

Chapter 2

Measurement

Measurement versus Theory

- Measurements of the performance of the economy.
GDP, prices, savings, wealth, capital and labor.
- Build simple models to explain how the economy works.

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Notation

- | | | | |
|----------------|---|-----------------|----|
| ■ GDP | Y | ■ Imports | IM |
| ■ Price level | P | ■ Exchange Rate | ER |
| ■ Consumption | C | ■ Net Exports | NX |
| ■ Investment | I | ■ Saving | S |
| ■ Gov Spending | G | ■ Capital | K |
| ■ Taxes | T | ■ Employment | E |
| ■ Exports | X | ■ Unemployment | UE |

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Measuring Gross Domestic Product GDP

The dollar value of the final output produced during a given period of time within the borders of the United States.

Published on a quarterly basis.

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Three approaches to measuring GDP

- Value Added Approach (Product Approach)
- Income Approach
- Expenditure Approach

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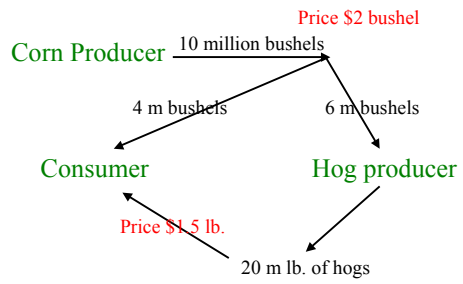
Example Economy

Economic Agents

- Corn producer
- Hog producer
- Consumers
- Government

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Setup



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Table 2-1 Corn Producer

Table 2.1 Corn Producer

Total revenue	\$20 million
Wages	\$5 million
Interest on loan	\$0.5 million
Taxes	\$1.5 million

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Table 2-2 Hog Producer

Table 2.2 Hog Producer

Total revenue	\$30 million
Cost of feed corn	\$12 million
Wages	\$4 million
Taxes	\$3 million

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Table 2-3 After-Tax Profits

After-tax profits
 = Total Revenue – Wages – Interest – Cost of
 Intermediate inputs - Taxes

Table 2.3 After-Tax Profits

Corn producer	\$13 million
Hog producer	\$11 million

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Table 2-4 Government

\$ 4.5 m from producers and \$ 1 m from consumers

Table 2.4 Government

Tax revenue	\$5.5 million
Wages	\$5.5 million

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Table 2-5 Consumers

\$ 5 m (Corn) + \$ 4 m (Hog) + \$ 5.5 m (Gov)

Table 2.5 Consumers

Wage income	\$14.5 million
Interest income	\$0.5 million
Taxes	\$1 million
Profits distributed by producers	\$24 million

Sum from Table 2.3 After-Tax Profits

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Table 2-6 GDP – Product Approach
How much value do you add to the final product?

The sum of value added goods and services in production across all productive units in the economy

Evaluate the bridge at the cost of inputs

Value added—corn	\$20 million
Value added—hogs	\$18 million
Value added—government	\$5.5 million
GDP	\$43.5 million

Table 2-2 Hog Producer

Value added
= Value of final goods – value of intermediate goods
EXPLAIN WHY?

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Table 2-7 GDP – Expenditure Approach
How much did you spend?

The total spending on all final goods and services production in the economy

Include Inventory

Consumption	\$38 million
Investment	0
Government expenditures	\$5.5 million
Net exports	0
GDP	\$43.5 million

Purchased the bridge at \$ 5.5 m

\$ 8 m on Corn + \$ 30 m on Hogs

Total Expenditure = C + I + G + NX

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Table 2-8 GDP – Income Approach
How much did you earn?

Add up all incomes received by economic agents contributing to production

Wage Income	\$14.5 million
After-tax profits	\$24 million
Interest income	\$0.5 million
Taxes	\$4.5 million
GDP	\$43.5 million

Taxes paid by producers

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All approaches are equal

Total output is ultimately sold.

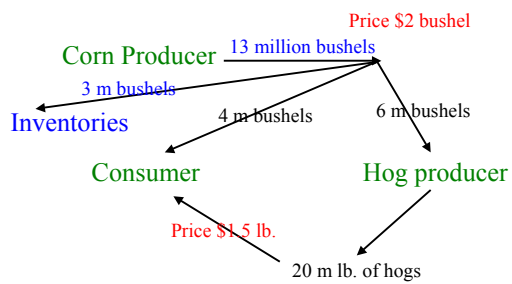
Total Output is also Total Income.

Income-Expenditure Identity

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

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Inventories: Redo the same example with 3 million bushels of Corn kept as inventories



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Table 2-9 Components of GDP Expenditure Approach

Component of GDP	\$ Billions	% of GDP
GDP	\$9,299.2	100%
Consumption	6,268.7	67.4
Durables	761.3	8.2
Nondurables	1,845.5	19.8
Services	3,661.9	38.8
Investment	1,650.1	17.7
Fixed investment	1,606.8	17.3
Nonresidential	1,203.1	12.9
Residential	403.8	4.3
Inventory investment	43.3	0.5
Net exports	-254.0	-2.7
Exports	990.2	10.6
Imports	1,244.2	13.4
Government expenditures	1,634.4	17.6
Federal defense	365.0	3.9
Federal nondefense	203.5	2.2
State and local	1,065.8	11.5

Source: Survey of Current Business, December 2000.

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Table 2-10 Real vs. Nominal GDP

Table 2.10 Data for Real GDP Example

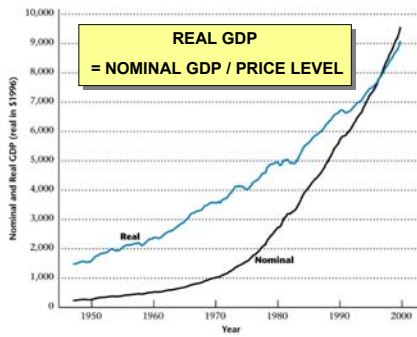
	Apples	Oranges	
Quantity in year 1	50	100	Nominal year 1
Price in year 1	\$1.00	\$0.80	
Quantity in year 2	80	120	Nominal year 2
Price in year 2	\$1.25	\$1.60	

Compute Real GDP for year 2

- year 1 as base
- Chain-weighted

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Figure 2-2 Nominal GDP (black line) and Chain-Weighted Real GDP (colored line) for the Period 1947-1999



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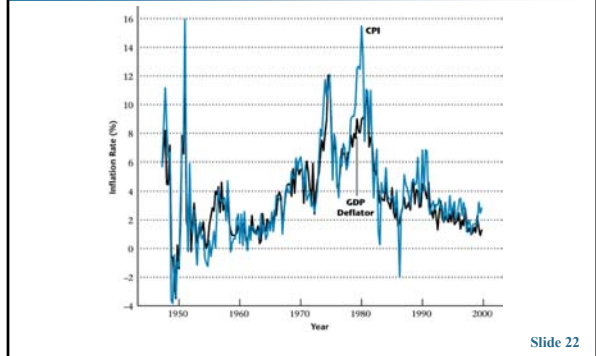
Table 2-11 Base Year vs. Chain-weighting Methods to Compute Inflation

Table 2.11 Implicit GDP Price Deflators, Example

	Year 1	Year 2	% Increase
Year 1 = base year	100	165.9	65.9%
Year 2 = base year	58.4	100	71.2
Chain-weighting	73.8	124.8	69.1

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Figure 2-3 Inflation Rate Calculated from the CPI (colored line), and Calculated from the Implicit GDP Price Deflator (black line)



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