



# Econ 201: Introduction to Economic Analysis

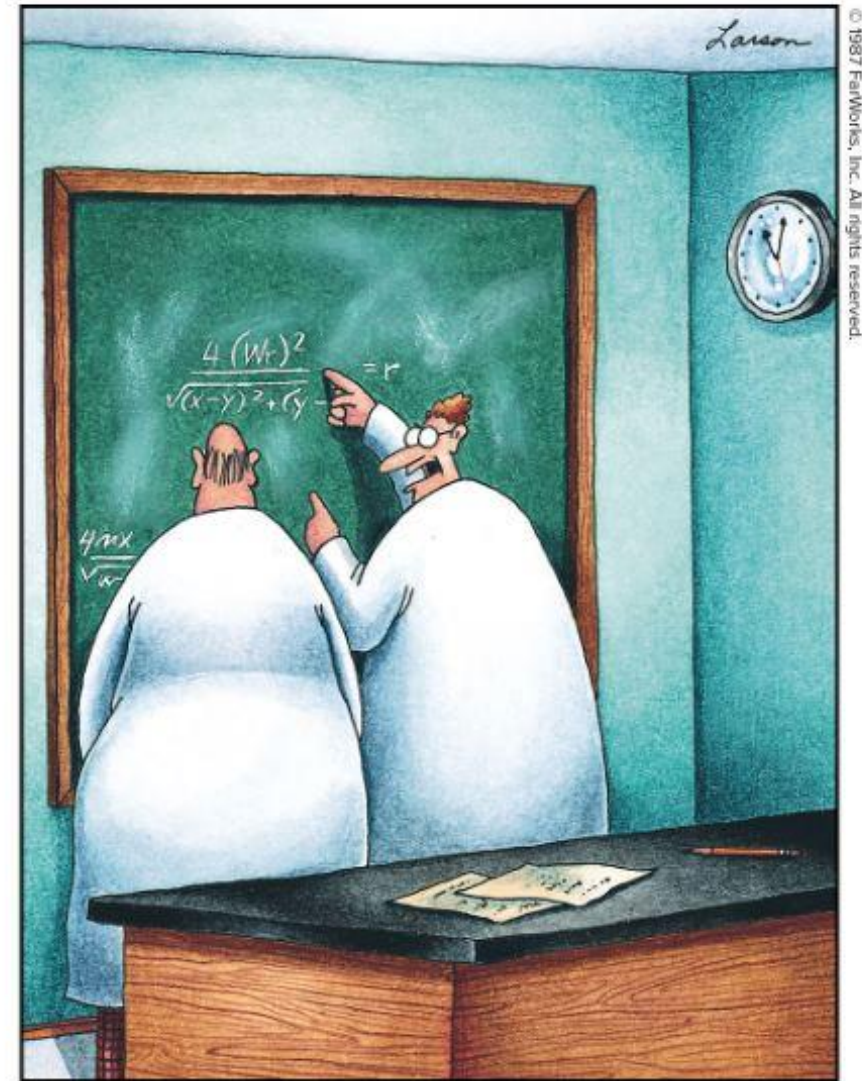
## November 9 Lecture: Measuring Macroeconomic Variables



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# Daily dose of The Far Side

[www.thefarside.com](http://www.thefarside.com)



“Yes, yes, I *know* that, Sidney—everybody knows *that!* ... But look: Four wrongs *squared*, minus two wrongs to the fourth power, divided by this formula, *do* make a right.”

# Preview of this class session

- **Gross domestic product** (GDP) is the most common basic measure of economic activity
- **Price indexes** measure the average level of prices of a market basket of goods
- Labor-market data categorizes adults as **employed**, **unemployed**, or **out of the labor force**





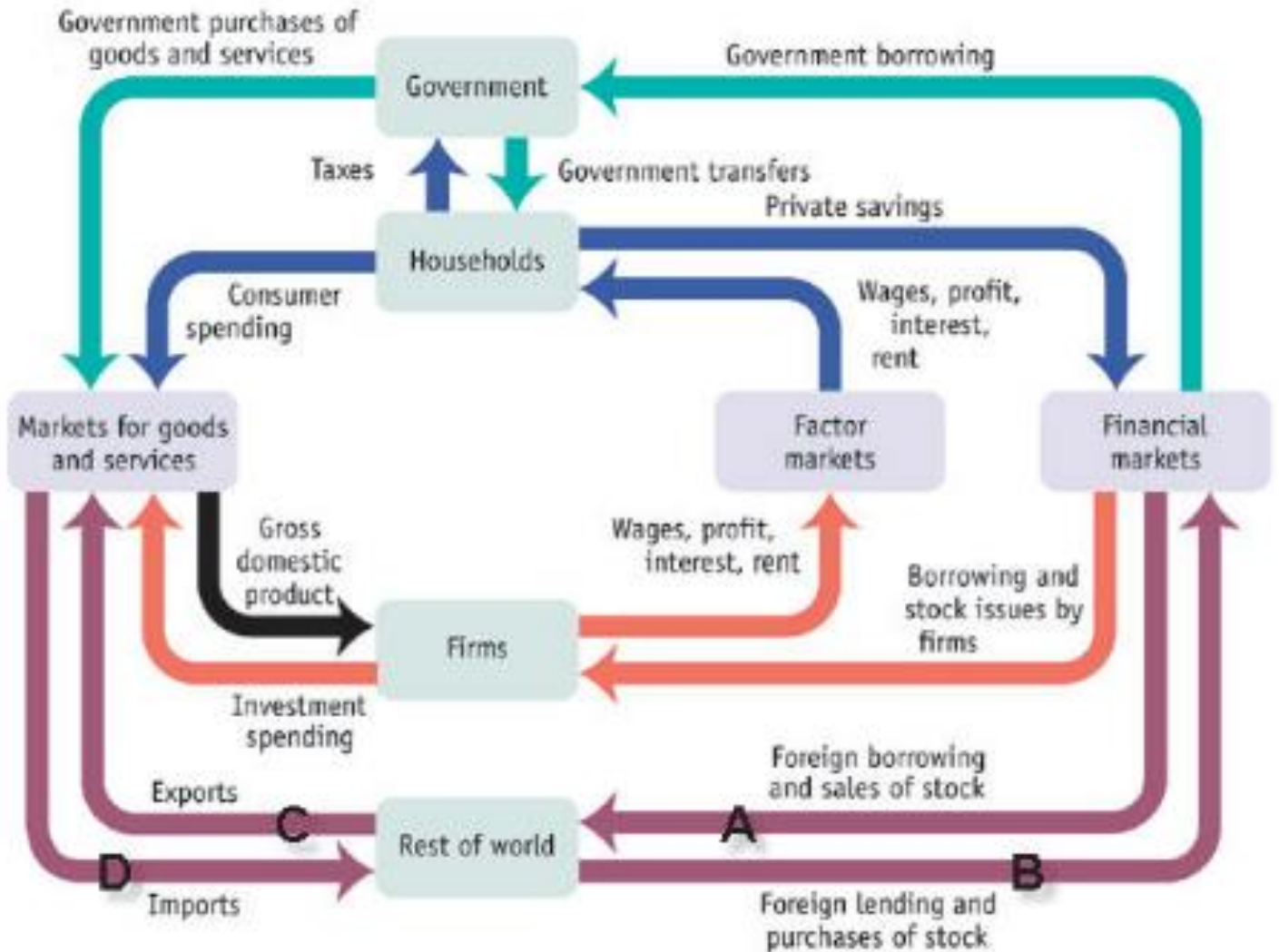
# Basic macroeconomic variables

- Macro is an “empirical discipline,” built to explain movements in variables that we can observe: We are limited by the data
- What variables are most important and why? What makes people better off or happier?
  - Higher real GDP means average household’s budget constraint shifts outward in terms of purchased goods: higher utility other things equal
  - Stable prices provide security and convenience; money doesn’t depreciate in your pocket
  - Low unemployment rate means that most people have jobs
- Case study focuses on how responses to happiness surveys are affected by macroeconomic variables



# Circular flow of income and goods

- Three markets:
  - Goods and services
  - Factors of production
  - Loanable funds
- Four sets of agents:
  - Households
  - Firms
  - Government
  - Rest of world
- $\text{Income} = \text{Output} = \text{Expenditures}$





# National income and product accounts

- **Income** = Wages & salaries + Interest + Rent + Proprietors' income + Depreciation + Corporate profit + Indirect taxes + ...
- **Expenditures** = Consumption + Real investment + Government spending + Exports – Imports
- **Output** = Sum of value added in all industries
- Income = Expenditures = Output
- Aggregated in dollars paid
  - Measures (marginal) consumer's willingness to pay
  - Subject to distortion due to inflation: **real vs. nominal** flows



# Gross domestic product

- **Market value** of all **final** goods and services produced **in an economy** during a **period of time**
- Market value: What someone was willing to pay (including taxes)
- Final goods: Exclude intermediate goods to avoid double-counting
- In an economy:
  - GDP: produced within U.S.
  - GNP: produced by U.S. residents
- Period of time: GDP is a flow measured at annual rate



# Shortcomings of real, per-capita GDP

- **Omitted sources of utility**

- Leisure
- Non-market production
- Environmental amenities
- Safety and security
- Health status
- Provision of resources for the future

- Measures average, but **neglects distribution**

- Comparing across countries?

- Use **purchasing-power parity exchange rates** to compare earning power





# Measuring general price level

Comparing price of market basket of goods to price of that market basket in another year (base year)

**Laspeyres** index:

$$P_t = 100 \times \frac{\sum_{i=1}^N P_{i,t} Q_{i,b}}{\sum_{i=1}^N P_{i,b} Q_{i,b}}$$

Base-year weights

**Paasche** index:

$$P_t = 100 \times \frac{\sum_{i=1}^N P_{i,t} Q_{i,t}}{\sum_{i=1}^N P_{i,b} Q_{i,t}}$$

Given-year weights

**Chain-weighted** index:

$$\frac{P_t}{P_{t-1}} = \frac{\sum_{i=1}^N P_{i,t} Q_{i,t}}{\sum_{i=1}^N P_{i,t-1} Q_{i,t}}$$

Build up year by year

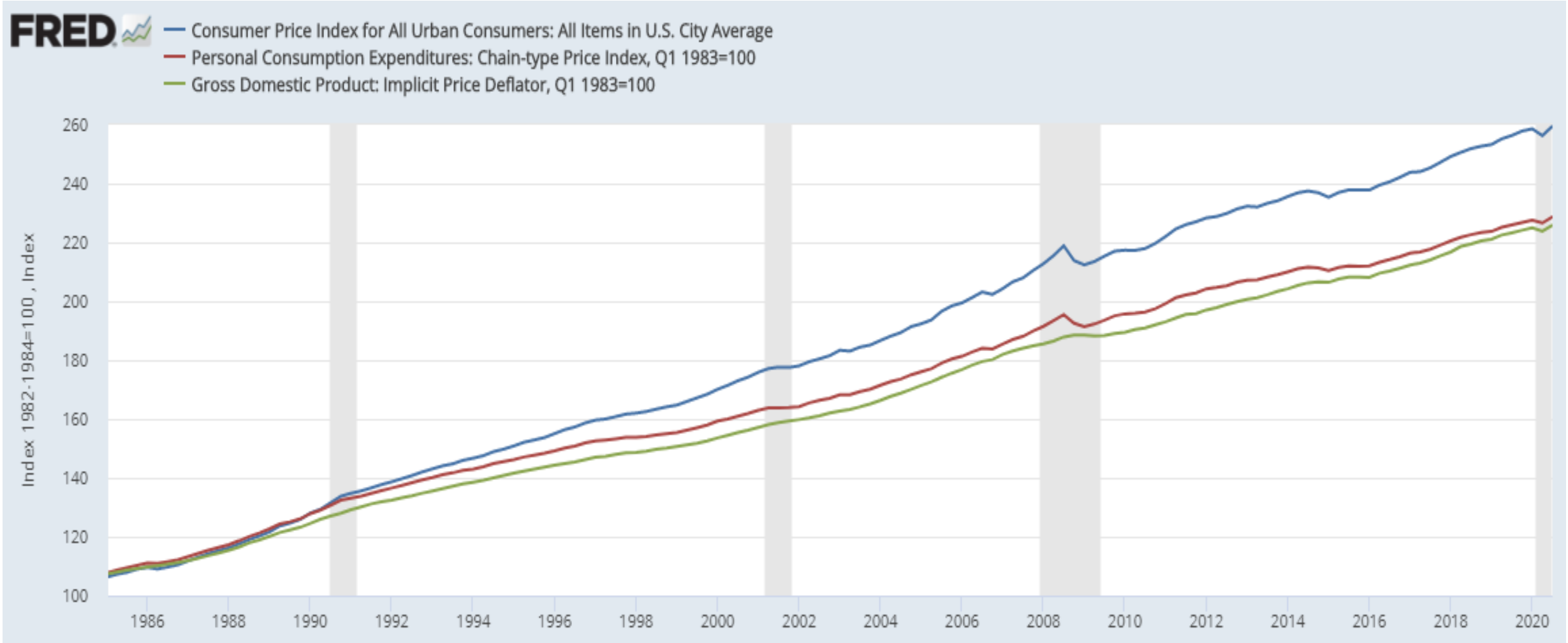


# Published U.S. indexes and biases

- Biases affecting all price indexes:
  - Overstate inflation due to new goods
  - Overstate inflation due to unmeasured improvements in products
  - Overstate inflation due to outlet substitution
- **Consumer price index (CPI):**
  - Laspeyres index overstates inflation due to product substitution
  - Off by 0.75 – 1.50 percentage points per year
  - 27 times higher now than in 1913
- **GDP deflator**
  - Paasche index understates inflation due to product substitution
  - Now mostly replaced by **chained GDP price index** to reduce bias
- **Inflation rate** is percentage rate of change in price index



# Three price indexes since 1983





# Labor-market data

- Three categories within working-age population:
  - Employed
  - Unemployed
  - Out of the labor force
- Data from monthly Current Population Survey
  - Working? Yes = Employed
  - If not, actively seeking work or awaiting recall? Yes = Unemployed, No = out of labor force
- Labor force = Employed + Unemployed
- Labor-force participation rate = Labor force  $\div$  Population
- Unemployment rate = Unemployed  $\div$  Labor force



# Alternative measures of underemployment

## HOUSEHOLD DATA

**Table A-15. Alternative measures of labor underutilization**

[Percent]

Measure	Not seasonally adjusted			Seasonally adjusted					
	Sept. 2019	Aug. 2020	Sept. 2020	Sept. 2019	May 2020	June 2020	July 2020	Aug. 2020	Sept. 2020
U-1 Persons unemployed 15 weeks or longer, as a percent of the civilian labor force	1.3	5.0	4.5	1.3	1.4	2.1	5.0	5.1	4.6
U-2 Job losers and persons who completed temporary jobs, as a percent of the civilian labor force	1.4	6.4	5.5	1.6	11.6	8.9	8.1	6.4	5.7
U-3 Total unemployed, as a percent of the civilian labor force (official unemployment rate)	3.3	8.5	7.7	3.5	13.3	11.1	10.2	8.4	7.9
U-4 Total unemployed plus discouraged workers, as a percent of the civilian labor force plus discouraged workers	3.5	8.8	8.0	3.7	13.6	11.5	10.6	8.7	8.2
U-5 Total unemployed, plus discouraged workers, plus all other persons marginally attached to the labor force, as a percent of the civilian labor force plus all persons marginally attached to the labor force	4.1	9.7	8.8	4.3	14.6	12.5	11.3	9.6	8.9
U-6 Total unemployed, plus all persons marginally attached to the labor force, plus total employed part time for economic reasons, as a percent of the civilian labor force plus all persons marginally attached to the labor force	6.5	14.3	12.4	6.9	21.2	18.0	16.5	14.2	12.8

NOTE: Persons marginally attached to the labor force are those who currently are neither working nor looking for work but indicate that they want and are available for a job and have looked for work sometime in the past 12 months. Discouraged workers, a subset of the marginally attached, have given a job-market related reason for not currently looking for work. Persons employed part time for economic reasons are those who want and are available for full-time work but have had to settle for a part-time schedule. Updated population controls are introduced annually with the release of January data.

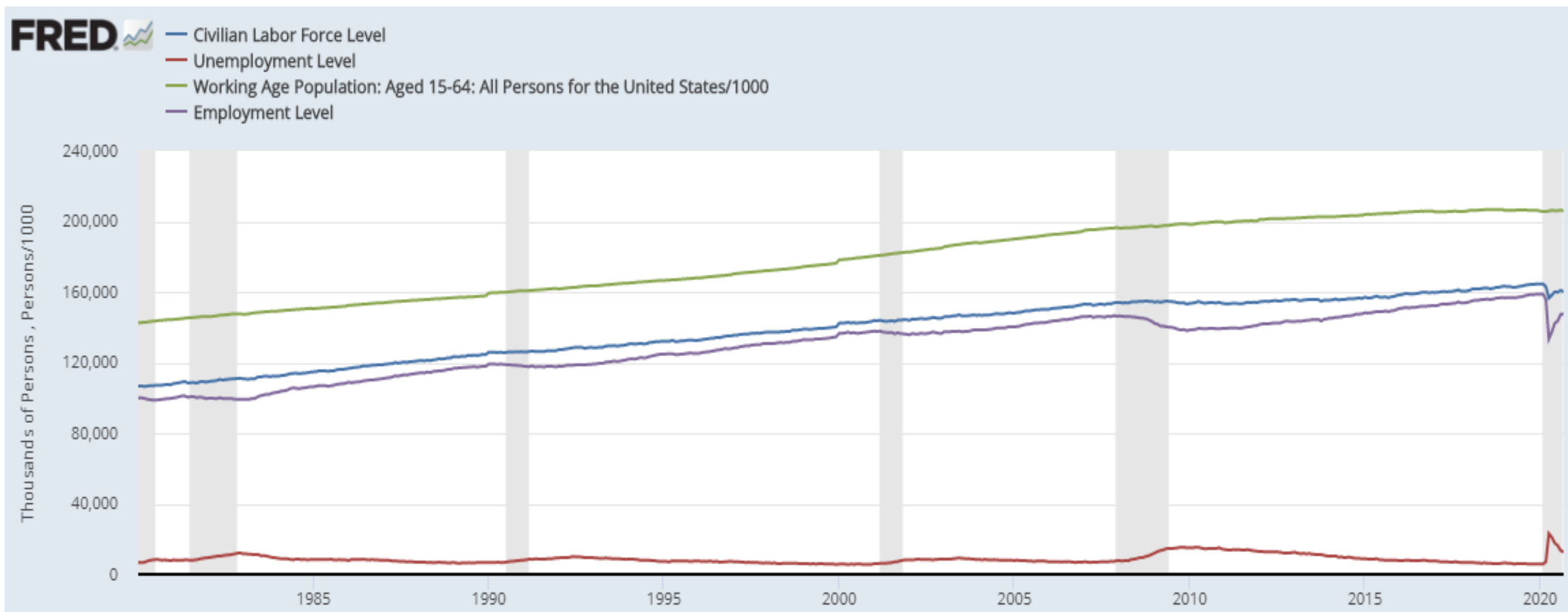


# Unemployment as search

- We often think of the unemployed as **searching** for jobs
- **Matching** of unemployed workers and vacant jobs takes time
- Job search is useful in achieving better matches
  - This implies that optimal unemployment rate is positive
- **Natural unemployment rate** is equilibrium rate to which the economy tends when macroeconomy is in balance
  - Natural rate is not zero
  - Natural  $\sim$  optimal?
  - Are workers and firms choosing the optimal length of search when overall labor market is balanced?

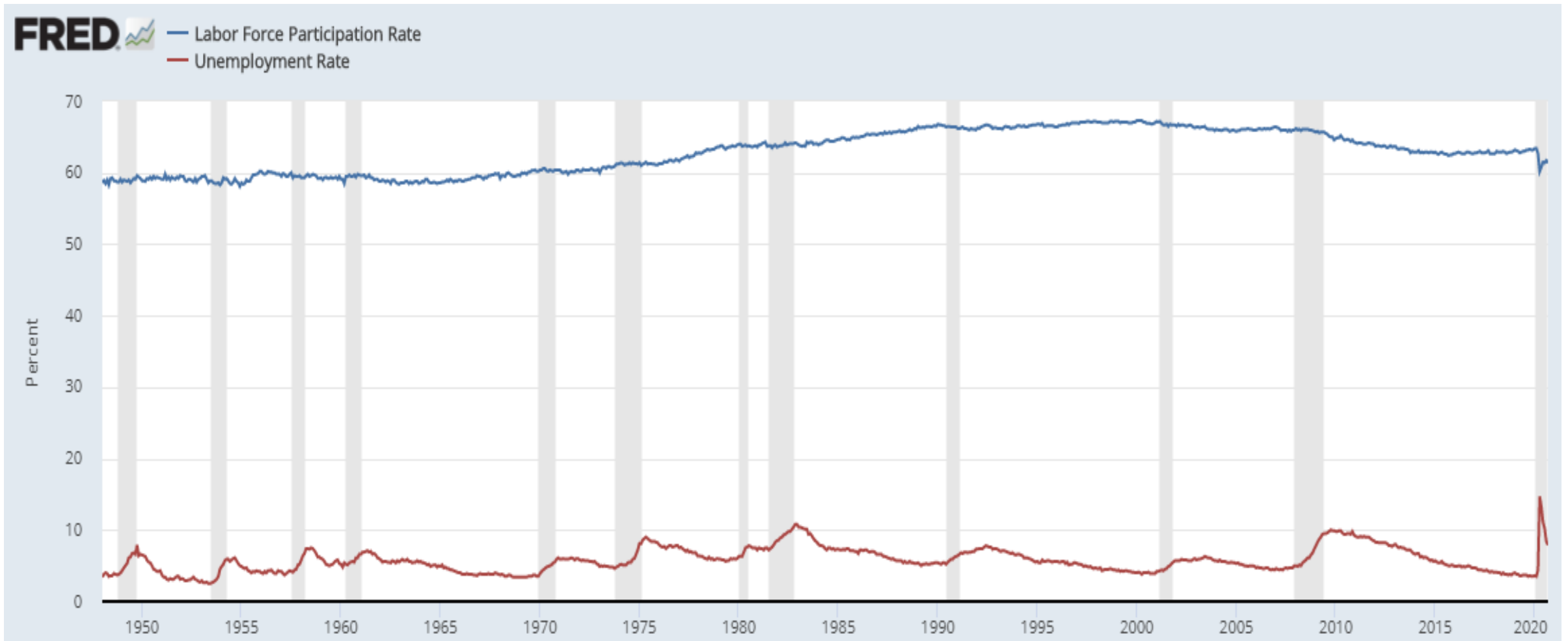


# U.S. labor market: Numbers since 1980





# U.S. labor market: Rates since 1980





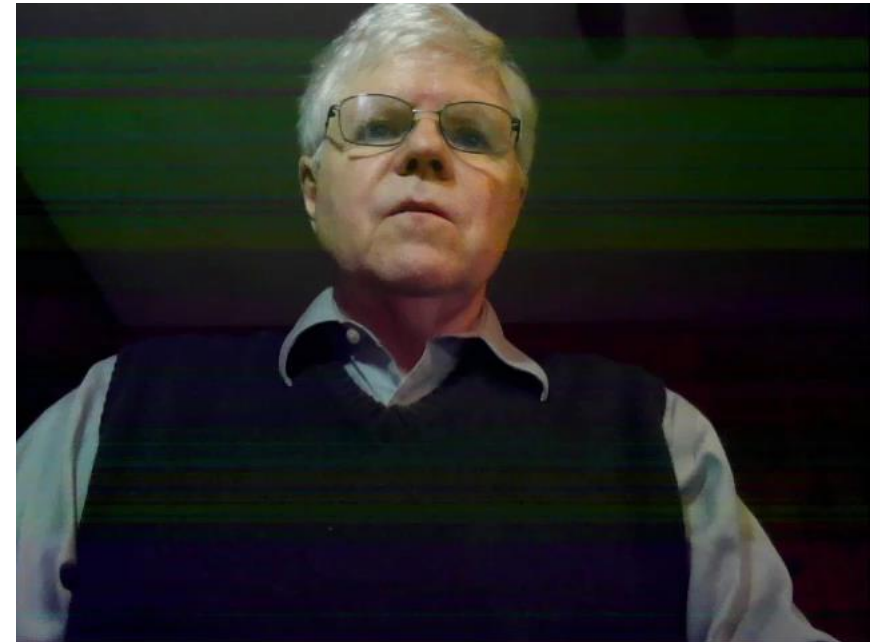


# Bottom line on macroeconomic measurement

- We try!
- Measures don't always match underlying theoretical concepts
- Surveys are always estimates
  - 64,000 households in monthly labor survey
  - CPI data collectors visit stores monthly to collect prices
  - Both are published by BLS at beginning of next month
- GDP is heroic estimate by BEA based on dozens of underlying indicators
  - Only quarterly in U.S.
  - Published in long sequence of preliminary and revised estimates

# Review

- We discussed three main categories of macroeconomic data
  - National-accounts data on income, output, and expenditures (GDP)
  - Price indexes that measure inflation over time
  - Labor-market variables such as the labor force, employment, and unemployment
- All three have connections to economic well-being of the economy





# Daily diversion: Another bad economist joke

Three guys decide to play a round of golf: a priest, a psychologist, and an economist. They get behind a very slow twosome, who, despite having caddies, are taking all day to line up their shots and then four-putting every green. By the 8th hole, the three men are complaining loudly about the slow play ahead of them and swearing up a storm.

The priest says, "Holy Mary, I pray that they should take some lessons before they play again." The psychologist says, "I swear there are people who like to play golf slowly." The economist says, "I didn't expect to spend this much time playing a round of golf."

By the 9th hole, they have had it with slow play. The psychologist goes up to a caddie and demands that they be allowed to play through. The caddie says that would be fine, and explains that the two golfers are blind, and that both are retired firemen who lost their eyesight saving people in a fire. This explains their slow play, states the caddie. "Would you please not swear and complain so loudly?"

The priest is mortified, saying, "Here I am, a man of the cloth, and I've been swearing to the slow play of two blind men." The psychologist is also mortified, saying, "Here I am, a man trained to help others with their problems, and I've also been complaining about the slow play of two blind men."

The economist ponders the situation. He goes back to the caddies and asks, "Listen, the next time they play, could it be at night?"

--Taken from Jeff Thredgold, *On the One Hand: The Economist's Joke Book*



# What comes next?

- Wednesday's class will be an overview of basic theories of economic growth
- Case study for Wednesday examines the empirical data on how advanced in information technology have affected aggregate productivity growth
- Problem Set #7 will be due on Wednesday, November 21