

# Measuring Employment and Unemployment

**National Association for Business Economics**

**Economic Measurement Seminar**

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## THE EMPLOYMENT SITUATION — JUNE 2022

Total **nonfarm payroll employment** rose by 372,000 in June, and the **unemployment rate** remained at 3.6 percent, the U.S. Bureau of Labor Statistics reported today. Notable job gains occurred in professional and business services, leisure and hospitality, and health care.

Household  
Survey

Chart 1. Unemployment rate, seasonally adjusted,  
June 2019 – June 2022

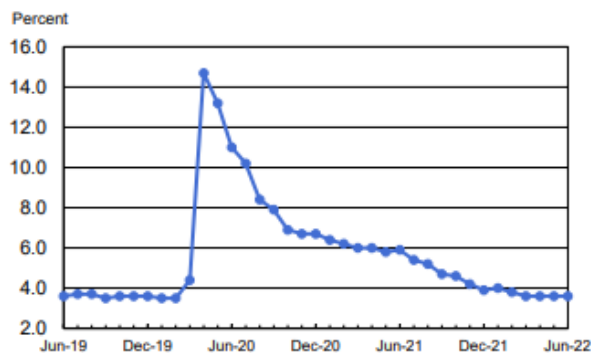
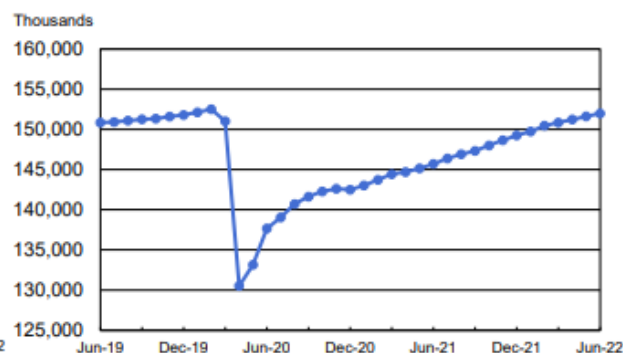


Chart 2. Nonfarm payroll employment, seasonally adjusted,  
June 2019 – June 2022



Establishment  
Survey

# Current Employment Statistics (Establishment Survey)

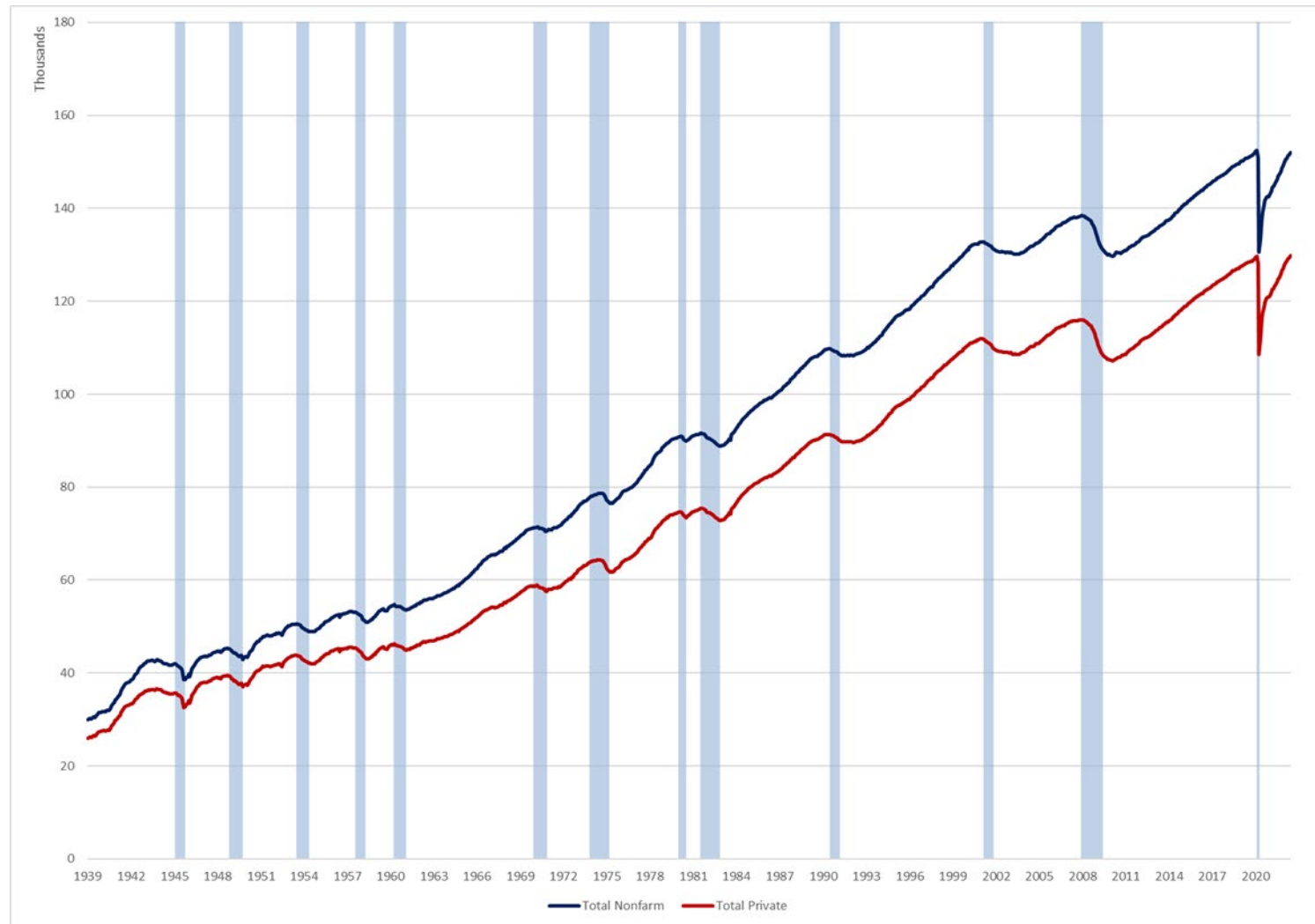


# What is the CES survey?

- Monthly payroll survey
- 131,000 nonfarm businesses and government agencies
- 670,000 worksites
- One-third of all jobs



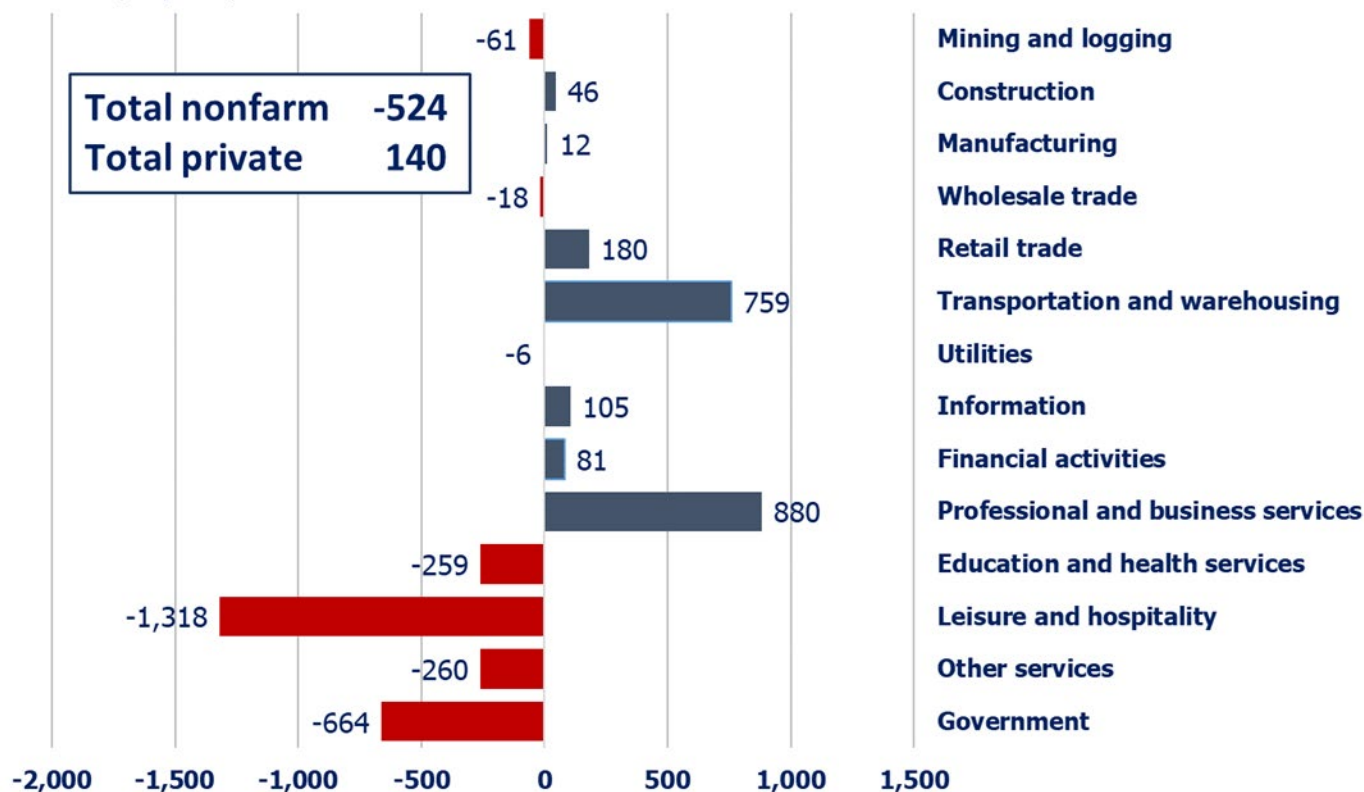
# Total and Private Nonfarm Employment



# Impacting all Industry Sectors

Employment in total nonfarm, change since February 2020

Seasonally adjusted, in thousands



Bureau of Labor Statistics, Current Employment Statistics survey July 08, 2022  
Data are preliminary.

# CES Mission

**Accurate, timely, objective, and relevant** data

Industry employment, hours, and earnings

Nation, states, and metropolitan areas



# Timeliness—It's all in the name

## ■ CURRENT

Employment  
Statistics

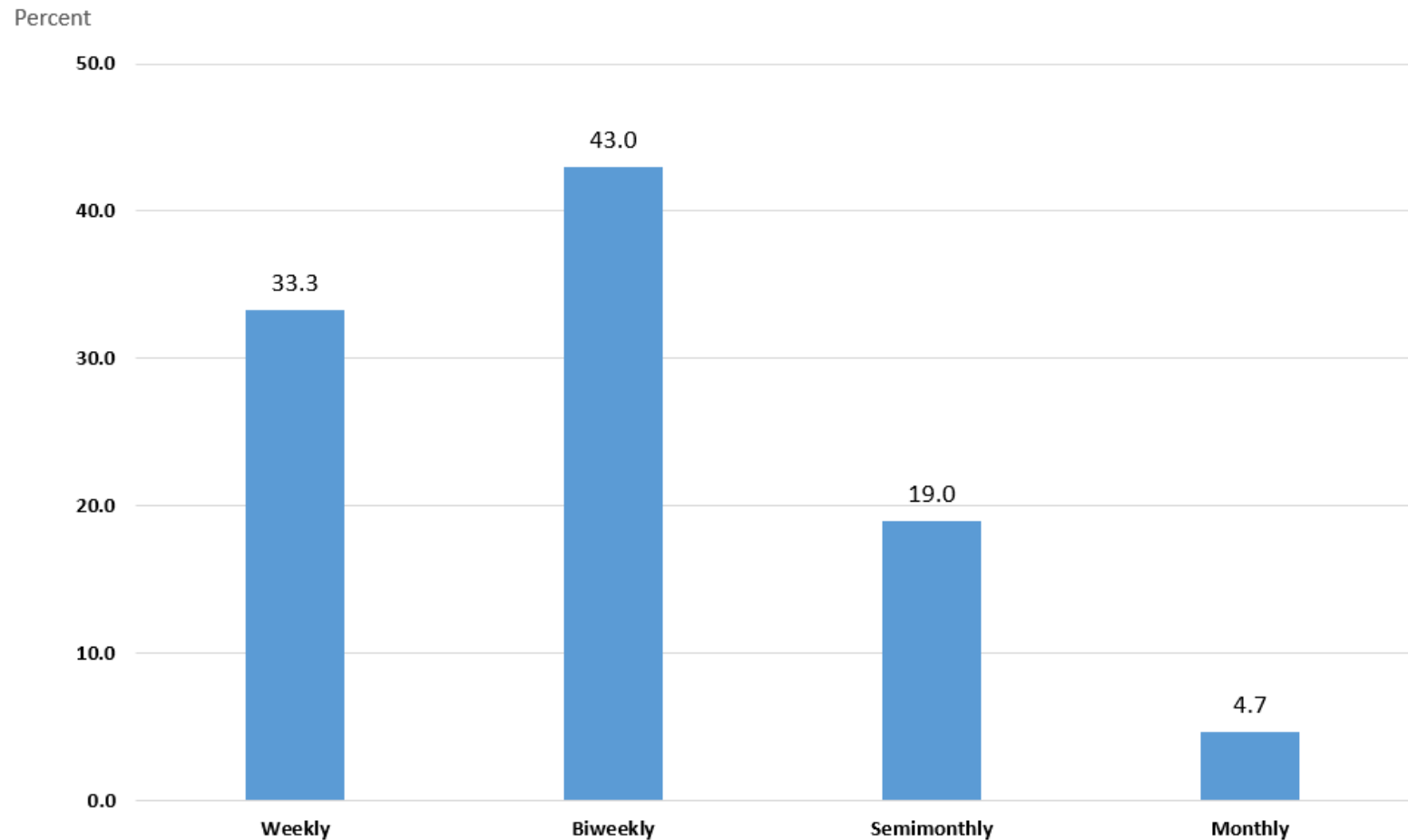
■ Reference period:  
pay period including  
12<sup>th</sup> of the month

■ Published on the 3<sup>rd</sup>  
Friday after week of  
the 12<sup>th</sup>, not always  
the 'first Friday'

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>June 2022</b>						
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		
<b>July 2022</b>						
						2
3	4	5	6	7	8	9



## Private establishments by length of pay period, percent distribution, February 2020

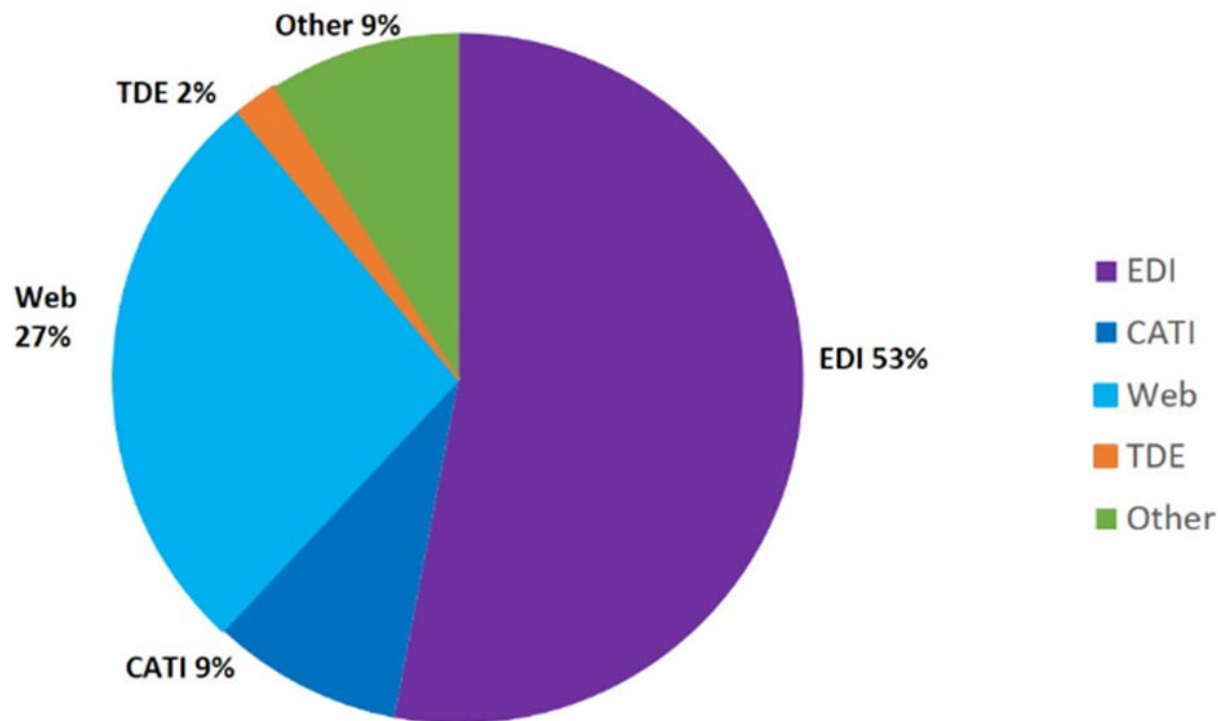


Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey

[Length of pay periods in the Current Employment Statistics survey : U.S. Bureau of Labor Statistics \(bls.gov\)](https://www.bls.gov/news.release/archives/cesqa02202002.pdf)

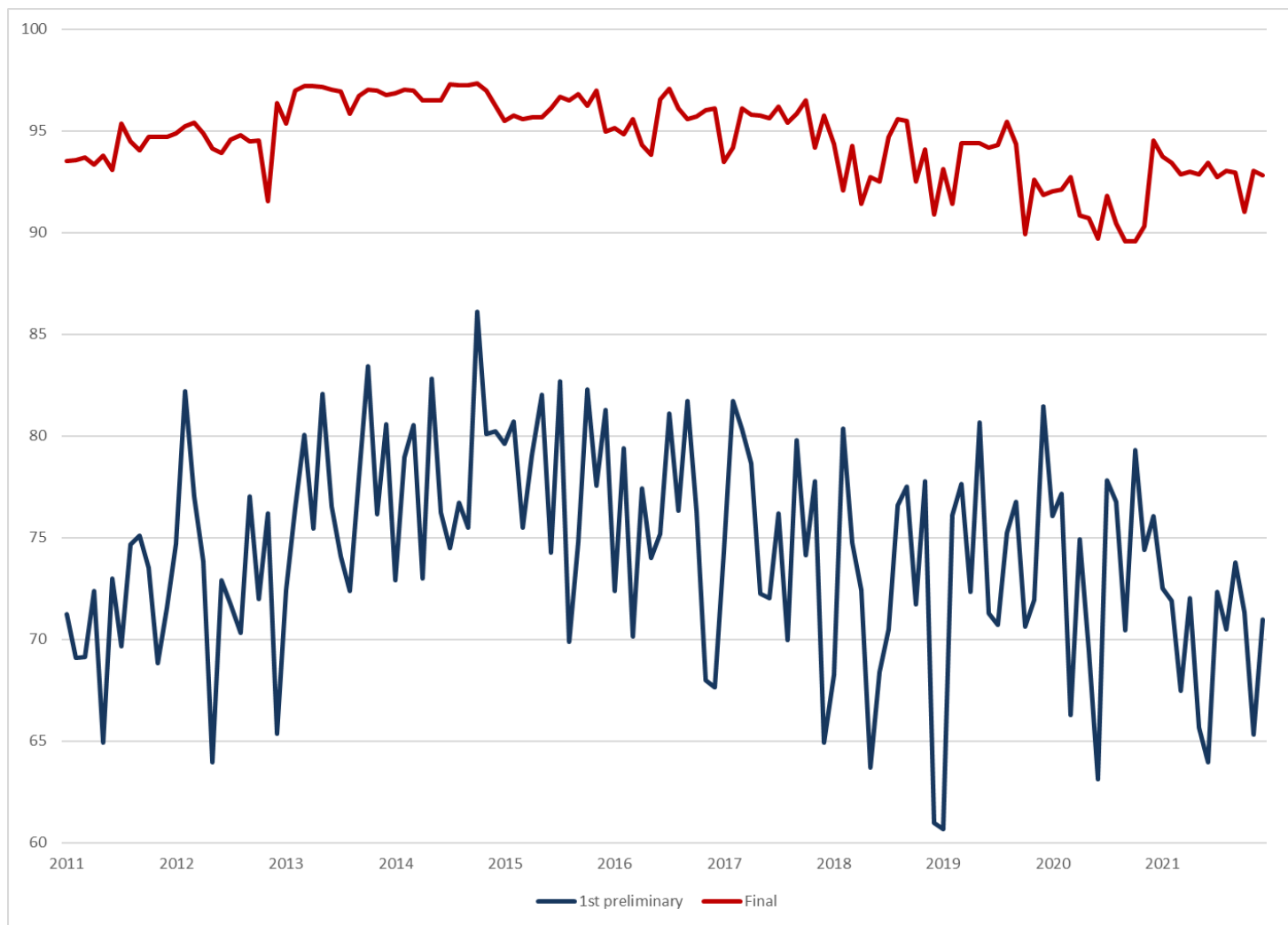
# Data collection

Current Employment Statistics Survey Data Collection Methods,  
by Percent



Source: U.S. Bureau of Labor Statistics, Division of Current Employment Statistics.  
February 4, 2022

# National Estimates Collection Rates, 2011-2021



<https://www.bls.gov/web/empsit/cesregrec.htm>

# Data for large industries published earlier

## ESTABLISHMENT DATA

**Table B-1a. Employees on nonfarm payrolls by industry sector and selected industry detail, seasonally adjusted**

[In thousands]

Industry	2017 NAICS code	Seasonally adjusted						Change from: May2022 - June2022(P)
		June 2021	Feb. 2022	Mar. 2022	Apr. 2022	May 2022(P)	June 2022(P)	
<b>Mining and logging</b>		566	600	605	613	619	625	6
Logging	1133	46.7	44.8	45.6	44.6	44.1	44.9	0.8
<b>Mining</b>	21	519.1	554.7	559.0	568.4	574.7	579.8	5.1
Oil and gas extraction	211	116.4	128.8	130.9	137.1	137.6	139.4	1.8
Mining, except oil and gas	212	174.1	176.1	176.5	176.5	178.8	179.4	0.6
Coal mining	2121	36.2	36.9	36.8	37.1	37.8	38.2	0.4
Bituminous coal and lignite surface mining(1)	212111	15.8	16.5	16.5	16.8	17.1	-	-
Bituminous coal underground mining and anthracite mining(1)	212112,3	20.0	20.3	20.3	20.2	20.6	-	-
Metal ore mining	2122	41.3	42.8	43.0	43.4	43.3	43.2	-0.1
Nonmetallic mineral mining and quarrying	2123	96.6	96.5	96.7	96.1	97.7	98.0	0.3
Stone mining and quarrying(1)	21231	42.9	44.6	44.1	43.6	44.4	-	-
Crushed and broken limestone mining(1)	212312	21.9	23.1	22.5	22.4	22.4	-	-
Other stone mining and quarrying(1)	212311,3,9	20.7	21.7	21.6	21.1	21.9	-	-
Sand, gravel, clay, and refractory mining(1)	21232	41.7	40.1	40.5	41.0	40.9	-	-
Construction sand and gravel mining(1)	212321	29.6	28.7	28.6	29.0	28.8	-	-
Other nonmetallic mineral mining(1)	21239	11.7	12.0	12.1	12.1	12.2	-	-
Support activities for mining	213	228.6	249.8	251.6	254.8	258.3	261.0	2.7
Support activities for oil and gas operations(1)	213112	180.6	193.6	195.4	197.6	199.8	-	-

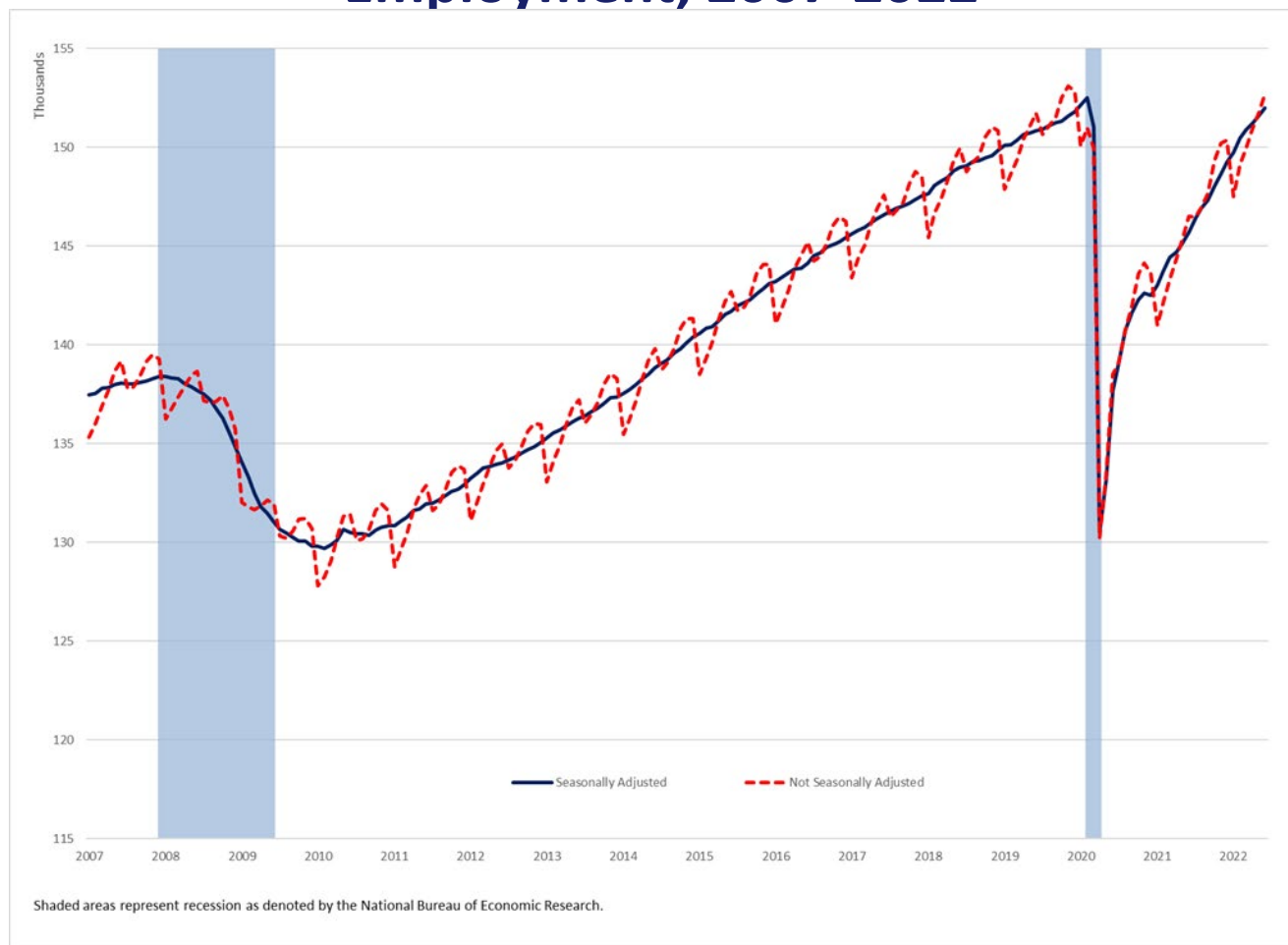
# Accuracy

- Sample design
- Seasonal adjustment
- Revise monthly estimates
- Annual benchmark
  - ▶ Resets employment to a population count
- Account for business births and deaths
- Research

# CES Sample Design

- Stratified by state, industry, and size
- An optimum-allocation method designed to maximize reliability of total private employment estimate at statewide level
- Updated semi-annually for new firm births
- Large firms are heavily sampled as a design efficiency
- Sample weights assure proper representation of all size firms

# Total nonfarm Seasonally adjusted vs. Unadjusted Employment, 2007-2022



# Calendar effects

- 4 or 5 weeks between weeks of the 12<sup>th</sup>
- Business days (Monday-Friday) during reference month
- Moving holidays
- Outliers in 2020 data





# Revisions to CES data: Example

## Nonfarm payroll employment, in thousands

Publication date	March 2022	April 2022	March-April change	Revision
May 6, 2022	150,886	151,314	+428	
June 3, 2022	150,856 (final)	151,292	+436	+8
July 8, 2022		151,224 (final)	+368	-68

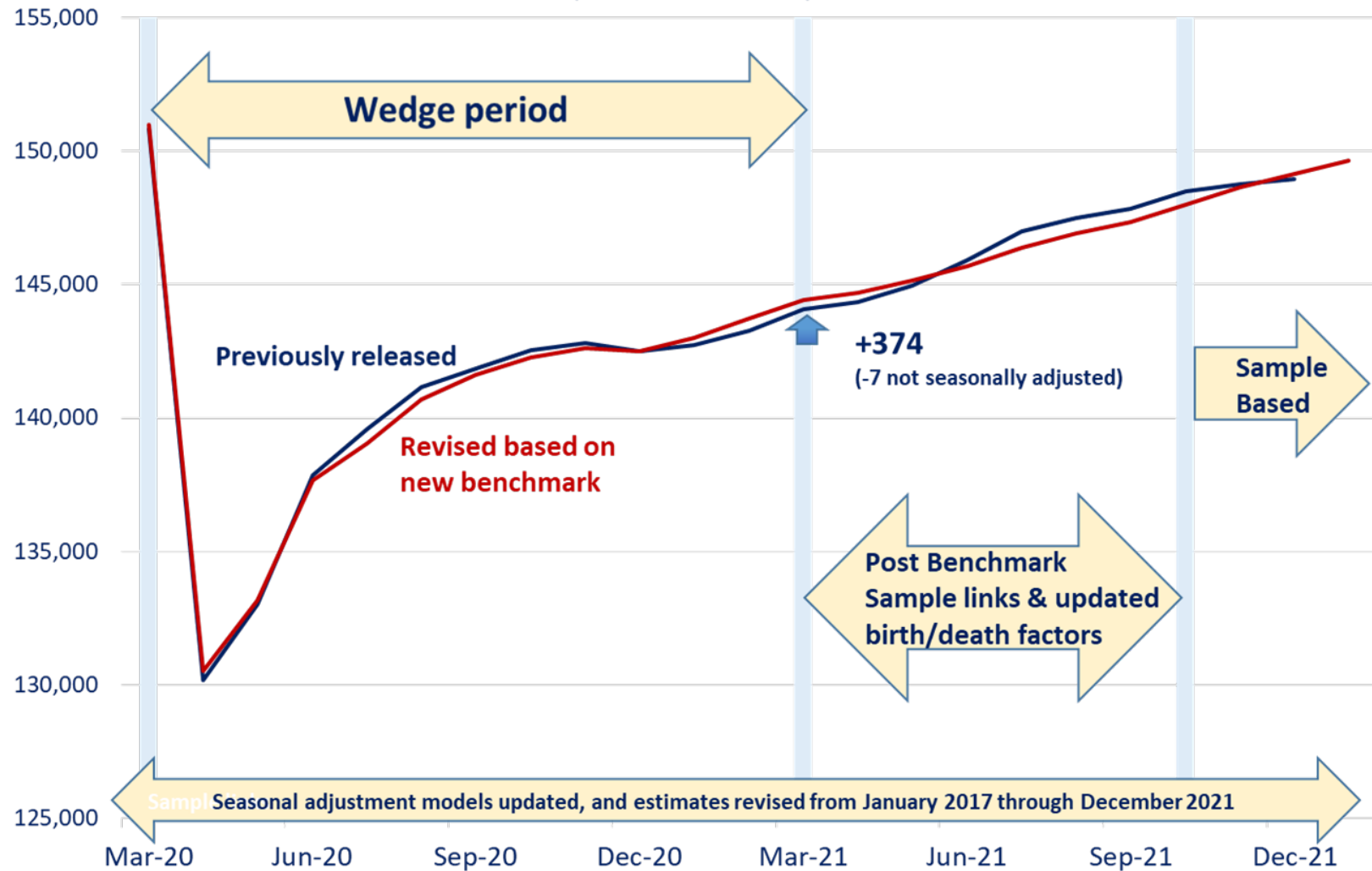
# Monthly revisions

- Contributing factors to monthly revisions:
  - ▶ Additional sample reports
  - ▶ Corrected microdata
  - ▶ Concurrent seasonal adjustment factors recalculated

## **ABSOLUTE MEAN revision to over-the-month employment change, 2003-present (in thousands)**

Seasonally adjusted		Not seasonally adjusted	
1 <sup>st</sup> revision	2 <sup>nd</sup> revision	1 <sup>st</sup> revision	2 <sup>nd</sup> revision
33	33	46	19

# Benchmark Update, seasonally adjusted (in thousands)



# Business births and deaths

- Unavoidable lag between firm opening for business and appearing on the sample frame
- Death units are difficult to collect
  - ▶ Often not possible to distinguish deaths from nonresponse during monthly collection

# Birth-Death Relationship

- Business Employment Dynamics provides data on openings and closings (<https://www.bls.gov/bdm/>):
  - ▶ Similar magnitudes of employment
  - ▶ Relatively small and stable difference
- CES method
  - ▶ Use death employment as a proxy for birth employment
  - ▶ Model the residual and add to each monthly estimate
- Effectively reduces non-sampling error

# Confidence Intervals: National Employment Estimates

- 90-percent confidence intervals for statistically significant changes, based on sampling error
  - ▶ 1-month change:  $\pm 116,000$
  - ▶ 3-month change:  $\pm 187,000$
  - ▶ 6-month change:  $\pm 260,000$
  - ▶ 12-month change:  $\pm 340,000$
- Error measures also available for hours and earnings and state data on BLS website

<https://www.bls.gov/web/empst/cesconfidenceintervals.xlsx>



# Relevance

- Two CES news releases designated as Principal Federal Economic Indicators
  - ▶ Employment Situation
  - ▶ Real Earnings
- Dating recessions

**Payrolls increased 372,000 in June, more than expected, as jobs market defies recession fears**

PUBLISHED FRI, JUL 8 2022 8:30 AM EDT | UPDATED 3 HOURS AGO



## What the latest jobs report means

Despite a strong labor market, recession fears are growing as the Fed aggressively raises interest rates to bring down inflation.

By Madeleine Ngo | madeleine.ngo@vox.com | Jul 8, 2022, 11:50am EDT



## The economy added 372,000 jobs in June, outpacing expectations



By [Alicia Wallace](#), CNN Business  
Updated 1:15 PM ET, Fri July 8, 2022

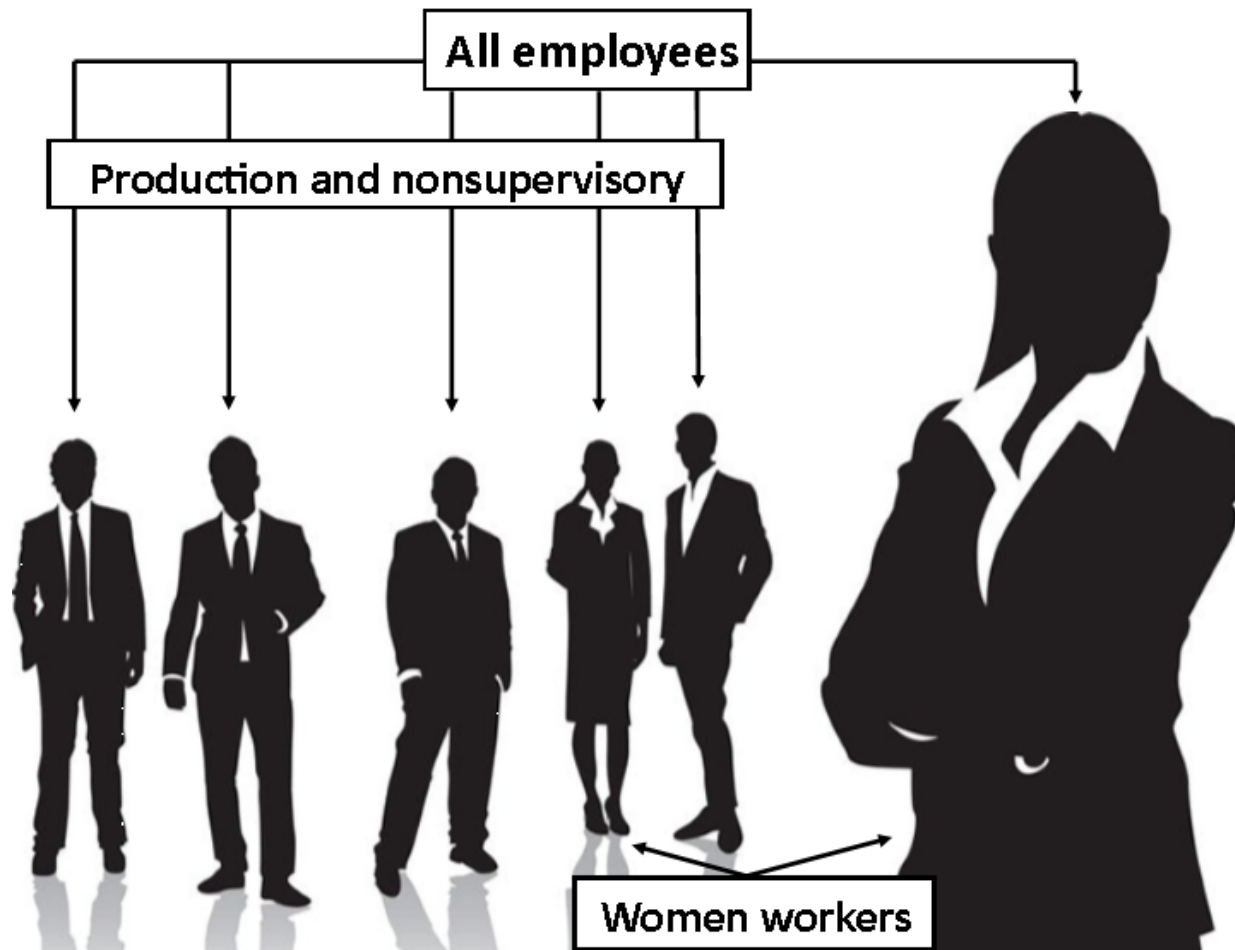


# Important Uses of CES Data

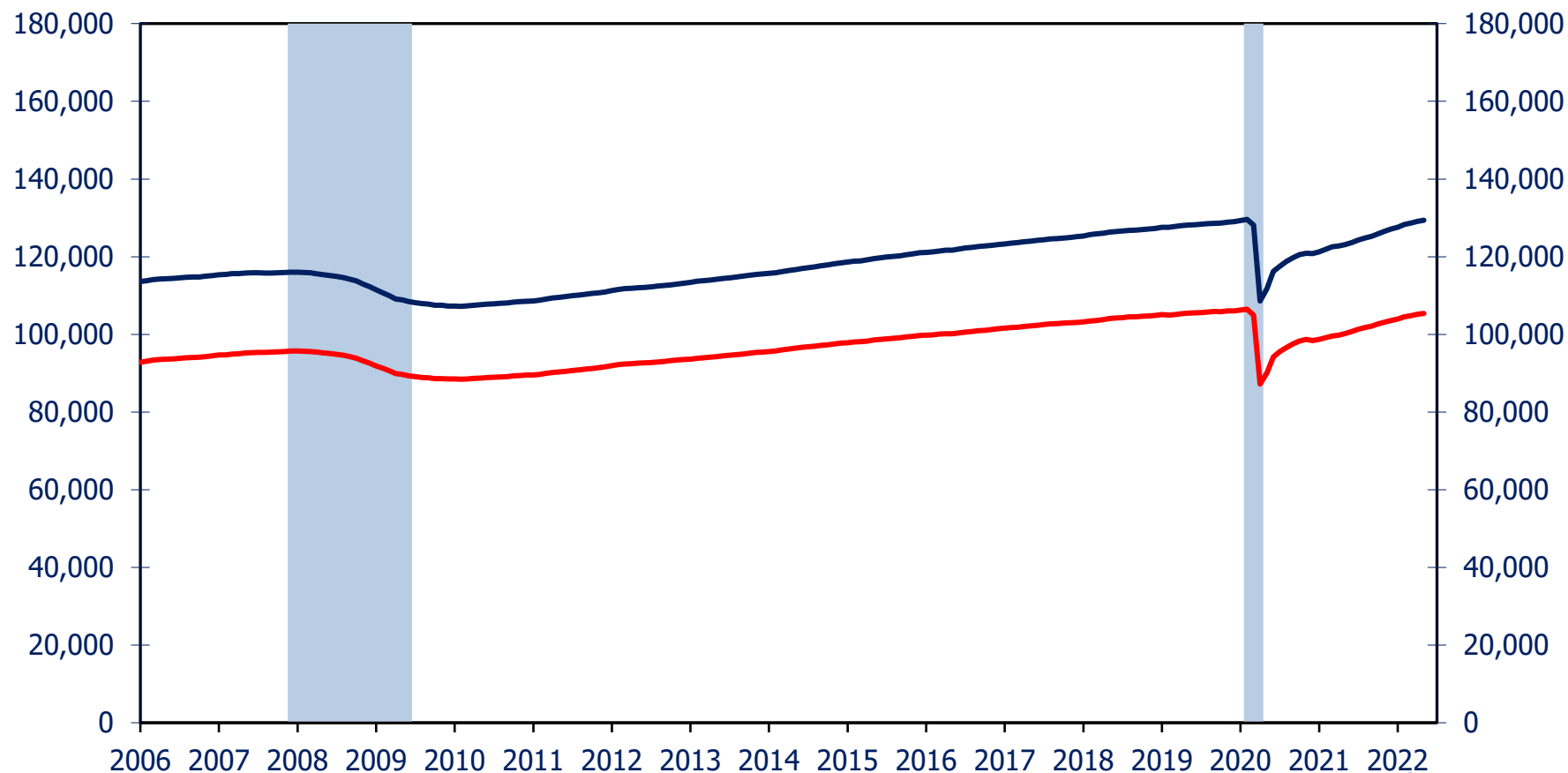
- Economic indicator
  - ▶ Evaluate current health of the economy
  - ▶ Help identify business cycle turning points
  - ▶ Identify inflation trends
- Decision making for fiscal and monetary policy
- Revenue forecasting
- Input to other economic series



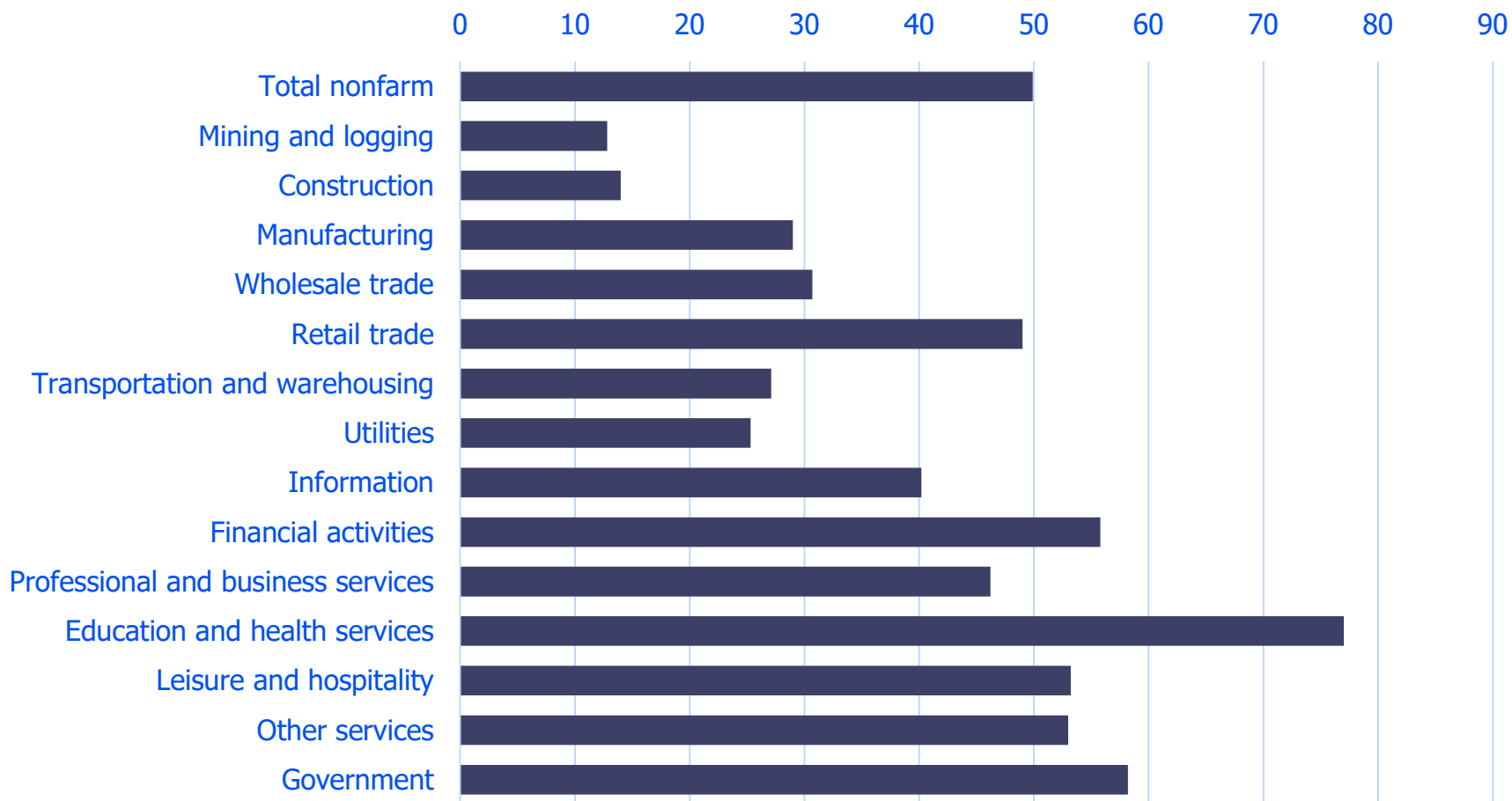
# Employment Series



# Total private employment and private production and nonsupervisory employment



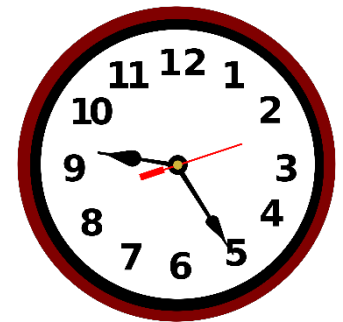
# Women employees as a percent of total employment, June 2022



# Additional Series

## ■ Hours and Earnings for private-sector employees

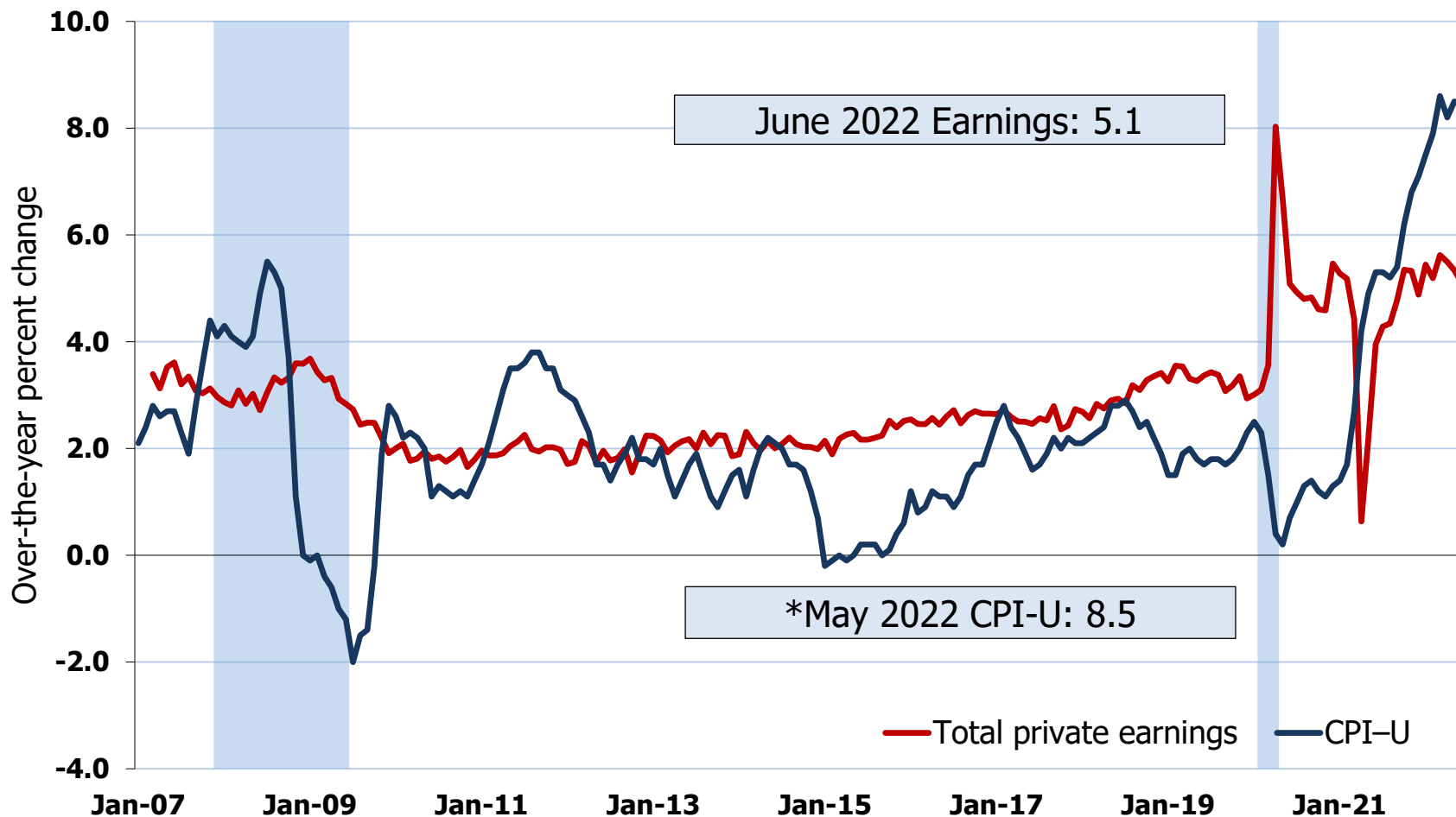
- ▶ Average weekly hours
  - Average weekly overtime hours (manufacturing only)
- ▶ Average hourly earnings



## ■ Derivative series

# Average hourly earnings, all employees, and CPI-U\*

January 2007–June 2022  
Seasonally adjusted



Bureau of Labor Statistics, Current Employment Statistics survey, July 08, 2022.

\*Consumer Price Index, CPI-U (1982-84 = 100)

Shaded area represents recession as denoted by the National Bureau of Economic Research.

# Average hourly earnings of all employees, sorted by level, June 2022

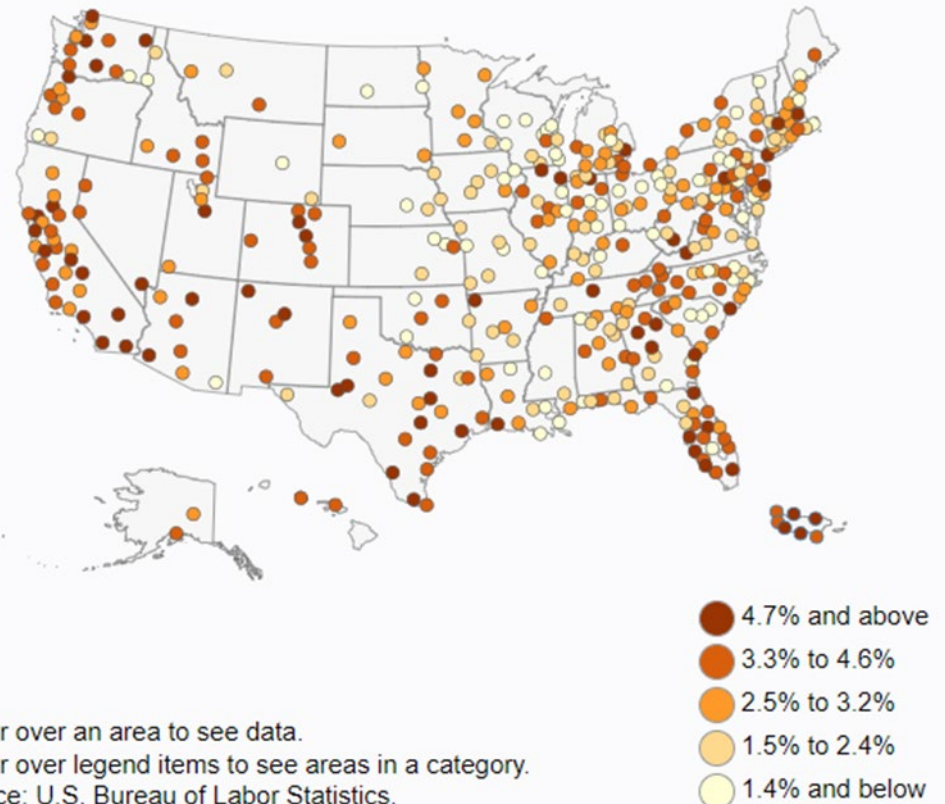
Industry	Average hourly earnings	12-month percent change
Leisure and hospitality	\$ 20.16	9.1
Retail trade	\$ 22.87	4.4
Transportation and warehousing	\$ 27.86	5.3
Other services	\$ 28.36	2.9
Manufacturing	\$ 30.86	4.2
Private education and health services	\$ 31.72	6.1
Total private	\$ 32.08	5.1
Construction	\$ 34.68	5.6
Wholesale trade	\$ 35.06	4.5
Mining and logging	\$ 36.07	3.7
Professional and business services	\$ 38.62	5.8
Financial activities	\$ 41.06	2.4
Information	\$ 46.23	4.4
Utilities	\$ 47.34	6.1



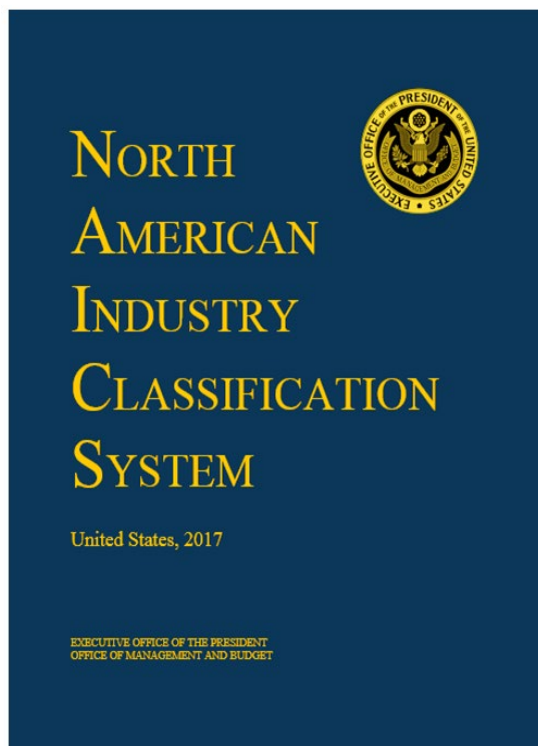
# Geographic Detail

- National
- 50 States & D.C.
- ~450 metropolitan areas and divisions
- Puerto Rico & U.S. Virgin Islands

Change in nonfarm employment by metropolitan area, May 2021 to May 2022, not seasonally adjusted



# Industry Detail



- Employment:  
866 industries
- Hours and earnings:  
about 600 industries
- Details vary by industry and  
by geography

Industry classification: <https://www.bls.gov/cew/classifications/industry/home.htm>

National series: <https://www.bls.gov/web/empsit/cesseriespub.htm>

State & Area series: <https://www.bls.gov/sae/additional-resources/list-of-published-state-and-metropolitan-area-series/home.htm>





# CES on the BLS Website

- National:

<http://www.bls.gov/ces/home.htm>

- State and Area:

<http://www.bls.gov/sae/home.htm>

# Current Population Survey (CPS)



# CPS – the Household Survey

- Nationally representative monthly survey of about 60,000 eligible households, including data for about 110,000 people
- Provides valuable information about the labor force each month by demographic, job, and other characteristics
- Joint effort between BLS and Census Bureau

# CPS Sample Design

- Universe: civilian noninstitutional population age 16 and over
- Frame: continually updated for new housing
- Mode of collection: in-person or phone interviews
- Voluntary survey, 73.1% response rate in June 2022



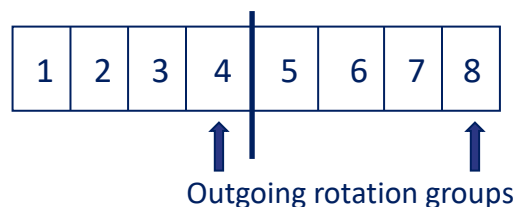
# CPS Monthly Schedule

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		Survey reference week			12	
		Survey conducted			19	
					Release day	

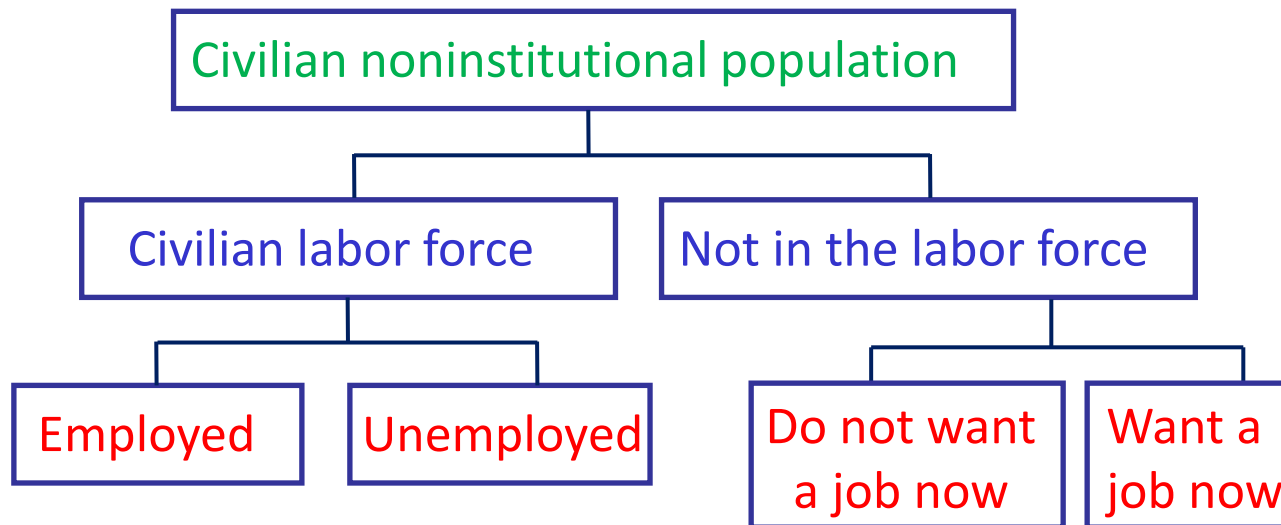
# CPS Data Collection

## ■ 4-8-4 rotation schedule

- ▶ 75% overlap month to month
- ▶ 50% overlap year to year
- ▶ Some items asked every month, others only in certain months



# CPS Concepts

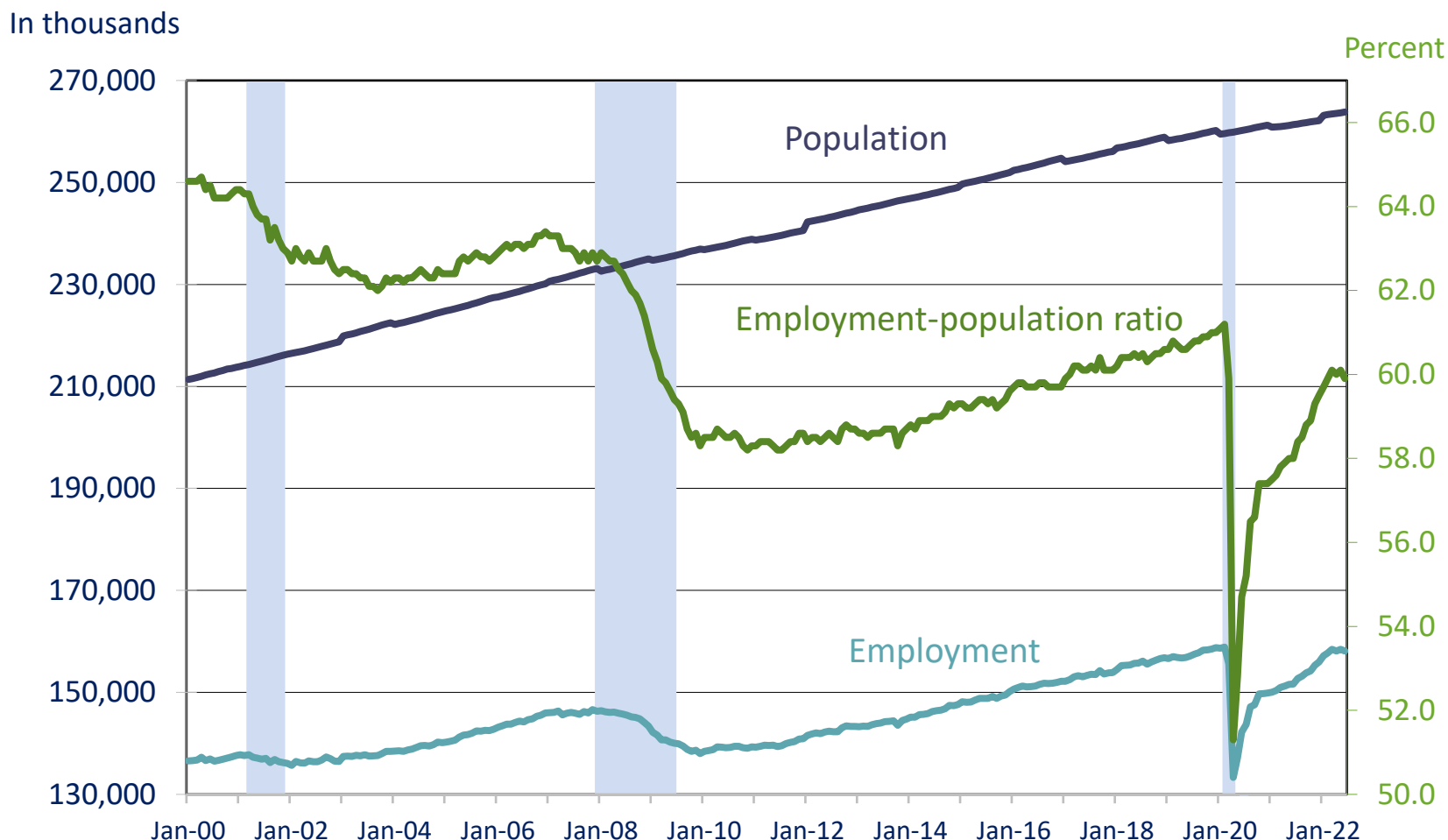


# Employment

- A count of employed **persons, not jobs**
- Includes:
  - ▶ Persons who did any work as paid employees
  - ▶ Persons who worked in their own business or farm
  - ▶ Persons who worked at least 15 hours as unpaid workers in a family business owned by a member of their household
  - ▶ Persons who did not work but had a job from which they were temporarily absent
- Excludes:
  - ▶ Persons working around the house
  - ▶ Persons doing volunteer work
  - ▶ Active duty in the Armed Forces
  - ▶ People who reside in institutions (prisons, mental health facilities, residential nursing homes)



# Employment-population ratio varies over time



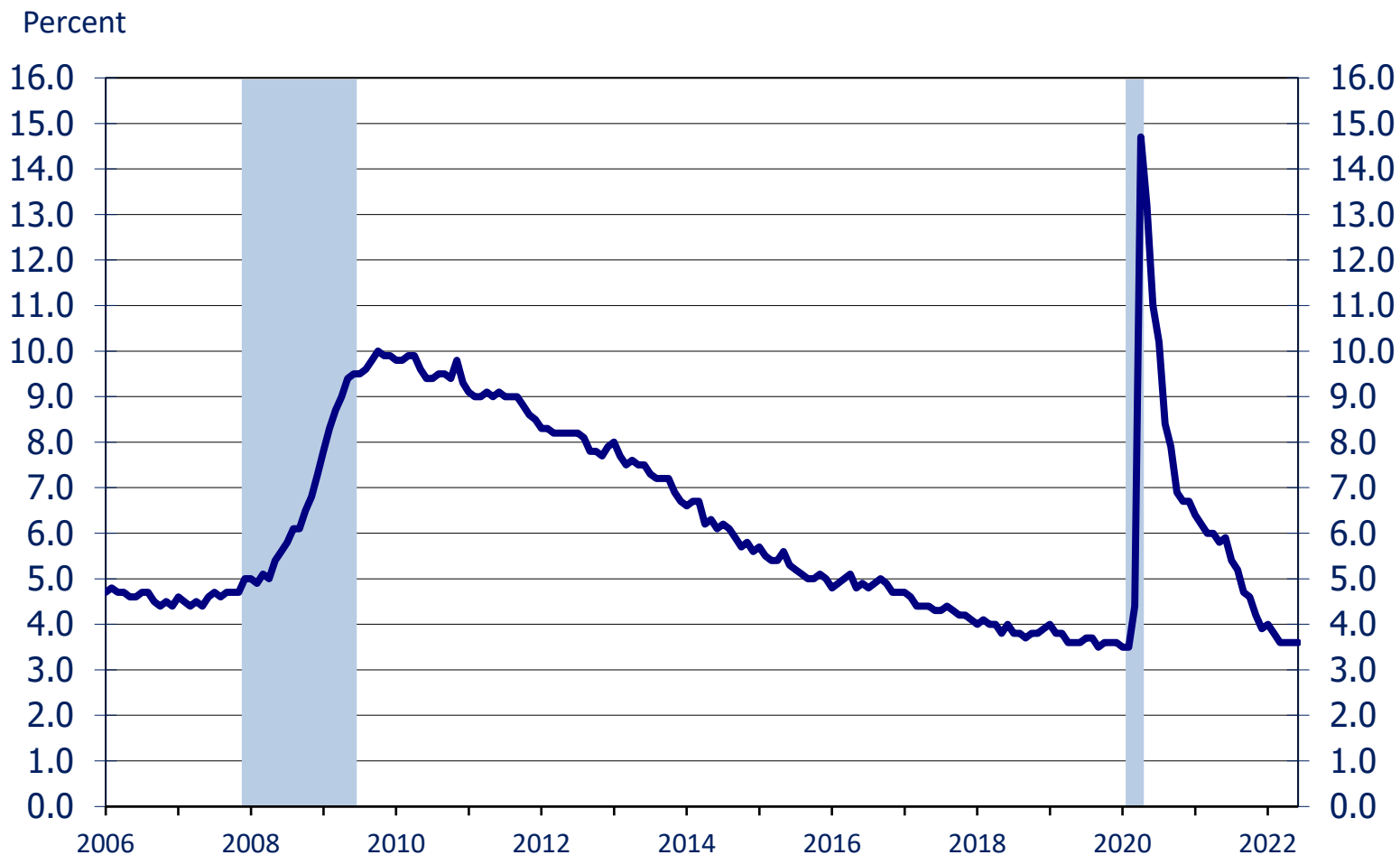
NOTE: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER). Source: Bureau of Labor Statistics, Current Population Survey.

# Unemployment

- Includes persons:
  - ▶ Who did not work during the reference week
  - ▶ **AND** were available for work, except for temporary illness
  - ▶ **AND** made specific (active) efforts to find work during the prior 4-week period
  - ▶ Also **includes persons on temporary layoff** who may or may not have searched for work



# Unemployment rate

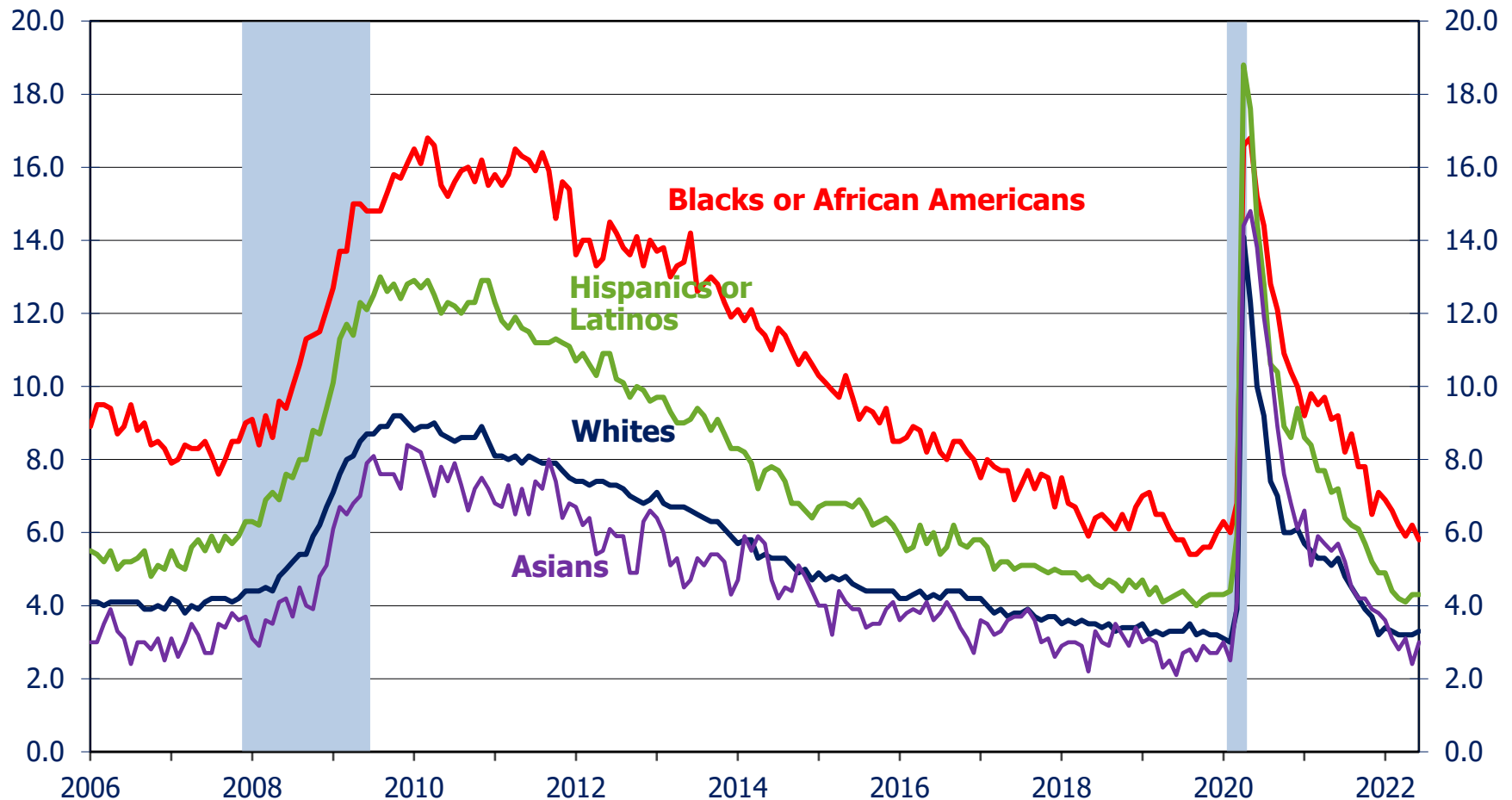


Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER). Source: Bureau of Labor Statistics, Current Population Survey.



# Unemployment rates by race and ethnicity

Percent

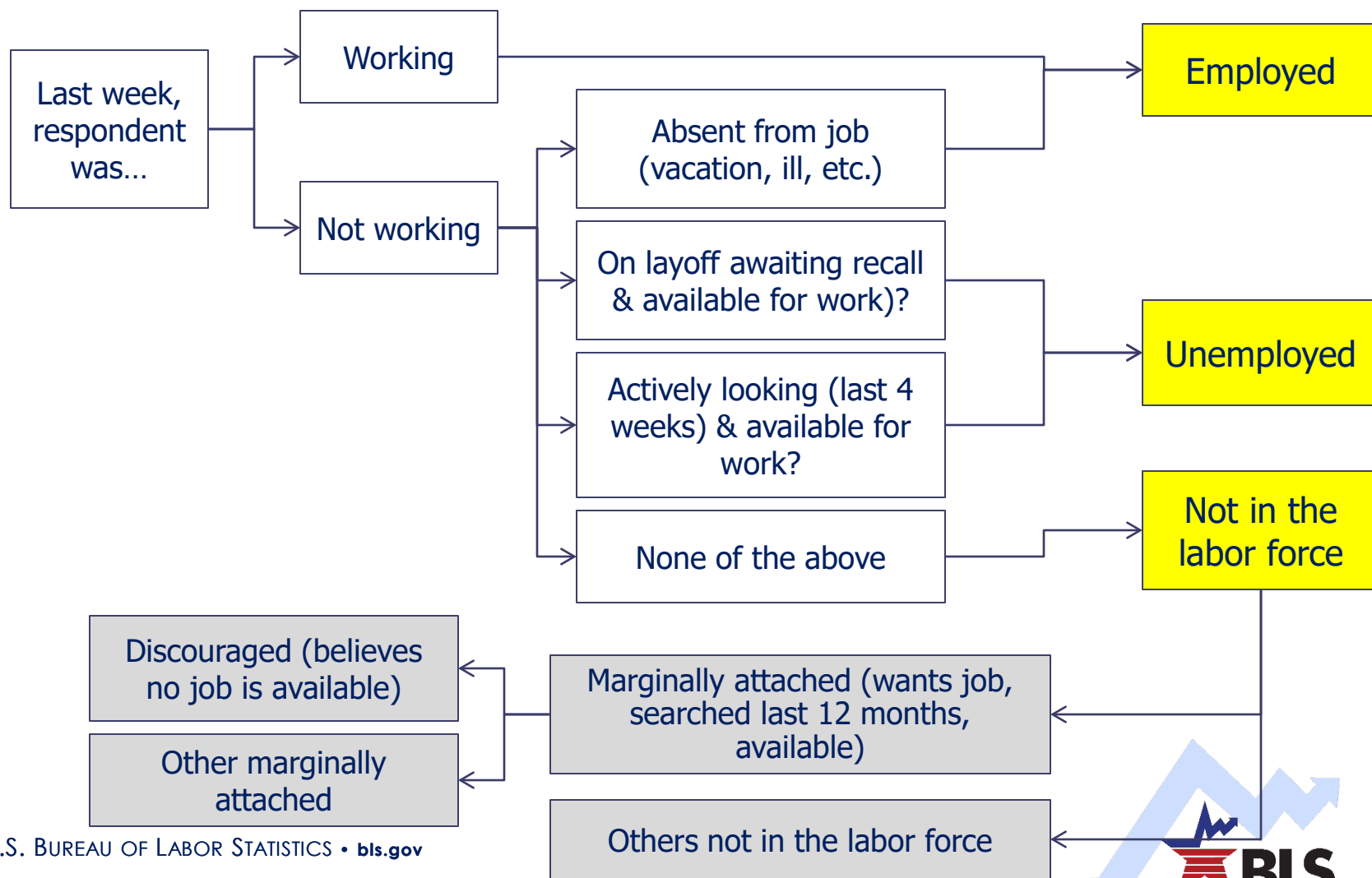


Note: Shaded area represents recession as determined by the National Bureau of Economic Research (NBER). Persons of Hispanic or Latino ethnicity may be of any race.

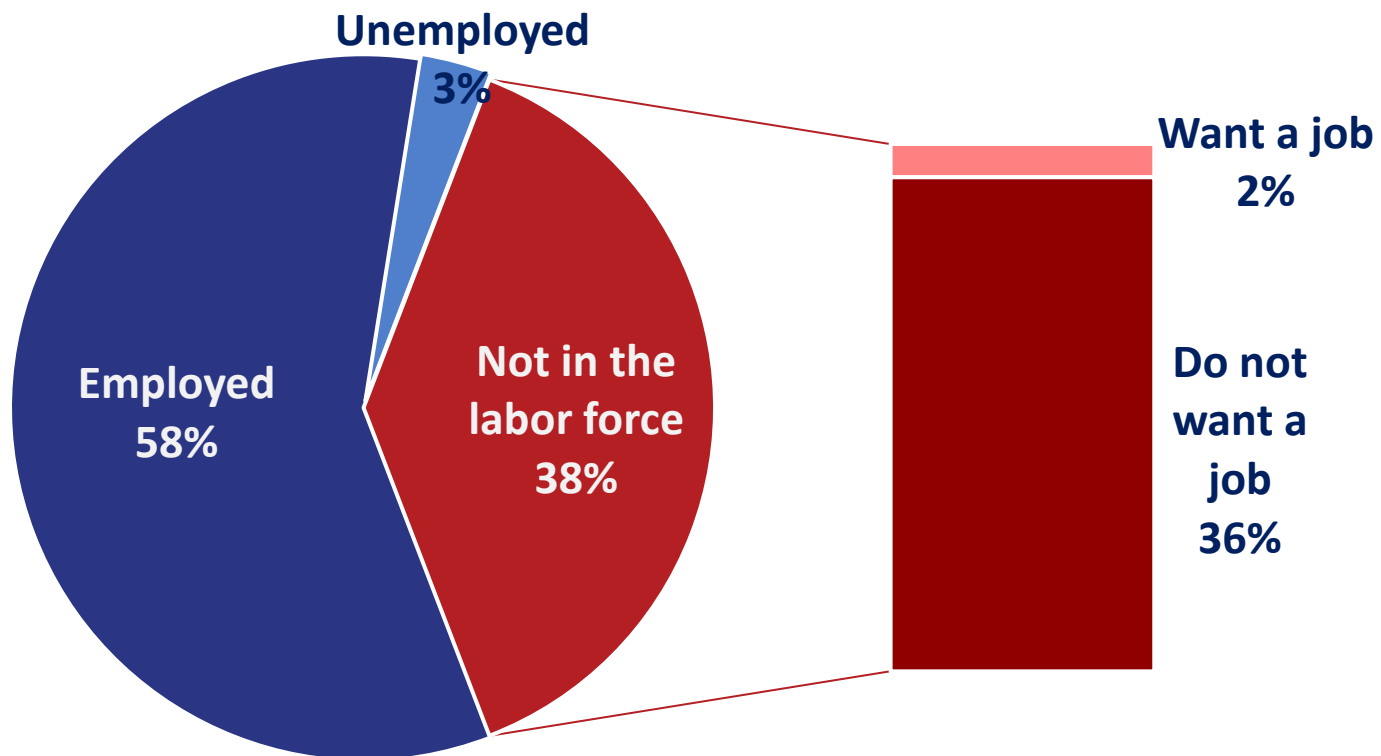
Source: Bureau of Labor Statistics, Current Population Survey.



# Questions determine labor force status of household members

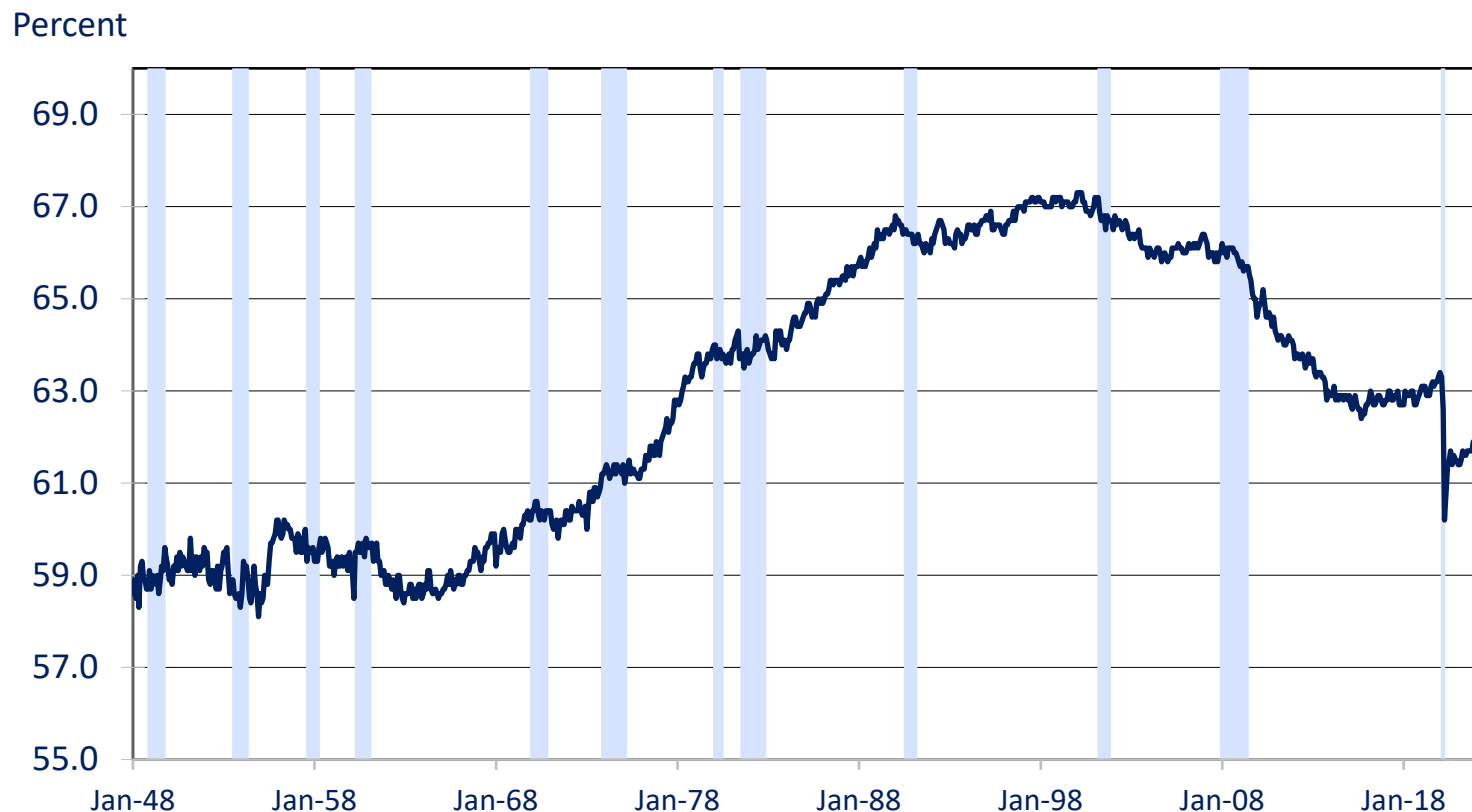


# Labor force status of population, 2021 annual averages



## Labor force participation rate reached a peak in early 2000, before trending down

Seasonally adjusted, 1948-2022



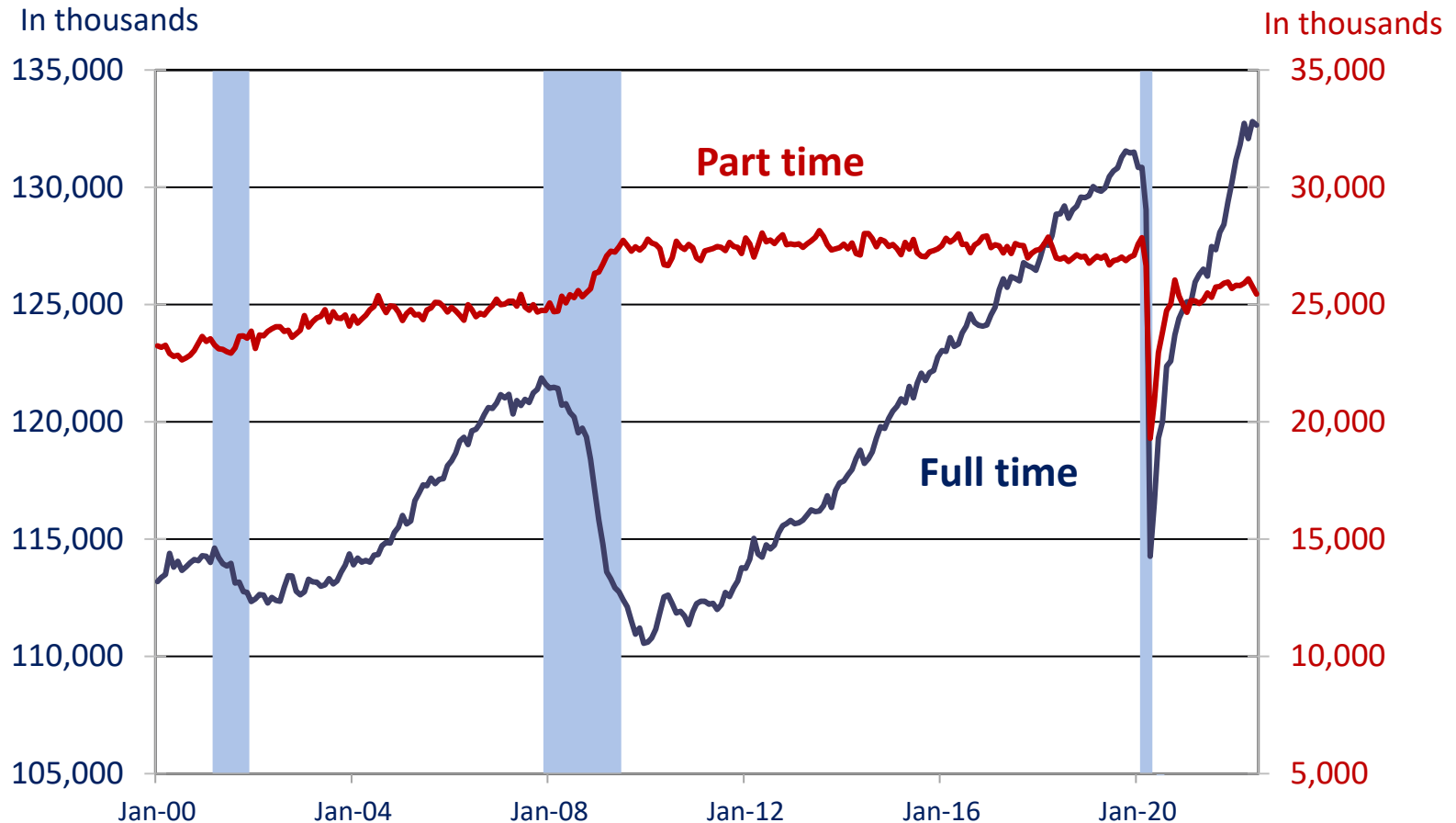
Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).  
Source: Bureau of Labor Statistics, Current Population Survey.

# Part-time workers

- Worked 1-34 hours
- Usual hours and actual hours at work
- Reasons for working part time:
  - ▶ **Economic reasons (involuntary)**
    - Slack work
    - Couldn't find full time
    - Seasonal decline in demand
  - ▶ **Noneconomic reasons (voluntary)**
    - Child care problems
    - Own health or disability
    - Other family or personal obligations
    - Others



# Full- and part-time employment trends

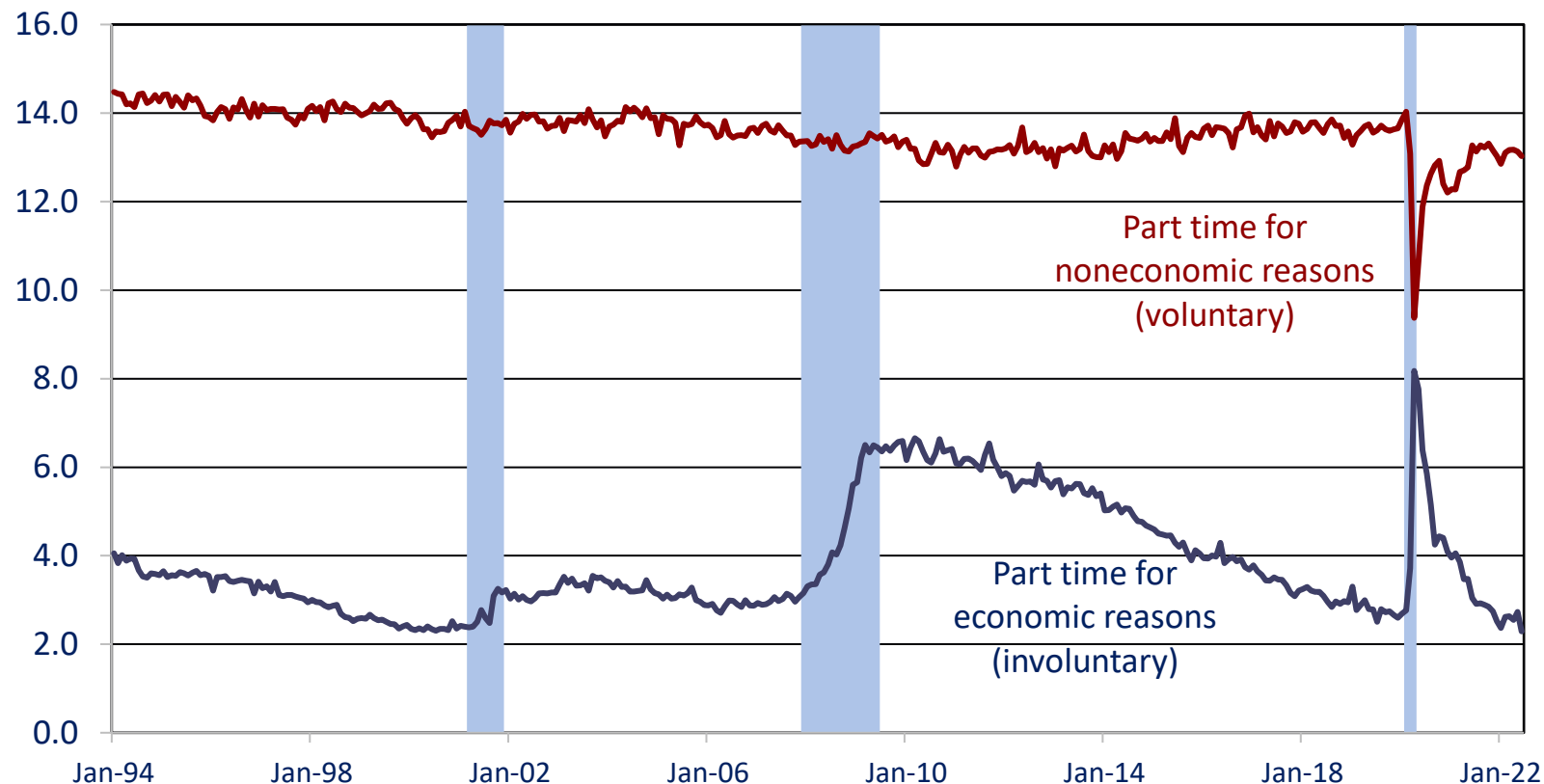


Note: Data are seasonally adjusted. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

Source: Bureau of Labor Statistics, Current Population Survey.

# Involuntary and voluntary part-time employment

Percent of total employment



Note: Data are seasonally adjusted. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

Source: Bureau of Labor Statistics, Current Population Survey.

# Labor underutilization

## ■ Underemployment

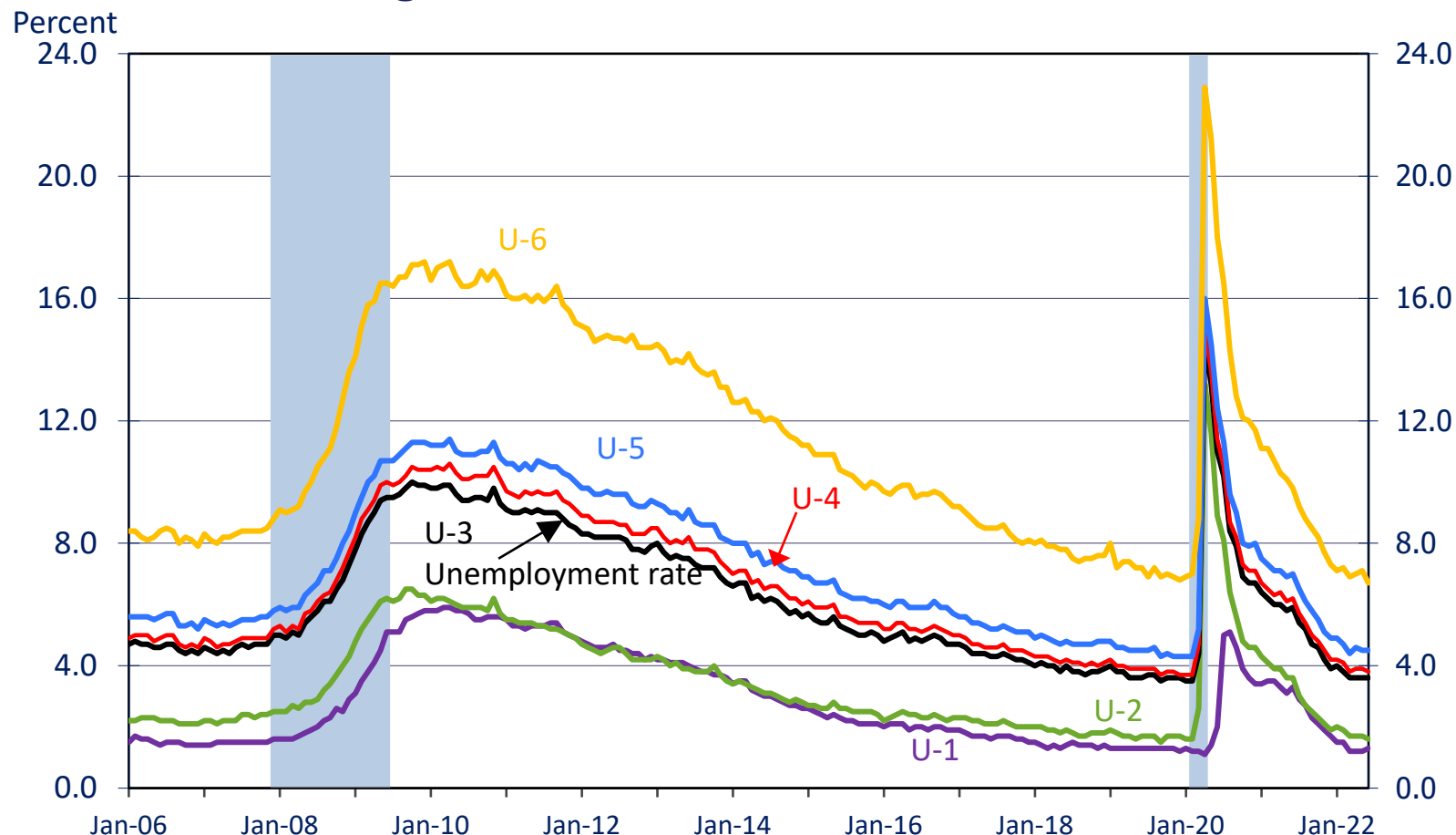
- ▶ Generally, people whose labor and/or skills are underutilized in their jobs
- ▶ Not officially defined concept in CPS
  - Part time for economic reasons—CPS concept
  - Overqualified workers—Not a CPS concept

## ■ Range of alternative measures of “labor underutilization”

# Alternative measures of labor underutilization

- U-1 Unemployed 15 weeks or longer : labor force
- U-2 (Job losers + completed temp jobs) : labor force
- **U-3 Unemployed : labor force (official unemployment rate)**
- U-4 (Unemployed + discouraged workers) : (labor force + discouraged workers)
- U-5 (Unemployed + all marginally attached workers) : (labor force + all marginally attached workers)
- U-6 (Unemployed + all marginally attached workers + workers employed part time for economic reasons) : (labor force + all marginally attached workers)

## The alternative measures of labor underutilization move almost in harmony, telling similar stories of changes in the degree of labor market difficulties

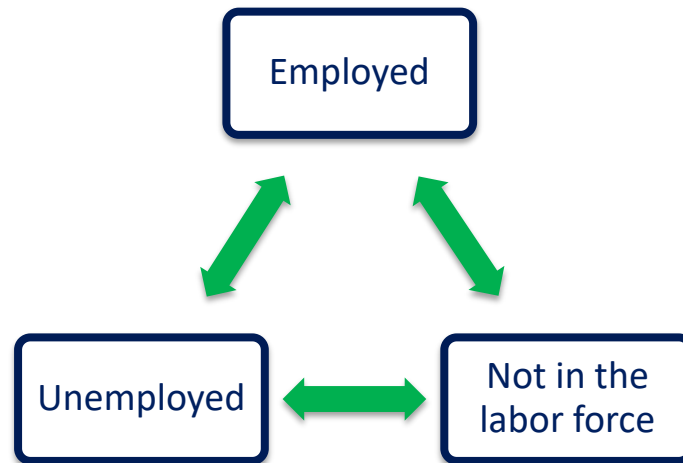


Note: Data are seasonally adjusted. Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).

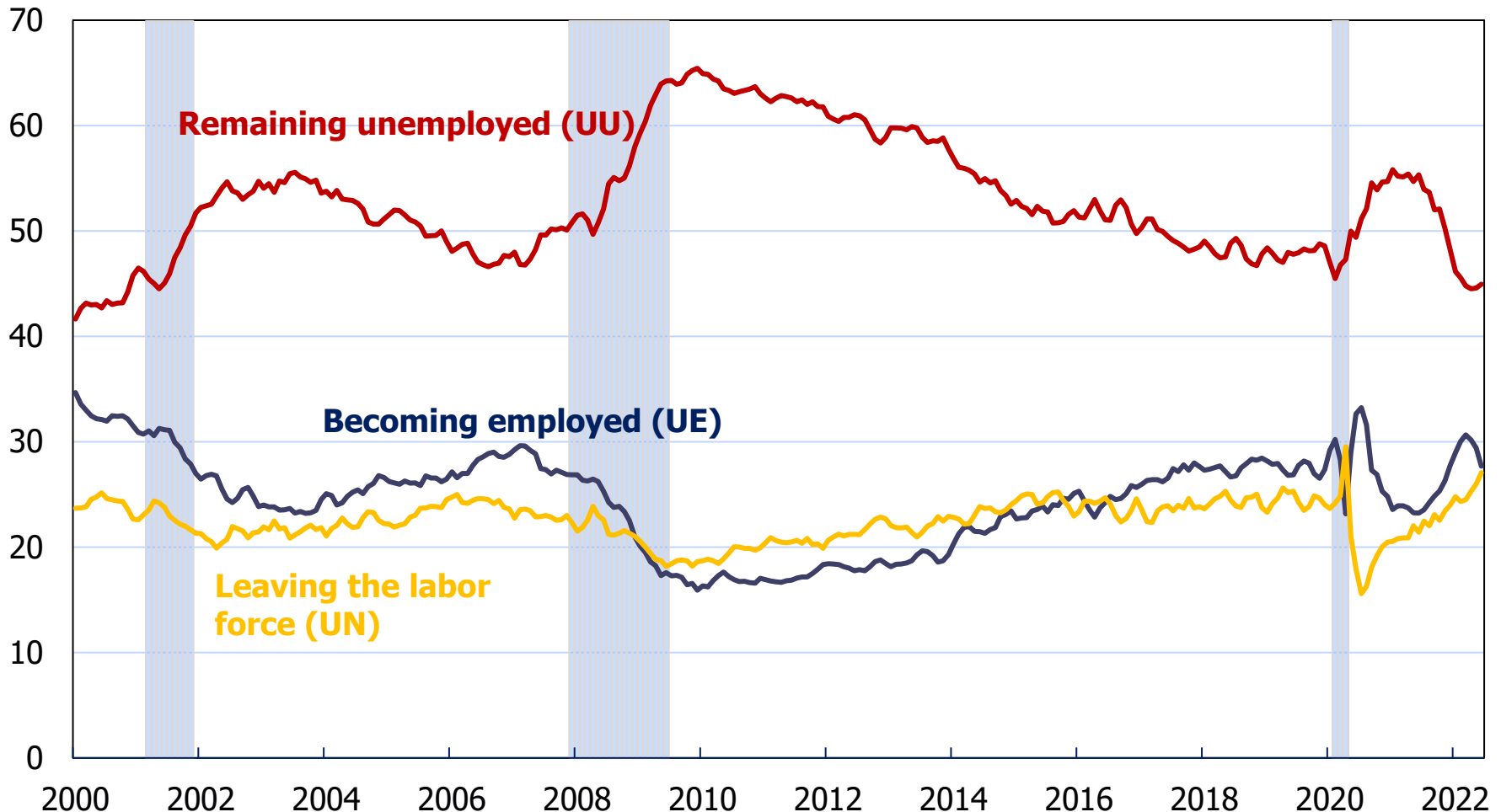
Source: Bureau of Labor Statistics, Current Population Survey.

# More jobs does not necessarily mean unemployment falls over the month

Millions of people transition between the 3 mutually exclusive labor force statuses each month



# Percentage of the unemployed who remained unemployed, found employment, or left the labor force, 3-month moving average

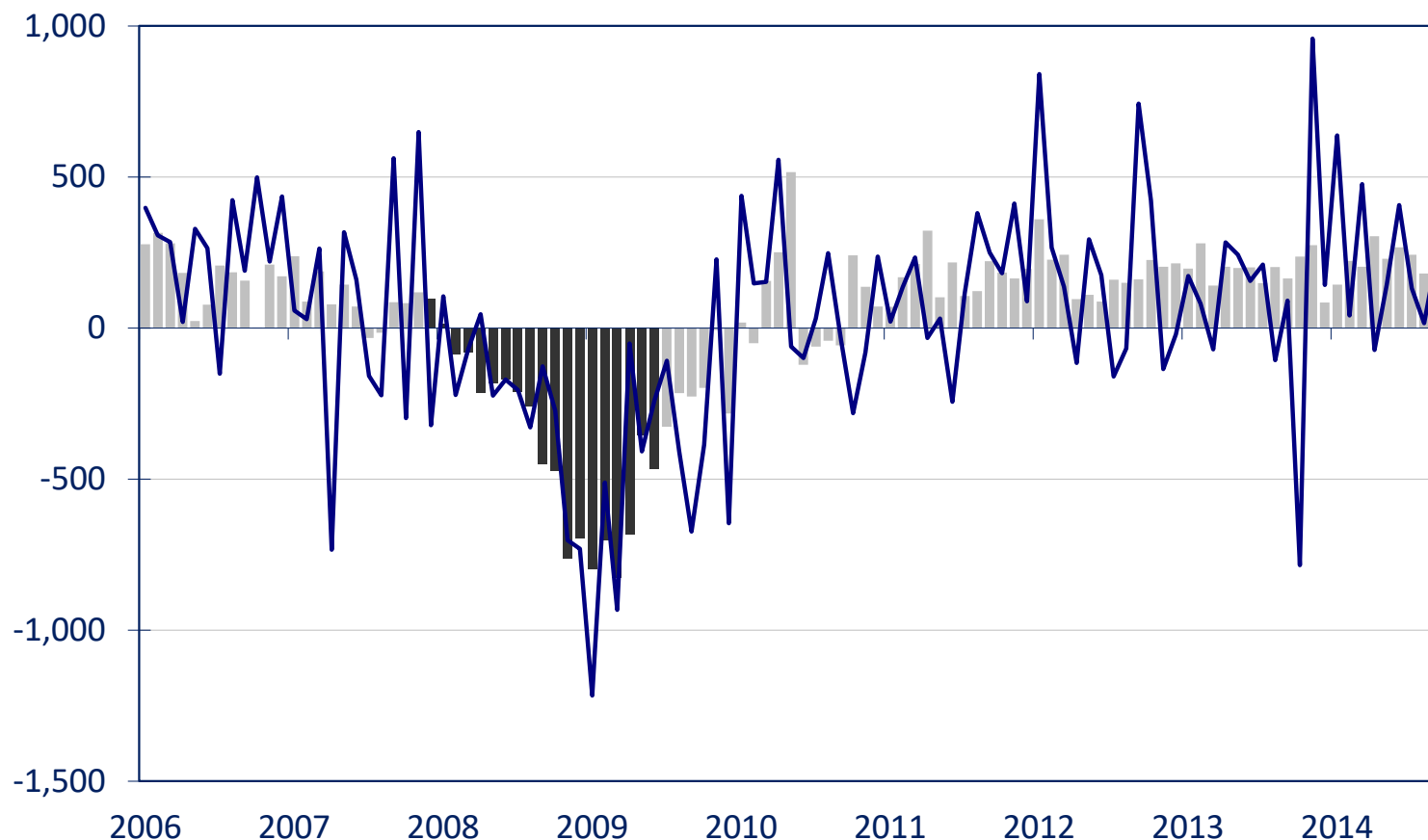


Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER).  
Source: Bureau of Labor Statistics.

# Over-the-month changes in total CPS employment and CES nonfarm payroll employment

Total CPS employment change  
(in thousands)

Nonfarm payroll employment  
change (in thousands)



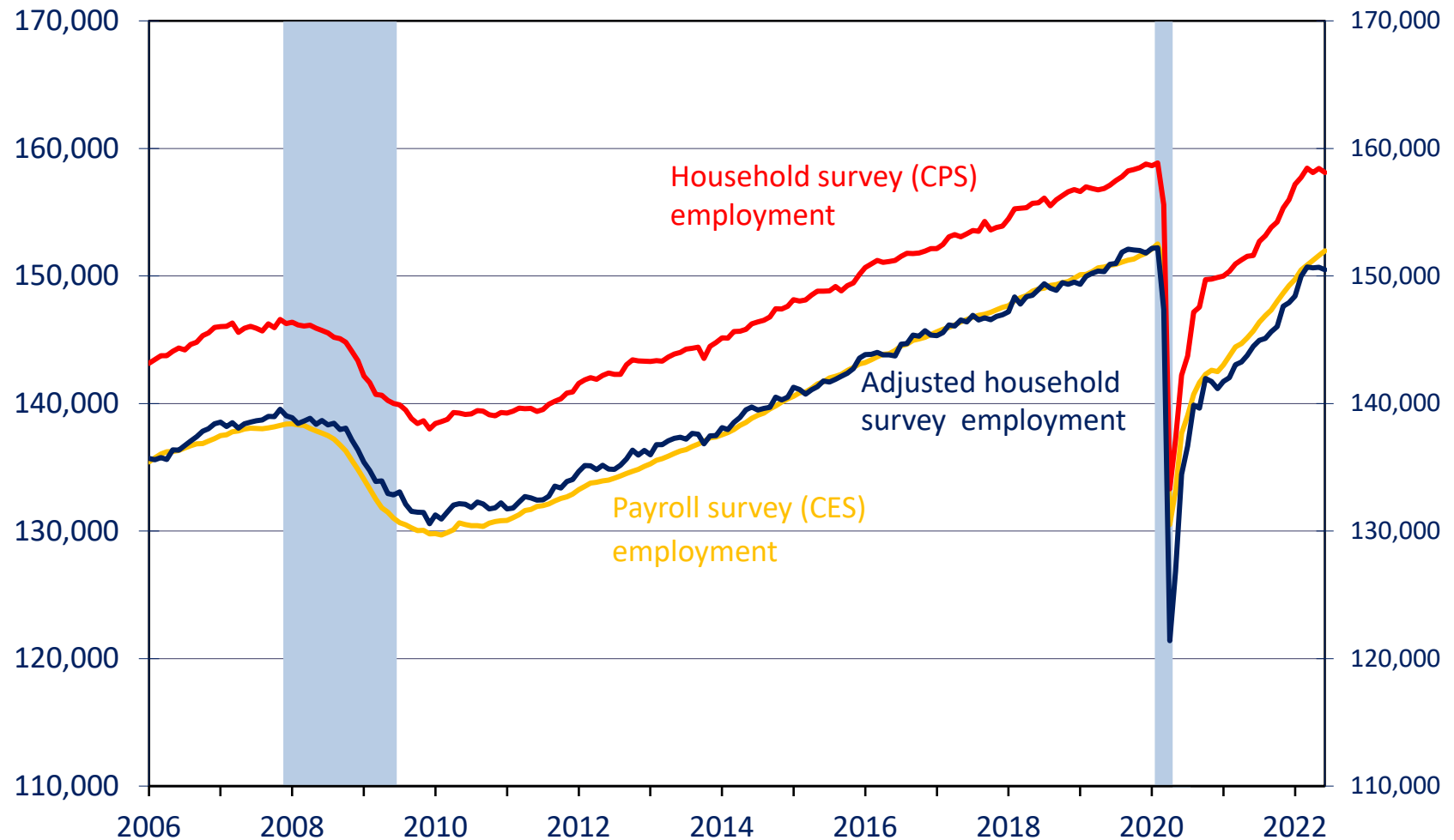
NOTE: Dark bars coincide with recession as determined by the National Bureau of Economic Research (NBER).  
SOURCE: Bureau of Labor Statistics, Current Employment Statistics (CES) and Current Population Survey.





# Employment from the CPS and CES

In thousands



Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research (NBER). Source: Bureau of Labor Statistics.



# Comparing CPS & CES

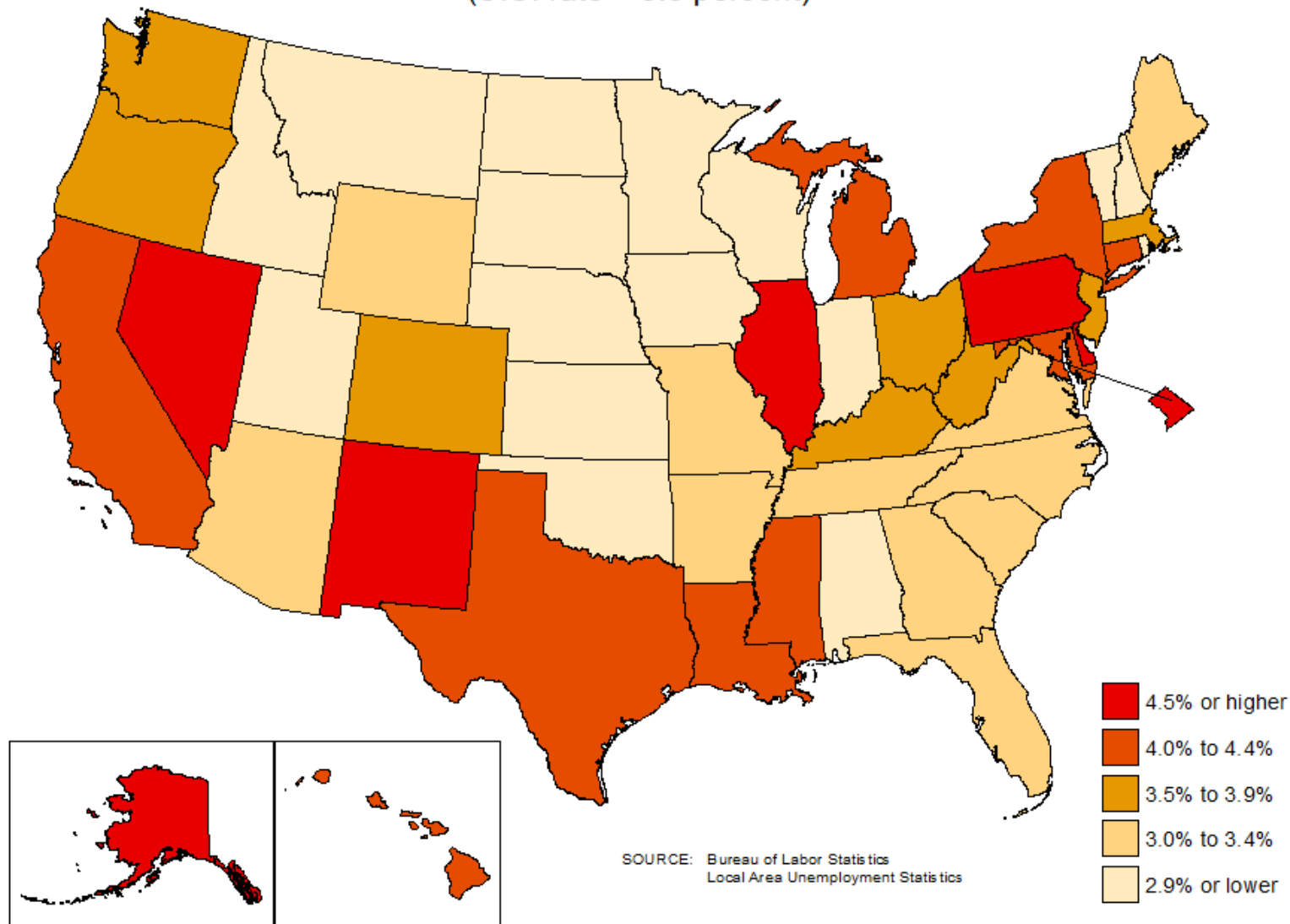
	Household Survey (CPS)	Establishment Survey (CES)
<b>Scope</b>	Civilian noninstitutional population age 16 and over	Nonfarm wage and salary jobs
<b>Data source</b>	60,000 households	Payroll of 131,000 businesses and government agencies, representing about 670,000 worksites
<b>Major outputs</b>	Labor force, employment, unemployment, and associated rates with demographic detail	Employment, hours, and earnings with industry and geographic detail
<b>Reference period</b>	Generally, the calendar week that includes the 12th of the month	Pay period that includes the 12th of the month
<b>Employment concept</b>	Employed people (multiple jobholders are counted only once).	Number of jobs (multiple jobholders are counted for each nonfarm payroll job). Includes only people who received pay for the reference pay period
<b>Employment inclusions and exclusions</b>	<p>Includes:</p> <ul style="list-style-type: none"> <li>• Unincorporated self-employed</li> <li>• Unpaid family workers</li> <li>• Agriculture &amp; related workers</li> <li>• Workers in private households</li> <li>• Workers on unpaid leave</li> </ul> <p>Excludes</p> <ul style="list-style-type: none"> <li>• Workers on furlough for the entire reference week</li> </ul>	<p>Excludes:</p> <ul style="list-style-type: none"> <li>• All groups listed at left, except the logging component of agriculture and related industries.</li> </ul> <p>Includes:</p> <ul style="list-style-type: none"> <li>• Furloughed workers if they receive pay for any portion of the pay period that includes the furlough.</li> </ul>

# Local Area Unemployment Statistics (LAUS)

- Federal-state cooperative program
- Monthly estimates of labor force status for 7,500+ subnational areas based on a hierarchy of non-survey methodologies
- No monthly data available on:
  - Demographics
  - Industry
  - Occupation
  - Duration of unemployment
- Annual Geographic Profiles by State
  - <https://www.bls.gov/opub/geographic-profile/home.htm>

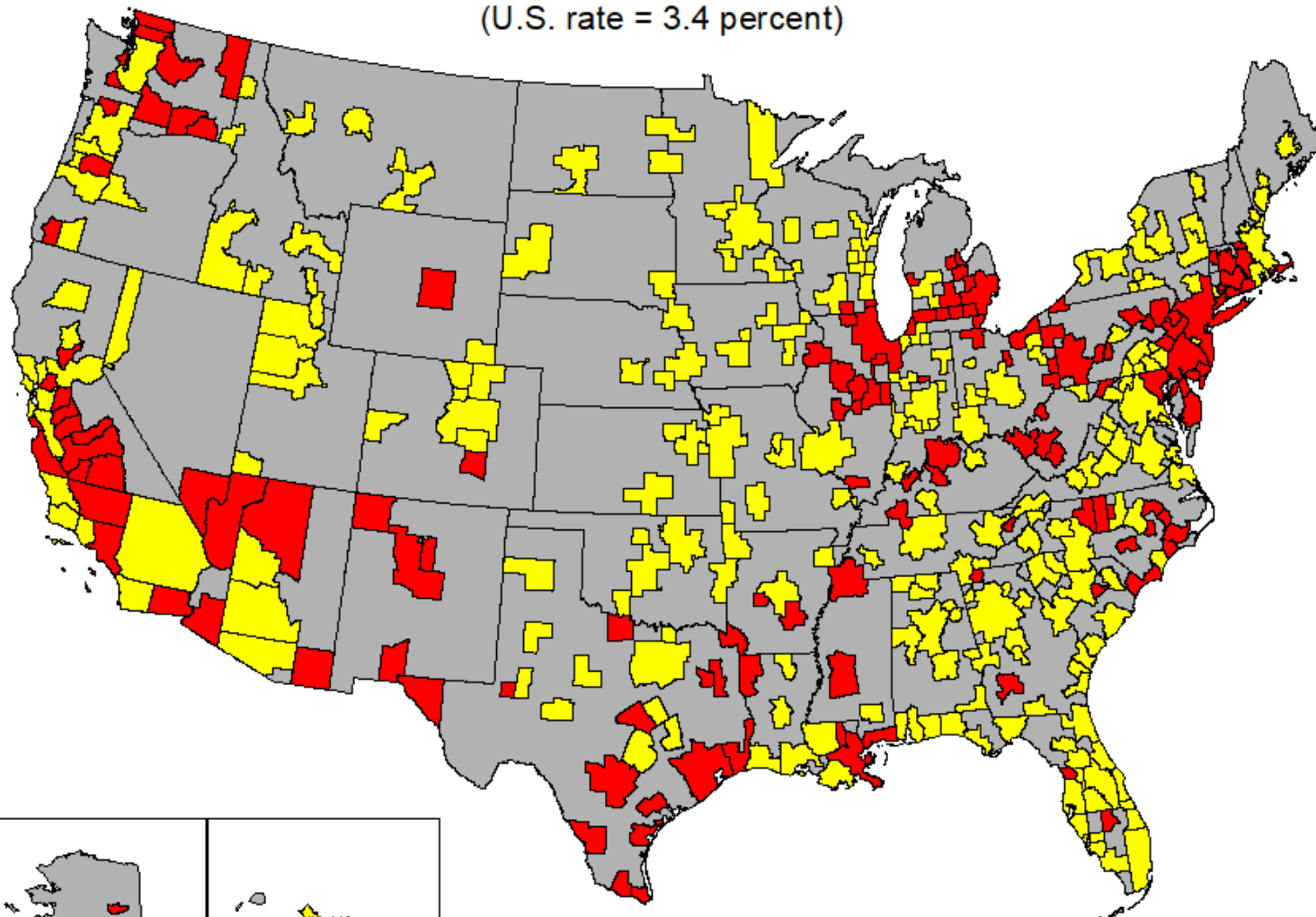
# Unemployment rates by state, seasonally adjusted, May 2022

(U.S. rate = 3.6 percent)



# Unemployment rates for metropolitan areas, not seasonally adjusted, May 2022

(U.S. rate = 3.4 percent)



NOTE: Map includes data for 389 metropolitan areas based on Office of Management and Budget Bulletin No. 18-03. Areas in the six New England states are Metropolitan New England City and Town areas (NECTAs), while areas in other states are county-based.

■ Above U.S. average  
■ U.S. average or below

# Contact Information

## Current Employment Statistics

[www.bls.gov/ces/](http://www.bls.gov/ces/)

(202)-691-6555

[cesinfo@bls.gov](mailto:cesinfo@bls.gov)

## Current Population Survey

[www.bls.gov/cps/](http://www.bls.gov/cps/)

202-691-6378

[cpsinfo@bls.gov](mailto:cpsinfo@bls.gov)

