



# MgtEcon 300 — Session 1: Growth and Stabilization in the Global Economy

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## Outline of Today's Class

- What is macroeconomics?
- An outline of the course
- The macroeconomics of the long run
- The macroeconomics of the short run
- Some basic tools

## What is Macroeconomics?

## What is Macroeconomics?

- Why is an average American today more than 10 times richer than the average American 100 years ago?
- Why is an average American 50 times richer than an average Ethiopian today?
- What determines the rate of inflation?
- What determines the level of unemployment?
- What role does the government play in recessions and booms?
- How do financial markets affect the real economy?



## Course Outline

### ① The Long Run

- Why are some countries richer than others?
- Why do economies grow?
- What determines inflation and unemployment in the long run?
- Why do countries trade?

### ② The Short Run

- What causes recessions and booms?
- Monetary and fiscal policy
- The financial crisis
- Exchange rates and the international financial system

## Models, Data, Discussion

- Use models to understand data and perform quantitative analysis
- Many open questions (no parallel universe machine!)
- Lots of class discussion
- Understand long run trends, current events, and policy debates

## Course Logistics // Review the Syllabus

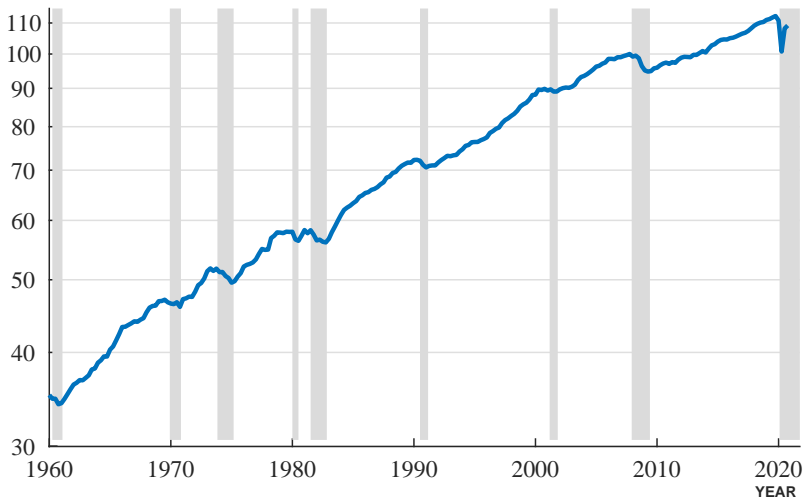
- Four assignments (groups up to 4 people)
- Take-home midterm and final (solo work)
- Optional 15-minute student presentations in penultimate class
- Redacted slides on Canvas before class. Full slides posted after class
- Canvas / syllabus contain articles to read before class
- Attendance: Attend live whenever possible. Watch recordings if not
- Participation: Use Raise Hand on Zoom. Chat disabled
- Recordings of Zoom class posted on Canvas for 1 week (then deleted)
- Course TA w/ office hours: Rachel Schuh (see syllabus/Canvas)
- Our office hours: after class and Wednesdays in person starting April 14



# The Macroeconomics of the Long Run

## Real GDP per Person in the United States

REAL GDP PER PERSON (2007Q4=100)



## Name that Country

- Life expectancy is less than 50 years
- 1 out every 10 infants dies before the age of one
- More than 90% of households have no electricity, refrigerator, telephone, or car
- Fewer than 10% of adults have completed high school.

What country is it?

## Name that Country

- Life expectancy is less than 50 years
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What country is it?

The United States circa 1890!

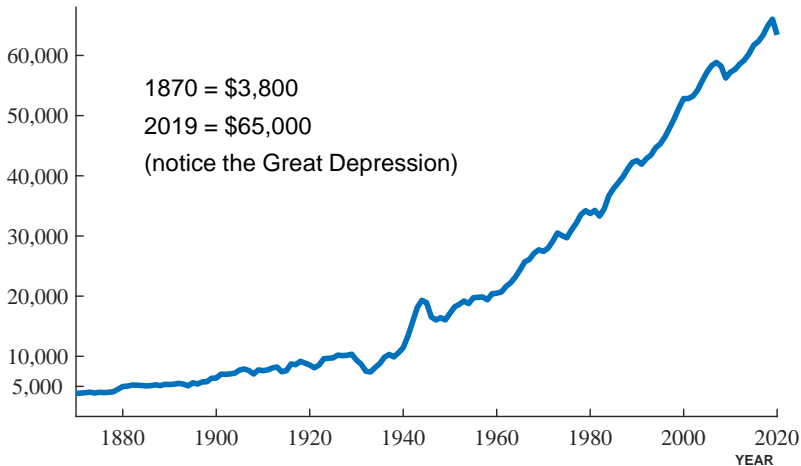
## The Power of Economic Growth

- In just a century, the U.S. economy has been completely transformed
  - Almost all households have electricity, refrigerators, cell phones, and cars
  - Overwhelming majority graduates from high school, many college
  - New goods: air-conditioning, dishwashers, jet planes, skyscrapers, home movie theaters, iPads
- Health: Life expectancy in 1900 = 50 years, today 79 years
  - The richest person in the world in the mid 1800s — the European financier Nathan Rothschild — died from an infection that \$10 of antibiotics would cure today.



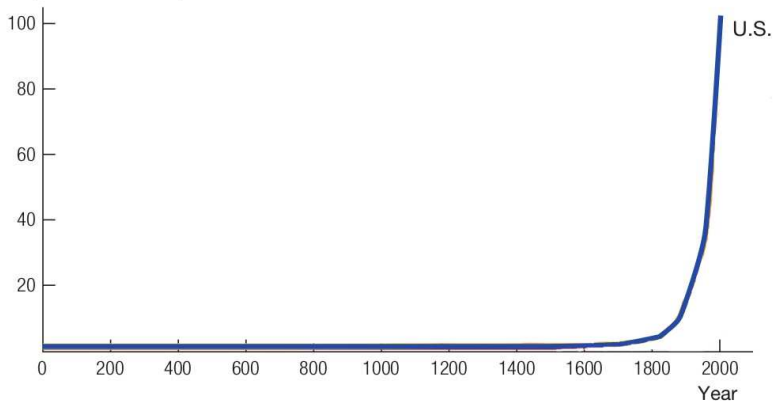
## GDP per Person has Grown by a Factor of 17 since 1870

PER CAPITA GDP (2020 DOLLARS)



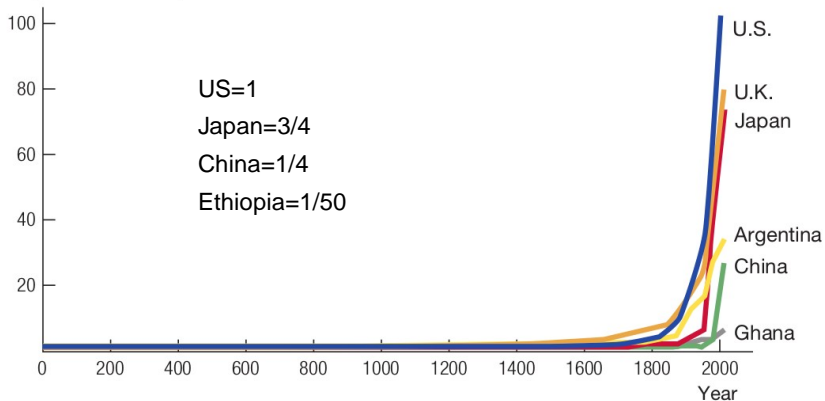
## GDP per Person in the United States

Per capita GDP  
(multiple of 300 dollars)



## GDP per Person around the World

Per capita GDP  
(multiple of 300 dollars)





Key Tools:

Growth Rates and Ratio Scales

## Growth Rates

- Growth Rate = Average Annual Percentage Change
- Example: The growth rate of GDP between 2020 and 2019 is

$$\frac{GDP_{2020} - GDP_{2019}}{GDP_{2019}}$$

- To compute the growth rate between 1960 and 2020, we can compute the growth rate in each year and take the average
  - There are other mathematical techniques to make this even easier; if interested, see the textbook, pp. 50–54

## Rule of 70

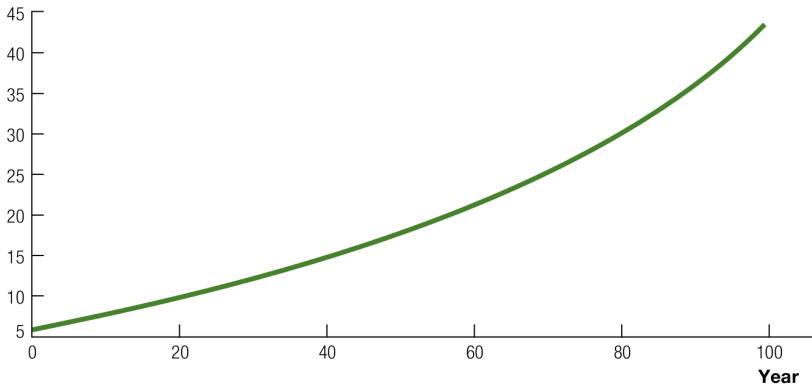
- Growing at a constant rate of  $g\%$  per year, GDP (or anything else) will double approximately every  $70/g$  years.

$$\text{Rule of 70: Years to Double} = \frac{70}{g}$$

- Examples
  - Growing at 2%: Double every  $70/2=35$  years.
  - Growing at 5%: Double every  $70/5=14$  years.
  - Growing at 7%: Double every  $70/7=10$  years.
- Can reverse to estimate a growth rate when observing a “time to double”

## Is Population Growing at a Constant Rate here?

Population  $L$  (billions)



## Ratio Scale

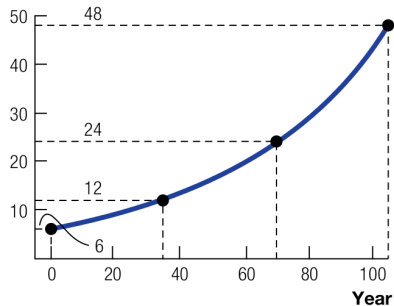
- A **ratio scale** helps us see growth rates
  - Sometimes called a “logarithmic scale” (e.g. Excel)
- Idea: Label the vertical axis as “1 2 4 8” instead of “1 2 3 4”
- Labels rise by a constant *proportion* (e.g. a factor of 2 or 10) instead of by a constant amount (e.g. by 1 or 100)
  - Traditional scale: “100 200 300 400” “5 10 15 20”
  - Ratio scales: “100 200 400 800” “1 10 100 1000”
- Why does this help us see growth rates?

Growth at a constant rate looks like a straight line on a ratio scale



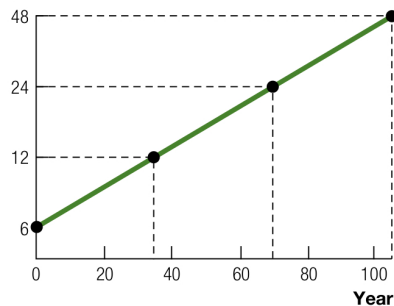
## Population over Time: Traditional and Ratio Scales

Population  $L$  (billions)



(a) On a standard scale...

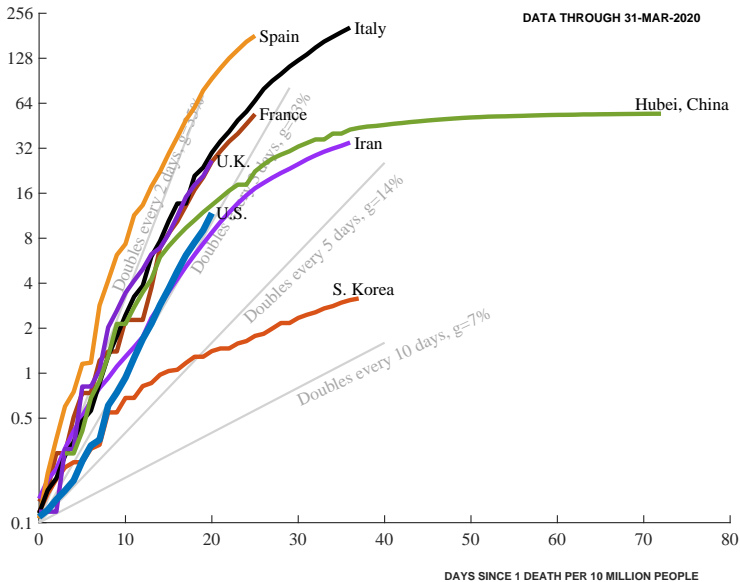
Population  $L$  (billions)  
(ratio scale)



(b) and a ratio scale.

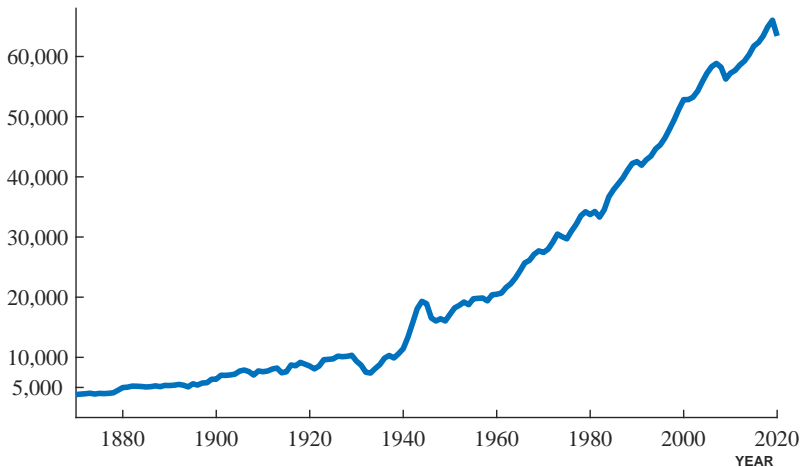
## Growth in Covid Deaths

CUMULATIVE DEATHS PER MILLION



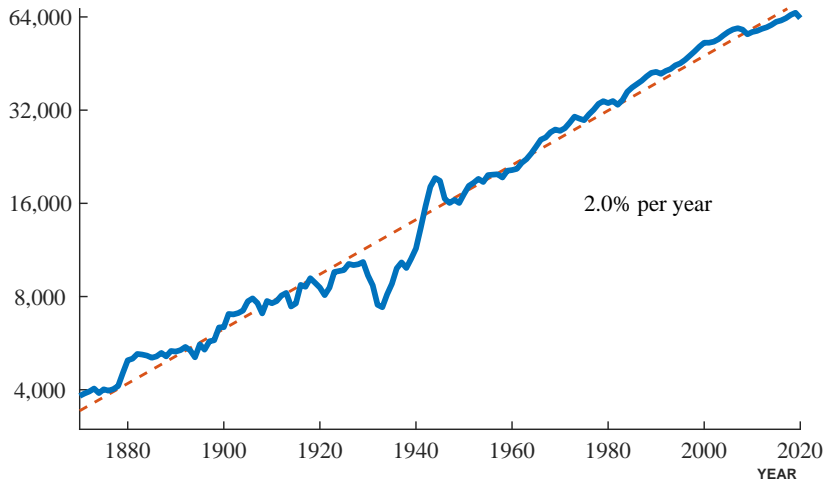
## U.S. GDP per Person on a Traditional Scale

PER CAPITA GDP (2020 DOLLARS)



## U.S. GDP per Person on a Ratio Scale

PER CAPITA GDP (RATIO SCALE, 2020 DOLLARS)

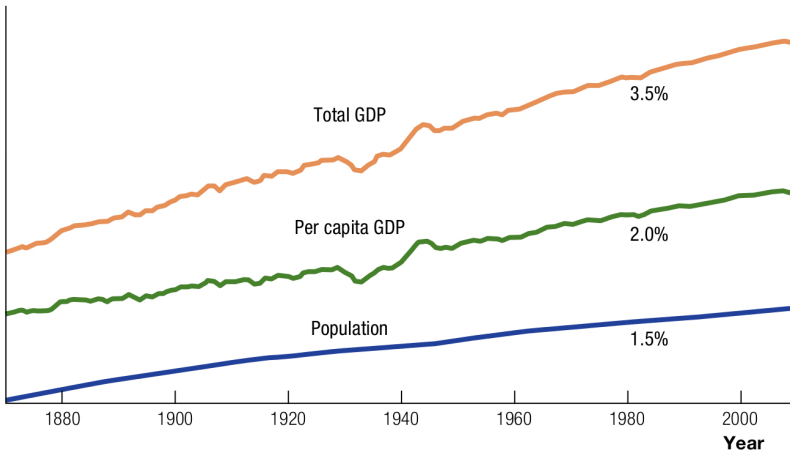


## Growth Rates of Products, Ratios, and Powers

- Key: Compute growth rates using math operations that are “one step lower”
  - Product  $\rightarrow$  Sum, Division  $\rightarrow$  Subtraction, Power  $\rightarrow$  Multiplication
- Consider two variables  $x$  and  $y$  with growth rates  $g_x$  and  $g_y$ 
  - Product:  $z = x \times y \Rightarrow g_z = g_x + g_y$
  - Ratio:  $z = x/y \Rightarrow g_z = g_x - g_y$
  - Power:  $z = x^a \Rightarrow g_z = a \times g_x$

## U.S. GDP, Per Capita GDP, and Population

Ratio scale



## The Power of Economic Growth: International Edition

- South Korea: Sustained growth of 6% since 1960
  - Doubles every 12 years
  - In 50 years — about two generations — doubles 4 times  
 $\Rightarrow 2^4 = 16$  times richer than grandparents!!
- Contrast with Madagascar or Haiti
  - Negative growth for 50 years
  - Grandchildren are poorer than grandparents

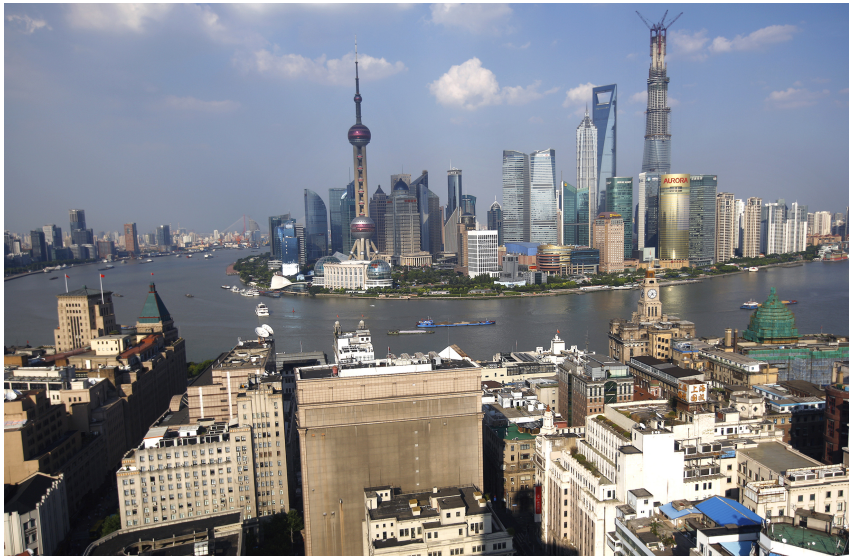
Growth is like compound interest: small differences in growth rates compound over time to generate enormous differences in incomes

## Shanghai 1987



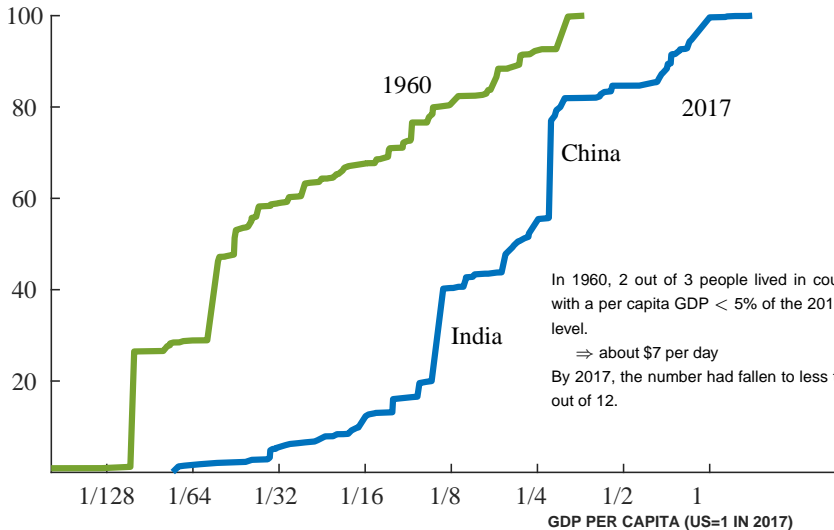


## Shanghai 2013



## The Distribution of World Population by Income

SHARE OF WORLD POPULATION (PERCENT)



## Famous Lucas Quotation (1985)

*I do not see how one can look at figures like these without seeing them as representing possibilities. Is there some action a government of India could take that would lead the Indian economy to grow like Indonesia's or Egypt's? If so, what exactly? If not, what is it about the "nature of India" that makes it so? The consequences for human welfare involved in questions like these are simply staggering: Once one starts to think about them, it is hard to think about anything else.*

— Robert E. Lucas, Jr., 1995 Nobel Prize winner

# The Macroeconomics of the Short Run



## The Macroeconomics of the Short Run

*But this “long run” is a misleading guide to current affairs. “In the long run” we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean is flat again.*

*John Maynard Keynes, 1923*

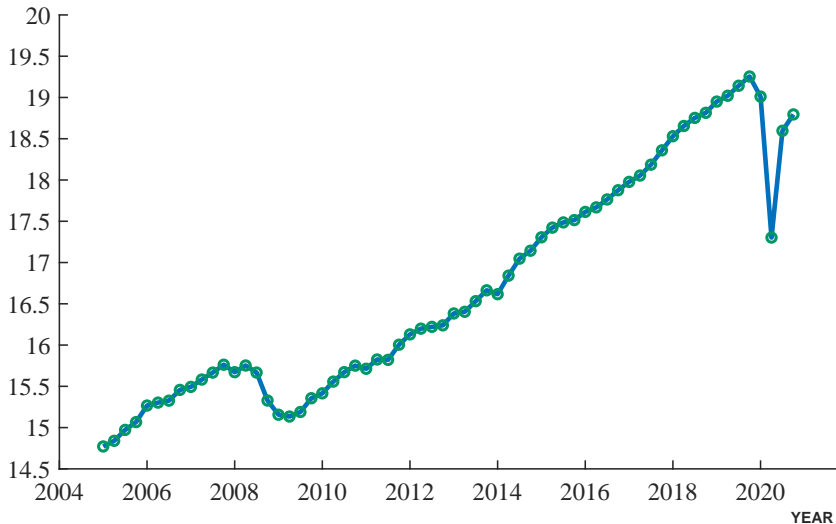
## The Macroeconomics of the Short Run

In the second half of the course, we will talk about

- Booms and recessions — and Covid-19
- Unemployment
- Inflation
- Monetary and fiscal policy
- Financial crises
- Exchange rates

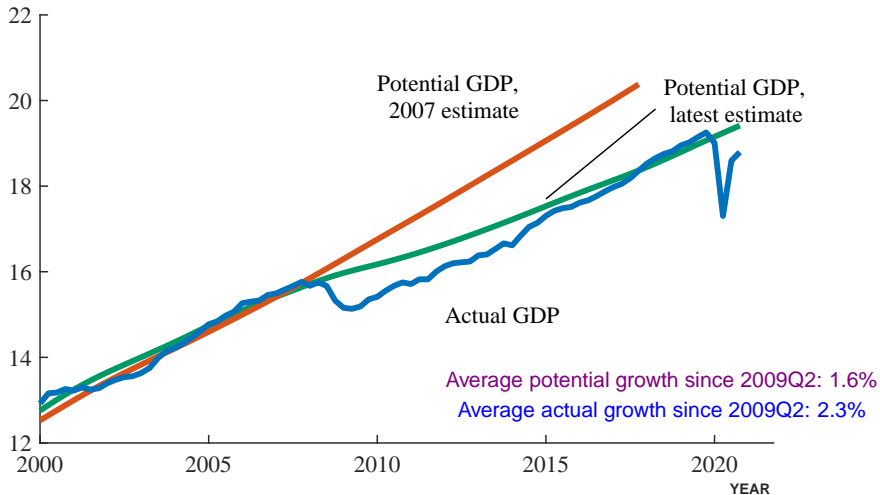
## U.S. Real GDP in Recent Years

TRILLIONS OF 2012 DOLLARS



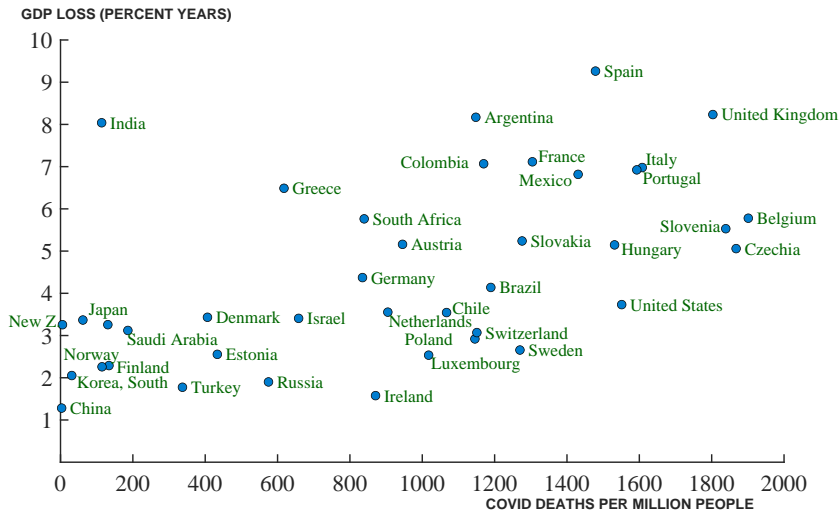
## U.S. Real GDP in Recent Years

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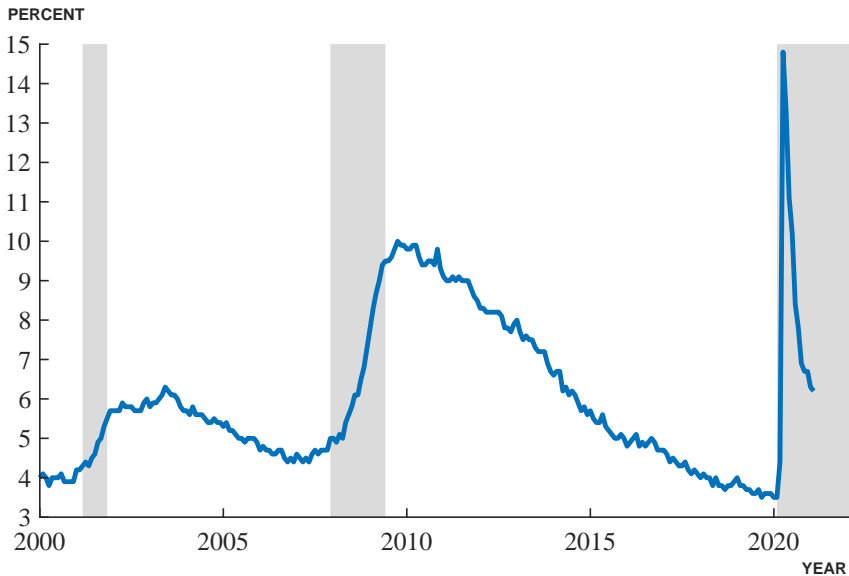




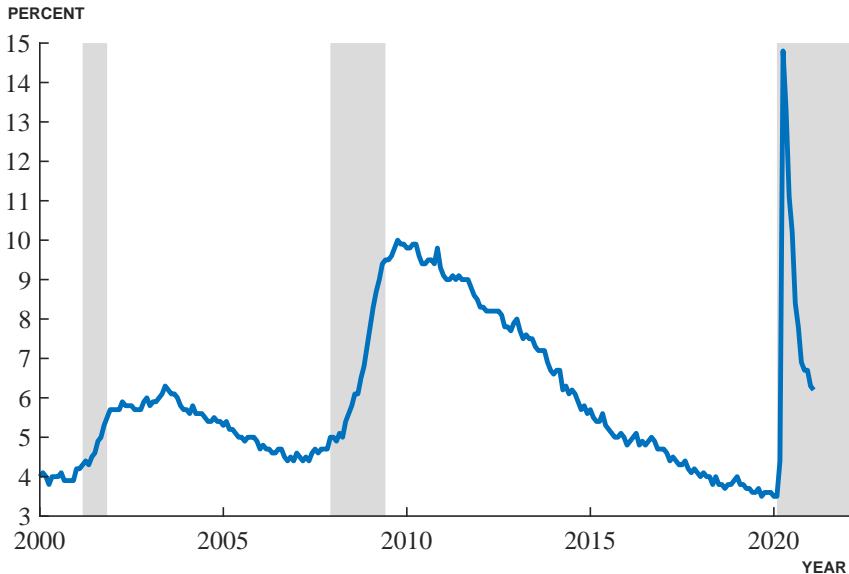
## International Covid Deaths and Lost GDP



## What is this Graph?



## The U.S. Unemployment Rate

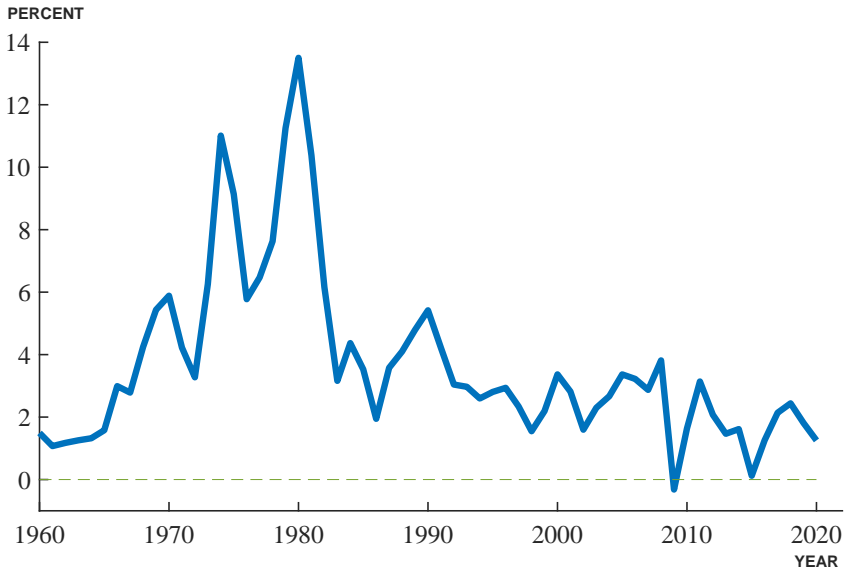


## Unemployment Rate in Spain

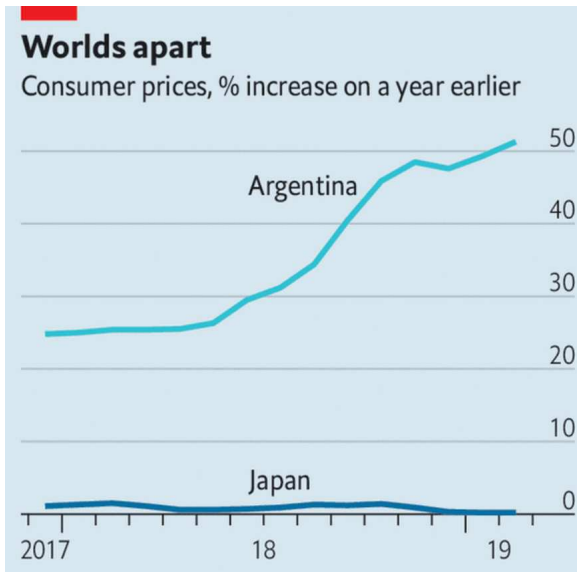


SOURCE: [TRADINGECONOMICS.COM](https://tradingeconomics.com) | NATIONAL STATISTICS INSTITUTE (INE)

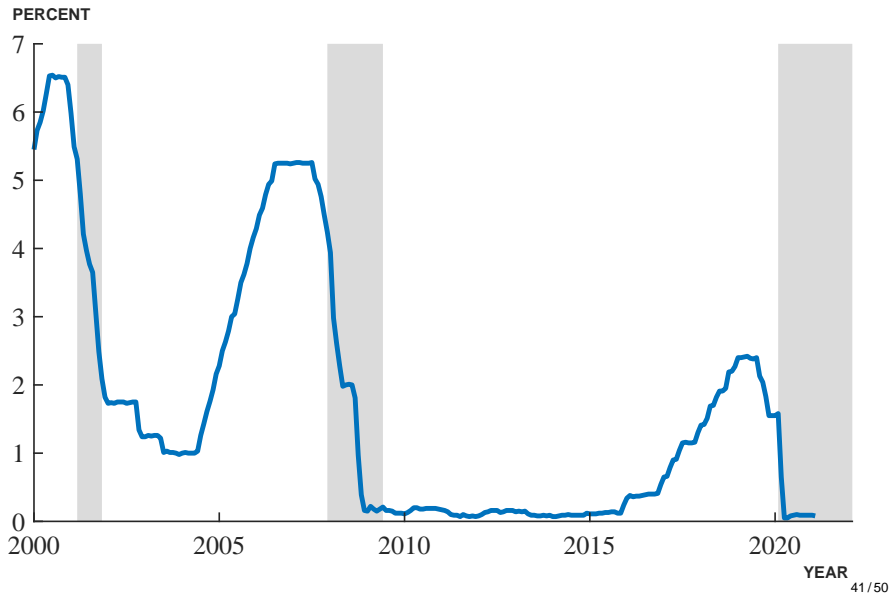
## Inflation in the U.S.



## Inflation in Argentina and Japan



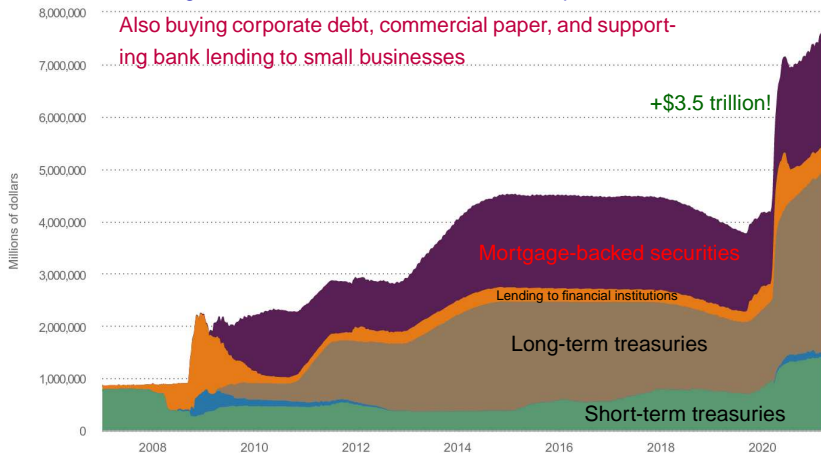
## Monetary Policy in the U.S.: the Fed Funds Rate



# Unconventional Monetary Policy: Quantitative Easing

Lending to financial institutions: +\$1 trillion in April 2020

Also buying corporate debt, commercial paper, and supporting bank lending to small businesses



## Assets on the Fed Balance Sheet

Source: <https://www.clevelandfed.org/en/our-research/indicators-and-data/credit-easing.aspx>

More info: <https://www.brookings.edu/research/fed-response-to-covid19/>





## Key Tool: National Income Accounting

## National Income Accounting

- What is **Gross Domestic Product** (or GDP)?

Gross Domestic Product (GDP) is the market value of the final goods and services produced in an economy during the year.

- In 2019, U.S. GDP = \$21.5 trillion, or \$65,000 per person (current \$).

## GDP: Production = Expenditure = Income

Suppose the entire economy consists of a single firm that hires workers to make wine.

- **Production approach:**
  - GDP is total amount of wine produced in a year
  - Count the bottles as they are made
- **Expenditure approach:**
  - GDP is total amount of wine sold in a year
  - Count the bottles as they are sold to consumers
- **Income approach:**
  - GDP is the total income earned by the workers plus the “profits” made by the firm
  - Distinguish economic profits versus accounting profits

*These are three equivalent ways to measure GDP*

## The National Income Identity

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

$Y$  = GDP (in dollars)

$C$  = Consumption

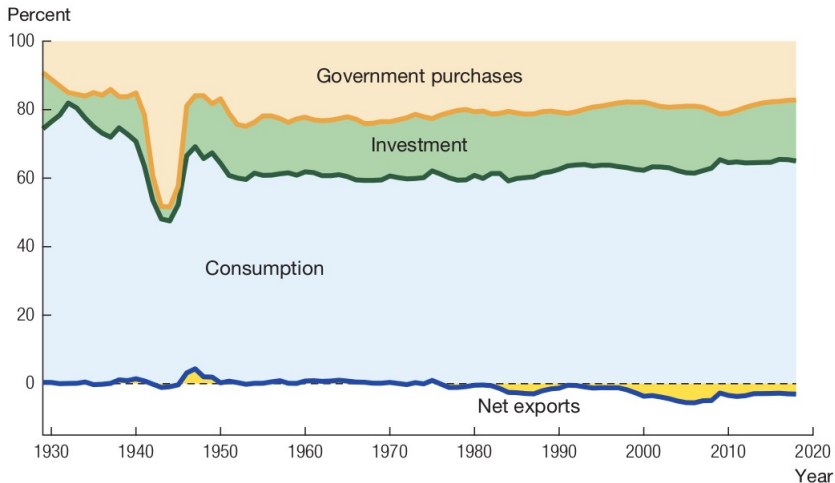
$I$  = Investment

$G$  = Government purchases

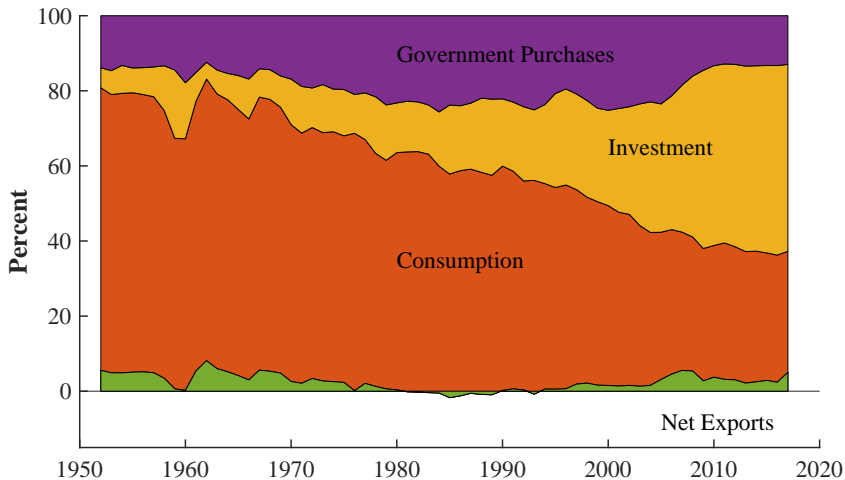
$NX$  = Net exports = exports (EX) - imports (IM)

$$Y + IM = C + I + G + EX$$

## The Composition of U.S. GDP



## The Composition of China's GDP



## Real versus Nominal GDP

- GDP in 2019 was \$21.5 trillion, in 1995 was \$7.4 trillion.
- How much is more goods and services, and how much is higher prices?

$$\text{Nominal GDP} = \text{Price Level} \times \text{Real GDP}$$

Nominal GDP = Value in current dollars

Price Level = Price index

Real GDP = Quantity of goods and services

– e.g. “in 2012 dollars” or “in constant prices”

Nominal GDP conflates both changes in the price level and changes in the amount of goods and services. Real GDP strips out changes in prices.

- Applying our growth rules to this equation:

$$\mathcal{G}_{\text{nominal}} = \mathcal{G}_{\text{prices}} + \mathcal{G}_{\text{real}} \\ \text{inflation}$$

## Questions for Review

- What is the current state of the U.S. economy?
- What is economic growth and why does it matter?
- What is a growth rate? Give some examples of growth rates for various countries during various periods of time: U.S.? China? Others?
- What is the Rule of 70? How can it be used to compute growth rates over long periods of time?
- What is a ratio scale and how is it useful?
- In what ways are China and India important to world growth? (Keep this question in mind in coming weeks.)
- How do you calculate growth rates for products, ratios, and powers?