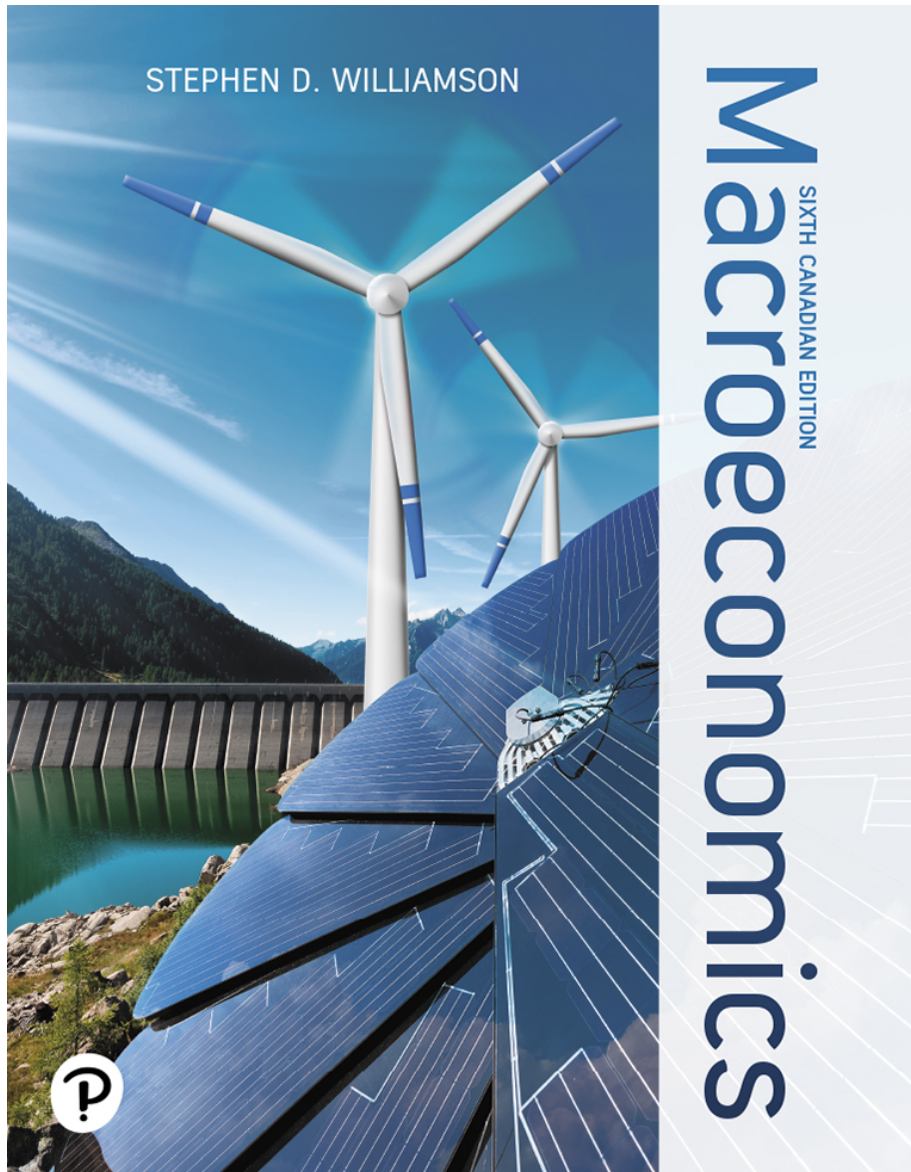


# Macroeconomics

Sixth Canadian Edition



## Chapter 2 Measurement

# Chapter 2 Topics

- Measuring GDP
- Nominal and real GDP and price indices
- Savings, wealth and capital
- Labour market measurement

# Measuring GDP: The National Income and Product Accounts (NIPA)

- GDP Measured Using: (i) the product approach; (ii) the expenditure approach; (iii) the income approach.
- Show how this is done using an example.

# National Income Accounting Example

- Fictional Island Economy
- Coconut Producer, Restaurant, Consumers, Government

## Table 2.1

### Coconut Producer

= total revenue -

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

20 - 5 - 0.5 - 1.5

## Table 2.2

### Restaurant

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

$$30 - 12 - 4 - 3.$$

**Table 2.3**  
After-Tax Profits

Coconut producer	\$13 million
Restaurant	\$11 million

## Table 2.4

### Government

*budget balance*      *surplus*  
*deficit.*

Tax revenue	\$5.5 million
Wages	\$5.5 million



**Table 2.5**  
Consumers

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

## Table 2.6

### GDP Using the Product Approach

Value added—coconuts	\$20 million
Value added—restaurant	\$18 million
Value added—government	\$ 5.5 million
GDP	\$43.5 million

## Table 2.7

### GDP Using the Expenditure Approach

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

## Table 2.8

### GDP Using the Income Approach

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

$$GDP = C + I + G + NX,$$

**Table 2.9**

## Gross Domestic Product for 2017 (1 of 2)

<i>Component of GDP</i>	<i>\$ Billions</i>	<i>% of GDP*</i>
GDP	2137.5	100
Consumption	1241.0	58.1
Durables	161.4	7.6
Semi-durables	84.4	3.9
Nondurables	284.3	13.3
Services	678.3	31.7
Investment	405.9	19.0
Nonresidential	202.4	9.5
Residential	164.7	7.7
Change in inventories	17.5	0.8
Intellectual property prods.	35.6	1.7

## Table 2.9

### Gross Domestic Product for 2018 (2 of 2)

Government expenditures	523.7	24.5
Government consumption	442.8	20.7
Government investment	80.9	3.8
Net exports	-50.4	-2.4
Exports	663.7	31.1
Imports	-714.1	-33.4

\*Percentages do not add up to 100 because of rounding and statistical discrepancy. Source: Statistics Canada database, Table 384-0038. © Stephen D. Williamson.

# Problems in Measuring GDP

- Economic activity in the *underground economy* cannot be measured directly – this activity might be measured indirectly by accounting for the use of currency.
- Government production is difficult to measure, as the output (for example defense services) is typically not sold in the market.

# Nominal and Real GDP and Price Indices

- Price Index: Weighted average of a set of observed prices that gives a measure of the *price level*. *CPI/PPi GDP deflator*
- Price indices allow us to measure the *inflation rate* – the rate of change in the price level.
- A measure of the inflation rate allows us to determine how much of an increase in GDP is *nominal* and how much is *real*.

$$\frac{P_{t+1} - P_t}{P_t}$$



**Table 2.10**  
Data for Real GDP Example

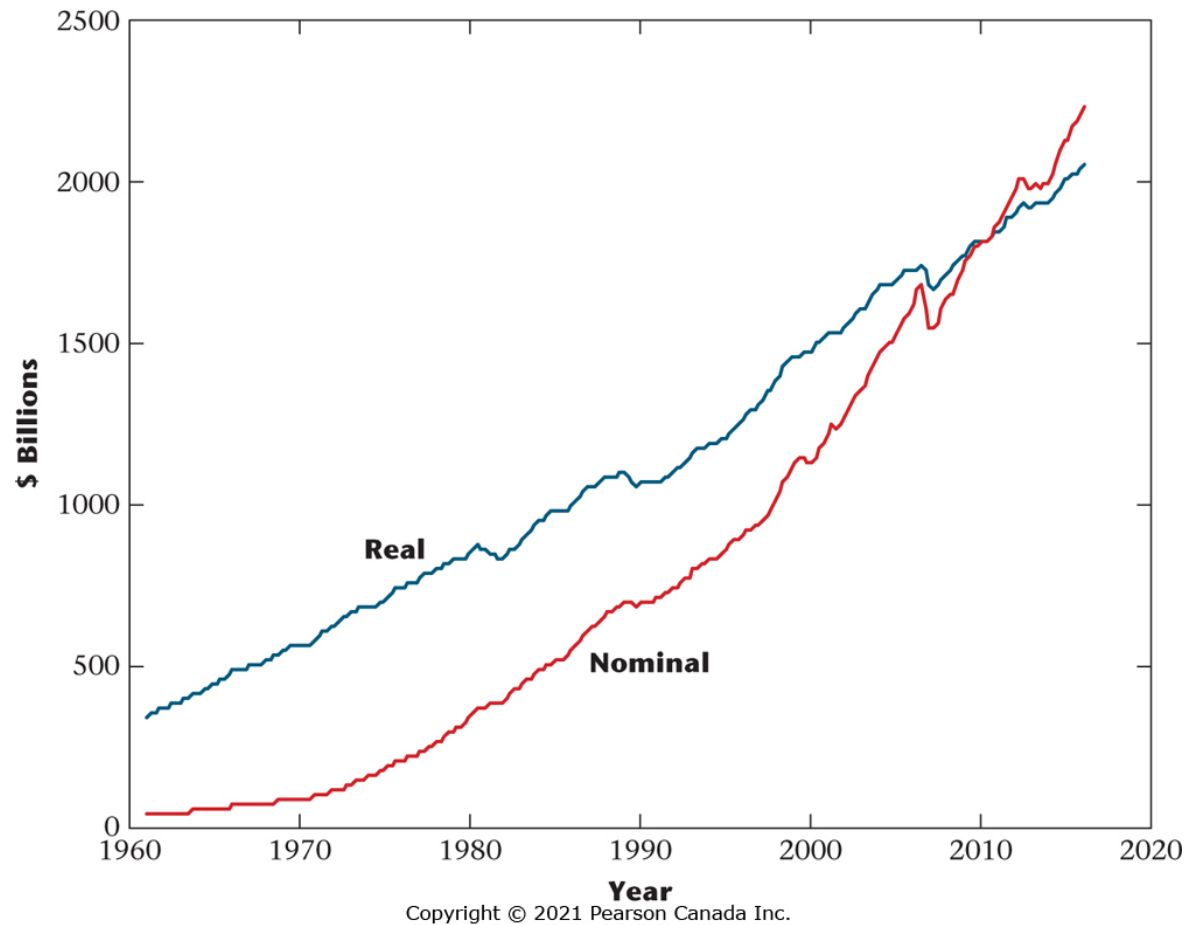
	<i>Apples</i>	<i>Oranges</i>
Quantity in year 1	50	100
Price in year 1	\$1	\$0.80
Quantity in year 2	80	120
Price in year 2	\$1.25	\$1.60

*nominal = current yr price  $\times$  current yr quantity.*

*real = base yr  $\times$  quantity.*

## Figure 2.1

Nominal GDP (red line) and Chain-Weighted Real GDP (blue line), 1961–2018



Note that the two time series cross in 2012 because real GDP is measured in 2012 dollars. The growth rate in real GDP is smaller than the growth rate for nominal GDP because of positive inflation over this period.

**Table 2.11**

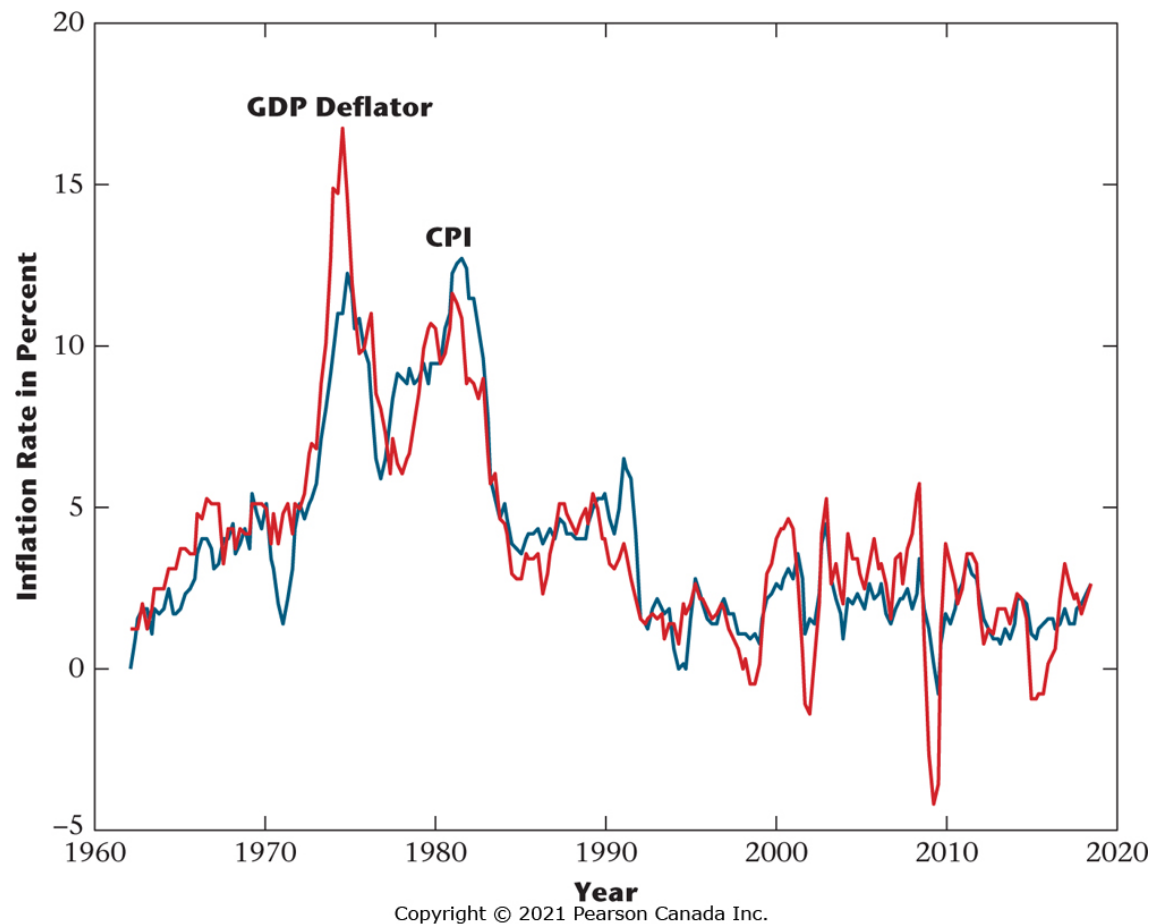
Implicit GDP Price Deflators, Example

	<i>Year 1</i>	<i>Year 2</i>	<i>% Increase</i>
Year 1 = base year	100	165.9	65.9
Year 2 = base year	58.4	100	71.2
Chain-weighting	100	168.5	68.5

$$\text{deflator} = \frac{\text{nominal}}{\text{real}}$$

## Figure 2.2

Quarterly Inflation Rate Calculated from the CPI (blue line) and the Implicit GDP Price Deflator (red line), 1962–2018



These measures are broadly similar, but there can be substantial differences.

# Problems in Measuring Real GDP and the Price Level

- The relative prices of goods change over time – a problem for CPI measurement.
- The quality of goods and services changes over time.
- New goods and services are introduced, and some goods and services become obsolete.

# Savings, Wealth and Capital (1 of 5)

- Private Disposable Income:

$$Y^d = Y + NPP + TR + INT - T$$

$$\text{after-tax income} = \text{total income} +$$

# Savings, Wealth and Capital (2 of 5)

- Private Sector Saving:

m

# Savings, Wealth and Capital (3 of 5)

- Government Saving = – Government Deficit:



# Savings, Wealth and Capital (4 of 5)

- National Saving = Private Saving + Government Saving:

# Savings, Wealth and Capital (5 of 5)

- National savings is reflected in investment (new capital stock) plus the current account surplus (acquisition of claims on foreigners):

# Labour Market Measurement

- The Statistics Canada monthly household survey divides the working-age population into three groups:
  - Employed
  - Unemployed
  - Not in the Labour Force
- Labour force = employed + unemployed

# Three Key Labour Market Measures