

INTRODUCTION TO ECONOMICS

Sizing Up the Economy Using GDP^a



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^aBased on Ch. 21 of “*Principles of Economics*” by Betsey Stevenson & Justin Wolfers.

Sizing Up the Economy Using GDP

Chapter Objective

- Measure and analyze total economic activity.



Katja Kuhl

Roadmap (1 of 5)

■ GDP and the Macroeconomy

Learn how to measure the size of an economy using gross domestic product.

■ GDP Measures Total Spending, Output, and Income

Analyze GDP as a measure of total spending, output, and income.

■ What GDP Captures and What It Misses

Assess GDP as a measure of living standards.

■ Real and Nominal GDP

Distinguish between real changes in quantities and the effects of changing prices.

■ Millions, Billions, and Trillions

Scale large numbers into something more manageable.

From Microeconomics to Macroeconomics

This is the point in your economics studies where you shift attention from *microeconomics to macroeconomics*.

Macroeconomics is the study of the economy as a whole.

Shifting from a Microeconomic to a Macroeconomic Perspective

	Microeconomics	Macroeconomics
Income	Your individual income	Total income in the whole country
Output	The output your business produces	Total output produced by all businesses in a country
Spending	Your spending or the spending of your family or your company	Total spending across all people, businesses, and the government in a country

The Circular Flow

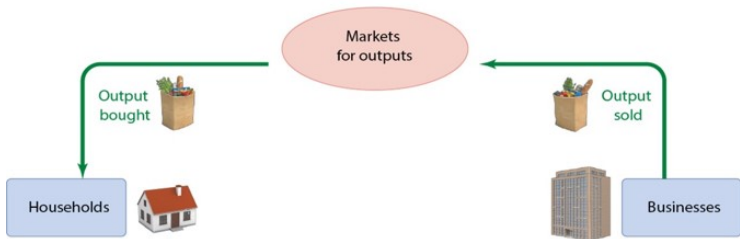
The **circular flow** diagram illustrates the interdependence of the macroeconomy.

It is a great example of the ***interdependence principle*** at work, providing a conceptual framework for analyzing macroeconomic interdependence.

The Circular Flow of Income and Resources - Step 1

The circular flow shows that the market value of output = spending on output = income received = wages + profits. GDP is defined as the value of these flows.

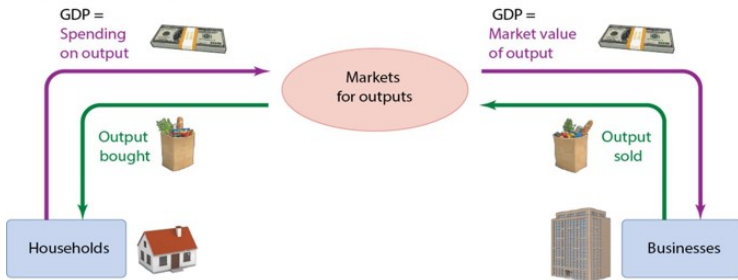
The green arrows show that each flow of goods or services in one direction is matched by a flow of money in the other direction, shown by the purple arrows.



The Circular Flow of Income and Resources - Step 2

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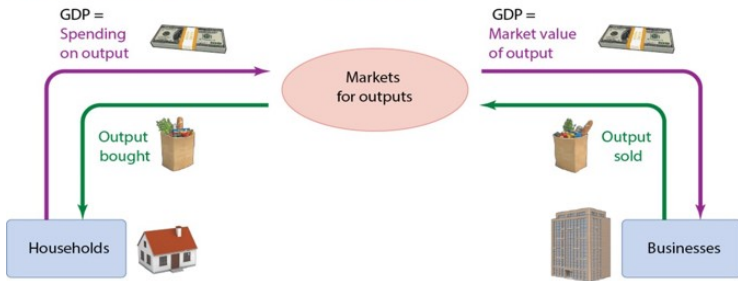
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The Circular Flow of Income and Resources – Transition Slide

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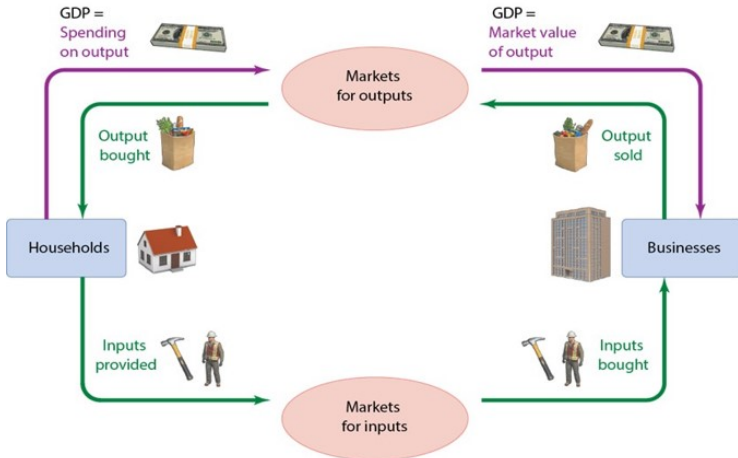
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The Circular Flow of Income and Resources - Step 3

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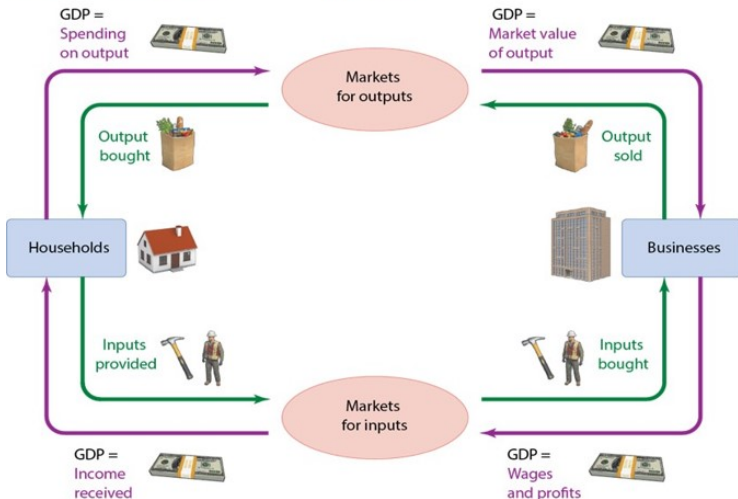
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The Circular Flow of Income and Resources - Step 4

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Clicker question (1 of 4)

McDonald's hires 20 new workers to staff a new restaurant.
Where does this transaction take place?

1. output market
2. input market

Clicker question (1 of 4)

McDonald's hires 20 new workers to staff a new restaurant.
Where does this transaction take place?

1. output market
2. input market **correct**

Total income, output, and spending are all equal.

All output that's produced gets sold at some market price. →
The market value of total output must be equal to total spending.

Every dollar that someone spends is a dollar of income for someone else. →
Total spending must be equal to total income.

The Definition of GDP

Gross domestic product (GDP) is the market value of all final goods and services produced within a country in a year.

GDP is a key measure of economic activity.

GDP is the market value ...

- \$20.5 trillion is the market value of everything produced in 2018.
- Add up the value of everything produced from armchairs to zippers.
- The value of each item is its market price times the quantity produced.

...of all ...

- As a comprehensive measure, GDP includes everything produced and sold in markets.
- Nonmarket goods and services are not included.

... final goods and services ...

- **Intermediate goods and services** are not included (ex. lumber used to make a couch).
- Only **final goods and services** are included (ex. couch).



Vasily Gamayunov/Shutterstock



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Discussion Question: Why only final goods and services?

Why are only final goods and services included in GDP and not also intermediate goods?

...produced ...

- GDP measures production, so it does not count the resale of existing goods and services (ex. sale of a used car).
- Second-hand sales change only the ownership of the product.

...within a country ...

- U.S. GDP measures what is collectively produced domestically (within the United States).
- This includes products made in the U.S. by foreign-owned businesses.
- U.S. GDP does not include products made in foreign countries by American-owned businesses.

...in a year.

- We need a time frame for GDP.
- A year is typically used, although measures are also reported quarterly.

Review: What Is GDP?

- Total output, total spending, and total income in the economy all have the same value. That value is an economy's GDP.
- Gross domestic product (GDP) is the **market value of all final goods and services produced within a country in a year.**

Roadmap (2 of 5)

- GDP and the Macroeconomy

Learn how to measure the size of an economy using gross domestic product.

- **GDP Measures Total Spending, Output, and Income**

Analyze GDP as a measure of total spending, output, and income.

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Scale large numbers into something more manageable.

GDP is three things at once.

Because GDP is simultaneously total spending, total output, and total income, there are three ways to calculate GDP:

- Add up every dollar of spending.
- Add up every dollar's worth of output produced.
- Add up every dollar of income earned.

Measuring GDP: A Story of a Couch.

- Bennett Lumber Company is a family-owned company in Washington that chops trees into lumber.
- Some of this lumber is used by a furniture company in North Carolina, McCreary Modern, to make couches.
- The couches are sold to Crate & Barrel, which markets them to customers for \$1,500.

Perspective one: GDP measures total spending.

GDP is the sum of the following:

Consumption (C)

Investment (I)

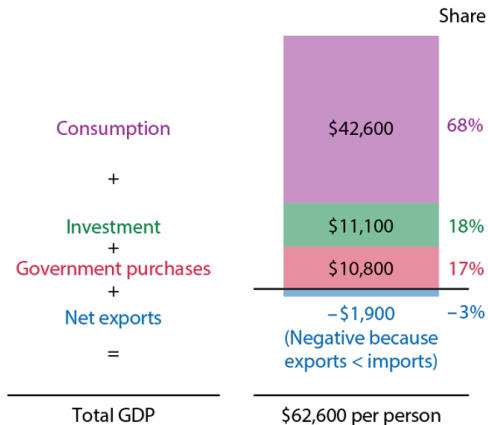
Government purchases (G)

Net exports (NX)

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

GDP Is the Sum of All Spending on Final Goods and Services – Overview

Spending per person



2018 Data from: Bureau of Economic Analysis.

GDP Is the Sum of All Spending on Final Goods and Services – Step 1

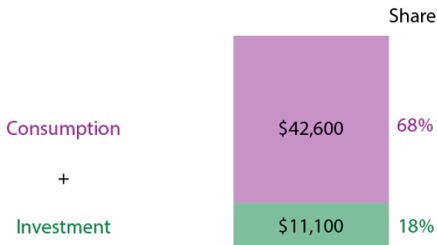
Spending per person



2018 Data from: Bureau of Economic Analysis.

GDP Is the Sum of All Spending on Final Goods and Services – Step 2

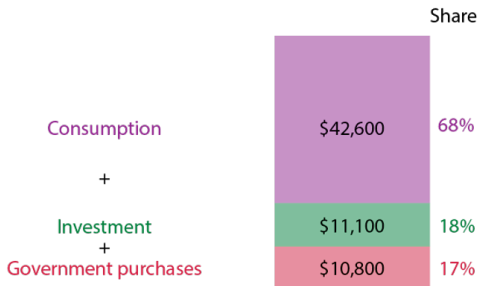
Spending per person



2018 Data from: Bureau of Economic Analysis.

GDP Is the Sum of All Spending on Final Goods and Services – Step 3

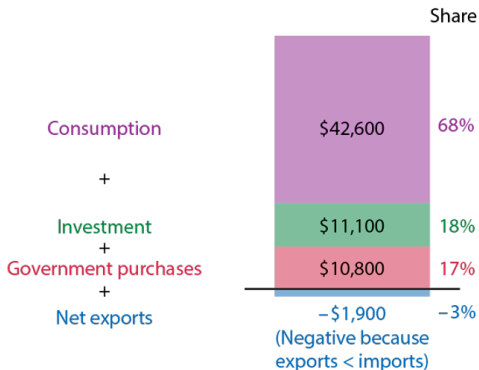
Spending per person



2018 Data from: Bureau of Economic Analysis.

GDP Is the Sum of All Spending on Final Goods and Services – Step 4

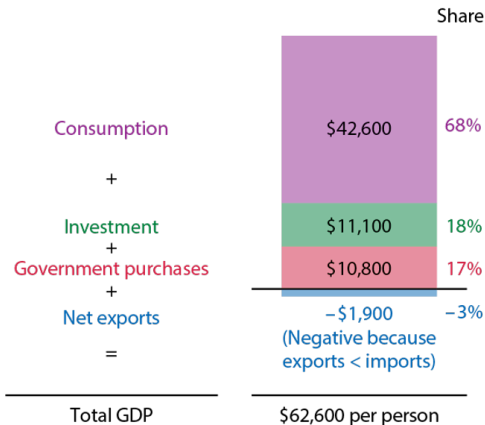
Spending per person



2018 Data from: Bureau of Economic Analysis.

GDP Is the Sum of All Spending on Final Goods and Services – Step 5

Spending per person



2018 Data from: Bureau of Economic Analysis.

How do you calculate GDP using total spending?

Bennett Lumber takes raw material and turns it into lumber, which is sold to McCreary Modern for \$400. →
Intermediate good Not included

McCreary Modern turns the lumber into a couch, which is sold to Crate & Barrel for \$1,000. →
Intermediate good Not included

Finally, the couch is sold by Crate & Barrel for \$1,500. →
\$1,500 consumption
\$1,500 total spending

Clicker question (2 of 4)

Molly Maids house cleaning services are considered:

1. consumption.
2. investment.
3. government purchases.
4. net exports.

Clicker question (2 of 4)

Molly Maids house cleaning services are considered:

1. consumption. **correct**
2. investment.
3. government purchases.
4. net exports.

Perspective two: GDP is total output.

GDP measures total output in the economy. Total output can be calculated by taking the sum of value added (the amount by which the value of an item is increased at each stage of production).

$$\text{Value added} = \text{Total sales} - \text{Cost of intermediate inputs}$$

How do you calculate GDP using total output?

Bennett Lumber takes raw material and turns it into lumber, which is sold to McCreary Modern for \$400. →
\$400 value added

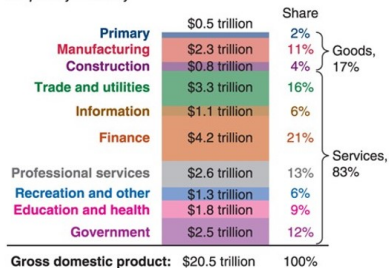
McCreary Modern turns the lumber into a couch, which is sold to Crate & Barrel for \$1,000. →
\$600 value added

Finally, the couch is sold by Crate & Barrel for \$1,500. →
\$500 value added
\$1,500 total output

In the U.S. economy, the production of services dominates goods.

- Services account for 83% of total output in 2018.
- The U.S. is a service-based economy.

Output by industry



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Perspective three: GDP measures total income.

GDP is the sum of all incomes in the economy.

Total income = Total wages + Total profits

Capital gains and losses are not counted as new income (your earnings or losses from selling an existing asset).

How do you calculate GDP using total income?

Bennet Lumber started with raw materials that cost \$0. Bennet paid \$300 in wages and sold the lumber for \$400. →

\$300 wages

\$100 profit

McCreary Modern bought the lumber for \$400 and paid \$500 in wages. It sold the couch for \$1,000. →

\$500 wages

\$100 profit

Crate & Barrel bought the couch for \$1,000 and paid \$200 in wages. It sold the couch for \$1,500. →

\$200 wages

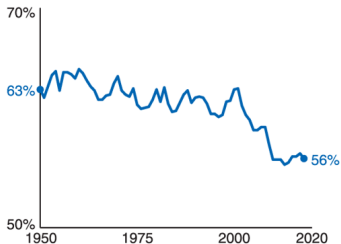
\$300 profit

\$1,500 total income

Labor's share of GDP is declining.

- Labor share describes the share of total income going to workers.
- Capital share describes the share of total income going to owners of capital.

Share of GDP paid to workers
(in the business sector)



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Review: How is GDP measured?

GDP is it can be measured as a that measurement is called
<i>Total spending</i>	$Y = C + I + G + NX$	“Gross Domestic Product”
<i>Total output</i>	Sum of value added	“Value Added”
<i>Total income</i>	Total wages + Total profits	“Gross Domestic Income”

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Scale large numbers into something more manageable.

Discussion

GDP does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our courage, nor our wisdom, nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile.

– President Robert F. Kennedy

Limitations of GDP

1. Prices are not values.
2. Nonmarket activities are excluded.
3. The shadow economy is missing.
4. Environmental degradation isn't counted.
5. Leisure doesn't count.
6. GDP ignores distribution.

Limitation one: Prices are not values.

- GDP effectively assigns each good and service a value equal to its market price.
- Price is not a good indicator of value when either consumer surplus or a market failure is present.

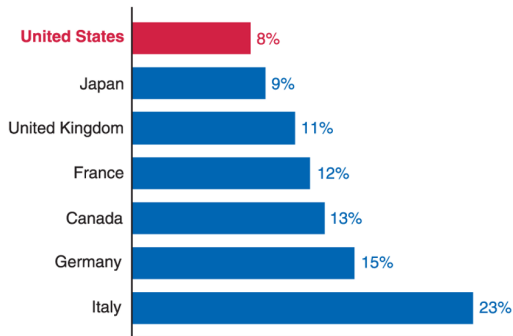
Limitation two: Nonmarket activities are excluded.

- GDP does not measure all productive activity.
- Nonmarket activities are omitted from GDP.

Limitation three: The shadow economy is missing.

- The shadow economy includes economic activity purposely conducted out of view of the government.
- These activities are unmeasured and therefore are excluded from GDP.

Interpreting the data: Measuring the shadow economy



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Limitation four: Environmental degradation isn't counted.

- GDP treats natural resources as if they have no value until they are transformed into something else.
- The cost of environmental degradation is ignored.

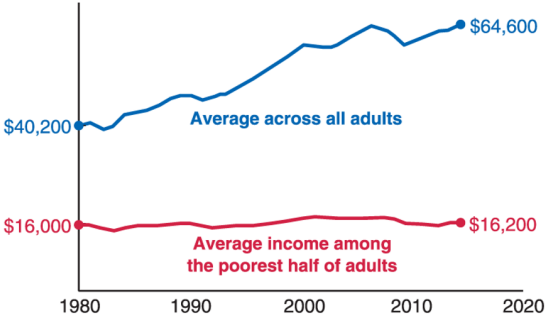
Limitation five: Leisure doesn't count.

- GDP includes the benefit of work, which is more income.
- GDP does not include the cost of work, which is less leisure.

Limitation six: GDP ignores distribution.

Average income has risen, but not for the bottom half

Real national income per adult

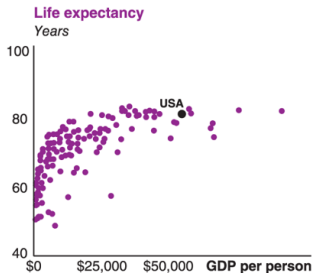
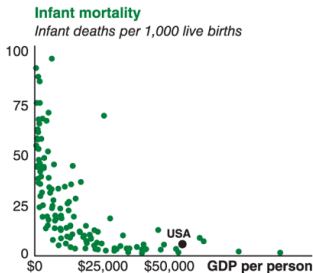
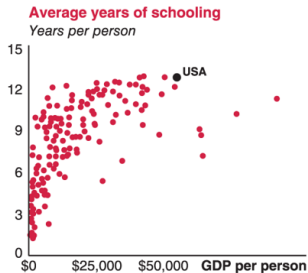
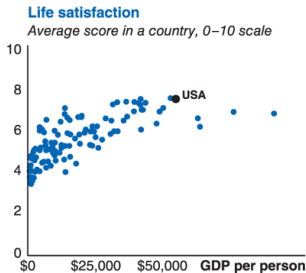


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GDP as a Measure of Living Standards.

- GDP leaves out a lot, but there is a logic to it.
- As average income in a country rises, it becomes easier to invest in things that matter (ex. health and education of children).
- GDP indicates the resources available to pursue things people value.

Higher GDP Is Correlated with Better Life Outcomes



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Review: Limitations of using GDP as a measure of standard of living

- Market price may be a poor indicator of value.
- Not all productive activity in the economy is measured.
- A large shadow economy can result in the value of GDP being understated.
- GDP does not measure environmental impact.
- Work is included in GDP, and leisure is not.
- GDP measures the size of the pie, not the actual slice each person receives.

Roadmap (4 of 5)

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Real and Nominal GDP

- **Nominal GDP:** GDP measured in today's prices
- **Real GDP:** GDP measured in constant prices

Calculating Real and Nominal GDP

		<u>Calculating Nominal GDP</u>		<u>Calculating Real GDP</u>	
	Quantity sold (Q)	Actual price (P)	Nominal GDP = $P \times Q$	Average price $\bar{P} = \frac{P_t + P_{t-1}}{2}$	Real GDP = $\bar{P} \times Q$
Last year	100 couches	\$1,500	$\$1,500 \times 100$ = \$150,000	\$1,515	$\$1,515 \times 100$ = \$151,500
This year	103 couches	\$1,530	$\$1,530 \times 103$ = \$157,590	\$1,515	$\$1,515 \times 103$ = \$156,045
Growth rate	+3%	+2%	+5%	+0%	+3%

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Clicker question (3 of 4)

	2017	2017	2018	2018
	Price	Quantity	Price	Quantity
Snickers	\$2.50	10	\$3.00	12
Coffee	\$7.00	15	\$7.50	20

Nominal GDP in 2017 is:

1. \$130.00.
2. \$136.25.
3. \$61.00.
4. \$170.00.

Clicker question (3 of 4)

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Review: Nominal GDP versus real GDP

- Nominal GDP measures the value of GDP right now, based on current prices.
- Real GDP excludes the effect of price changes.
- Real GDP measures changes in the quantity of output produced.
- Real GDP is used to measure economic growth.

Roadmap (5 of 5)

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Understanding big numbers

- It is hard to conceptualize and easy to confuse large numbers like trillions.
- Once numbers get past a certain point, they start to lose meaning to people.
- It is important to understand the differences when considering the macroeconomy.

Millions, Billions, and Trillions



Let's start with \$100



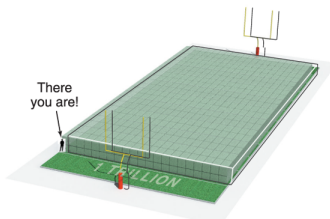
\$10,000 is a tidy bundle



\$1 million fills a briefcase



\$1 billion is a busload of cash



\$1 trillion is a football field, stacked taller than a typical person

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Strategies for Scaling Big Numbers

1. Evaluate what it means per person.
2. Compare big numbers to the size of the economy.
3. Compare big numbers to their own history.
4. Use the rule of 70 to evaluate long-run growth rates.

Practice question: Scaling numbers

State if the following is millions, billions, or trillions:

1. Number of Walmart employees in the U.S.
2. Number of Amazon Prime members
3. US real GDP

Practice question: Scaling numbers

State if the following is millions, billions, or trillions:

1. Number of Walmart employees in the U.S.
1.4 million
2. Number of Amazon Prime members
100 million worldwide
3. US real GDP
\$20.5 trillion

Key Takeaways

- **Macroeconomics builds on microeconomic principles.**
- **Total spending = Total output = Total income**
- **GDP is a strong measure of living standards, but it has several limitations.**
- **Nominal GDP uses current prices, and real GDP uses constant prices.**
- **Use strategies for scaling big numbers.**