ECON 002: Principles of Macroeconomics

- Lecture 4: GDP and Stable Prices

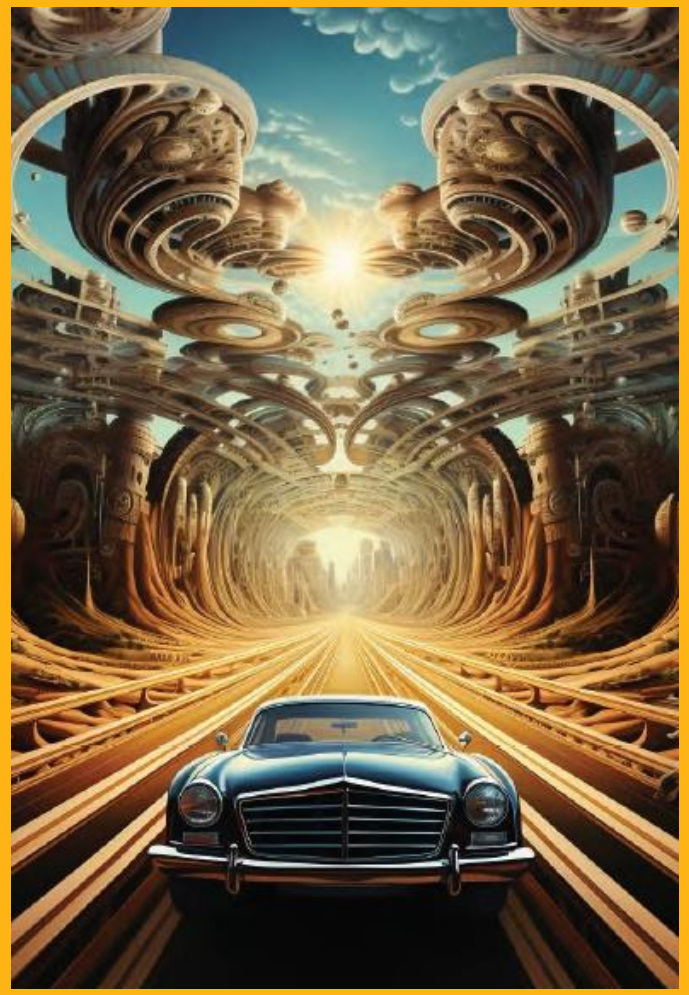
GDP: the market value of all final goods and services produced for a marketplace during a period of time, within a country's borders

- "During a Period of Time"
- Typically define a period of time as one year, 2024

- Everything produced in 2024 counts towards 2024 GDP

- A used 2017 Toyota Camry is sold on Craigslist in April 2024.
- Is the car counted in 2017 or 2024 GDP?

- A used 2017 Toyota Camry is sold at a used car dealership in April 2024
- What is counted in 2017 GDP? 2024 GDP?



GDP: the market value of all final goods and services produced for a marketplace during a period of time, **within a country's borders**

- "Within a Country's Borders"
- GDP: Production within the geographical border of a country.
- Can also be a City, State, Continent or Planet!

- Gross National Product (GNP): Production by citizens of a country, no matter where they are

Measuring GDP

- Most common way to measure GDP is the **Expenditure Approach**
- Bureau of Economic Analysis (www.bea.gov)
  National Income and Product Accounts (NIPA) table

- Four General Categories

1. Consumptions of goods and services (C): purchases by the households
2. Private investment of goods and services (I): purchases by firms/businesses
3. Government goods and services (G): purchase by governments
4. Net Exports (NX) = Exports (X) – Imports (M): net purchases by foreigners
    1. Exports (X): Goods sold by home country, money **comes from** abroad
    2. Imports (M): Goods bought by home country, money **goes** abroad

- GDP defined as **Y = C + I + G + NX**

Y = **C** + I + G + NX

- Consumption (C)
- Consumption (67%): a final good or service purchased by a household
- Goods (21%): a tangible item that consumers gain ownership over when purchasing
  - Durable Goods (9.5%): Motor Vehicles, Furniture, Recreation Goods
  - Non-Durable Goods (14.9%): Food, Clothing, Gasoline
- Services (47%): an intangible good that we purchase but do not gain ownership of: health care, airline tickets, financial services, etc.

Incorporating Housing

- Are homes a durable good?
- **New homes** are considered an *investment*
  Household buying a home ~ Firm purchasing a plant
- Households do not take their home when they move

- **Rental Housing**: counted as a service

- **Imputed Rent**: the cost to you if you rented your home
  - If your home would rent for $1,000/month = $12,000/year, count $12,000 in "imputed rent" as a service

- Housing Services make up 12% of the total GDP!

$Y = C + I + G + NX$

Investment (I)

- Investment (18%): goods and services purchased by firms
- Nonresidential Investment (13.9%): Capital machinery and plants
  - Tractor, Assembly Line Part, Computer, Software, Desk, Building/Plant
- Residential Investment (4.0%): New home construction
- Change in Private Inventories (~0%)

Change in Private Inventories

Campus Bookstore in 2024

$10,000 worth of hoodies made and up for sale!

GDP in 2024 increases by $10,000

Sell $8,000 worth of hoodies

Consumption in 2024 increases by???

$2,000 worth of hoodies unsold at the end of the year

Added to inventory/stock room/etc.

Increase inventory in 2024 = increase investment in 2024

Campus Bookstore in 2025

Remaining $2,000 in hoodies sold!

Consumption in 2025 increases by $2,000

Where did the hoodies come from?

Inventory/stock room/etc. (not produced)

Decrease in inventory of $2,000

Change in Inventory = -$2,000

Investment decreases by $2,000 in 2025

Total Change in 2025 GDP? $0

Consumption = +$2,000, Investment = -$2,000

Y = C + I + **G** + NX

Government Purchases (G)

- Government Purchases (17.2%): Goods and services that the government buys
- Federal Spending (6.5%): bought by the Federal Government
  - National Defense (3.7%)
  - What else?
- State and Local Spending (10.7%): bought by local governments
- Does not include transfer payments such as Social Security, Unemployment Benefits, Welfare. Why?

$Y = C + I + G + \mathbf{NX}$

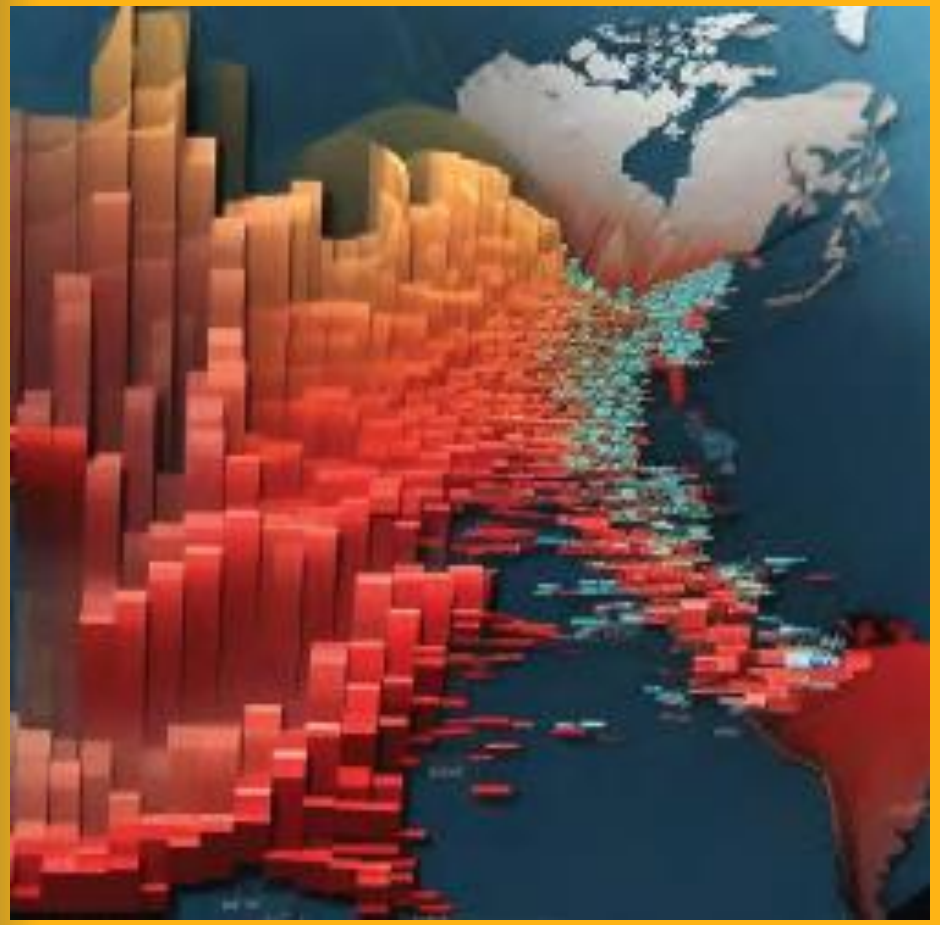
Net Exports (NX)

- Net Exports (NX) = Exports (X) minus Imports (M) = X – M

- Exports (X) : Goods and services purchased BY foreign entities
- Imports (M) : Goods and services bought FROM foreign entities

- Exports are 10.8% of GDP
- Imports are 13.9% of GDP
- Net Exports are 10.8% - 13.9% = -3.1% of GDP

Y = C + I + G + NX



US Nominal GDP in 2024 Q4

C = 20.24Trillion

I = 5.29 Trillion

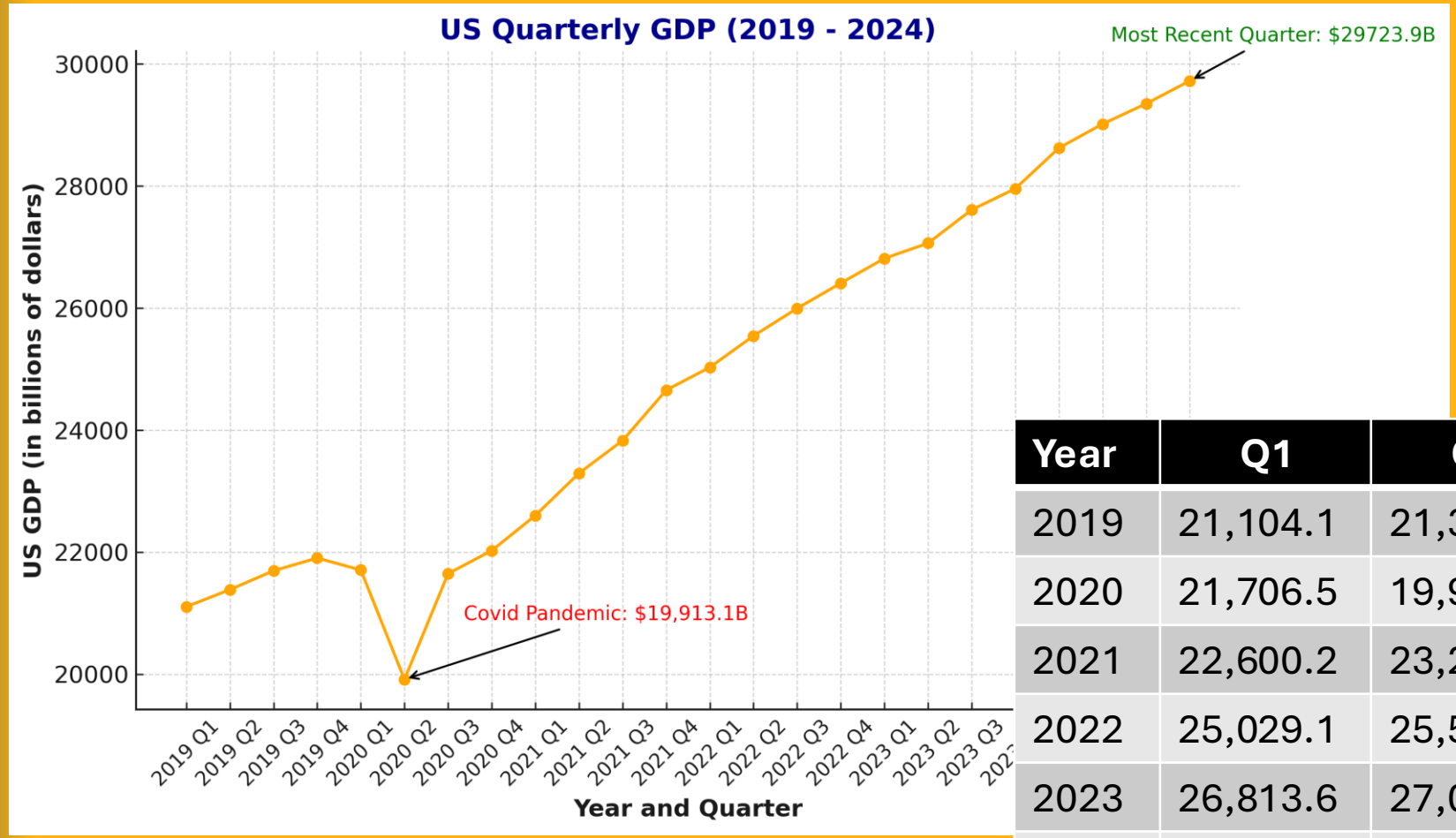
G = 5.10 Trillion

X = 3.22 Trillion

M = 4.14 Trillion

Y = 29.72 Trillion

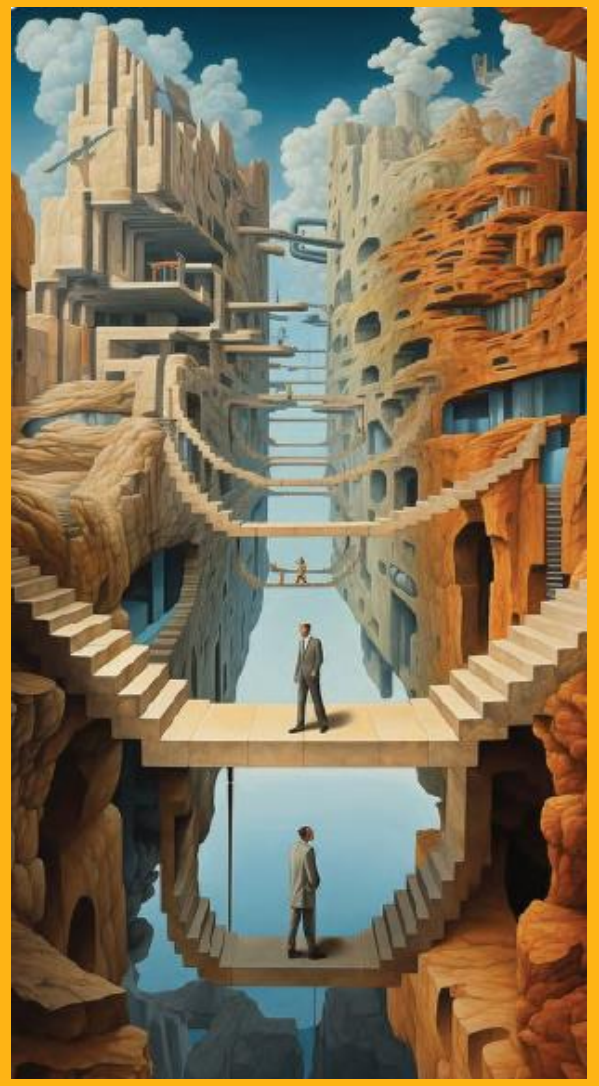
Total US GDP



Year	Q1	Q2	Q3	Q4
2019	21,104.1	21,384.8	21,694.3	21,902.4
2020	21,706.5	19,913.1	21,647.6	22,024.5
2021	22,600.2	23,292.4	23,829.0	24,654.6
2022	25,029.1	25,544.3	25,994.6	26,408.4
2023	26,813.6	27,063.0	27,610.1	27,957.0
2024	28,624.1	29,016.7	29,349.9	29,723.9

State GDP by Country

Alternative Measures of GDP

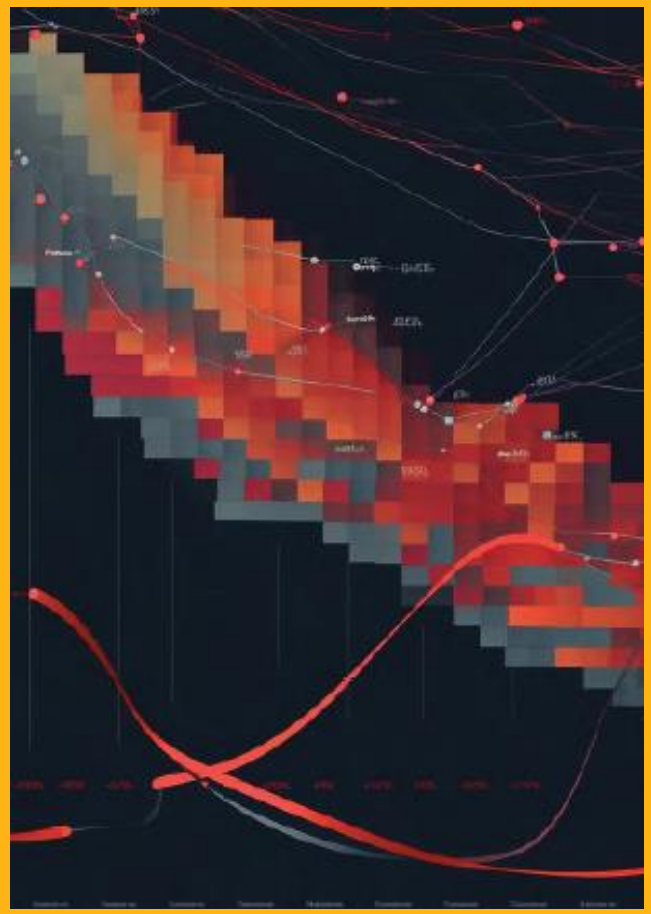


- Remember Best Buy:
  - Step 1: Raw materials are gathered, sold to parts manufacturer for $50
    Step 2: Parts are created by manufacturer and sold to Dell for $150
    Step 3: Dell assembles the computer and sells to Best Buy for $350
    Step 4: Best Buy sells computer to you for $400
- We only add the final $400 sale to GDP (do not double count!)
- Each stage of the production process adds value to the final product
  - Step 1: $50 in raw materials sold to parts manufacturer ($50 in value)
    Step 2: $50 in raw materials sold becomes $150 worth of parts ($100 in value-added)
    Step 3: $200 in parts assembled and sold for $350 ($200 in value-added)
    Step 4: $350 computer sold for $400 at central location ($50 in added-value)
- Each step adds value to the product = “Profit” of the firm
- Value-Added GDP = 50 + 100 + 200 + 50 = **$400**
- Value-Added GDP = Firm Profit

Alternative Measures of GDP

- Best Buy made $50. Who gets that $50?
  - Labor = Income
  - Rent = Landlord Income
  - Interest Payment = Bank/Lender = Income
  - Owner = Income

- Factor Payments GDP = Household Income!
- GDP = Y =
  - Total Production (Expenditure Approach)
  - Firm Profit (Value-Added Approach)
  - Household Income (Factor Payments Approach)

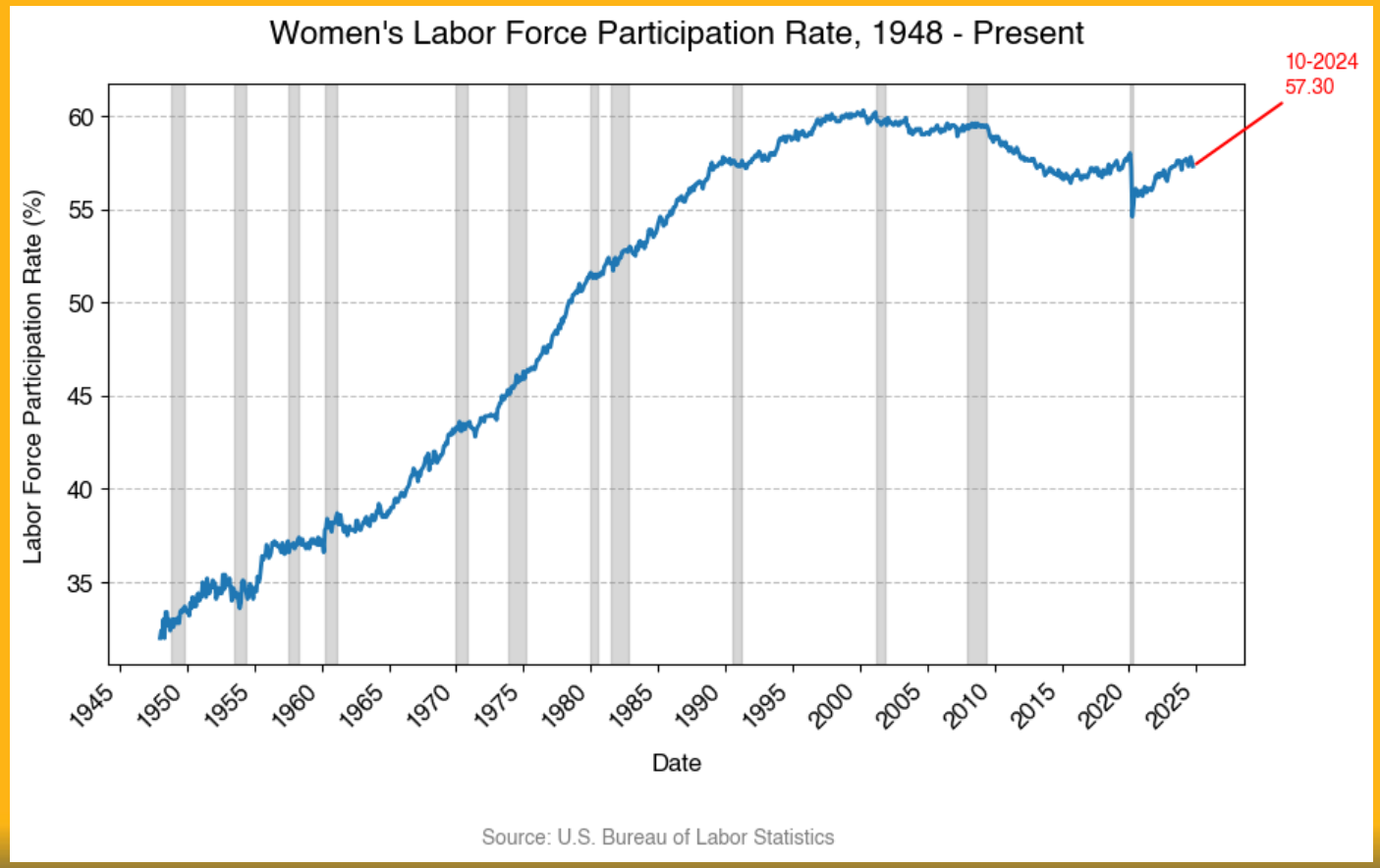


Shortcomings of GDP

Household Activities: GDP ignores vital household activities like childcare and home maintenance

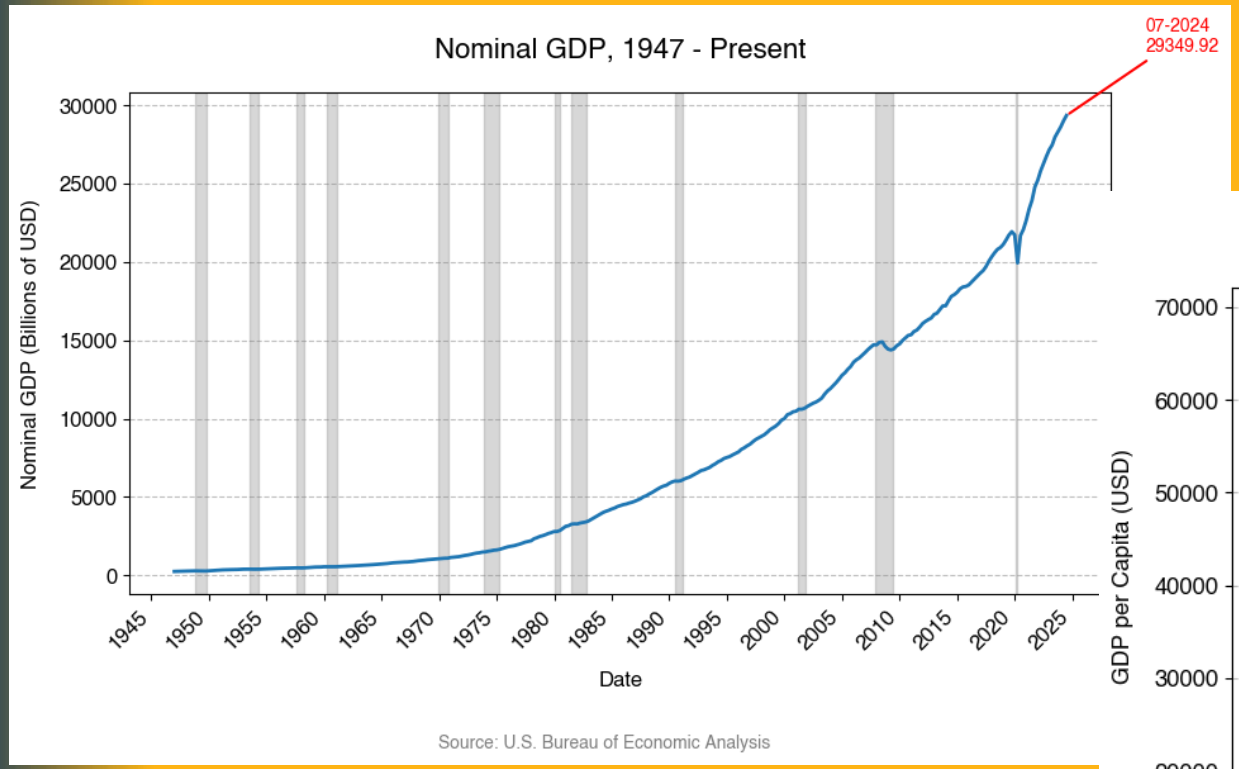
Illegal Sales and Work: GDP does not capture illegal sales and work in the black market or underground economy.

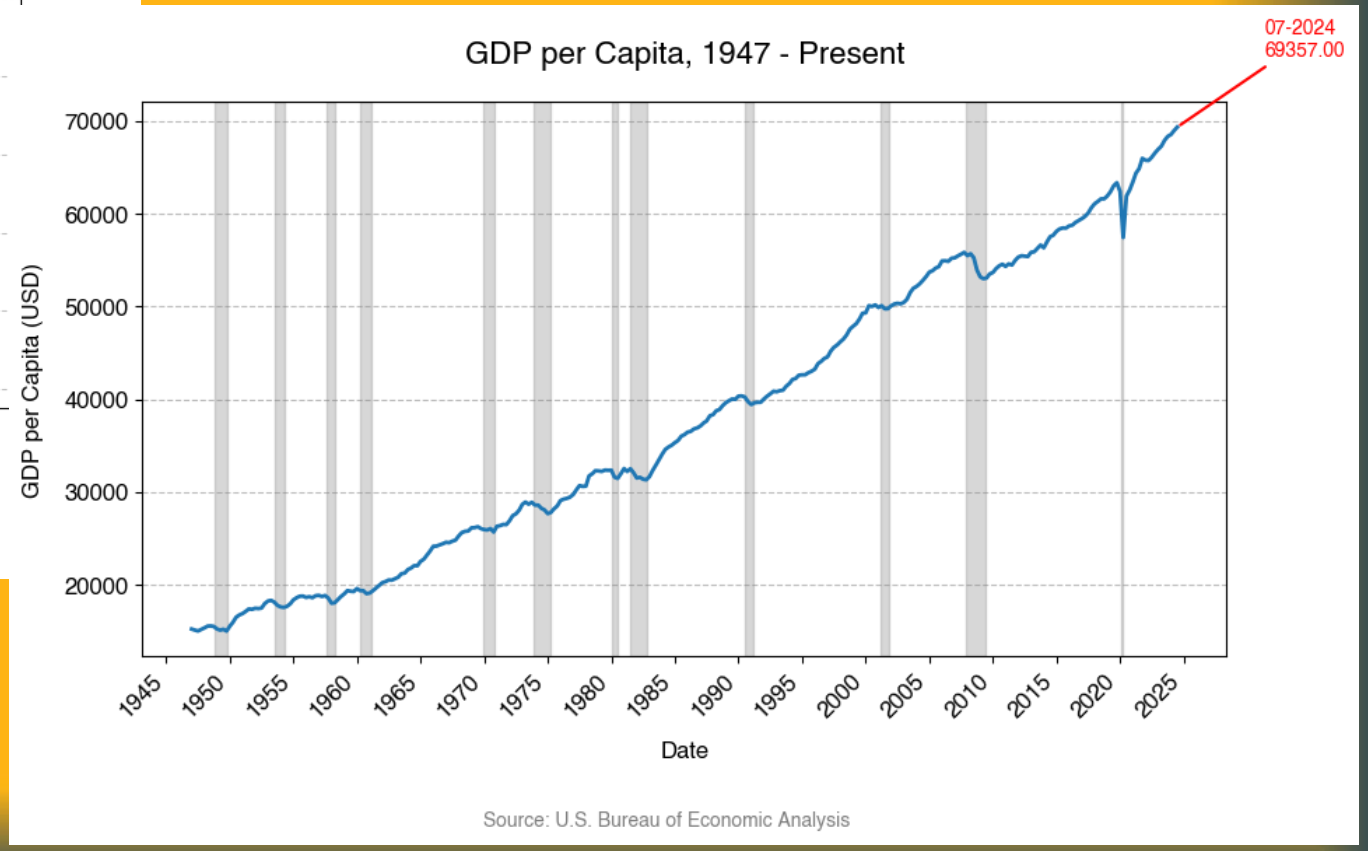
Changing Labor Force Dynamics: GDP overlooks gig economy and changes in the characteristics of workers and jobs



GDP and Well Being?

GDP/Capita, Inequality, Health, Gross National Happiness (GNH)





Calculating GDP

- Simple UCSB Economy

	2009	
Product	Quantity	Price
Food		
Housing		
Movies		

Calculating GDP

- Simple UCSB Economy

	2009		2016	
Product	Quantity	Price	Quantity	Price
Food				
Housing				
Movies				

Calculating GDP

- Simple UCSB Economy

	2009		2016	
Product	Quantity	Price	Quantity	Price
Food	1000	1	1500	2
Housing	100	100	150	150
Movies	500	5	1000	10

Calculating GDP

- Nominal GDP: Value of final goods and services evaluated at ***current year prices***
  - Total dollars exchanged
- Real GDP: Value of final goods and services evaluated at ***base year prices***
  - Value of dollars exchanged if prices did not change from the prices in an arbitrary (base) year
- GDP Deflator: Measure of how much nominal GDP changes are driven by price changes

Using the Deflator to Calculate Price Increases

- How much did prices increase between 2009 and 2017?

- How much did real GDP increase between 2009 and 2017?

Real GDP vs Nominal GDP with a single good

Movie	World Gross (Nominal)	Movie	
1. Avatar (2009)	$2,923,706,026		
2. Avengers: Endgame (2019)	$2,799,439,100		
3. Avatar: The Way of Water (2022)	$2,320,250,281		
4. Titanic (1997)	$2,264,743,305		
5. Star Wars: The Force Awakens (2015)	$2,071,310,218		
6. Avengers: Infinity War (2018)	$2,052,415,039		
7. Spider-Man: No Way Home (2021)	$1,921,847,111		
8. Jurassic World (2015)	$1,671,537,444		
9. The Lion King (2019)	$1,663,075,401		
10. The Avengers (2012)	$1,520,538,536		

Real GDP vs Nominal GDP with a single good

Movie	Worldwide Gross (Nominal)		Movie	Ticket Sales
1. Avatar (2009)	$2,923,706,026		1. Gone w/the Wind (1939)	202,044,600
2. Avengers: Endgame (2019)	$2,799,439,100		2. Star Wars (1977)	178,119,600
3. Avatar: The Way of Water (2022)	$2,320,250,281		3. Sound of Music (1965)	142,415,400
4. Titanic (1997)	$2,264,743,305		4. ET (1982)	141,854,300
5. Star Wars: The Force Awakens (2015)	$2,071,310,218		5. Titanic (1997)	135,474,500
6. Avengers: Infinity War (2018)	$2,052,415,039		6. The Ten Commandments (1956)	131,000,000
7. Spider-Man: No Way Home (2021)	$1,921,847,111		7. Jaws (1975)	128,078,800
8. Jurassic World (2015)	$1,671,537,444		8. Doctor Zhivago (1965)	124,135,500
9. The Lion King (2019)	$1,663,075,401		9. Exorcist (1973)	110,599,200
10. The Avengers (2012)	$1,520,538,536		10. Snow White and the 7 Dwarfs (1937)	109,000,000

Stable Prices

Goal 2: Stable Prices

Inflation = Prices are rising

Deflation = Prices are falling

How much do consumers care about all prices?

What is the ideal level of inflation/deflation?

Federal Reserve's "Stable Prices"

Why is the inflation target not higher?

Today ——————————————6 Months——————————————1 Year

Invest, Prepare ——————————Produce——————————Sell at Expected Price

As prices rise, workers expect cost-of-living adjustments/wage increases

Example: Inflation is 25% away than expectations.

If inflation expectations are 2%, inflation range is 1.5% to 2.5%

If inflation expectations are 50%, inflation ranges from 37.5% to 62.5%

At 37.5% inflation, firms don't sell at high enough prices to pay input costs.

At 62.5% inflation, workers don't get raises to match the increasing prices of goods.

Federal Reserve's "Stable Prices"

Why is the inflation target not lower?

Deflation:

1. Consumer Response: When the prices of goods and services are expected to decrease, consumers delay purchases.

Less spending = Less production = Lower GDP = Unemployment

2. Debt Burden:

Situation: $50,000 loan today, have to payback in 25 years
$50,000 in 25 years is equivalent to $30,477 today at 2% inflation. Wages, prices, etc. rise, so the debt burden ($50,000) is less costly over time.

If prices are falling and interest rates don't adjust, debt burden is growing! Deflation-still owe $50,000, but wage, prices, etc. have decreased! At 2% deflation for 25 years, $50,000 today is equivalent to $82,000 in 25 years!

3. Wage Adjustments

Real Wage Growth = Nominal Wage Growth –Inflation Rate

Easier to decrease real wage than nominal wage

Consumer Price Index

GDP Deflator Growth: measure of inflation

Do the prices of ALL goods and services matter to consumers?

Consumer Price Index

- How do we calculate an “average price” for all goods purchased by consumers?
- **STEP 1: What do consumers purchase?**
- Determine basket of goods:

Consumer Price Index

- How do we calculate an “average price” for all goods purchased by consumers?
- **STEP 2: How heavy is each good in the basket?**
- Determine the weight of goods and services in the basket:

Consumer Price Index

- How do we calculate an “average price” for all goods purchased by consumers?
- **STEP 3: Calculate the weighted cost of a basket**
- Similar to GDP, calculate the cost of the average good bought by a household

Consumer Price Index

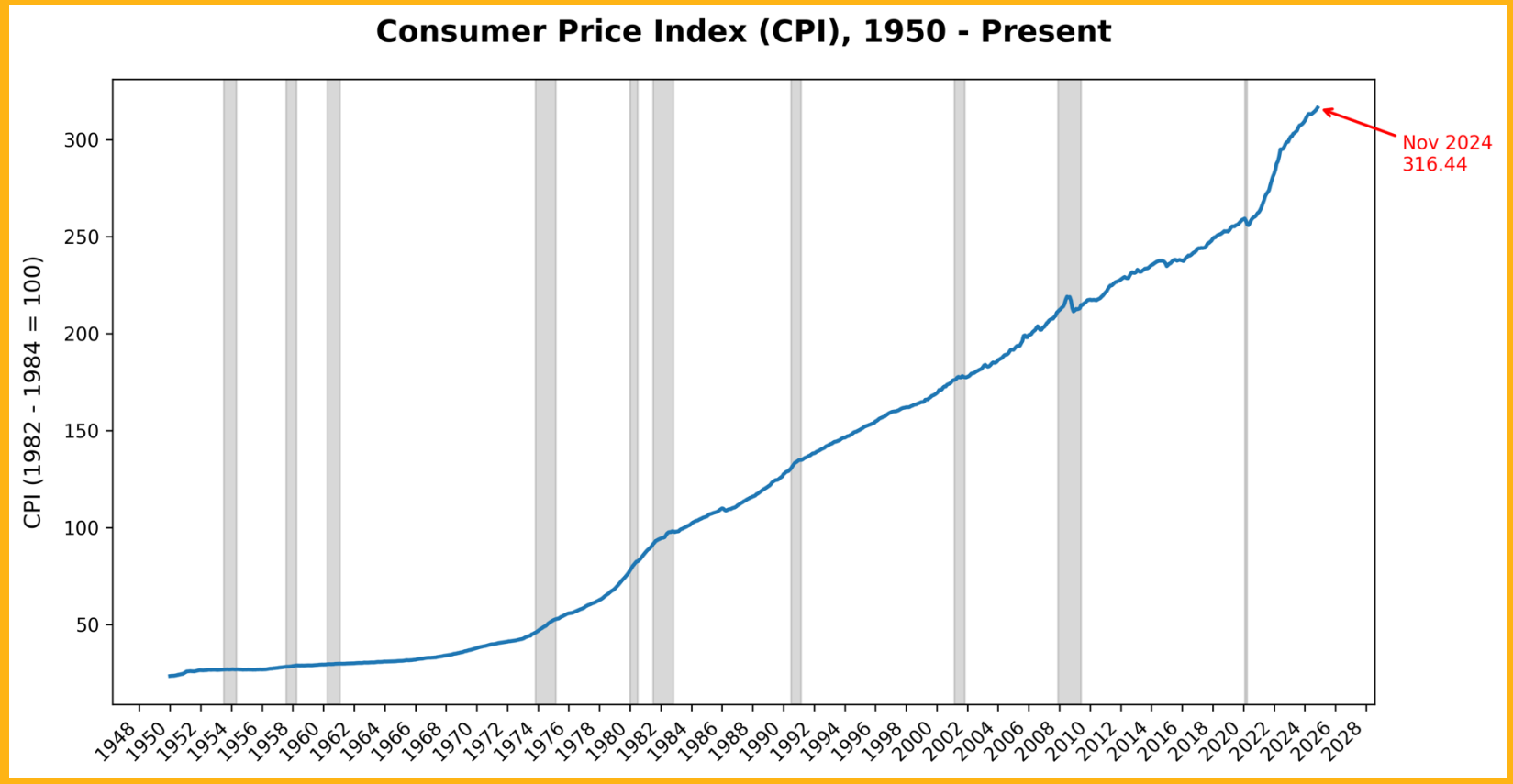
Calculate Base Year (BY) Basket Cost:
BY Prices x BY Q

Calculate Current Year (CY) Basket Cost: CY Prices x BY Q

CPI = Ratio of Basket Costs

Inflation = CPI Growth Rate

Consumer Price Index



Base Year: 1982-1984 Average Weights/Prices, CPI = 100

Today (November, 2024), CPI =316.44

1950 CPI = 24

Is the CPI an accurate measure of inflation?

Some Potential Problems with CPI

Substitution, quality, and new products can distort inflation measurements.

Consumers may change buying habits and price hikes may not always correlate with improved quality.

CPI doesn't cover new products or cheap stores/websites.

Economists believe it overestimates inflation by 0.5-1%.