The government is very keen on amassing statistics . . . They collect them, add them, raise them to the $n^{th}$ power, take the cube root and prepare wonderful diagrams. But you must never forget that every one of these figures comes in the first instance from the village watchman, who just puts down what he damn pleases.

— Sir Josiah Stamp
(head of Britain’s revenue department in the late 19th century)
Aggregate Accounting

• **Aggregate accounting** (or national income accounting) measures **total**, or **aggregate production** in the economy as a whole
GDP

• **Gross Domestic Product (GDP):** the dollar value of all final goods and services produced within a country’s borders in one year
  • GDP is measured in dollars
  • Only measures **final** goods and services
  • It is the single most used economic measure
GDP Measures Final Output

• GDP **does not** measure total transactions in the economy

• **It counts final output, not intermediate goods**
  
  • **Final output**: goods and services purchased for final use
  
  • **Intermediate goods/products**: goods used as an **input** in the production of some other product
GDP Measures Final Output

- Counting the sale of both final and intermediate goods would result in double counting and GDP would be artificially higher.

- One way to eliminate double counting is the value added approach.
  - Subtract intermediate goods from the value of its sales.
What is **NOT** Counted in GDP

- Intermediate goods
- Transfer payments (Social Security)
- Work of homemakers
- The underground economy/black market
- Sale of stocks/bonds
- Sale of used goods
How GDP is Used

1. To compare to previous years (Is there growth?)
2. To determine if policy changes worked
3. To compare to other countries (Are we better off?)
GDP is a Flow Concept

• GDP is a **flow concept**: the amount of total final output a country produces **per year, not** at one moment in time

• **Wealth accounts** are a balance sheet of an economy’s assets and liabilities and it is a **stock concept** (at a particular moment in time)
GDP is a Flow Concept

- **Real wealth** is the value of the productive capacity of the assets of an economy measured by the goods and services it can produce now and in the future.

- **Nominal wealth** is the value of those assets measured at current market prices.
Calculating GDP

• Quantities of goods and services produced are multiplied by their per unit market price to determine a value measure of that good or service (P X Q)
  • This weights the importance of each good by its price
  • The sum of all of these values is GDP
Calculating GDP

• Assume our economy only produces 3 goods.

• What is the GDP for our economy?

<table>
<thead>
<tr>
<th>Good</th>
<th>Price</th>
<th>Quantity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoes</td>
<td>$50</td>
<td>10</td>
<td>$500</td>
</tr>
<tr>
<td>T-shirts</td>
<td>$10</td>
<td>50</td>
<td>$500</td>
</tr>
<tr>
<td>Socks</td>
<td>$6</td>
<td>100</td>
<td>$600</td>
</tr>
</tbody>
</table>

$1600
The Components of GDP

GDP is divided into four expenditure categories:

1. Consumption (C) is spending by households on goods and services
   - Includes **durable** and **nondurable goods**
     - Durable goods are goods that last a long time (washing machines; refrigerators)
     - Nondurable goods are goods that do not last long or are immediately consumed
The Components of GDP

- **Investment (I)** is spending for the purpose of additional production (NOT stocks/bonds)
  - Included new capital or machinery purchased by a firm
  - New construction (new grocery store or new homes)
  - Market value of unsold inventory
The Components of GDP

3. Government spending ($G$) is goods and services that the government buys
   - Such as highways, airports, etc.
   - Does NOT include transfer payments such as Social Security

4. Net exports ($X-M$ or $X_n$) is spending on exports ($X$) minus spending on imports ($M$)
The Components of GDP

• This gives us the formula:
  
  • \( GDP = C + I + G + (X_n) \)

• (Note: GDP may also be designated by \( Y \) to represent aggregate)
GDP: Expenditures and Income Approach

There are two approaches to measuring GDP:

1. **Expenditures Approach**: add up all the spending on final goods and services produced in a given year

   - This is denoted by \( \text{GDP} = C + I + G + (X_n) \)
GDP: Expenditures and Income Approach

2. Income Approach add up all the income that resulted from selling all final goods and services produced in a given year

GDP = Compensation of employees + Rents + Interest + Proprietors’ income + Corporate profits (Corporate income taxes + dividends + undistributed corporate profits) + indirect business taxes + depreciation (consumption of fixed capital) + net foreign factor income
Aggregate Income

- **Aggregate income** is the total income earned by citizens and firms of a country

- Aggregate income = Employee compensation + Rents + Interest + Profits
Aggregate Income

• Aggregate income consists of:

  • **Employee compensation**: wages and salaries paid to individuals

  • **Rent**: income from property received by households
Aggregate Income

• **Interest**: interest businesses pay to households that have lent them money

• **Profits**: amount left over after compensation to employees, rents, and interest have been paid
Equality of Income and Expenditures

• Whenever a good or service is produced (output), somebody receives an income for producing it

• This gives us the aggregate income and production identity

• Aggregate Income ≡ Aggregate Production
Equality of Income and Expenditures

• This aggregate identity allows us to calculate GDP either by adding up all values of final outputs (C, I, G, X_n) or by adding up the values of all earnings or income.
Comparing GDP Among Countries

• **Per capita GDP** can be used to compare relative standards of living among various countries (this can be a misleading figure)

• **Purchasing power parity** adjusts for relative price differences before making comparisons
Per Capita GDP

- **Per capita real output (real GDP per capita)** is real GDP divided by the total population.
- Even if total output is increasing, the population may be growing even faster, so per capita real output may **fall**.
- **Real GDP per capita** is the best measure of a nation’s standard of living.
Real and Nominal GDP

• **Nominal GDP** is GDP measured in current prices
  • It does **not** account for inflation from year to year
  • Considered less accurate
Real and Nominal GDP

- **Real GDP** is GDP expressed in constant, or unchanging, dollars
  - Real GDP adjusts for inflation
  - It is the best measure of economic growth
  - More accurate because prices have been adjusted according to a base year
GDP and Inflation

- GDP figures are affected by **inflation**
  - If GDP increases due to increases in the price level, then welfare does **not** increase

- Changes in welfare over time are best indicated by changes in **real GDP**, which is nominal GDP adjusted for inflation
Calculating the GDP Deflator

- A **deflator** is an adjustment that accounts for inflation and tells us what output would have been with no inflation.

- Economists favor the GDP deflator because it includes a larger number of goods.
Calculating the GDP Deflator

• The **GDP deflator** measures the prices of all goods (not just the market basket) produced in a nation relative to a base year.
• This is a broader measure compared to the CPI.

\[
\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100
\]

\[
\text{Nominal GDP} = \frac{\text{Deflator} \times \text{Real GDP}}{100}
\]
Real and Nominal GDP

- **Nominal GDP** is GDP calculated at existing prices
- **Real GDP** is nominal GDP adjusted for inflation
- The **price index** is used as the GDP deflator

\[
\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP deflator}} \times 100
\]

OR

\[
\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{Price Index in hundredths}}
\]
Real and Nominal GDP

• If given the increase in nominal GDP and the inflation rate you can calculate the change in real output

• $\% \Delta \text{in real GDP} = \% \Delta \text{in nominal output} - \text{inflation}$
Net Domestic Product (NDP)

• **Net domestic product** is GDP adjusted for depreciation
  
  • **Depreciation** is the amount of capital used up in producing that year’s GDP
  
  • NDP measures output available for purchase
  
  • NDP=GDP—Depreciation
GNP

- **Gross National Product (GNP)** is the aggregate final output of citizens and businesses of an economy in one year
  - GNP = GDP + Net foreign factor income
GNP

• **Net foreign factor income**: we add the foreign income of our citizens and subtract the income of residents who are not citizens
Chapter Summary

• Aggregate accounting is a set of rules and definitions for measuring economic activity in the aggregate economy

• GDP is the total market value of all final goods and services produced in an economy in one year

• GDP is the sum of four expenditures:

\[
\text{GDP} = C + I + G + (X_n)
\]

• Intermediate goods can be eliminated from GDP by:
  • Measuring only final sales
  • Measuring only value added
Chapter Summary

• Net domestic product is GDP less depreciation

• NDP represents output available for purchase because production used to replace worn-out plant and equipment (depreciation) has been subtracted

• GDP measures output produced within the borders of a country; GNP measures the economic output produced by the citizens of a country

• Aggregate income = Compensation of employees + Rent + Interest + Profit
Chapter Summary

- Aggregate income equals aggregate production because whenever a good is produced somebody receives income for producing it, and profit is key to that equality.

- Because GDP measures only market activities, GDP can be a poor measure of relative living standards among countries.

- To compare income over time, we must adjust for price-level changes. After adjusting for inflation, nominal measures are changed to “real” measures.
Chapter Summary

Real GDP = $\frac{\text{Nominal GDP}}{\text{GDP deflator}} \times 100$

- GDP has its problems:
  - GDP does not measure economic welfare
  - GDP does not include transactions in the underground economy
  - The price index used to calculate real GDP is problematic
  - Subcategories of GDP are often interdependent