensation?

Measuring GDP: an orange island economy

Two companies only, Orange Corp. (produces oranges and sell them to the public and to Juice Corp.), and Juice Corp. (produces and sells orange juice)

Transactions of Orange Corp in 2001:

Wages paid to employees	$15,000
Taxes paid to government	$ 5,000
Sales revenue:	
Oranges sold to public	$10,000
Oranges sold to Juice Corp.	$25,000

Transactions of Juice Corp. in 2001:

Wages paid to employees	$10,000
Taxes paid to government	$ 2,000
Sales revenue	$40,000
Oranges purchased from orange corp.	$25,000

U.S. GDP and Its Components, 2006 (in billions of dollars)

Total GDP	13194.7	100%
Personal consumption expenditures	9224.5	69.91%
Investment	2209.2	16.74%
Net exports	-762	-5.78%
Government expenditures	2523	19.12%

Real versus Nominal GDP

- Inflation can distort economic variables like GDP, so we have two versions of GDP:
  One is corrected for inflation, the other is not.

- **Nominal GDP** values output using current prices. It is not corrected for inflation.

- **Real GDP** values output using the prices of a *base year*. Real GDP is corrected for inflation.

EXAMPLE:

	Pizza		Latte	
year	*P*	*Q*	*P*	*Q*
2002	$10	400	$2.00	1000
2003	$11	500	$2.50	1100
2004	$12	600	$3.00	1200

Compute nominal GDP in each year:

Increase:

2002: $10 x 400 + $2 x 1000 = $6,000

37.5%

2003: $11 x 500 + $2.50 x 1100 = $8,250

30.9%

2004: $12 x 600 + $3 x 1200 = $10,800

EXAMPLE:

	Pizza		Latte	
year	*P*	*Q*	*P*	*Q*
→ 2002	$10	400	$2.00	1000
2003	$11	500	$2.50	1100
2004	$12	600	$3.00	1200

Compute real GDP in each year,
using 2002 as the base year:

Increase:

2002: $10 x 400 + $2 x 1000 = $6,000

20.0%

2003: $10 x 500 + $2 x 1100 = $7,200

16.7%

2004: $10 x 600 + $2 x 1200 = $8,400

EXAMPLE:

year	Nominal GDP	Real GDP
2002	$6000	$6000
2003	$8250	$7200
2004	$10,800	$8400

In each year,

- nominal GDP is measured using the (then) current prices.
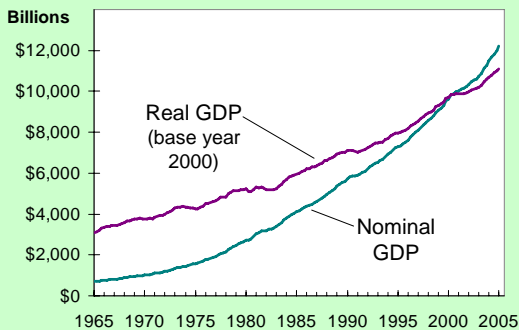- real GDP is measured using constant prices from the base year (2002 in this example).

EXAMPLE:

year	Nominal GDP		Real GDP	
2002	$6000	37.5%	$6000	20.0%
2003	$8250	30.9%	$7200	16.7%
2004	$10,800		$8400	

- The change in nominal GDP reflects both prices and quantities.
- The change in real GDP is the amount that GDP would change if prices were constant (*i.e.,* if zero inflation).
  Hence, real GDP is corrected for inflation.

Nominal and Real GDP in the U.S., 1965-2005

Billions

Real GDP (base year 2000)

Nominal GDP

$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$0

1965 1970 1975 1980 1985 1990 1995 2000 2005

The GDP Deflator

- The GDP deflator is a measure of the overall level of prices.

- Definition:

$$\text{GDP deflator} = 100 \times \frac{\text{nominal GDP}}{\text{real GDP}}$$

- One way to measure the economy's **inflation rate** is to compute the percentage increase in the GDP deflator from one year to the next.

EXAMPLE:

year	Nominal GDP	Real GDP	GDP Deflator	
2002	$6000	$6000	100.0	
2003	$8250	$7200	114.6	14.6%
2004	$10,800	$8400	128.6	12.2%

Compute the GDP deflator in each year:

2002:   100 x (6000/6000) =   100.0

2003:   100 x (8250/7200) =   114.6

2004:   100 x (10,800/8400) =   128.6

ACTIVE LEARNING 2:
Computing GDP

	2004 (base yr)		2005		2006	
	P	Q	P	Q	P	Q
good A	$30	900	$31	1,000	$36	1050
good B	$100	192	$102	200	$100	205

Use the above data to solve these problems:

A. Compute nominal GDP in 2004.

B. Compute real GDP in 2005.

C. Compute the GDP deflator in 2006.

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Answers

	2004 (base yr)		2005		2006	
	P	*Q*	*P*	*Q*	*P*	*Q*
good A	$30	900	$31	1,000	$36	1050
good B	$100	192	$102	200	$100	205

A. Compute nominal GDP in 2004.

$30 x 900 + $100 x 192 = $46,200

B. Compute real GDP in 2005.

$30 x 1000 + $100 x 200 = $50,000

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	2004 (base yr)		2005		2006	
	P	*Q*	*P*	*Q*	*P*	*Q*
good A	$30	900	$31	1,000	$36	1050
good B	$100	192	$102	200	$100	205

C. Compute the GDP deflator in 2006.

Nom GDP = $36 x 1050 + $100 x 205 = $58,300

Real GDP = $30 x 1050 + $100 x 205 = $52,000

GDP deflator = 100 x (Nom GDP)/(Real GDP)

= 100 x ($58,300)/($52,000) = 112.1

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GDP and Economic Well-Being

- ***Real GDP per capita is the main indicator of the average person's standard of living.***

- But GDP is not a perfect measure of well-being.

- Robert Kennedy issued a very eloquent yet harsh criticism of GDP:

Gross Domestic Product…

"… does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our courage, nor our wisdom, nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile, and it can tell us everything about America except why we are proud that we are Americans."
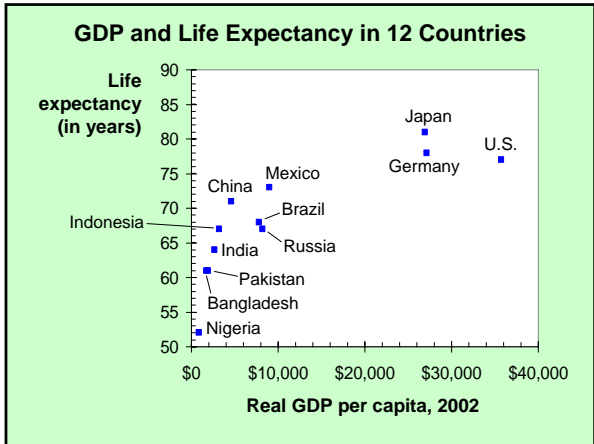
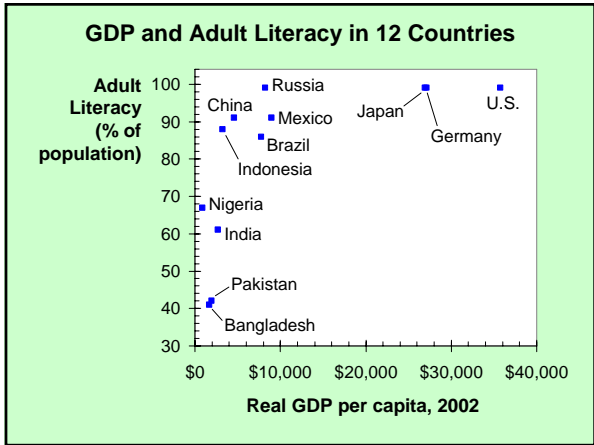*- Senator Robert Kennedy, 1968*

GDP Does Not Value:

- the quality of the environment
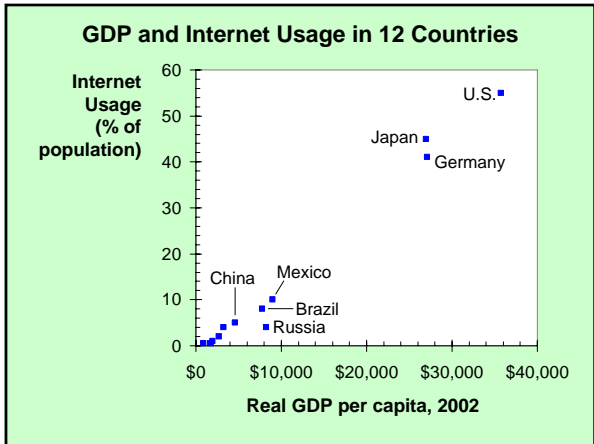
- leisure time

- non-market activity, such as the child care a parent provides his or her child at home

- an equitable distribution of income

Then Why Do We Care About GDP?

- Having a large GDP enables a country to afford better schools, a cleaner environment, health care, etc.

- Many indicators of the quality of life are positively correlated with GDP. For example…

GDP and Life Expectancy in 12 Countries

Life expectancy (in years)

Japan
U.S.
Germany
Mexico
China
Brazil
Indonesia
Russia
India
Pakistan
Bangladesh
Nigeria

90
85
80
75
70
65
60
55
50

$0 $10,000 $20,000 $30,000 $40,000

Real GDP per capita, 2002

GDP and Adult Literacy in 12 Countries

Adult Literacy (% of population)

Russia
China
Mexico
Japan
U.S.
Brazil
Germany
Indonesia
Nigeria
India
Pakistan
Bangladesh

100
90
80
70
60
50
40
30

$0 $10,000 $20,000 $30,000 $40,000

Real GDP per capita, 2002

GDP and Internet Usage in 12 Countries

Internet Usage (% of population)

U.S.
Japan
Germany
China
Mexico
Brazil
Russia

60
50
40
30
20
10
0

$0 $10,000 $20,000 $30,000 $40,000

Real GDP per capita, 2002

CHAPTER SUMMARY

- Gross Domestic Product (GDP) measures a country's total income and expenditure.

- The four spending components of GDP include: Consumption, Investment, Government Purchases, and Net Exports.

- Nominal GDP is measured using current prices. Real GDP is measured using the prices of a constant base year, and is corrected for inflation.

- GDP is the main indicator of a country's economic well-being, even though it is not perfect.

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