



ECONOMICS

PRIVATE AND PUBLIC CHOICE

16TH EDITION

GWARTNEY – STROUP – SOBEL – MACPHERSON

Taking the Nation's Economic Pulse

Full Length Text — Part: 3 Chapter: 7

Macro Only Text — Part: 3 Chapter: 7

To Accompany: “***Economics: Private and Public Choice, 16th ed.***”

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GDP – A Measure of Output



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GDP – A Measure of Output

- ***Gross Domestic Product*** (GDP):

The market value of final goods and services produced within a country during a specific time period, usually a year.

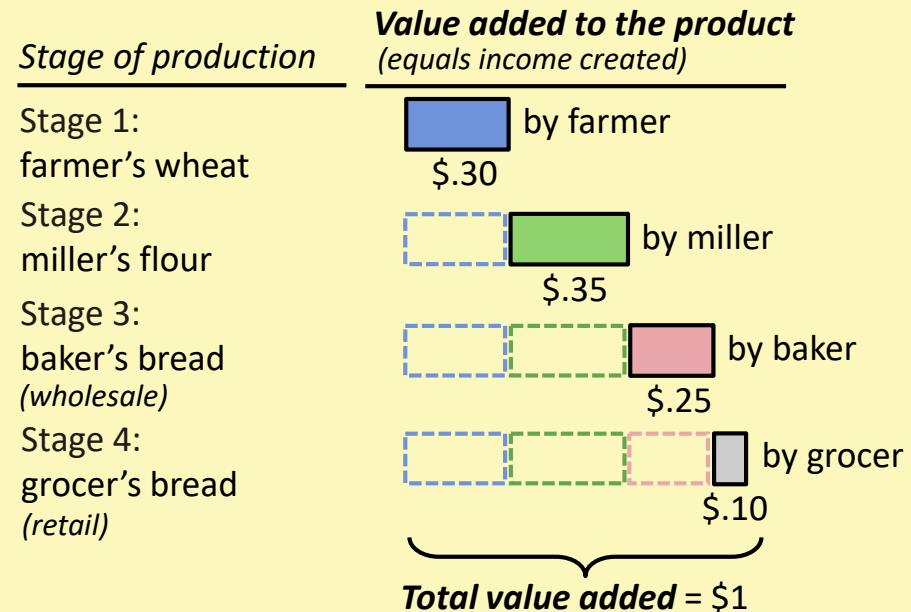
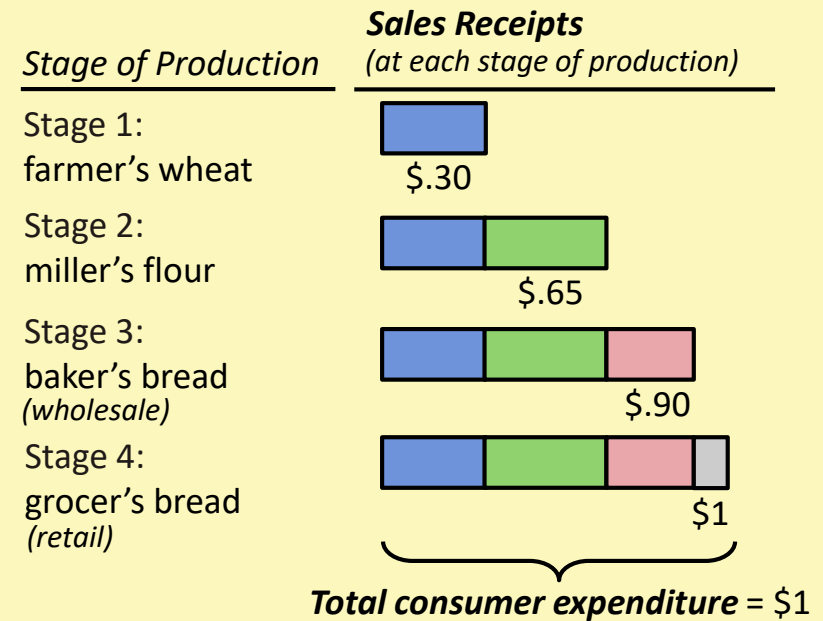
- GDP is the most widely used indicator of economic performance.

What Counts Towards GDP?

- Only final goods & services count.
 - Sales at intermediate stages of production are not counted as their value is embodied within the final-user good.
 - Including goods at intermediate stages of production would result in double counting.

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What Counts Toward GDP?

- What Counts Toward GDP?
 - Only transactions involving production count.
 - Financial transactions & income transfers are excluded because they do not reflect actual production.
 - Only production within the geographic borders of the country is counted.
 - Only those goods produced during the current period are counted.
 - Thus, the purchase and sale of goods produced during earlier years are not counted in this year's GDP.

Dollars are the Common Denominator for GDP

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- GDP is measured in dollars.
 - Each good produced increases output by the amount the purchaser pays for the good.
 - The total spending on all final-user goods and services produced during the year is summed, in dollar terms, to obtain the annual *GDP*.

GDP as a Measure of Both Output and Income

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Two Ways of Measuring GDP

$$\begin{array}{l} \text{Dollar flow of} \\ \text{expenditures} \\ \text{on final goods} \end{array} = \mathbf{GDP} = \begin{array}{l} \text{Dollar flow of} \\ \text{income (and indirect} \\ \text{cost) of final goods} \end{array}$$

- GDP is a measure of both output and income. Thus, there are two ways it can be measured.
 - GDP can be derived by totaling the expenditures on final-user goods and services produced during the year.
 - This is called the **expenditure approach**.
 - Alternatively, GDP can be calculated by summing the income payments to the resource suppliers and the indirect cost of producing the goods and services.
 - This is called the **resource cost-income approach**.

Expenditure Method of Measuring GDP

- ***Expenditure Approach:***

- GDP is the sum of expenditures on final-user goods and services purchased by households, investors, governments, and foreigners.
- When calculated by this method, there are 4 components of GDP:
 - personal consumption purchases
 - gross private investment (including inventories)
 - government purchases (consumption and investment)
 - net exports (exports minus imports)

Resource Cost-Income Method of Measuring GDP

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- **Resource Cost - Income Approach:**
 - GDP is the sum of costs incurred and income (including profits) generated by the production of goods & services in the period.
 - The direct cost income components of GDP:
 - employee compensation
 - self-employment income
 - rents
 - interest
 - corporate profits

Sum of these = *national income*

Resource Cost-Income Method of Measuring GDP

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- ***Resource Cost - Income Approach: (cont.)***
 - Not all cost components of GDP result in an income payment to a resource supplier. To get GDP using this method, we need to account for 3 other factors:
 - *Indirect business taxes:*
Taxes that increase firm's production costs.
 - *Depreciation:*
Cost of wear and tear on the machines and other capital assets used to produce goods and services.
 - *Net Income of Foreigners:*
The income that foreigners earn producing goods within the borders of the U.S. minus the income Americans earn abroad.

Resource Cost-Income Method of Measuring GDP

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- When GDP is derived using the *Resource Cost - Income Approach*, it is calculated as the sum of:
 - national income,
(*employee compensation, self-employment income, rents, interest, corporate profits*)
 - indirect business taxes,
 - depreciation, and,
 - net income of foreigners.

Two Ways of Measuring GDP: *A Summary*

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Expenditure Approach

Personal consumption expenditures
+
Gross private domestic investment
+
*Government consumption
and gross investment*
+
Net exports of goods and services
= GDP

Resource Cost-Income Approach

Aggregate income:

- Employee Compensation
- Income of self-employed
- Rents
- Profits
- Interest

+

Non-income cost items:

- Indirect business taxes
- depreciation

+

Net income of foreigners

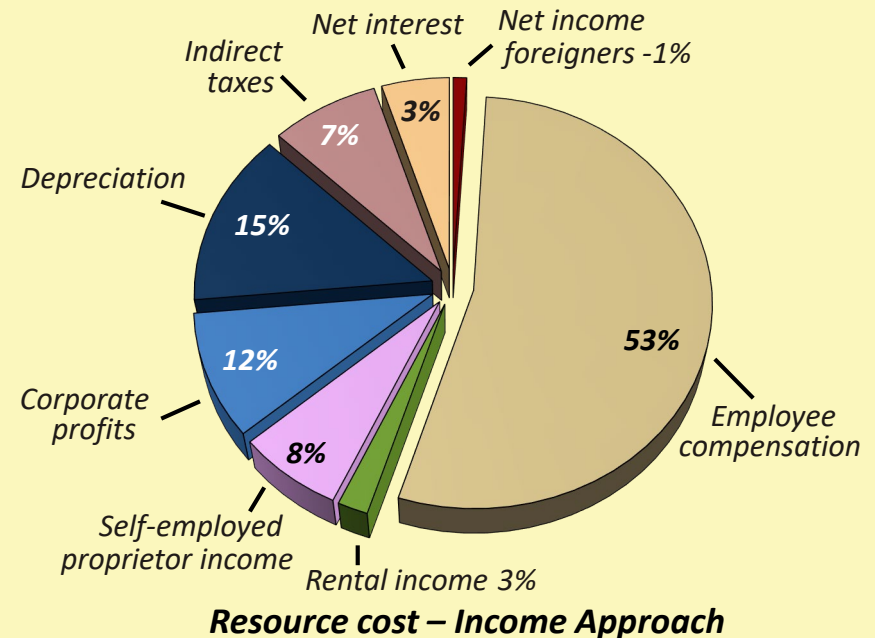
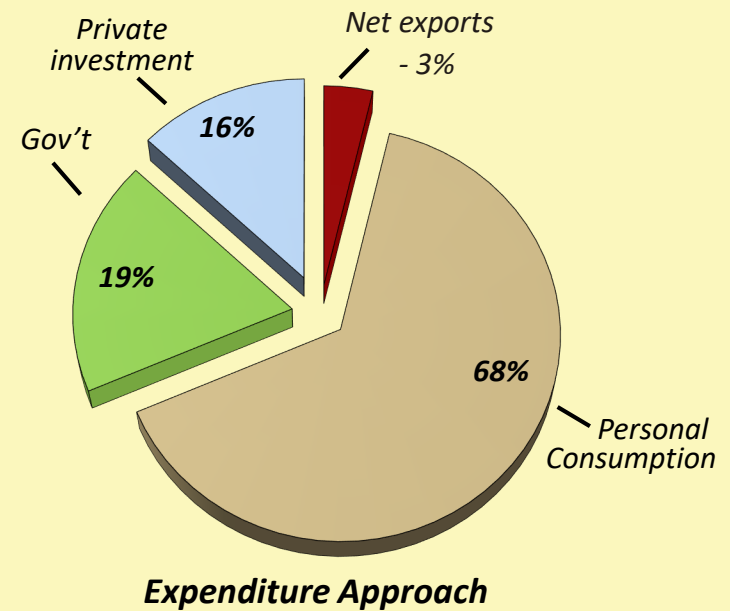
= GDP

U.S. GDP Components: 2012-2015

- The relative sizes of the major components of U.S. GDP usually fluctuate within a fairly narrow range.
- The average proportion of each U.S. component during the 2012-2015 period is shown to the right for both the expenditure and resource cost-income approach.

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Adjusting for Price Changes and Deriving Real GDP



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Real and Nominal GDP

- The term "***real***" means adjusted for inflation.
- ***Price indexes*** are used to adjust income and output data for the effects of inflation.
 - A ***price index*** measures the cost of purchasing a market basket (or “bundle”) of goods at a point in time relative to the cost of purchasing the same market basket during an earlier reference (or base) period.

Key Price Indexes:

- **Consumer Price Index (CPI):**
Measures the impact of price changes on the cost of a typical *bundle of goods & services* households purchase.
- **Chained Consumer Price Index (Chained CPI):**
A version of the CPI that adjusts the quantities of the typical market basket each month to reflect the impact of shifts away from goods that have become relatively more expensive.
- **GDP Deflator:**
designed to measure the change in the average price of the *market basket* of goods included in GDP.

Differences Among the Key Price Indexes:

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- The GDP deflator is a broader price index than the CPI. It reflects the bundle included in GDP while the CPI reflects only the bundle purchased by households.
- Because of their more frequent updating of the typical market bundle and adjustment for the substitution away from goods with higher relative prices, the chained CPI and GDP deflator generally provide a slightly lower estimate for the annual rate of inflation than the traditional CPI.

What is Inflation?

- ***Inflation*** is an increase in the general level of prices.
 - It is typically calculated annually.
- Inflation can be calculated using either the CPI or the GDP deflator.
- The Rate of Inflation is calculated as:

$$\text{Inflation rate} = \frac{\text{This year's price index} - \text{Last year's price index}}{\text{Last year's price index}} \times 100$$

CPI, Chained CPI, and the GDP Deflator: 2000-2015

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- Even though the CPI and the GDP deflator are based on different market baskets and procedures, they yield similar estimates of the rate of inflation.
- However, because of more frequent updating of the market bundle and adjustment for substitution away from goods with relatively higher prices, the chained CPI and GDP deflator generally indicate that inflation is between 0.2 and 0.3 % lower than the CPI.

Year	CPI	Inflation rate (%)	Chained CPI	Inflation rate (%)	GDP deflator	Inflation rate (%)
2000	100.0	-	100.0	-	100.0	-
2001	102.8	2.8	102.3	2.3	102.3	2.3
2001	104.5	1.6	103.5	1.2	103.8	1.5
2003	106.9	2.3	105.7	2.1	105.9	2.0
2004	109.7	2.7	108.3	2.5	108.8	2.7
2005	113.4	3.4	111.5	2.9	112.3	3.2
2006	117.1	3.2	114.7	2.9	115.8	3.1
2007	120.4	2.8	117.6	2.5	118.9	2.7
2008	125.0	3.8	122.0	3.7	121.2	1.9
2009	124.6	-0.4	121.4	-0.5	122.1	0.8
2010	126.6	1.6	123.2	1.4	123.6	1.2
2011	130.6	3.2	126.9	3.1	126.2	2.1
2012	133.3	2.1	129.4	1.9	128.5	1.8
2013	135.3	1.5	131.0	1.2	130.6	1.6
2014	137.5	1.6	132.9	1.4	132.7	1.6
2015	137.6	0.1	132.7	-0.1	134.1	1.0

Using the GDP Deflator to Derive Real GDP

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- The formula for converting nominal GDP into real GDP (in period 1 prices) is:

$$\text{Real GDP}_2 = \text{Nominal GDP}_2 \times \frac{\text{GDP Deflator}_1}{\text{GDP Deflator}_2}$$

- Data on both money (nominal) GDP and price changes are essential for meaningful comparisons of output between two time periods.

Using the GDP Deflator to Derive Real GDP

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- Between 2009 and 2012, nominal GDP increased from \$14,419 billion to \$17,943 billion... an increase of 24.4%.
- But, when the 2012 GDP is deflated to account for price increases ... we can see real GDP increased by 13.3%.

	Nominal GDP (billions of \$)	Price index (GDP deflator, 2009 = 100)	Real GDP (billions of 2009 \$)
2009	\$14,419	100.0	\$14,419
2012	\$17,943	109.8	\$16,342
% increase	24.4%	9.8%	13.3%

Source: <http://www.economagic.com>.

Converting Earlier Figures into Current Dollars

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- Sometimes we will want to make real data (e.g. income) comparisons in terms of the purchasing power of the dollar during the current year.
- This can be done by “inflating” the data for earlier years for increases in the price level.
- The formula for converting the figures for an earlier year into current dollars is:

$$Figure_{current \$} = Figure_{earlier \$} \times \frac{price\ index_{current\ year}}{price\ index_{earlier\ year}}$$

- If prices have risen, this will “inflate” the data for earlier years and bring them into line with the current purchasing power of the dollar.

Problems with GDP as a Measuring Rod

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Shortcomings of GDP as a Measuring Rod

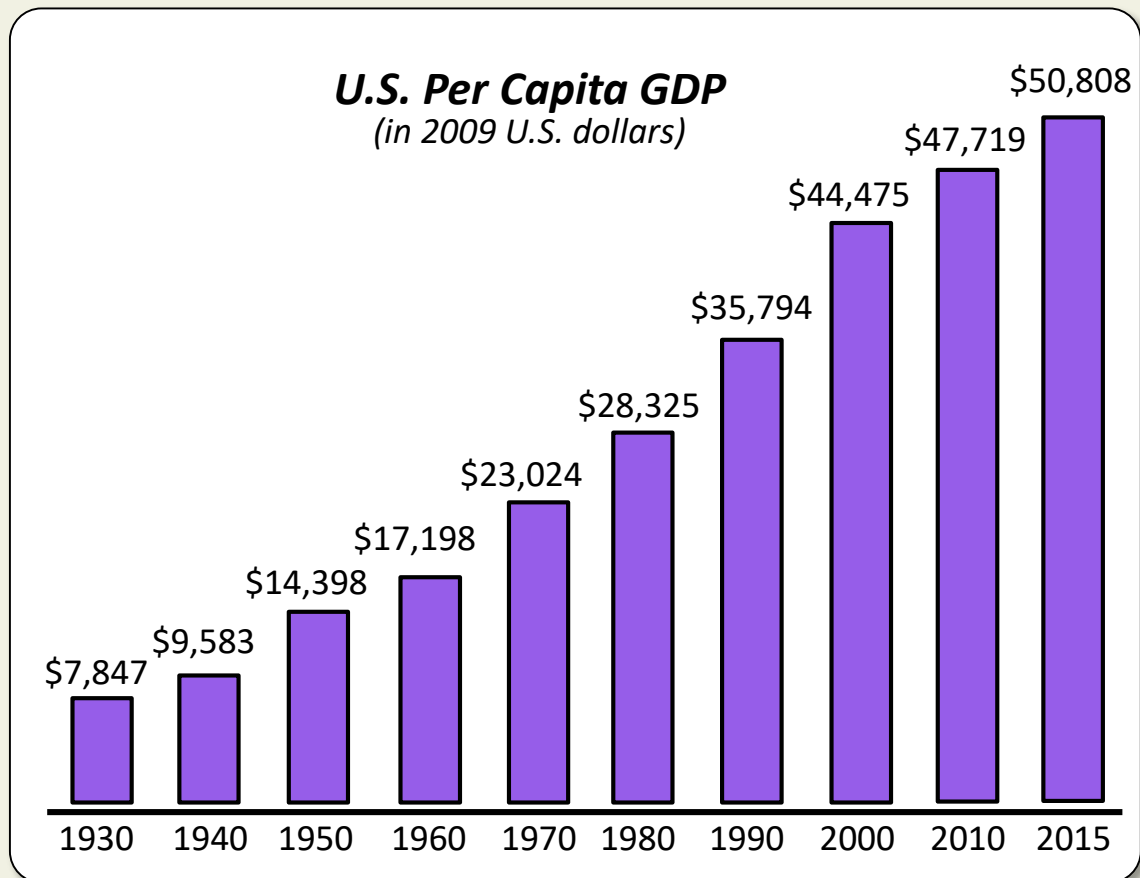
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- Shortcomings of GDP:
 - It does not count non-market production.
 - It does not count the underground economy.
 - It makes no adjustment for leisure.
 - It probably understates output increases because of the problem of estimating improvements in the quality of products.
 - It does not adjust for harmful side effects.

Per Capita GDP 1930-2015

- Per capita GDP is GDP divided by the size of the population.
- The real 2015 GDP per capita figure in the U.S. is more than six times the figure for 1930.
- How meaningful is this comparison?



Source: derived from U.S. Department of Commerce data.

Per Capita GDP Comparisons Across Time Periods

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- As was shown in the previous exhibit, real U.S. per capita GDP has increased substantially over the past 82 years.
- Compared to earlier periods, current GDP is probably biased upward because more output now takes place in the market sector and less in the household sector.
- However, it is also probably biased downward because of failure to adjust for increased leisure, improvements in the work environment, and the introduction of improved products and new technologies.
- The direction of the overall bias is uncertain.

GDP as a Measuring Rod

- In spite of its shortcomings, the evidence indicates that real GDP per person is a broad indicator of living standards.
 - As real per capita GDP in the United States has increased through time, the quality of most goods has increased while the amount of work time required for their purchase has declined.
 - Similarly, as real per capita GDP has risen in the United States and other countries, life expectancy and leisure time have gone up, while illiteracy and infant mortality rates have gone down.

The Great Contribution of GDP

- However, the “great contribution” of GDP is its ability to measure short-term fluctuations in output.
 - Year-to-year (and quarter-to-quarter) changes in real GDP provide a reasonably precise measure of what is happening to the rate of output.