

6

Measuring the Production, Income, and Spending of Nations



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A Precise Definition of GDP

GDP: a measure of the value of all newly produced¹ goods and services in a country² during some period of time³.

- Only newly produced goods and services are included. If you buy a 10-year-old baby stroller from a garage sale this year, none of the value of that stroller is included in the calculation of this year's GDP.

A Precise Definition of GDP

Only goods and services produced within the borders of a country are included. The Mini-Cooper you bought this year (made and assembled in the UK) is not part of the U.S. GDP; it is part of the United Kingdom's GDP.

A Precise Definition of GDP

Only new goods and services produced in a specified period of time are included. For example, if Ford produced a model 2009 Mustang in December 2010 but the car was not sold until January 2011, then that Mustang will be included in the GDP of the period in which it was produced— 2010.

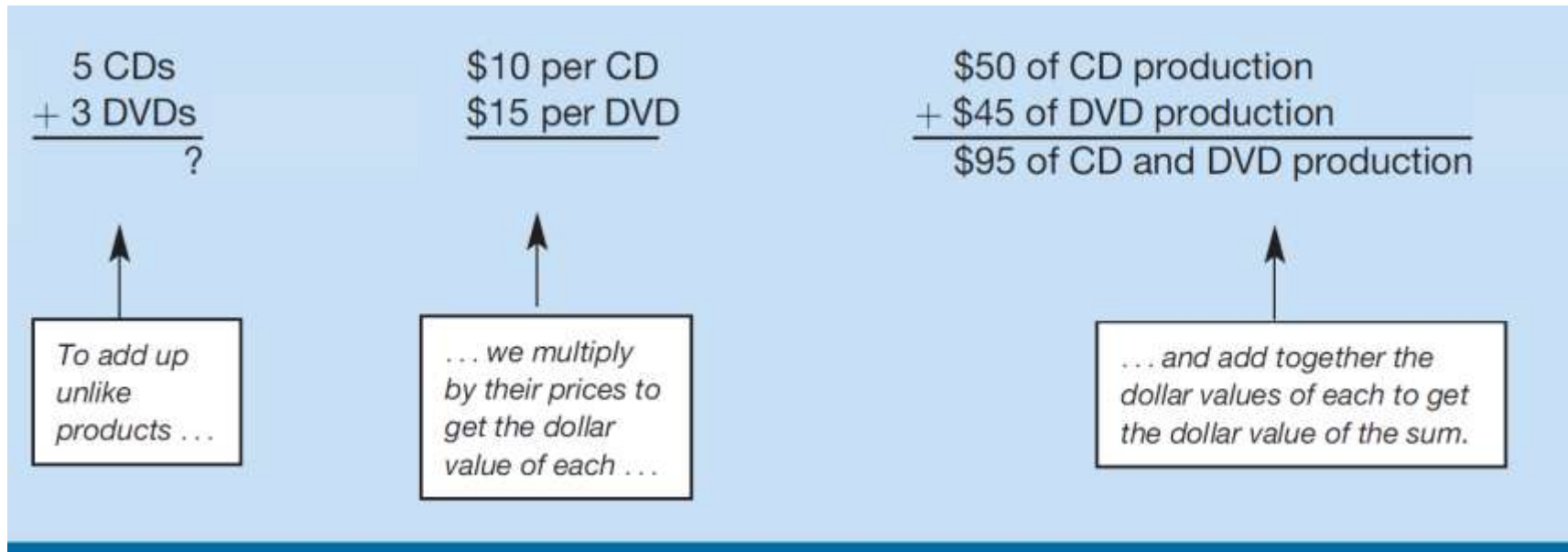
A Precise Definition of GDP

We cannot add 10 apples with 20 oranges. We can combine different goods only by multiplying the quantity of each good produced by its price.

Table 6-1 illustrates how to calculate the GDP with two goods, CDs and DVDs.

Adding Up Unlike Products: CDs and DVDs

Table 6-1



Intermediate Goods vs. Final Goods

Intermediate good: a good that undergoes further processing before it is sold to consumers; a good that is an input to the production of other goods or services.

Examples of intermediate goods:

- A bicycle tire that is sold to a bicycle manufacturing company
- Crude oil

Intermediate Goods vs. Final Goods

Final good: a new good that undergoes no further processing before it is sold to consumers; a good that is not an input to the production of other goods or services.

Examples of final goods:

- Bicycles sold at a bicycle shop
- Gasoline sold at a gas station

Intermediate Goods vs. Final Goods

Rule in calculating GDP:

To avoid double counting, never include intermediate goods; only final goods are part of GDP.

Stocks versus Flows

GDP is a measure of the flow of new goods and services in the economy. It does not tell us the value of all the goods and services that exist in the economy.

- For example, the number of new cars produced in the U.S. during a given time period is a flow measure, while the number of cars in the U.S. is a stock measure. Only the former will count toward GDP.

Three Ways to Measure GDP

The spending approach: measures the total amount that people spend on goods and services made in the United States.

The income approach: measures the total income earned by all factors of production (workers, businesses, capital) that produce goods and services in the United States.

The production approach: measures the total value of all goods and services as they are shipped out of the factory.

The Spending Approach

Total spending in the economy is divided into four components:

- Consumption spending
- Investment spending
- Government purchases
- Net exports (exports minus imports)

Components of Spending in 2010 (billions of dollars)

Table 6-2

Gross domestic product (GDP)	\$14,660
Consumption	10,349
Investment	1,827
Government purchases	3,000
Net exports	-516

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

The Spending Approach

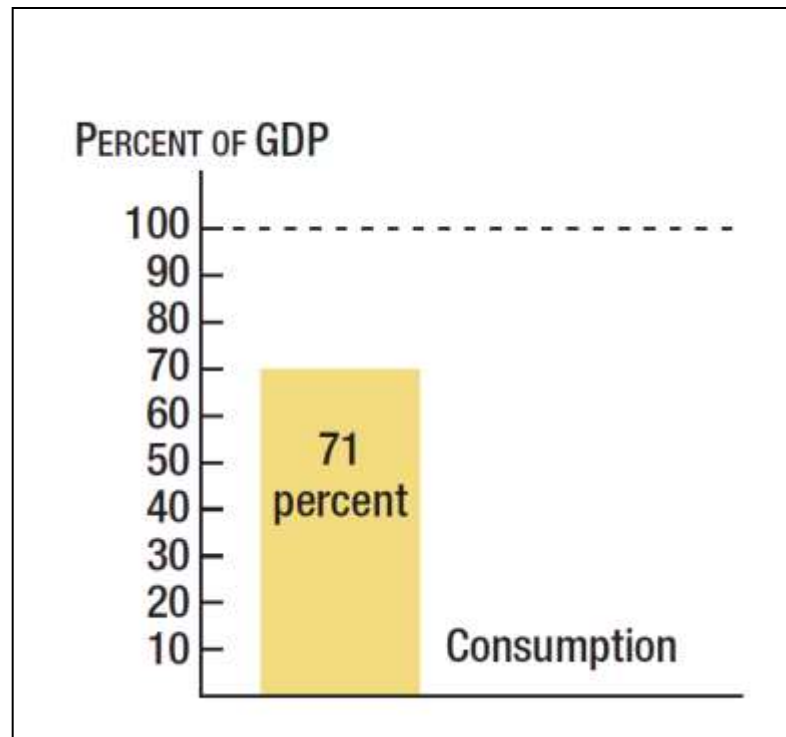
Consumption: purchases of final goods and services by individuals.

Examples of consumption spending:

- Purchase of a new convertible
- A weekend vacation
- An oil change

Consumption as a Share of GDP in 2008

Figure 6-1



The Spending Approach

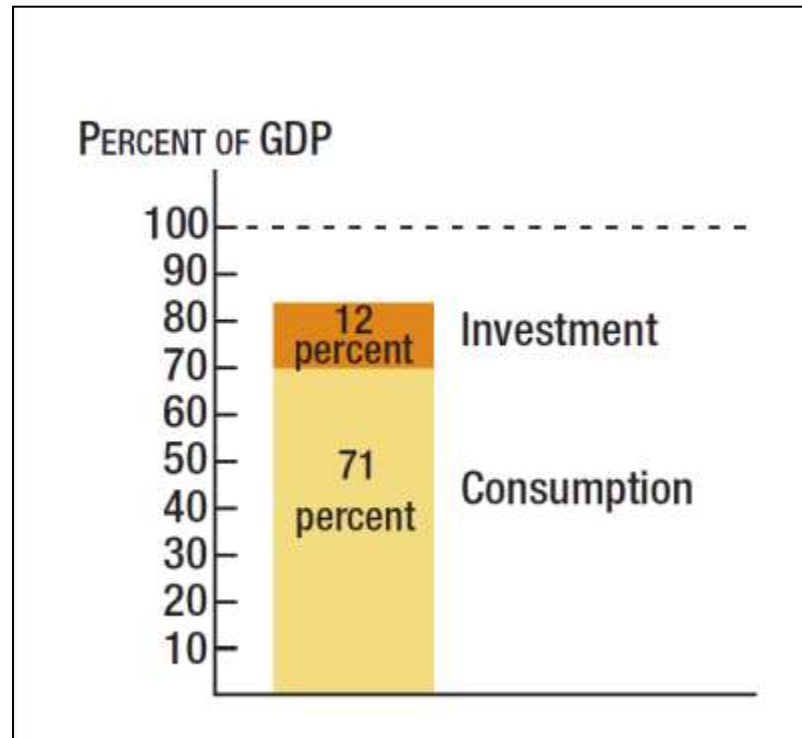
Investment: purchases of final goods and services by firms plus the purchases of newly produced residences by households.

Examples of investment spending:

- A business buys a new car
- A company builds a new factory

Investment and Consumption as a Share of GDP in 2010

Figure 6-2



The Spending Approach

The three components of investment spending:

- **Business fixed investment:** firm spending on new factories, machines, and other equipment.
- **Inventory investment:** the change in inventories (i.e., the difference between inventories at the end of the period and inventories at the start of the period).
- **Residential investment:** the purchase of new houses and apartment buildings.

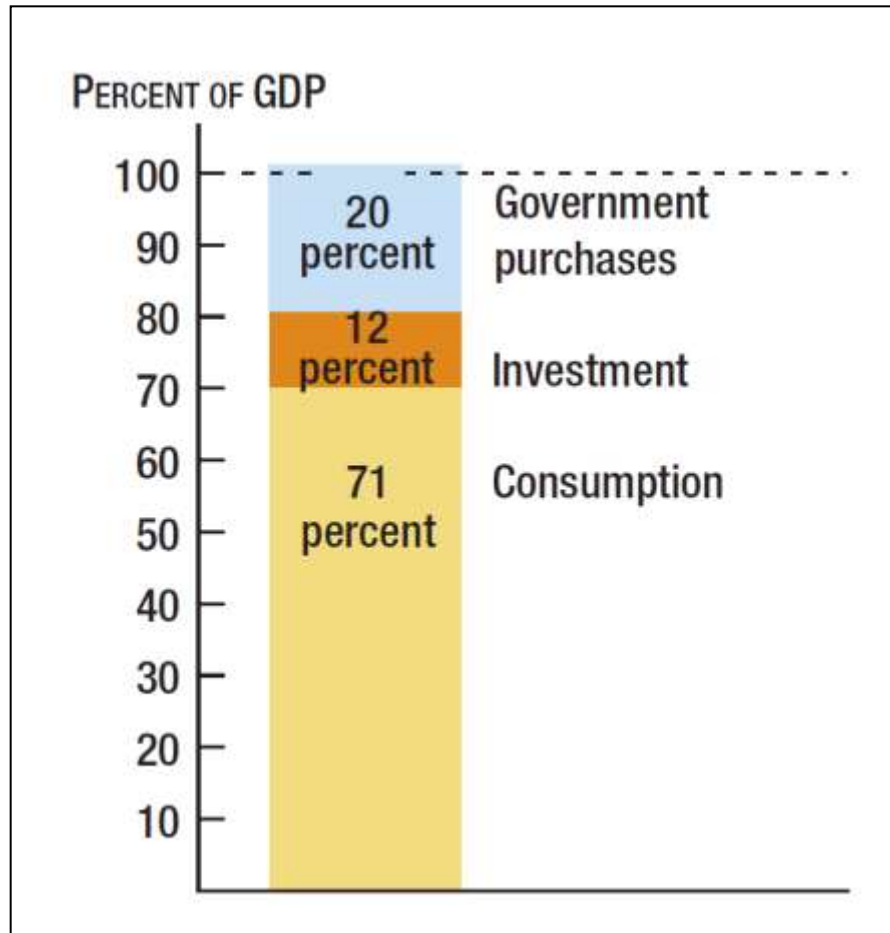
The Spending Approach

Government purchases: purchases by federal, state, and local governments of new goods and services.

Not all items in the government's budget are counted as part of government purchases. Welfare and retirement payments made by the government are not counted as part of these purchases.

Government Purchases, Investment, and Consumption as a Share of GDP in 2010

Figure 6-3



The Spending Approach

Exports: the total value of goods and services that people in one country sell to people in other countries.

Imports: the total value of goods and services that people in one country buy from people in other countries.

The Spending Approach

Net exports: the value of exports minus the value of imports.

Trade balance: the value of exports minus the value of imports; also known as net exports.

The Spending Approach

If net exports are positive, the country has a **trade surplus**.

If net exports are negative, the country has a **trade deficit**.

For the United States in 2010, exports equaled \$1,838 billion and imports equaled \$2,354 billion. The U.S. **trade deficit** for 2010 was \$516 billion.

The Spending Approach

A trade deficit for the United States is not uncommon. In fact, the last time the United States experienced a trade surplus was in the third quarter of 1980.*

*Source: the Bureau of Economic Analysis

The Spending Approach

Algebraic summary:

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

For the United States in 2010 (billions of dollars):

$$14,660 = 10,349 + 1,827 + 3,000 + (-516)$$

The Income Approach

Components of aggregate income in the economy:

- Labor income
- Capital income
- Depreciation
- Indirect business taxes
- Net income of foreigners

Aggregate Income and GDP in 2010 (billions of dollars)

Table 6-3

Aggregate income	
Labor income (wages, salaries, fringe benefits)	\$ 7,991
Capital income (profits, interest, rents)	3,719
Depreciation	1,869
Taxes, subsidies, and transfers	1,118
Net income of foreigners	-188
Statistical discrepancy	151
Equals GDP	14,660

Source: U.S. Department of Commerce.

Labor Income

Labor income: the sum of all wages, salaries, and fringe benefits paid to all workers in the country in a given period of time.

Labor Income

Wages: payments to workers paid by the hour.

Salaries: payments to workers paid by the month or year.

Fringe benefits: retirement, health, and other benefits paid by firms on behalf of workers.

Capital Income

Capital income: the sum of profits, rental payments, and interest payments.

Capital Income

Profits: include profits of both large and small businesses.

Rental payments: incomes to persons who own buildings and rent them out.

Interest payments: incomes received from lending to business firms.

Depreciation

Depreciation: the decrease in an asset's value over time. For capital, it is the amount by which physical capital (factories and machines) wears out over a given period of time.

Depreciation

Why include depreciation in GDP?

When profits and capital income are reported to government statisticians, depreciation has already been subtracted out. However, the new equipment that is used to replace old equipment is produced by someone who earns income. Hence, depreciation must be added back to calculate GDP via the income approach.

Depreciation

Net investment: the difference between the firm's purchases of final goods and the depreciation.

Gross investment: the firm's purchases of final goods, including depreciation.

Taxes, Subsidies, and Transfers

When we tabulate production by adding up the incomes of consumers and the profits of firms, sales taxes are not included in firms' profits. Hence, we must add these sales taxes back to labor and capital income.

Similarly, subsidies must be removed from calculations, because they do not represent income from production.

Net Income of Foreigners

Incomes of foreigners working in the United States are not included in U.S. labor income, but should be included in U.S. GDP.

Incomes of Americans working outside the United States are included in U.S. labor income, but should be not included in U.S. GDP.

Net Income of Foreigners

To get GDP, we must add net income earned by foreigners in the United States and subtract net income by Americans outside the United States.

Net Income of Foreigners

$$= \text{Income earned by foreigners in the United States} \quad - \quad \text{Income earned by Americans outside the United States}$$

Net Income of Foreigners

If net income of foreigners > 0 , then the value of income of foreigners working in the United States is larger than the value of American income outside the United States.

If net income of foreigners < 0 , then the value of income of foreigners working in the United States is smaller than the value of American income outside the United States.

Statistical Discrepancy

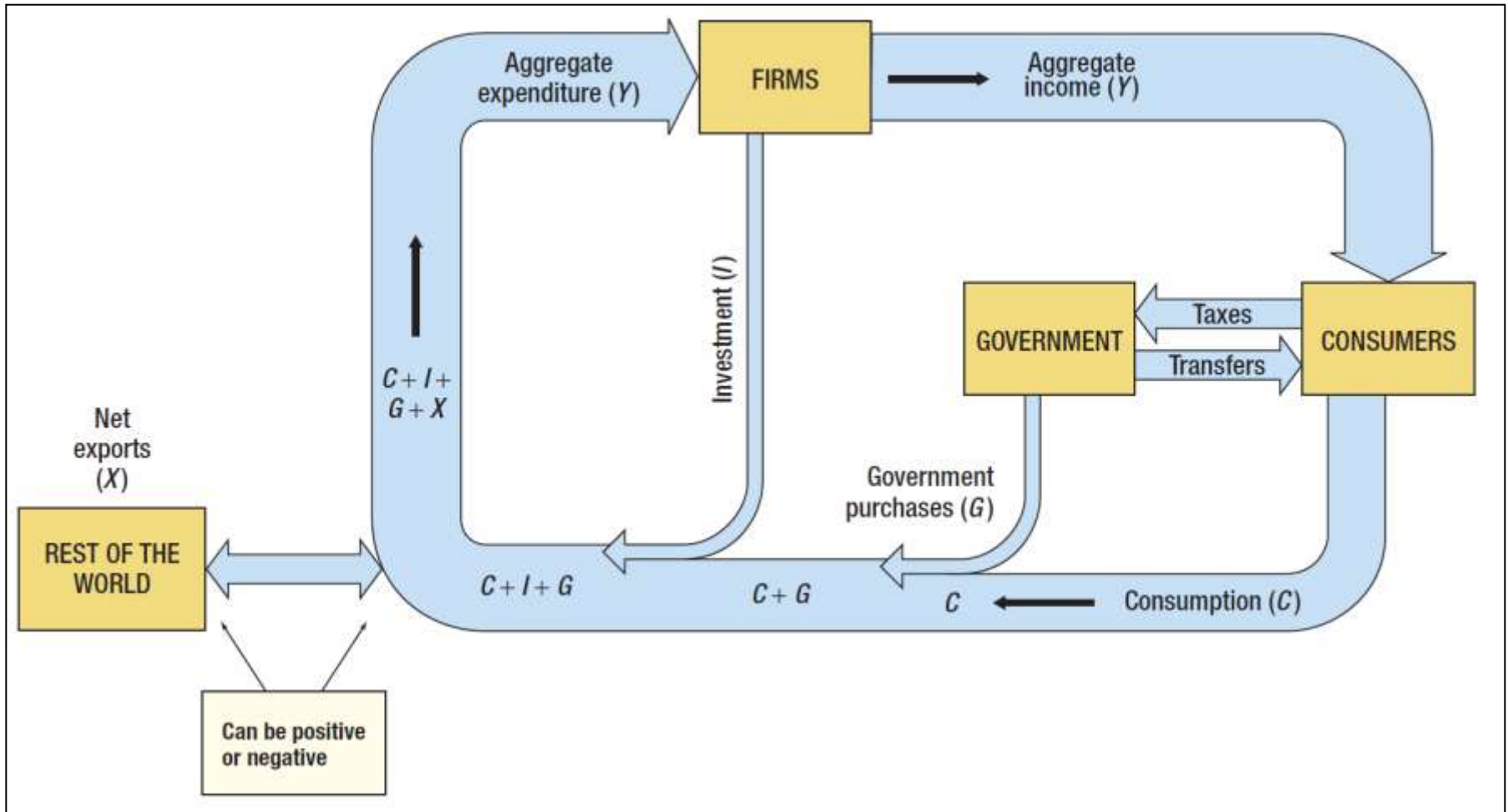
When we add up the components of aggregate income, the computed value is very close to GDP but is not exactly the same. The difference arises from errors in the collection of data on income and spending. The difference between aggregate income and GDP (less than 1 percent of GDP) is called *statistical discrepancy*.

The Circular Flow Diagram

The circular flow diagram in **Figure 6-4** illustrates the link between aggregate production and aggregate spending. People earn income from producing goods and services, and then use this income (Y) to buy goods and services (C, I, G, X).

The Circular Flow of Income and Expenditure

Figure 6-4



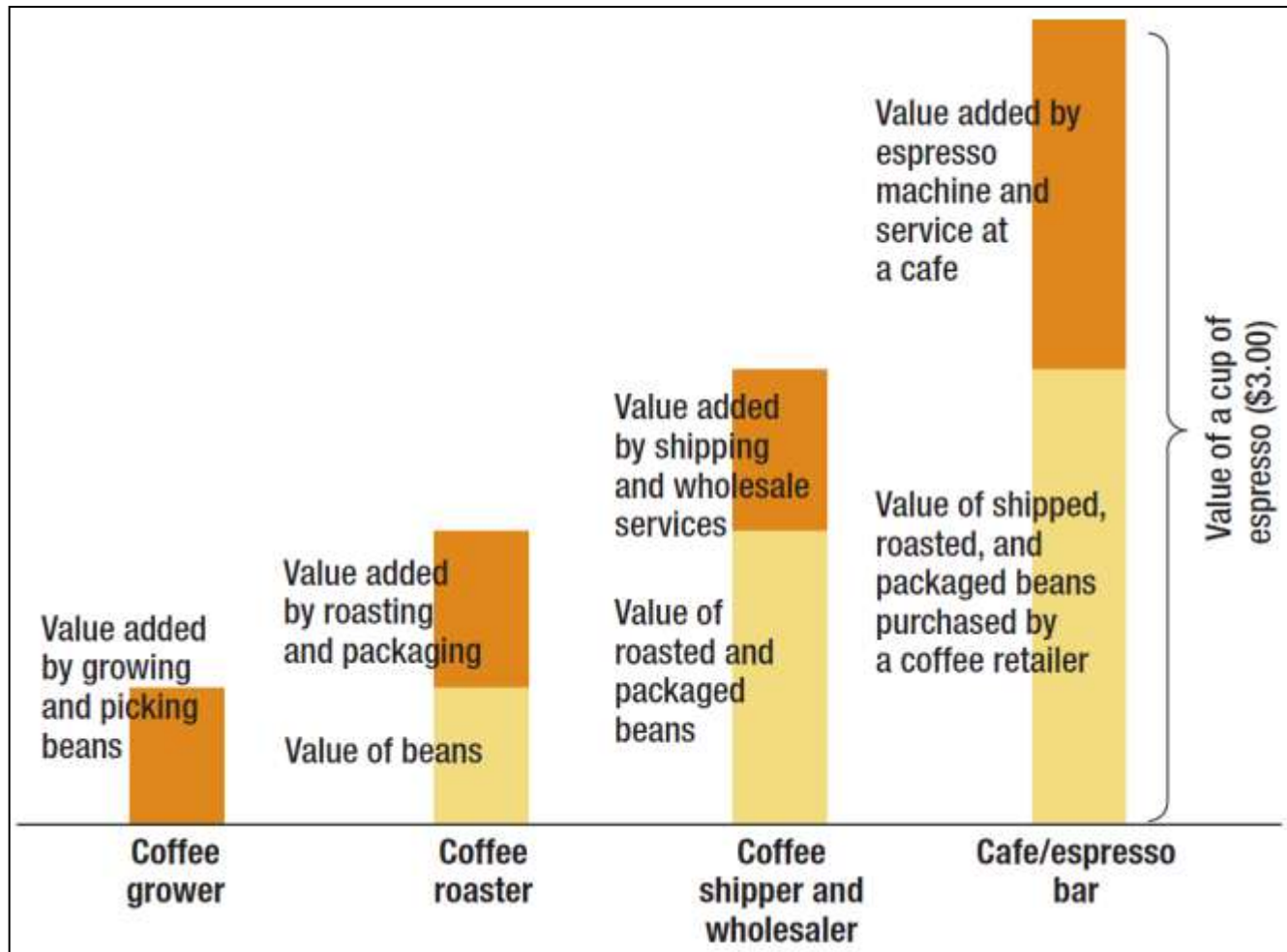
The Production Approach

When we measure GDP via the production approach, we avoid “double counting” by counting only the value added by each manufacturer.

Value added: the value of a firm’s production minus the value of the intermediate inputs used in production.

Value Added in Coffee: From Beans to Espresso

Figure 6-5



The Production Approach

As shown in **Figure 6-5**, the cup of espresso that you buy from an espresso bar is produced in multiple stages:

- The coffee beans are grown and harvested by a coffee farmer.
- A roaster buys, roasts, and packages the beans.
- A wholesaler buys the packaged beans and sells them to an espresso bar.
- The espresso bar sells you the espresso for \$3.00.