Unit 4: Measuring GDP and Prices

ECO 120 Global Macroeconomics

Reading

- Module 10 - pages 106-110
- Module 11

Goals

- Specific Goals:
  - Understand how to measure a country's output.
  - Learn a way to measure the overall level of prices in the economy.
  - Learn some problems with these measures.
- Learning Objectives:
  - LO3: Define, compute, and explain limitations to measures of the macroeconomy, including gross domestic product, inflation, and unemployment.

National income accounting

- **National income accounting**: different measures of a country's overall economic performance.
- Why do we care?
  - Assess the health of the economy by comparing output / person across countries and across time periods.
  - Track long run growth out the economy.
  - Access the effectiveness of macroeconomic policies.
- Measures:
  - **Gross domestic product**
  - **Net domestic product**
  - **National income**
  - **Personal income**
  - **Disposable income**

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Example: $350 suit

- The birth of suit:
  1. Sheep rancher produces and sells $120 wool to a wool processor.
  2. A firm processes the wool and sells the material to a suit manufacturer for $180.
  3. The suit manufacturer makes a suit and sells it to a wholesaler for $200.
  4. The wholesaler sells the suit to a retailer for $250.
  5. The retailer sells the suit to you for $350.
- If we counted all these transactions in GDP we get: $\$120 + \$180 + \$200 + \$250 + \$350 = \$1{,}100$.
- When actually, in the end we are only left with a suit worth $350.

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Value added approach

- Add to GDP only the value added at each step:
  1. Sheep rancher: \$120
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- Add up the value added at every stage of production:
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What's not counted?

- Non-production transactions: transactions that do not involve production of a good.
- Financial transactions
  - Public transfer payments such as social security payments and veterans payments.
  - Private transfer payments such as gifts between family members.
  - Stock market transactions.
- Secondhand transactions: contribute nothing to production, just moving ownership of final goods between people.

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- Consumption: consumption expenditures of households.
- Investment: purchases of capital goods by firms.
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Investment

- **Gross private domestic investment**
  - *Most important:* Capital - final purchases of machinery, equipment, and tools.
  - All construction: includes construction of new offices, factories, *and* residential houses.
  - Changes in inventories: "unsold" output (not counted in consumption, because never purchased).
- **Net private domestic investment** = gross private domestic investment - depreciation.
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- **Net exports** = exports - imports.
- Export goods are produced in the U.S. and consumed outside the U.S.
- Imports are subtracted
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  - Subtracting imports from exports results in a net quantity of goods produced in the U.S. that are sold outside the U.S.

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Gross domestic product

Expenditure approach leads to the equation:

$$Y = C + I + G + X - M$$

- Y: total output $\equiv$ GDP.
- C: private consumption
- I: gross private domestic investment
- X: exports
- M: imports

Income approach

- **Income approach**: another method of computing GDP, add up total income.
- **National income** is composed of:
  - Compensation of employees (income earned from labor)
  - Rent (income earned from owning land)
  - Interest (income earned from owning capital)
  - Proprietors' income (income earned from organizing production)
  - Corporate profits (income earned from organizing production)
- National income is *almost* equal to GDP.
  - Requires some statistical adjustments (corporate income taxes, undistributed corporate profits)

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Disposable Income

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- **Disposable income** = Personal income - personal taxes.
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$$\text{Disposable income} \approx \text{GDP} - \text{Personal Taxes}$$

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$$\text{Disposable income} \approx \text{GDP} - \text{Personal Taxes}$$

Disposable Income

- **Personal income** = National income
  1. *minus* social security payments
  2. *minus* corporate income taxes
  3. *minus* undistributed corporate profits
  4. *plus* transfer payments
- **Disposable income** = Personal income - personal taxes.
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Nominal vs. Real GDP

- Problem with GDP calculation is that it measures *market value* of goods and services.
- Prices may increase, but production stay the same.
- **Nominal GDP**: (unadjusted) GDP calculation using prices that prevailed when output was produced.
- **Real GDP**: GDP calculation that is adjusted for changes in prices.
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Calculating Real GDP

- Don't use current year prices to compute real GDP.
- Use prices from a chosen **base year**.
- Example:
  - Suppose only two goods: Brats and Cheese
  - Let's use 2005 as a base year, compute real GDP for 2006

$$\text{Real GDP}_{2006} = P_{Brats,2005} Q_{Brats,2006} + P_{Cheese,2005} Q_{Cheese,2006}$$

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Example: Nominal GDP

	Year 2005	
Item	Quantity	Price
Brats	100	\$1.00
Cheese	20	\$5.00

	Year 2006	
Item	Quantity	Price
Brats	150	\$2.00
Cheese	25	\$7.00

$$\text{Nominal GDP}_{2005} = 100(\$1) + 20(\$5) = 200$$

$$\text{Nominal GDP}_{2006} = 150(\$2) + 25(\$7) = 475$$

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- Real GDP using 2005 as a base year.

$$\text{Real GDP}_{2005} = 100(\$1) + 20(\$5) = 200$$

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- What is real GDP growth?

$$\text{Real GDP Growth} = \frac{275-200}{200} = 0.375 = 37.5\%$$

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$$\text{Real GDP}_{2005} = 100(2) + 20(7) = 340$$

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Shortcomings of GDP

- Does not account for non-market activities.
- Leisure: Average workweek in 1900 was 53 hours. Today it's 35 hours.
- Improved product quality (eg. computers).
- Underground economy.
- External costs. Clean up costs are actually *added* to GDP.
- Says nothing about distribution.

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Next up...

- Measuring Unemployment: Modules 12 and 13
- Measuring Inflation - Modules 14 and 15