ARTICLE

June 2023

Firm migrations in the United States: magnitude and trends

Population statistical programs such as the American Community Survey and Current Population Survey provide statistics on internal migration and geographic mobility within the United States. Although these statistics are a useful proxy for internal shifts in economic activity, they leave unanswered questions on business migrations: What types of businesses move? Where are they going? And where did they come from? This article is an initial attempt to fill these data gaps by using data from the Bureau of Labor Statistics longitudinal Quarterly Census of Employment and Wages program. We measure the magnitude of business migration across regions and highlight the characteristics of those businesses. We will show how business migration has trended over time, in what specific industries and regions migrant businesses are concentrated, and how their employment and wages compare with the rest of the economy.

On January 24, 1848, James W. Marshall, while working on the construction of a sawmill in present day Coloma, California, found flecks of gold in the mill's tailrace.[1] What followed this discovery was one of the largest mass migrations in American history. An estimated 300,000 people migrated to California between 1848 and 1854, bringing with them families and diverse cultural traditions.[2] Wherever people are located, they demand the goods and services that fulfill their wants and needs. Thus, as people migrate, so too does economic activity. While the prospect of new opportunity can attract people and businesses to cross state lines, other factors can lead them to move as well. Proximity to family and friends, better weather, or simply a desire to live somewhere new are all explanations for why people—and their businesses—might choose to live and work in a new state. Similarly, taxes and regulatory barriers and other business environments may lead businesses to explore opportunities in states with more favorable conditions and fewer constraints. In short, people and businesses move for a variety of reasons.

Several U.S. federal statistical programs, including the American Community Survey (ACS) and Current Population Survey (CPS), provide statistics on internal migration and geographic mobility for the United States. These data describe population flows between states, describe the reasons for moving, and provide demographic profiles of those crossing state and county lines. Although population migration statistics are a useful proxy for internal shifts in economic activity, they leave unanswered questions on business migrations: What types of businesses move? Where are they going? And where did they come from? This article is an attempt to fill these data gaps using data from the U.S. Bureau of Labor Statistics (BLS) longitudinal Quarterly Census of Employment and Wages (QCEW) program. In what follows, we measure the magnitude of business migration across regions and highlight the characteristics of those businesses.[3] We show how business migration has trended over time, in what specific industries and regions migrant businesses are concentrated, and how their employment and wages compare with the rest of the economy.

We also provide a background on the data source, a brief description of our methodology, a historical look at firm migration, and an analysis of recent migratory patterns of firms in the United States. We offer analysis by census region and at the state level. We conclude by highlighting characteristics of migrating firms, offering a summary of findings, and suggesting avenues for future research.

How are migrating firms identified?

Business migration statistics are derived from the QCEW program. Each quarter, the QCEW collects establishment-level employment and wage data from state unemployment insurance (UI) programs, providing a veritable economic census of employees on nonfarm payrolls. Thus, the QCEW data cover 98 percent of all nonfarm employees. In the third quarter of 2021, QCEW reported 145 million employees working at 11 million establishments.[4]

QCEW statistics are based on mandatory quarterly reports on employment and wages submitted by employers subject to UI laws. These records are reviewed, updated, and compiled in a longitudinal database (LDB), allowing for production of high-quality, accurate, and timely economic statistics.

The Business Employment Dynamics (BED) program links QCEW establishment-level records to construct an LDB of businesses in the United States. By means of unique identifiers, establishment records are linked across time, allowing for the measurement of gross job gains and gross job losses, as well as establishment entries and establishment exits across industries and states. The LDB is considered the BLS business register and serves as the establishment sampling frame in a number of BLS surveys and as the benchmark for the Current Employment Statistics program.[5]

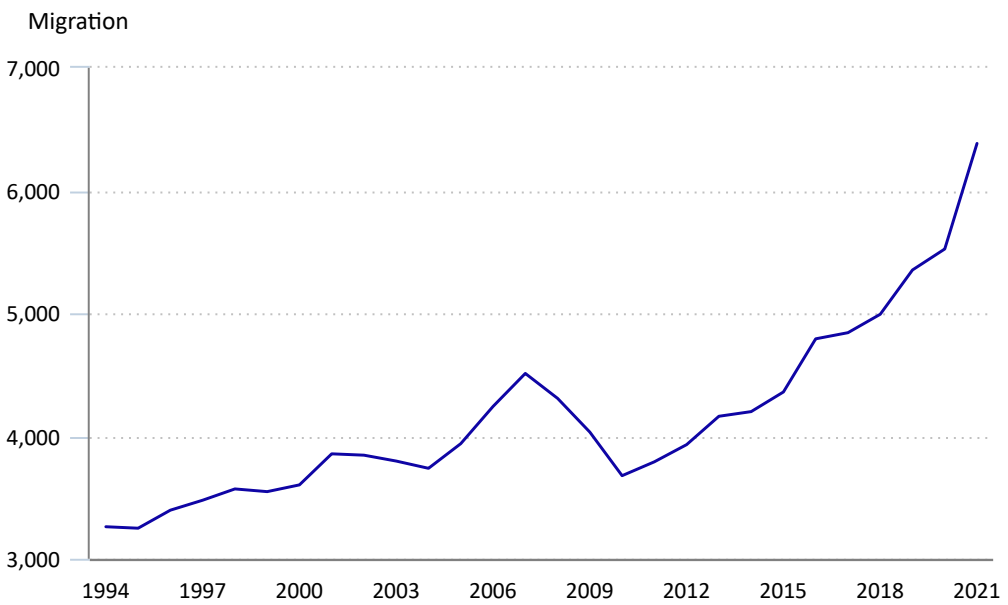
The BED program identifies migrating firms using the BLS business register. A firm, defined as all establishments sharing a unique Employer Identification Number (EIN) issued by the Internal Revenue Service, is considered to have migrated during the reference year if it is in a different state in the first quarter than in the first quarter of the preceding year. This process restricts our data to single-establishment firms because a multi-establishment firm may move establishments in and out of states as part of an expansion or contraction and not necessarily for the purpose of migration. We define an establishment as a single physical location where one predominant economic activity occurs and a firm as an entity consisting of one or more establishments sharing a unique EIN.[6] Consequently, other forms of business migration, such as a multi-establishment firm shifting business headquarters across state lines, are not captured by these statistics.

Single-establishment migrant firms, as defined above, are also counted as births in the states they move to and deaths in the states they come from, according to BED definitions. As such, migrant firms are a subset of establishment births and establishment deaths, which by themselves are a subset of establishment openings and closings.[7] Because establishments are not linked across states, births include entirely new establishments and those that have migrated into a state. Likewise, deaths include establishments that have gone out of business or have moved out of the state.

How has business migration changed over time?

As shown in chart 1, the level and rate of single-establishment firm migration, especially since 2009, has risen dramatically. In 1994, the earliest year for which this time series is available, a total of 3,261 firms crossed state lines. In 2021, this level more than doubled to 6,384 firms. Employment from migrant firms has also risen over this period.

Chart 1. Total migration of single-establishment firms, 1994–2021



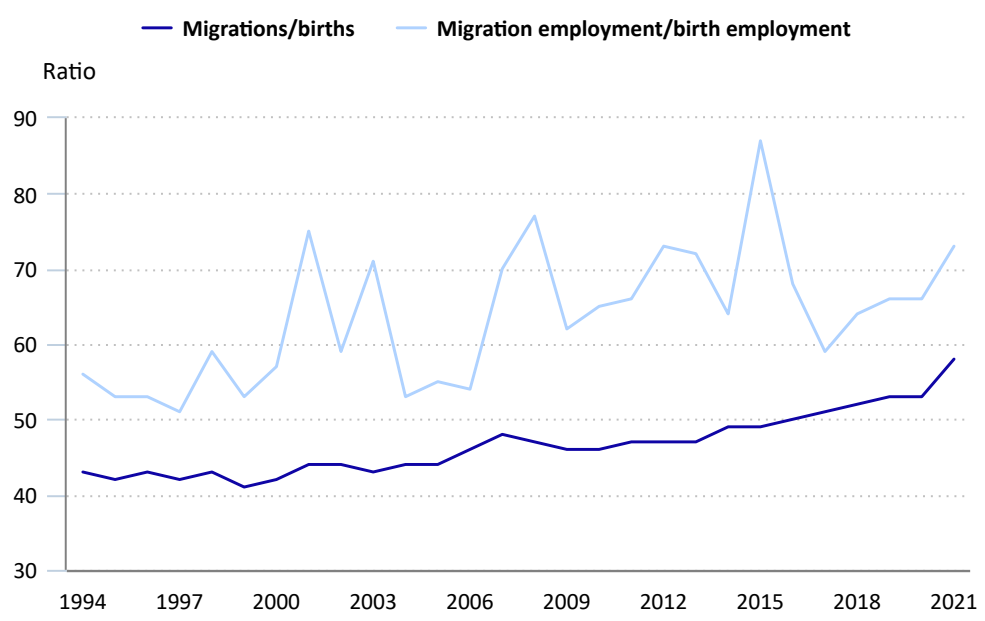
Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics.

View Chart Data

The trends in the number of migrant firms and their employment have some business cycle properties. The number of migrant firms fell during the 2001 and 2007–09 recessions.[8] These decreases were similar to patterns seen in previous recessions, as economic slowdowns lower most business activities, including migration. However, in the COVID-19 pandemic-induced recession of 2020, the number of firm migrations rose sharply. As we shall see, the rise was especially pronounced in the professional, scientific, and technical services industry sector.

The annual number of firm migrations is not large in magnitude when compared with the number of establishment openings or births. To add context, we compare the number of firm migrations and their employment with the number of establishment births and their employment. As firm migration increased in the aggregate, the number of establishment births increased as well. In 1994, there were only 43 firm migrations for every 10,000 establishment births. This number rose to 58 in 2021. (See chart 2.)

Chart 2. Ratio of firm migrations to 10,000 establishments births, 1994–2021



Click legend items to change data display. Hover over chart to view data.
Note: Data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

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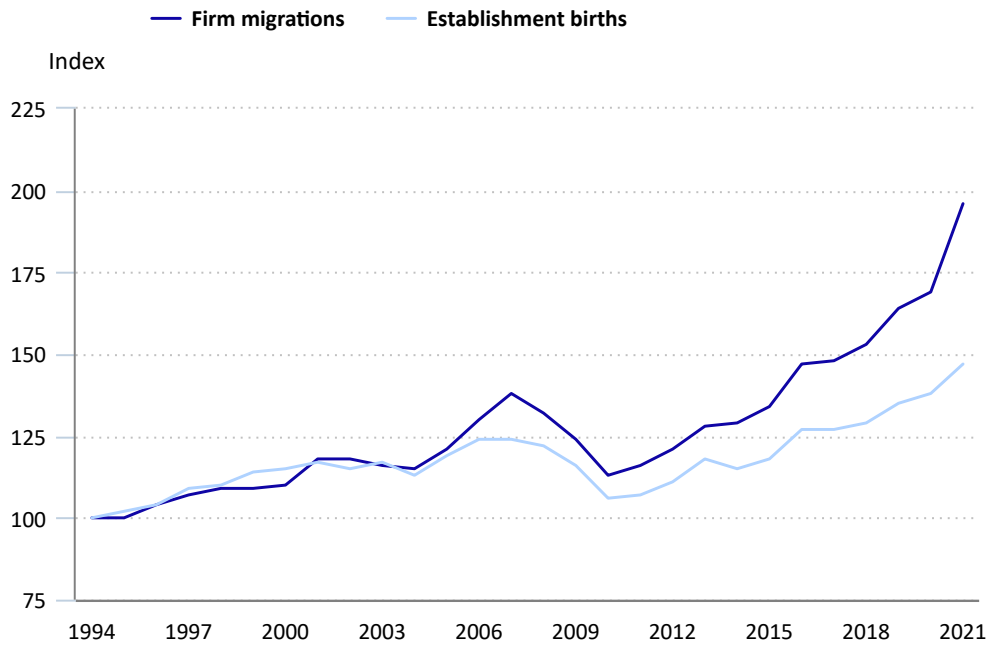
Although the magnitude of firm migration is small relative to the number of births, annual firm migrations have grown faster than births. As shown in chart 3, the trend and direction of changes in establishment births and firm migrations are similar. However, firm migration's growth index is much higher relative to establishment births. By 2021, firm migrations stood at 196 percent of their 1994 levels, whereas establishment births were at 147 percent of theirs.

Chart 3. Indexes of firm migrations and establishment births, 1994–2021



Click legend items to change data display. Hover over chart to view data.
Note: Data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

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These data exhibit strong cyclical properties. In both the 2001 and 2007–09 recessions, the level and rate of firm migration fell. In 2001 and 2008, firm migration fell by 0.3 percent and 6.4 percent, respectively.[9] In 2021, when the COVID-19 pandemic began, however, this relationship flipped, and a dramatic increase in firm migration was observed. Overall, 860 more firms migrated in 2021 than in 2020, an increase of over 15 percent.

Where do firms migrate?

To understand the pattern of firm migration across the United States, we used the four U.S. regions (Northeast, Midwest, South, and West) of the Census Bureau and tracked firm movement interregionally (between regions) and intraregionally (within regions).[10] In 2021, more firms migrated between regions than within them. A total of 3,011 firms (47.2 percent) engaged in intraregional migration in 2021, compared with 3,373 firms (52.8 percent) migrating interregionally.

In every region except for the South, fewer than 50 percent of migrating firms moved intraregionally. (See table 1.) The share is lowest in the Midwest, where 36.8 percent of migrating firms moved into another state within the same region. In the South, intraregional migration is the highest, where the rate is 57 percent. The region with the next highest level of intraregional migration, the West, saw 47.5 percent of migrating firms move within the region. In the Northeast, that number was 41.9 percent.

Table 1. Firm migration by regions, 2021

Origin region	Destination region				
	Northeast	Midwest	South	West	Total
Northeast	615	119	517	217	1,468
Midwest	76	426	447	209	1,158
South	234	255	1,111	349	1,949
West	159	204	587	859	1,809
Total	1,084	1,004	2,662	1,634	6,384

Note: The data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

Table 2 shows data on population migration from the Census Bureau ACS. From 2015 to 2020, about 90 percent of population movers moved within the same regions, much higher than the 47.2 percent for the firm migrations. The reason for this gap is the fact that firms may move for reasons different than those of population movers. For firms, the underlying motivation may be mostly economic, while people move for a variety of reasons, including establishing their own households, attending school, changing marital status, and so on. However, in both firm and population migrations, the South region as a destination has the highest share of total interregional movements.

Table 2. Population movers by regions, 2021

Origin region	Destination region				
	Northeast	Midwest	South	West	Total
Northeast	[1]	120,493	535,363	193,714	849,570
Midwest	93,670	[1]	526,874	290,294	910,838
South	305,635	407,454	[1]	488,663	1,201,752
West	134,100	238,243	551,394	[1]	923,737
Total	533,405	766,190	1,613,631	972,671	3,885,897
Intraregional movers	5,397,138	8,277,421	15,529,797	9,624,480	38,828,836

[1] Intraregional movers are accounted for in the last row.
Note: The data are single-establishment firms only.
Source: U.S. Census Bureau American Community Survey.

When tracking firm migrations across regions, we measured the number of firms moving in (in-migration), the number of firms moving out (out-migration), and the net migration, which shows the net gains or losses for the region. Table 3 shows the migration flows including inflows, outflows, and net migration across the regions.

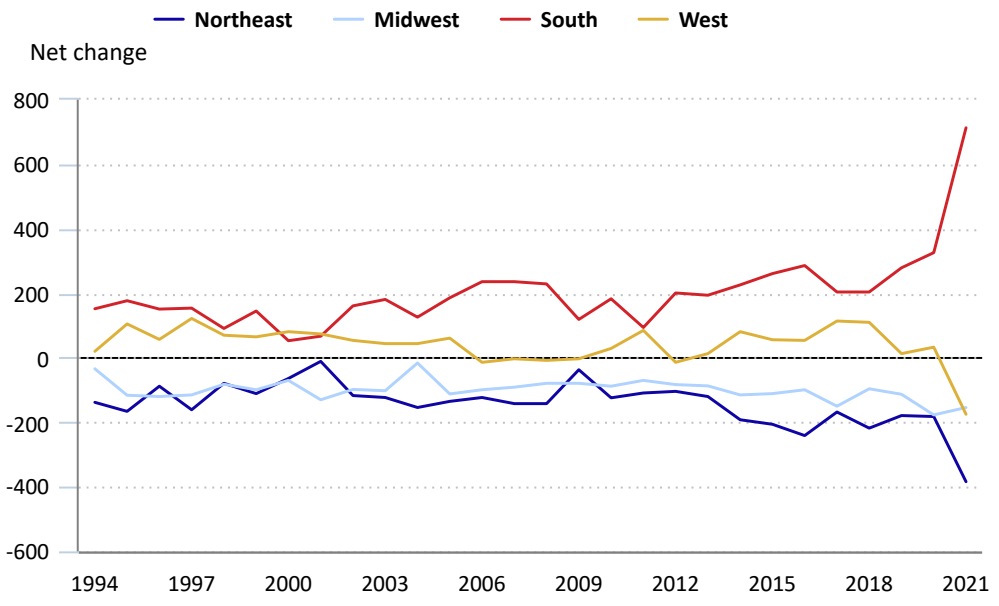
Table 3. Firm In-migrations, out-migrations, and net gains and losses by regions, 1994–2021

Year	Total migration	Northeast migration			Midwest migration			South migration			West migration		
		In	Out	Net	In	Out	Net	In	Out	Net	In	Out	Net
1994	3,261	666	804	-138	626	660	-34	1,197	1,045	152	772	752	20
1995	3,249	661	827	-166	606	722	-116	1,216	1,039	177	766	661	105
1996	3,396	768	856	-88	598	718	-120	1,276	1,125	151	754	697	57
1997	3,477	733	894	-161	587	702	-115	1,317	1,163	154	840	718	122
1998	3,569	795	874	-79	632	714	-82	1,308	1,217	91	834	764	70
1999	3,547	696	807	-111	630	729	-99	1,366	1,221	145	855	790	65
2000	3,602	812	876	-64	629	699	-70	1,349	1,296	53	812	731	81
2001	3,855	877	888	-11	611	741	-130	1,417	1,350	67	950	876	74
2002	3,844	853	970	-117	615	713	-98	1,515	1,354	161	861	807	54
2003	3,796	866	989	-123	639	741	-102	1,502	1,321	181	789	745	44
2004	3,737	760	914	-154	676	692	-16	1,439	1,313	126	862	818	44
2005	3,938	822	957	-135	639	751	-112	1,572	1,386	186	905	844	61
2006	4,241	865	988	-123	611	710	-99	1,757	1,521	236	1,008	1,022	-14
2007	4,510	878	1,020	-142	671	762	-91	1,829	1,593	236	1,132	1,135	-3
2008	4,307	840	982	-142	686	765	-79	1,766	1,537	229	1,015	1,023	-8
2009	4,032	866	903	-37	673	752	-79	1,573	1,454	119	920	923	-3
2010	3,677	765	889	-124	579	667	-88	1,411	1,228	183	922	893	29
2011	3,790	767	876	-109	669	739	-70	1,428	1,334	94	926	841	85
2012	3,930	800	904	-104	634	717	-83	1,541	1,340	201	955	969	-14
2013	4,161	858	978	-120	657	744	-87	1,638	1,444	194	1,008	995	13
2014	4,199	815	1,007	-192	688	803	-115	1,646	1,420	226	1,050	969	81
2015	4,359	793	999	-206	730	841	-111	1,715	1,454	261	1,121	1,065	56
2016	4,792	860	1,101	-241	834	933	-99	1,888	1,602	286	1,210	1,156	54
2017	4,842	955	1,123	-168	762	912	-150	1,899	1,695	204	1,226	1,112	114
2018	4,992	926	1,144	-218	793	889	-96	1,883	1,679	204	1,390	1,280	110
2019	5,353	1,005	1,184	-179	891	1,004	-113	2,073	1,794	279	1,384	1,371	13
2020	5,524	1,012	1,194	-182	810	987	-177	2,242	1,916	326	1,460	1,427	33
2021	6,384	1,084	1,468	-384	1,004	1,158	-154	2,662	1,949	713	1,634	1,809	-175

Note: The data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

Intraregional migrations do not have direct impact on the count of net migration. However, the regions with the highest levels of intraregional migration are also the regions with the highest levels of net migration (See chart 4). In most years since 1994, the South and West experienced the highest net migration of firms while the Northeast and Midwest witnessed the least. Differences in net migration between regions narrowed during the 2001 and 2007–09 recessions but widened again during the subsequent economic recoveries. Prior to the COVID-19 pandemic and recession, net migration began to rise in the South and to drop in the Northeast. In 2020, these gaps expanded, leading the South to witness an all-time high (for years in which we have data) of 713 firms moving into the region, on net. Out-migration from the Northeast accelerated: on net, 384 firms left the region. At the same time, net migration to the West sunk into negative territory, with 175 firms migrating out, on net. The Midwest experienced little change in its net firm migration figures, but it continued to witness more out-migration than in-migration.

Chart 4. Net firm migration by region, 1994–2021



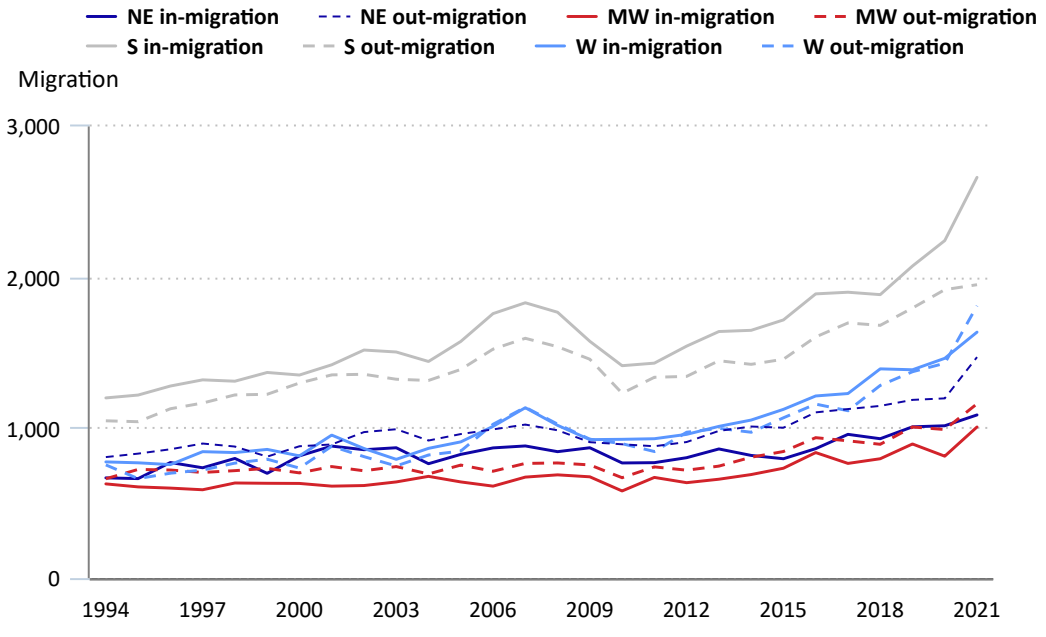
Click legend items to change data display. Hover over chart to view data.
Note: The data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

View Chart Data

The South had the highest cumulative net migration. Between 1994 and 2021, 5,635 firms migrated into the South, on net. The only other region to experience positive net migration during this period, the West, had 1,168 firms migrate into the region, on net. The Northeast and Midwest, respectively, had a net loss of 4,018 and 2,785 firms over this period. A large share of these firm migrations occurred between 2008 and 2019, with a sharp increase during 2021.

As chart 5 shows, out-migration and in-migration followed similar trends in all regions, but the regions showed considerable differences in the gap between the two series. The size of these gaps indicates the difference in the number of incoming and outgoing firms among the regions. In-migration exceeds out-migration in the South, out-migration exceeds in-migration in the Northeast and Midwest, and out-migration and in-migration were generally at similar levels in the West. The Northeast and Midwest consistently saw out-migration outpace in-migration. The migration levels of the two regions rose and fell in similar patterns, but their overall levels of migration were much lower than those in the South and West. For a time series of in-migration, out-migration, and net migrations across regions see table 3.

Chart 5. Migration by region, 1994–2021

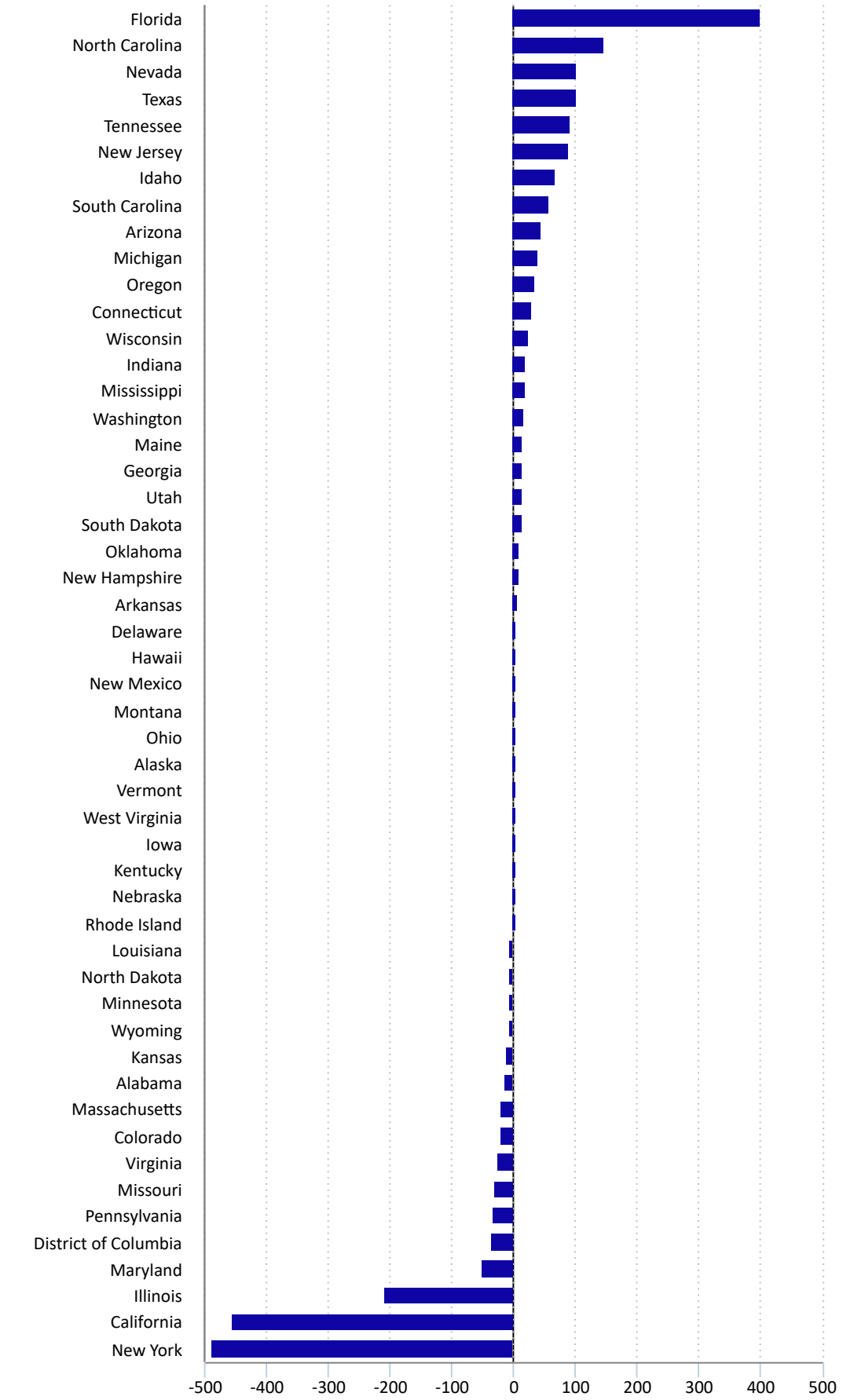


Click legend items to change data display. Hover over chart to view data.
Note: Data are single-establishment firms only. NE = Northeast, MW = Midwest, S = South, W = West.
Source: U.S. Bureau of Labor Statistics.

View Chart Data

State-level patterns mirrored regional migration flows. The two states with the highest levels of net migration in 2021—Florida and North Carolina—are in the top gaining states in the South region. These two states experienced positive net migration flows equal to 399 and 148 firms, respectively. (See chart 6.)

Chart 6. Net firm migration by state, 2021



Hover over chart to view data.
Note: Data are single-establishment firms only
Source: U.S. Bureau of Labor Statistics.

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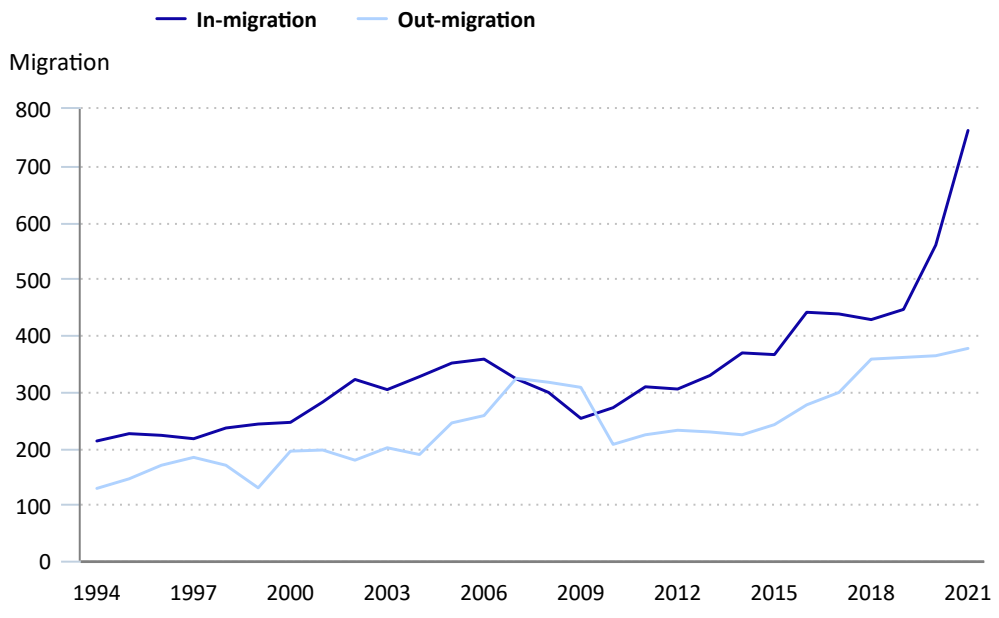
In Florida, firm migration trends reflected those of the broader South. Except for the 2006–08 period, in-migration surpassed out-migration. The levels and rates of migration flows rose steadily over time and surged during 2021. (See chart 7.)

Chart 7. Incoming and outgoing firm migration from Florida, 1994–2021



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Note: Data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

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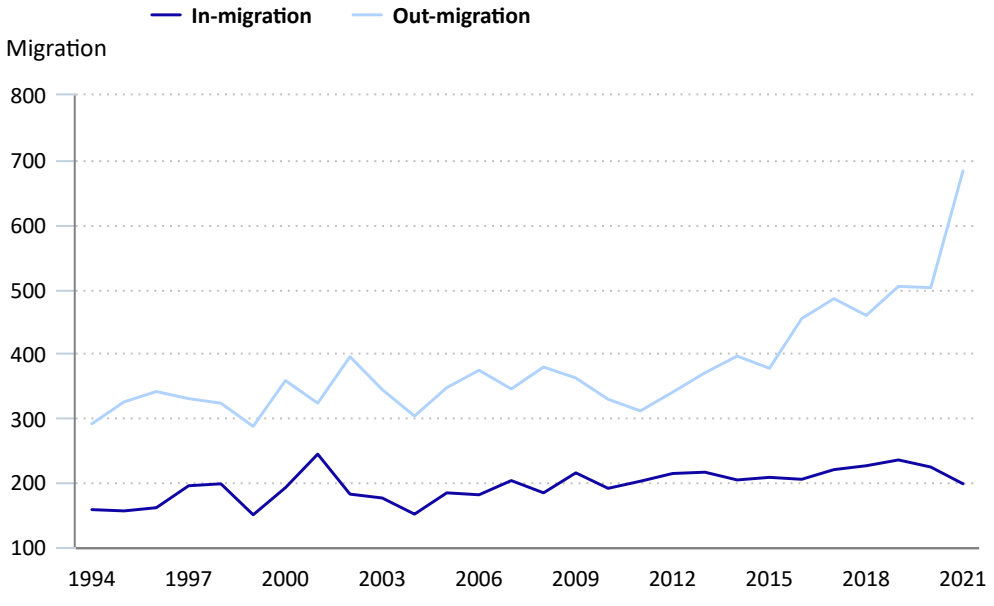
On the other hand, New York, with 485 firms leaving the state on net, had the highest level of negative net migration. Migration trends in New York mirrored those in the Northeast. Outward firm migration eclipsed inward migration every year in the 1994–2021 period. In 1994, 158 firms entered the state as 291 left it. In 2021, 198 firms migrated into the state while the number leaving increased to 683 firms. (See chart 8.)

Chart 8. Incoming and outgoing firm migration from New York, 1994–2021



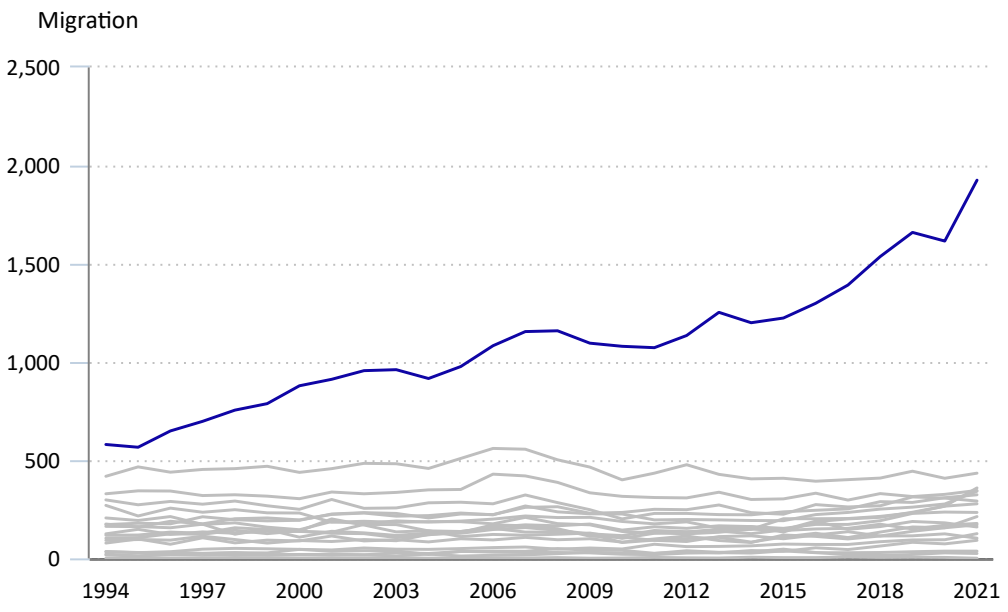
Click legend items to change data display. Hover over chart to view data.
Note: Data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

View Chart Data

What characteristics typify migrating firms?

Firm migration has been higher in the professional, scientific, and technical services industry sector than it has been in other industries. Businesses in professional, scientific, and technical services conduct activities that require a high degree of training and expertise, such as legal advice and representation; accounting, bookkeeping, and payroll services; computer services; consulting services; and research services to clients in a variety of industries.[11] In 1994, 16 percent of all migration was in this sector. In 2010, this share rose to 28 percent. In 2021, it reached an all-time high of 30 percent. As shown in charts 9 and 10, most of the growth in firm migration occurred in this sector, causing the industry's share of overall migration to rise. In 2021, firm migration in the professional, scientific, and technical services was 390 percent of its 1994 levels, compared with 145 percent for all other industries.

Chart 9. Firm migration, professional, scientific, and technical services sector versus all other sectors, 1994–2021



Hover over chart to view data.
Note: Data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

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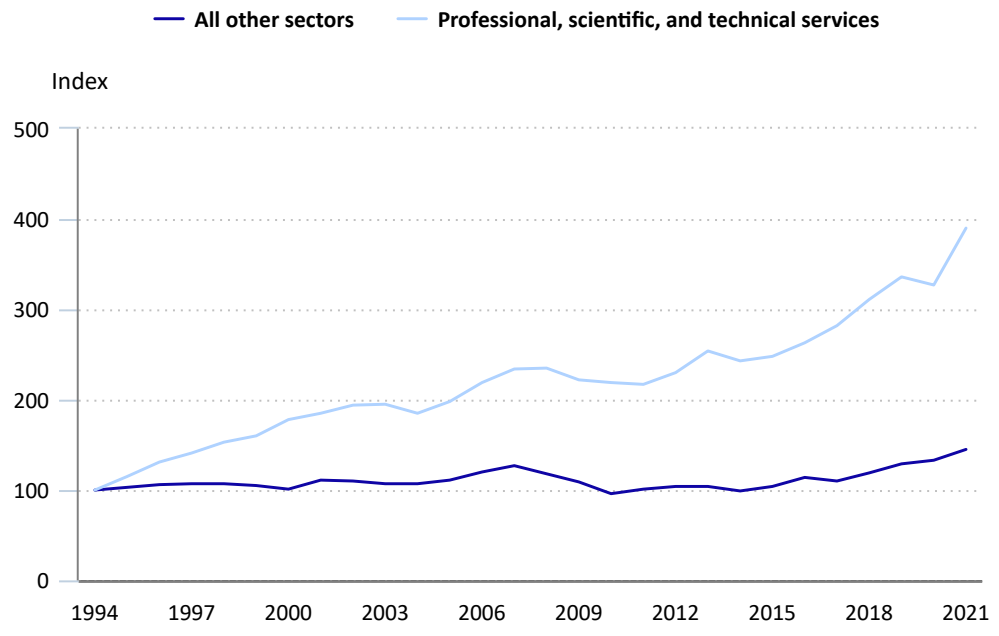
Chart 10. Indexes of firm migration by sector, 1994–2021



Click legend items to change data display. Hover over chart to view data.
Note: Data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

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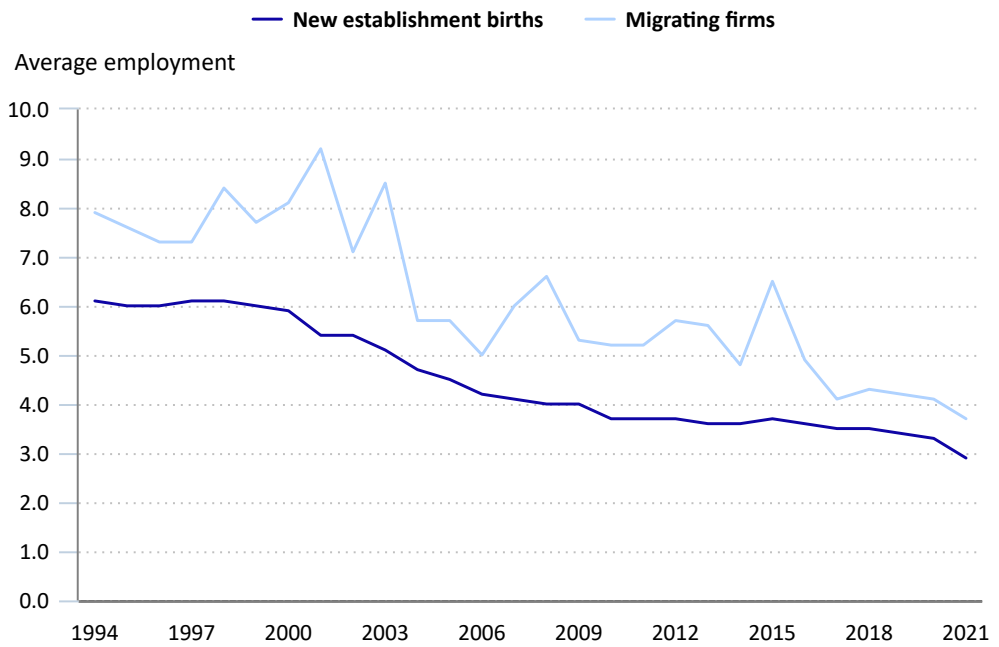
Migration patterns at the industry level exhibited the same cyclical patterns as firm migration at the national level in the 2001 and 2007–09 recessions: firm migration fell across all industries. During the 2020 recession, however, migration increased dramatically, mostly in the professional, scientific, and technical services industries.

Over time, the average employment of migrating firms has steadily decreased. Between 1993 and 2001, migrating firms' average employment hovered between 7 and 10 employees. Following the 2001 recession, average employment dropped, bottoming out at five employees in 2005. After the 2007–09 recessions, average employment continued to hover near five employees, but dropped to four employees in 2016. In contrast to the cyclical trends exhibited in the overall levels of firm migration, the average employment of migrating firms continued to fall during the 2020 recession. Compared with establishment births, migrating firms have had consistently higher levels of average employment. However, the average employment for each group of businesses has fallen at the same rates over time. In 2021, the average employment of both establishment births and migrating firms hovered slightly under 50 percent of their 1994 levels. (See chart 11.)

Chart 11. Average employment of migrating firms and new establishment births, 1994–2021



Click legend items to change data display. Hover over chart to view data.
Note: Data are single-establishment firms only.
Source: U.S. Bureau of Labor Statistics.

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Summary

Using the longitudinally linked QCEW data, we measured the annual number of single establishments and their employment and wages for those firms that moved across states and regions from 1994 to 2021. Migrant firms are presented by their states and regions of origin and destination and by their industry sectors. We found that in 2021, a total of 6,384 firms moved across state borders, almost twice the number than in 1994. As a percentage of the total firm population, the migrant share rose from 0.07 percent to 0.12 percent during this period. In 2020, more than 30 percent of migrant firms were in the professional, scientific, and technical services sector. Data show that the number of migrant firms generally grows in expansionary periods and declines or shows less growth during economic downturns. However, in the 2020 COVID-19 pandemic-induced recession, the number of migrant firms rose sharply. Although migrant firms move in and out of every state and region, data from 1994 to 2021 show that in-migration in the South has been consistently higher than out-migration. In the Northeast and Midwest regions, out-migration exceeded in-migration. In the West, in-migrations and out-migrations were generally in balance.

Data on firm migrations help paint a fuller picture of the changing labor market and overall economy. In this article, we provide insight on the nature and magnitude of the migratory firms. However, this analysis was limited in scope to single-establishment firms. Future research should develop a methodology to allow for estimates of migration at larger, more complex business entities—that is, firms with multiple establishments.

SUGGESTED CITATION:

Akbar Sadeghi, Kevin Cooksey, and Anthony Colavito, "Firm migrations in the United States: magnitude and trends," *Monthly Labor Review,* U.S. Bureau of Labor Statistics, June 2023, https://doi.org/10.21916/mlr.2023.11

Notes

[1] See “Marshall Gold Discovery State Historic Park” California Department of Parks and Recreation, no date, http://parks.ca.gov/?page_id=484#:~:text=In%201848%2C%20James%20W.,California’s%20and%20the%20nation’s%20history.

[2] See “California Gold Rush, 1848–1864,” LearnCalifornia.org, http://www.learncalifornia.org/doc.asp?id=118.

[3] We limit our analysis in this paper to the movements of firms across regions to avoid the potential nondisclosure issues related to publishing small number of firms moving from one state to another. We are not also evaluating any firms moving into or out of the United States. We use the terms “firms,” “businesses,” and “establishments” interchangeably, except where we otherwise define the terms.

[4] For the most current statistics from the Quarterly Census of Employment and Wages (QCEW) at the time of this publication, see *County employment and wages–third quarter 2022*, USDL-23-0349 (U.S. Department of Labor, February 22, 2023), https://www.bls.gov/news.release/archives/cewqtr_02222023.pdf. The most recent county employment data are always available at https://www.bls.gov/news.release/pdf/cewqtr.pdf. For more information about QCEW methodology, see "Quarterly Census of Employment and Wages: overview” in *Handbook of Methods* (U.S. Bureau of Labor Statistics), https://www.bls.gov/opub/hom/cew/.

[5] For more information on the U.S. Bureau of Labor Statistics business register and a comparison with the U.S. Bureau of Census business register, see Lucia Foster, Randy Becker, Joel Elvery, Cornell Krizan, Sang Nguyen, and David M. Talan “A comparison of the business registers used by the Bureau of Labor Statistics and the Bureau of the Census,” *Office of Survey Methods Research* (U.S. Bureau of Labor Statistics, August 2005), https://www.bls.gov/osmr/research-papers/2005/st050270.htm.

[6] We take this definition from Akbar Sadeghi, David M. Talan, and Richard L. Clayton, "Establishment, firm, or enterprise: does the unit of analysis matter?," *Monthly Labor Review*, November 2016, https://doi.org/10.21916/mlr.2016.51#:~:text=An%20establishment%20is%20a%20single,Internal%20Revenue%20Service%20(IRS).

[7] Establishment births are establishments with positive third-month employment for the first time in the current quarter with no links to establishments in the prior quarter, or establishments with positive third-month employment in the current quarter and zero employment in the third month of the previous four quarters. Establishment deaths are establishments that drop out of the BLS Business Register entirely or establishments with zero employment in the third month of a given quarter followed by four consecutive quarters with zero third-month employment. For more information, see “Business employment dynamics technical note” *Economic News Release* (U.S. Bureau of Labor Statistics, last modified January 25, 2023), https://www.bls.gov/news.release/cewbd.tn.htm.

[8] The National Bureau of Economic Research, as the arbiter of business cycles in the United States, defines a recession as the period between a peak of economic activity and the subsequent trough. For more information and all official recession dates, see “U.S. business cycle expansions and contractions” (National Bureau of Economic Research, last modified March 14, 2023), https://www.nber.org/research/data/us-business-cycle-expansions-and-contractions.

[9] We examine the 2008 levels and rates because the recession started in December 2007 and ended June 2009, so most of its affects are captured in the 2008 data.

[10] For the complete list of U.S. Census regions, as well as divisions, see *Census regions and divisions of the United States* (U.S. Census Bureau, no date), https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf.

[11] For the full definition and additional information about the professional, scientific, and technical services sector, see “Sector 54—Professional, scientific, and technical services” in *North American Industry Classification System* (U.S. Census Bureau), https://www.census.gov/naics/?input=54&year=2017&details=54.

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ARTICLE

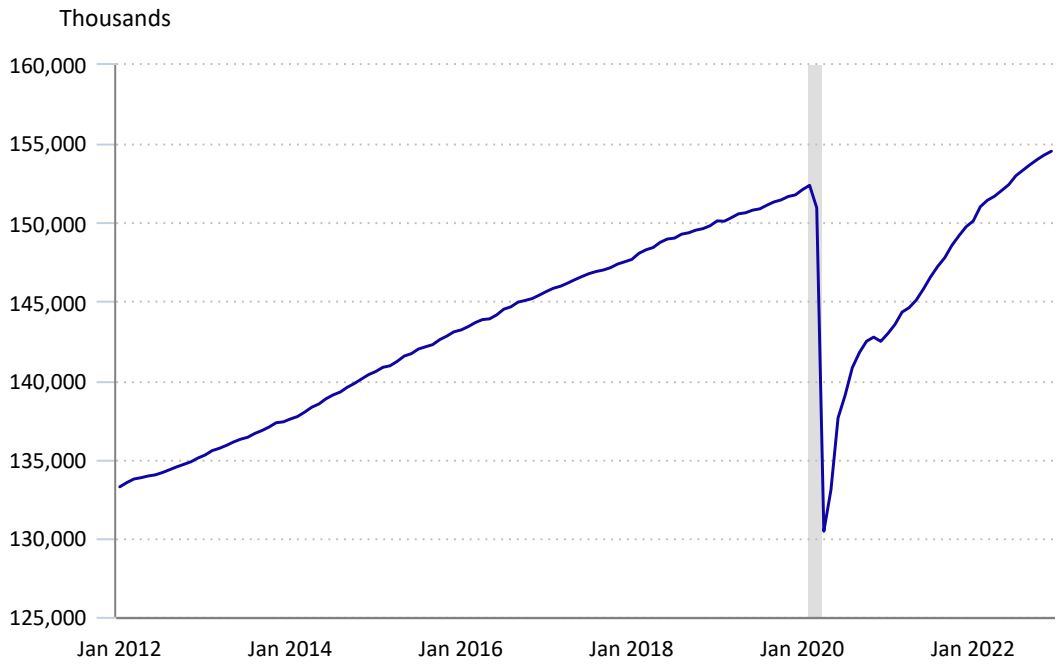
June 2023

Total nonfarm employment recovers in 2022, with some major industry sectors lagging behind

In June 2022, total nonfarm employment recovered from its historic pandemic-related declines and began to expand. However, while many major industry sectors expanded beyond their February 2020 levels in 2022, employment in several sectors remained below its prepandemic level.

According to data from the U.S. Bureau of Labor Statistics (BLS) Current Employment Statistics (CES) survey, nonfarm payroll employment in the United States recovered in 2022 from the widespread job losses caused by the onset of the COVID-19 pandemic in March 2020.[1] (See chart 1.) Nonfarm employment rose by 4.8 million in 2022, the second largest calendar-year gain in the history of CES. The largest calendar-year gain in the history of CES occurred in 2021 (+7.3 million), the year immediately following the onset of the pandemic. As of December 2022, nonfarm employment had expanded by 2.2 million above its February 2020 (or prepandemic) level. Average monthly job gains of 399,000 in 2022 slowed from average gains of 606,000 in 2021.

Chart 1. Total nonfarm employment, seasonally adjusted, January 2012–December 2022



Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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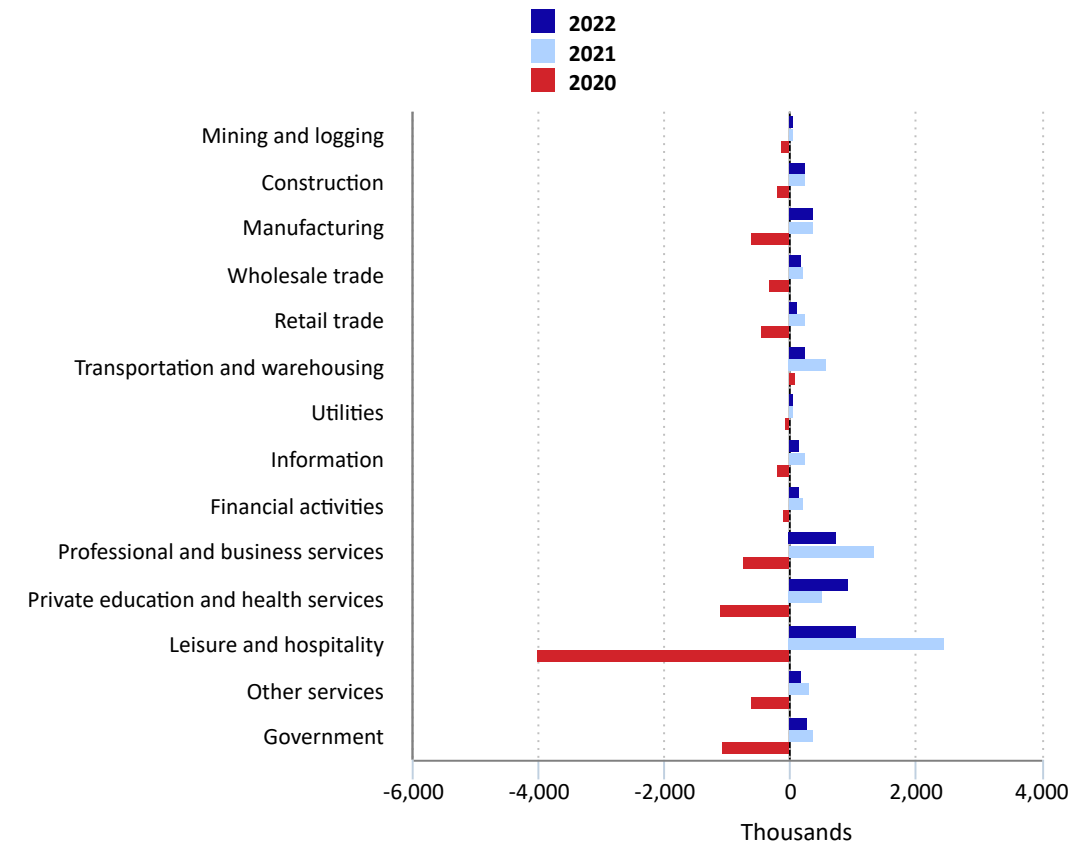
All major industry sectors experienced employment growth in 2022. Most sectors experienced a deceleration of job growth compared with 2021, including leisure and hospitality and professional and business services. (See chart 2.) In contrast, private education and health services[2] added considerably more jobs in 2022 than in 2021, and goods-producing industries added slightly more jobs than in the previous year.[3]

Chart 2. Over-the-year change in total nonfarm employment, by industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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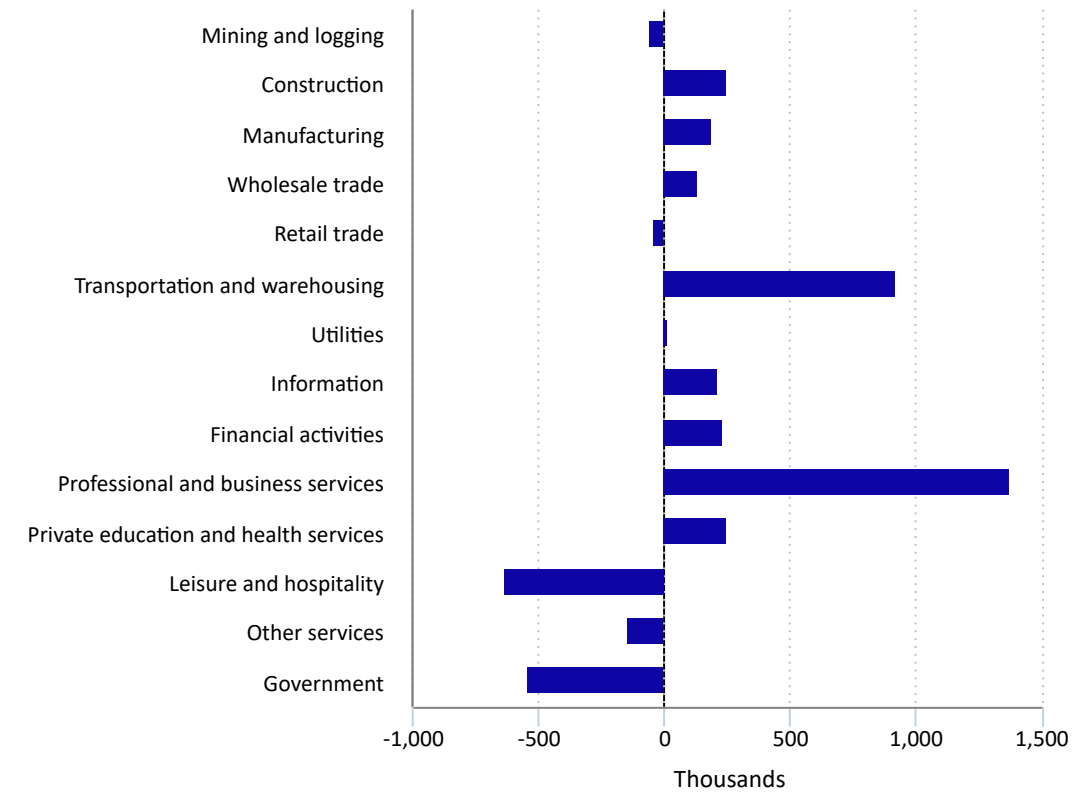
Although total nonfarm employment recovered to its February 2020 level in June 2022, the major industry sectors showed different patterns. Some industries had previously recovered and continued to expand in 2022, some recovered and began to expand in 2022, and some have yet to recover to their prepandemic employment levels. (See chart 3.) In professional and business services, transportation and warehousing, financial activities, information, and utilities, employment recovered in 2020 or 2021 and continued to expand in 2022. In construction, wholesale trade, manufacturing, and private education and health services, employment recovered and began to expand in 2022. Finally, in leisure and hospitality, government, other services, mining and logging, and retail trade, December 2022 employment levels remained below February 2020 levels.

Chart 3. Change in total nonfarm employment, by industry, seasonally adjusted, February 2020–December 2022



Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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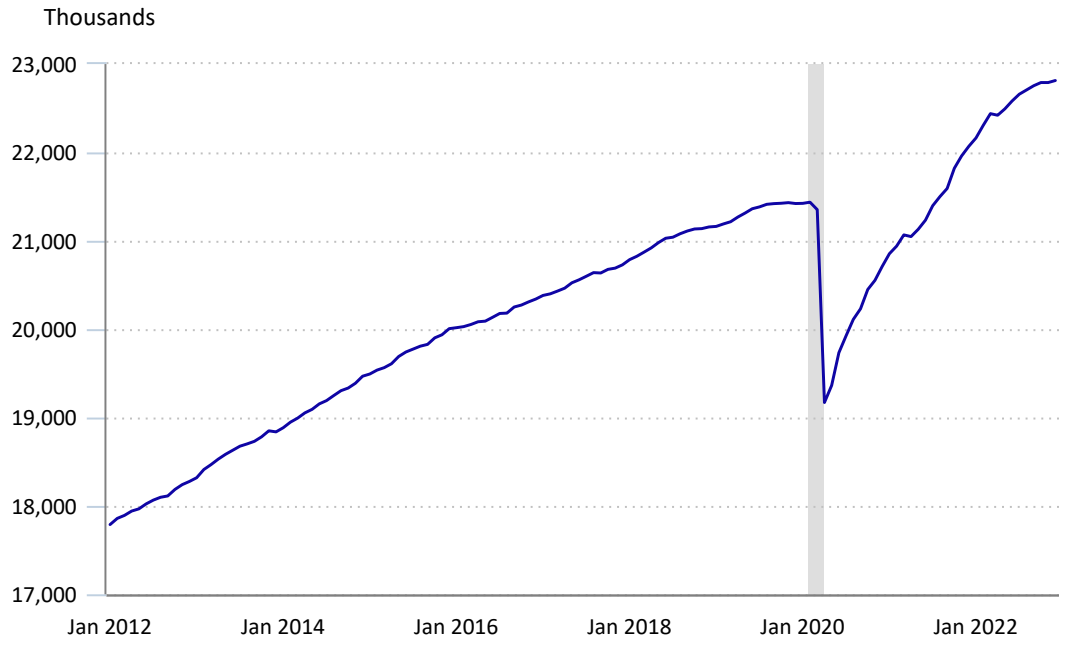
Continued employment expansion

Five major industry sectors recovered to their prepandemic employment levels prior to 2022 and continued to expand during the year: professional and business services, transportation and warehousing, financial activities, information, and utilities.

Professional and business services

Professional and business services had recovered from its pandemic-related job losses by August 2021. (See chart 4.) The industry added 745,000 jobs in 2022, a slowdown compared with the 1.4 million jobs added in 2021. By the end of 2022, employment in professional and business services had exceeded its prepandemic level by 1.4 million. Job growth over the year was driven by the component industry professional, scientific, and technical services, which added 491,000 jobs in 2022, compared with 689,000 in 2021. Employment in management of companies and enterprises increased by 65,000 in 2022, following an increase of 41,000 in 2021. Administrative and support and waste management and remediation services added 189,000 jobs in 2022, substantially less than the 629,000 jobs added in 2021. (See chart 5.)

Chart 4. Employment in professional and business services, seasonally adjusted, January 2012–December 2022



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Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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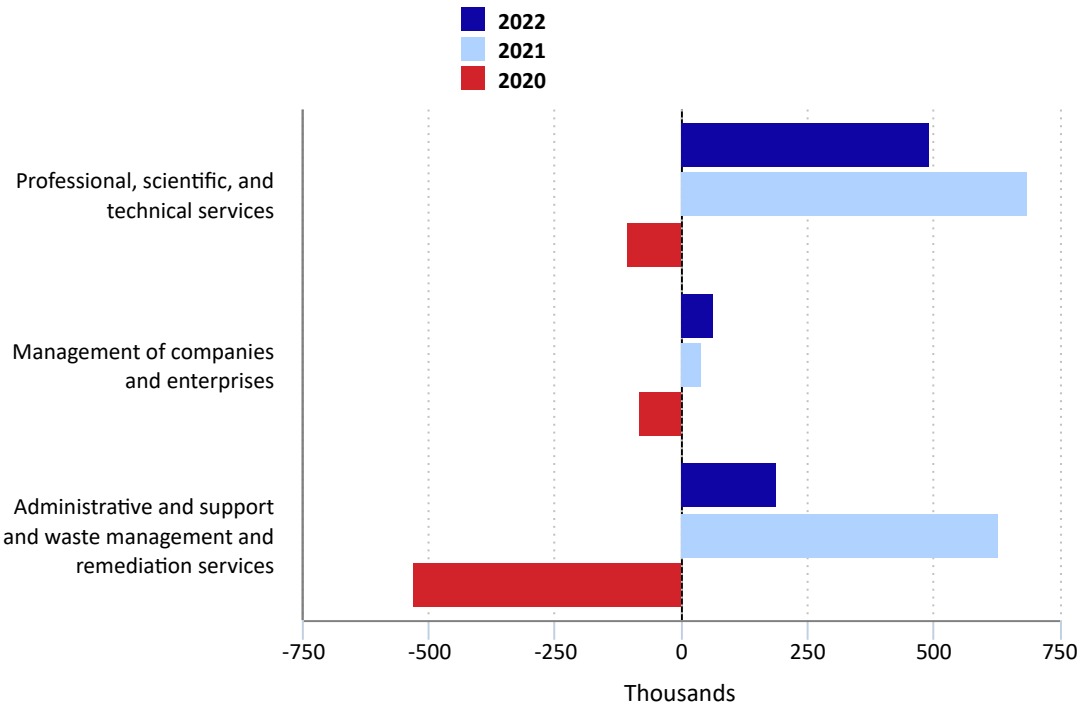
Chart 5. Over-the-year employment change in professional and business services, by component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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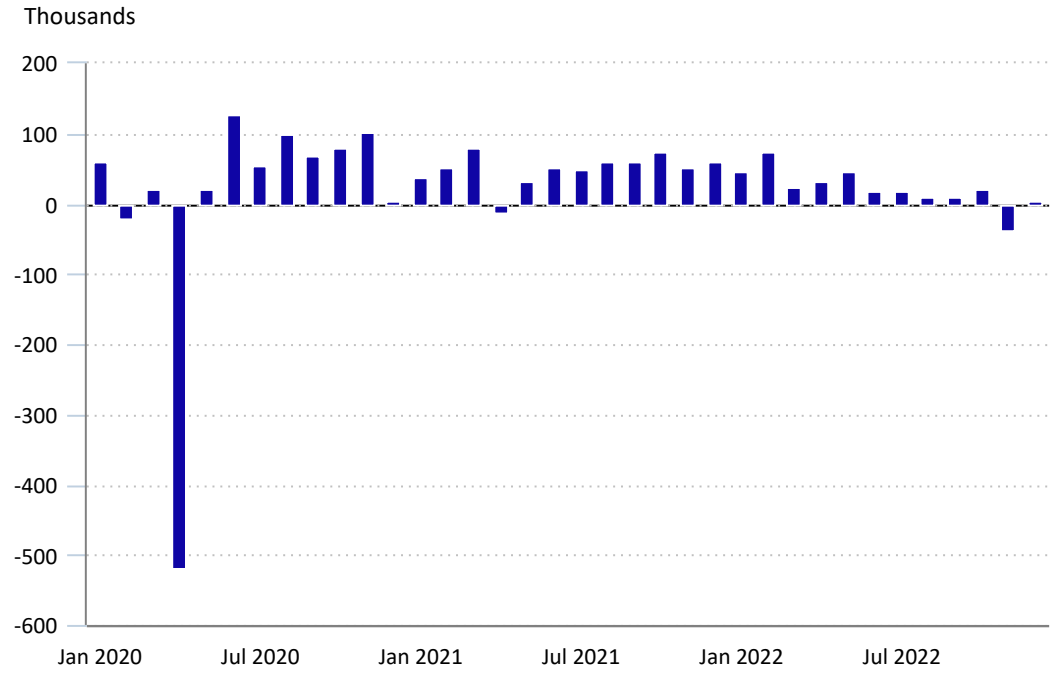
Within professional, scientific, and technical services, job gains were led by management, scientific, and technical consulting services (+111,000); computer systems design and related services (+100,000); and architectural, engineering, and related services (+76,000).

Within administrative and support and waste management and remediation services, job gains in services to buildings and dwellings (+52,000), office administrative services (+48,000), and investigation and security services (+41,000) were partially offset by job losses in business support services (–50,000). Employment in temporary help services changed little (–30,000) in 2022, after increasing by 333,000 in 2021.The slowdown in 2022 coincided with weakness in the American Staffing Association's Staffing Index over the year (+0.3 percent).[4] Temporary help employment tends to be viewed as a leading economic indicator, and much of 2022 was characterized by economic uncertainty and fears of a recession.[5]

Transportation and warehousing

Employment in transportation and warehousing recovered to its prepandemic level prior to the end of 2020, and by December 2022, it was 919,000 above its February 2020 level. (See chart 6.) The industry added 261,000 jobs in 2022, less than half the number added in 2021 (+596,000). Slowing employment growth in transportation and warehousing coincided with little change over the year (–3.9 percent) in the Cass Freight Index, which measures shipment volumes in the United States and is used as a transportation indicator.[6]

Chart 6. Over-the-month employment change in transportation and warehousing, seasonally adjusted, January 2020–December 2022



Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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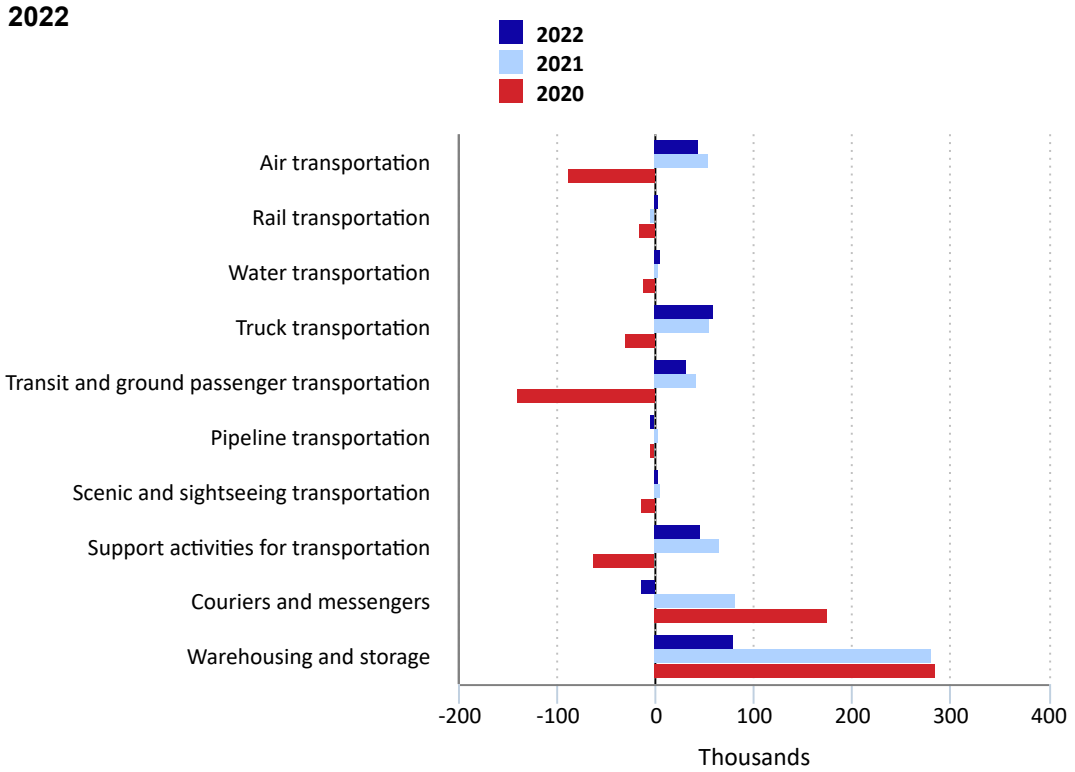
Within transportation and warehousing, employment increased over the year in truck transportation (+61,000) and in air transportation (+44,000). (See chart 7.) Consistent with these employment gains, the American Trucking Associations' Truck Tonnage Index increased in 2022 (+0.6 percent), as did air revenue passenger miles (+14.4 percent).[7]

Chart 7. Over-the-year employment change in transportation and warehousing, by component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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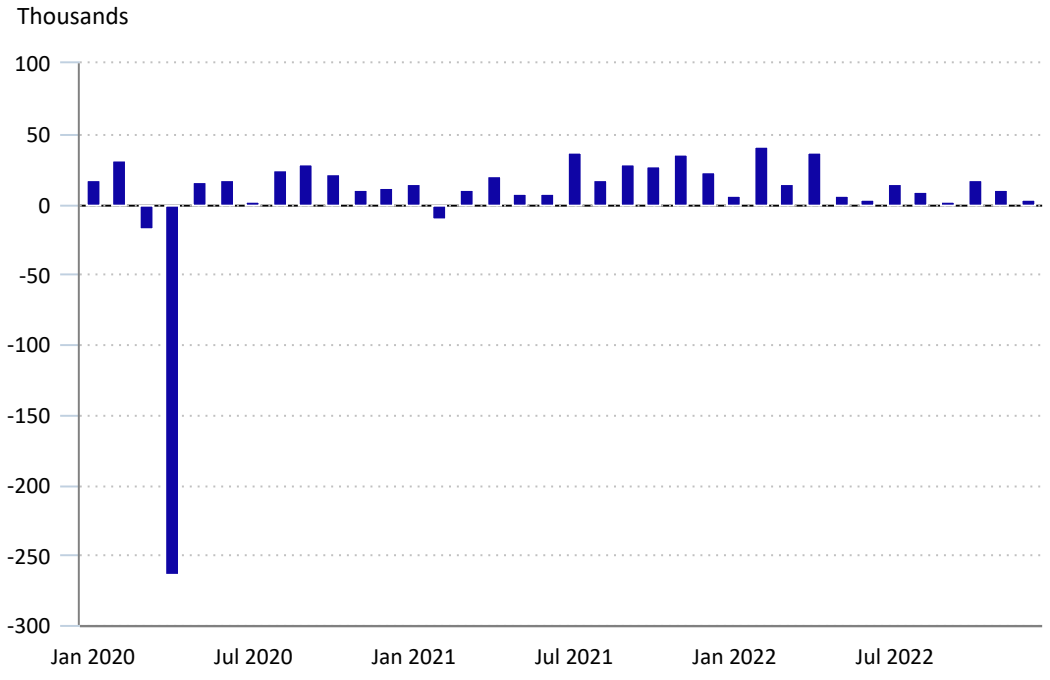
The deceleration of job growth in transportation and warehousing in 2022 compared with 2021 was largely driven by employment trends in the component industries couriers and messengers and warehousing and storage. Both industries had thrived earlier in the pandemic, as consumers turned to e-commerce as a substitute for in-person shopping. However, as prepandemic shopping behaviors resumed and the percentage of e-commerce accounting for total retail sales began to trend downward, job growth in these two industries slowed.[8] Employment in couriers and messengers changed little in 2022 (–14,000), compared with growth of 83,000 in 2021 and 176,000 in 2020. Employment in couriers and messengers reached a recent high in October 2022, but the industry lost 47,000 jobs, on net, in November and December. Employment in warehousing and storage increased by 81,000 in 2022, substantially down from increases of 282,000 in 2021 and 286,000 in 2020. Warehousing and storage employment reached a peak in June 2022, but the industry lost 27,000 jobs from June to December.

Elsewhere within transportation and warehousing, employment in transit and ground passenger transportation increased by 33,000 over the year, but the industry's December 2022 employment level remained 65,000 below its February 2020 level. Employment in this industry has likely not recovered because of the increased flexibility of employees to work from home and decreased commuter-transit ridership resulting from the pandemic.[9]

Financial activities

By October 2021, financial activities had recovered its pandemic-related job losses. The industry added 166,000 jobs in 2022, compared with 215,000 in 2021. (See chart 8.) By the end of 2022, employment in financial activities had exceeded its prepandemic level by 232,000.

Chart 8. Over-the-month employment change in financial activities, seasonally adjusted, January 2020–December 2022

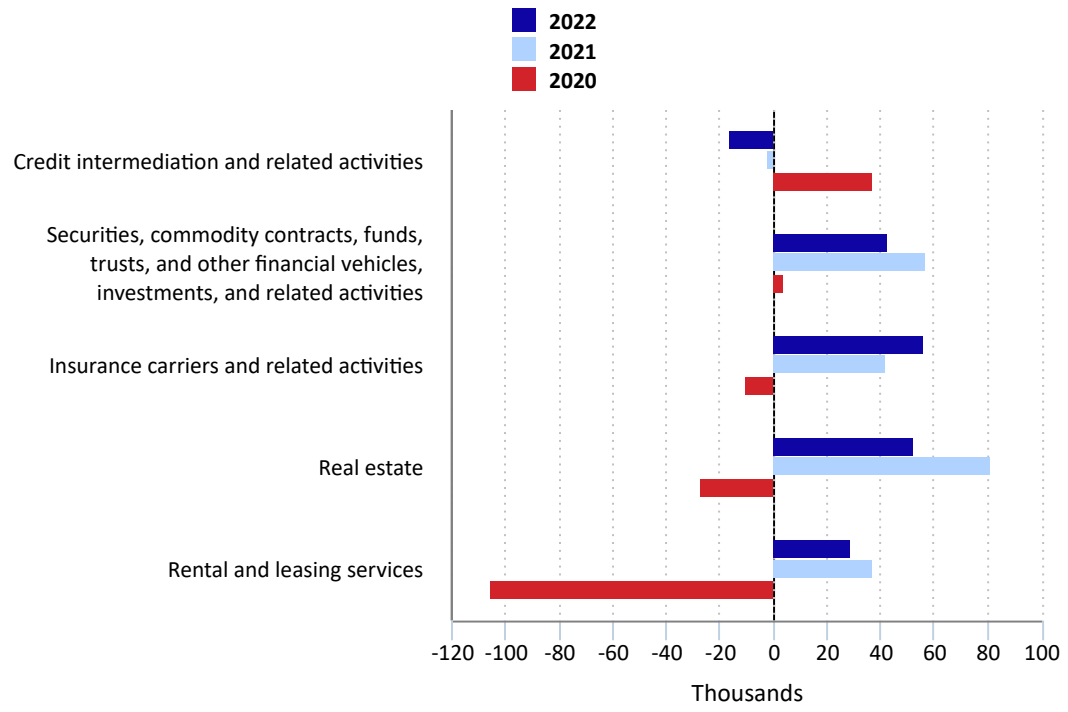


Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

View Chart Data

Over the year, job gains in financial activities were spread among insurance carriers and related activities (+56,000); real estate (+52,000); securities, commodity contracts, and funds (+43,000); and rental and leasing services (+29,000). (See chart 9.) In contrast, employment in credit intermediation and related activities changed little in 2022 (–16,000) and ended the year 31,000 below its most recent peak, in April 2021. Despite adding jobs over the year, rental and leasing services ended the year with an employment level that was 43,000 below its February 2020 level.

Chart 9. Over-the-year employment change in financial activities, by selected component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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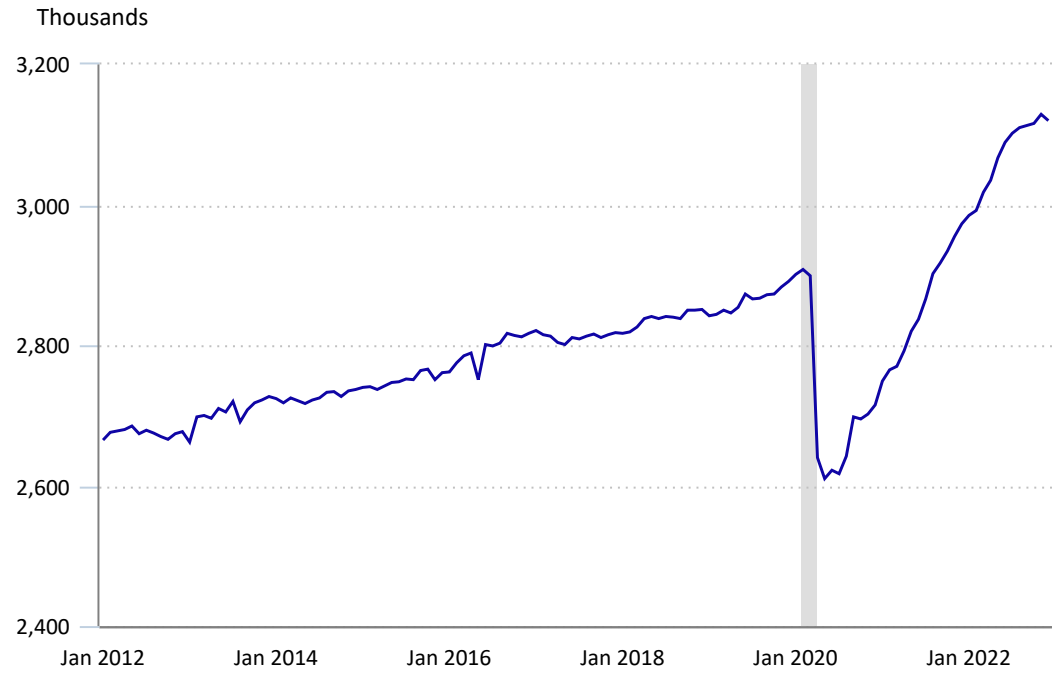
Economic indicators for financial activities were mostly negative in 2022. The federal funds rate increased by 4.02 percentage points during the year, as the Federal Reserve raised interest rates seven times in an effort to combat high inflation and slow economic growth.[10] These increases followed little to no change in the rate in 2021. In 2022, the average 30-year fixed mortgage rate surged by 3.19 percentage points to 6.31 percent, increasing by a larger margin over the year than in any other year on record.[11] The mortgage-rate increases in 2022 followed historically low and little-changed mortgage rates in 2021. In addition, the Standard and Poor's 500 index (or the "S&P 500") posted a decline of about 15 percent in 2022, after increasing by more than 27 percent in 2021.[12]

Information

The information sector recovered to its prepandemic employment level in September 2021 and added 147,000 jobs in 2022, down from the 258,000 jobs the industry added in 2021. (See chart 10.) By the end of 2022, information employment had expanded by 212,000 above its February 2020 level. Within the industry, computing infrastructure providers, data processing, web hosting, and related services added 51,000 jobs, down from 68,000 jobs added in 2021. (See chart 11.) Employment in motion picture and sound recording industries changed little over the year (+17,000), after increasing by 147,000 in 2021 and declining by 140,000 in 2020. Employment in motion picture and sound recording industries, which had previously declined sharply because of mass movie-theater closures and production shutdowns related to the pandemic, ended the year above its prepandemic level.[13]

Chart 10. Employment in information, seasonally adjusted, January 2012–December 2022



Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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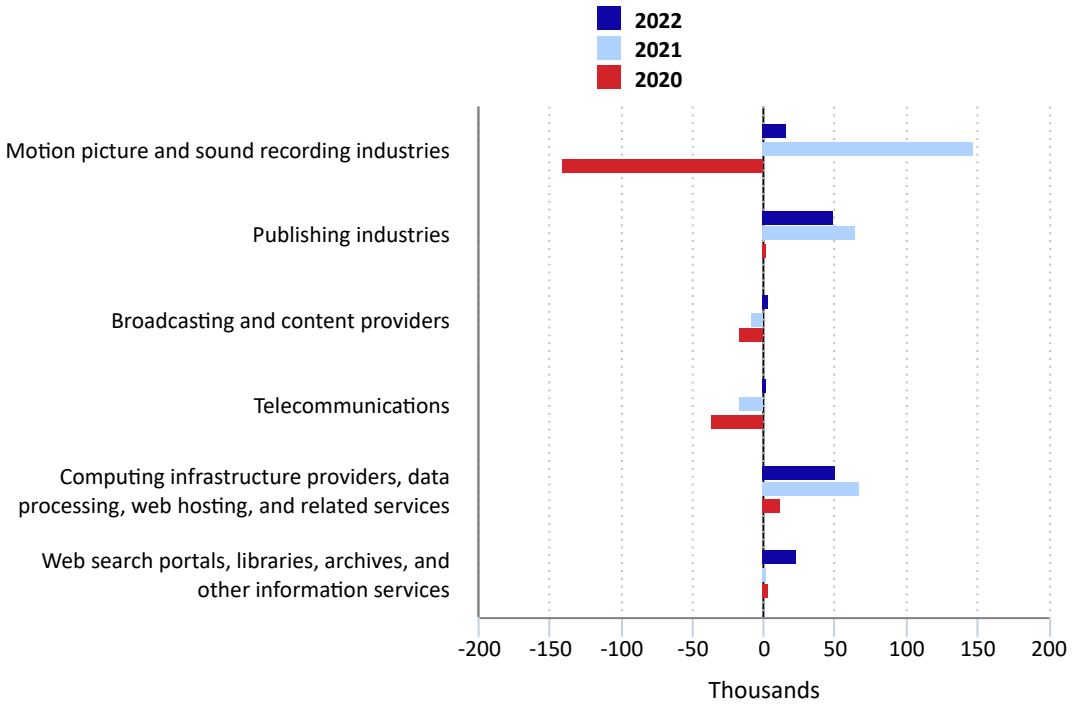
Chart 11. Over-the-year employment change in information, by component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

View Chart Data

Utilities

Employment in utilities changed little in 2021 (+7,000) and in 2022 (+7,000), after pandemic-related employment losses had recovered by November 2021.

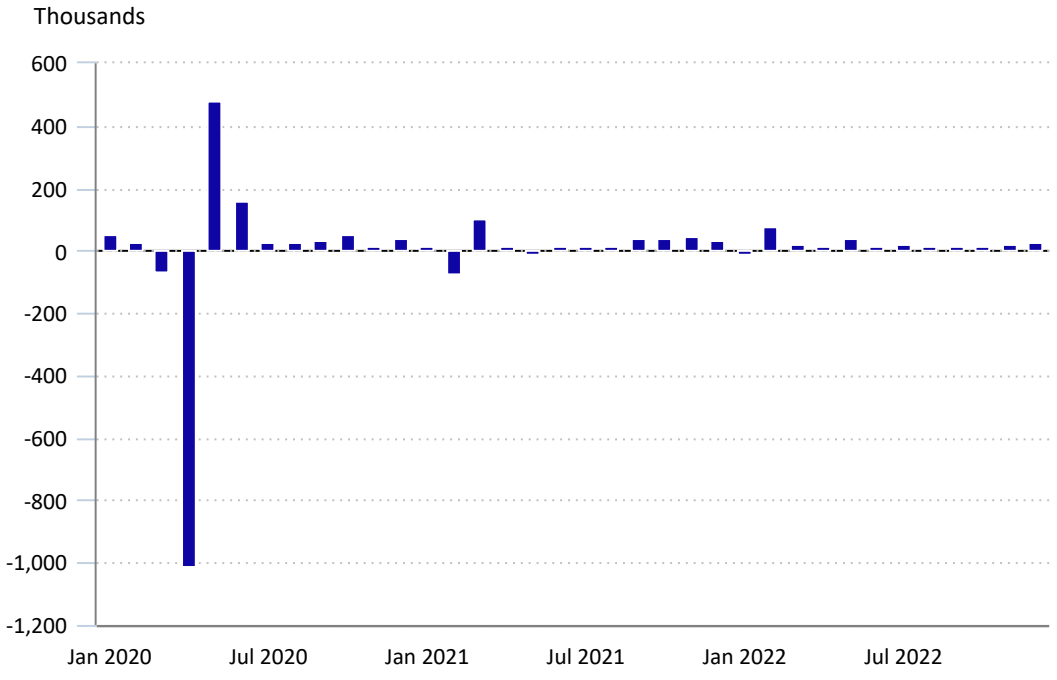
New employment recovery and expansion

Four major industry sectors recovered to their prepandemic employment levels and began to expand in 2022: construction, wholesale trade, manufacturing, and private education and health services.

Construction

Employment in construction returned to its February 2020 level in February 2022 and increased by 265,000 over the year, after increasing by 239,000 in 2021. (See chart 12.) By the end of 2022, construction employment was 251,000 above its February 2020 level.

Chart 12. Over-the-month employment change in construction, seasonally adjusted, January 2020–December 2022



Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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All major component industries within construction added jobs in 2022, with gains concentrated in nonresidential specialty trade contractors (+83,000) and residential specialty trade contractors (+79,000). (See chart 13.) Consistent with the job growth in the industry, both nonresidential construction spending and residential construction spending increased over the year, by 16.5 percent and 1.1 percent, respectively.[14]

Chart 13. Over-the-year employment change in construction, by component industry, seasonally adjusted, 2020, 2021, and 2022

Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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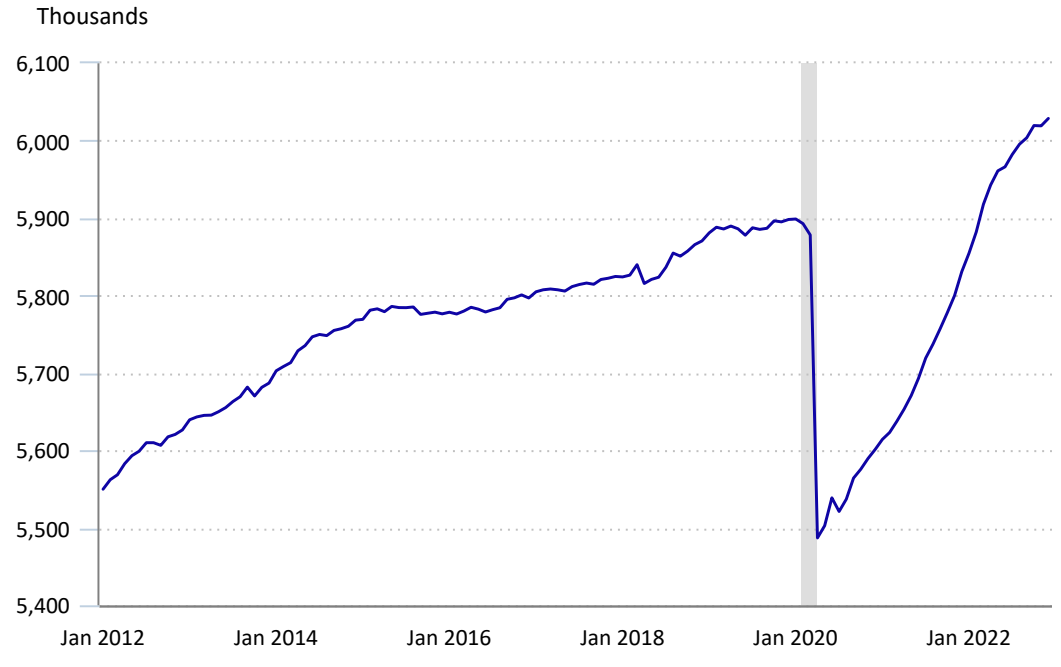
Despite over-the-year increases in construction employment, nonresidential construction spending, and residential construction spending, other construction-related economic indicators were negative in 2022, including housing starts (–22.5 percent), residential building permits (–29.5 percent), and new home sales (–25.5 percent).[15] In addition, the National Association of Homebuilders/Wells Fargo Housing Market Index (HMI), at 31 in December 2022, declined by 53 points over the year. An HMI value of less than 50 indicates negative homebuilder sentiment.[16] Homebuilders cited high inflation and the high mortgage-rate environment for the decline in homebuilder sentiment. Builders also noted a need to offer incentives, such as price reductions, in an effort to bolster home sales.[17]

Wholesale trade

The wholesale trade industry added 198,000 jobs in 2022, compared with 230,000 jobs added in 2021. (See chart 14.) Employment in the industry recovered to its prepandemic level in March 2022, and by December, it had expanded to 136,000 above its February 2020 level.

Chart 14. Employment in wholesale trade, seasonally adjusted, January 2012–December 2022



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Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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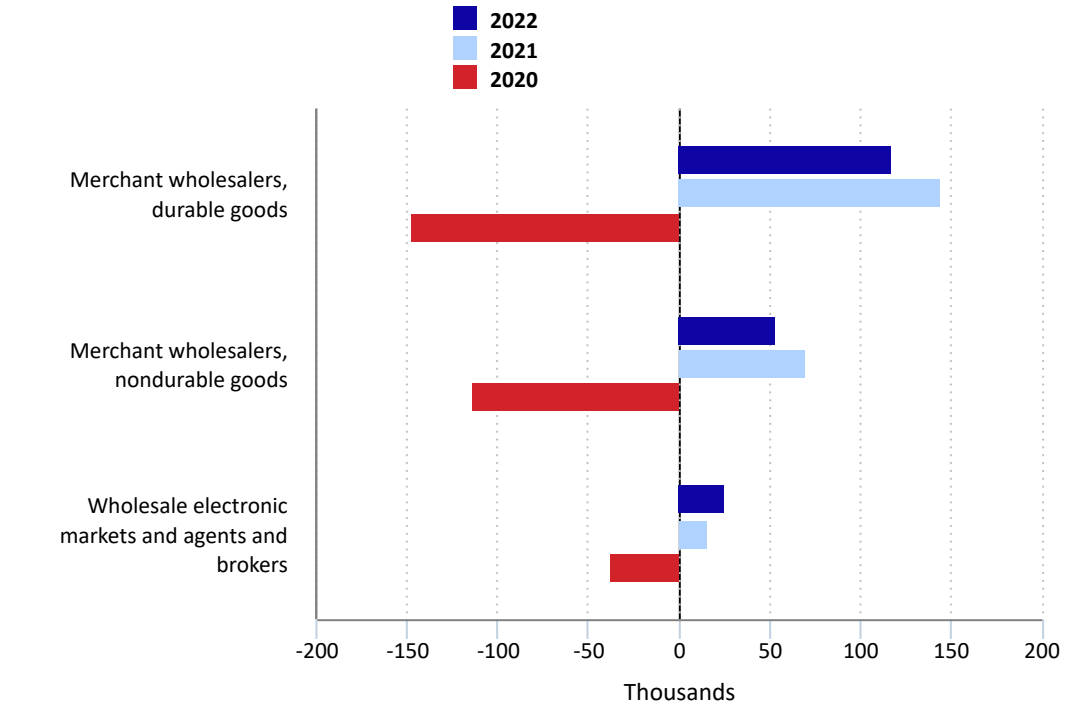
Employment gains in wholesale trade were led by merchant wholesalers of durable goods, which added 118,000 jobs in 2022. (See chart 15.) Employment in merchant wholesalers of nondurable goods increased by 54,000 over the year, while wholesale electronic markets and agents and brokers added 26,000 jobs.

Chart 15. Over-the-year employment change in wholesale trade, by component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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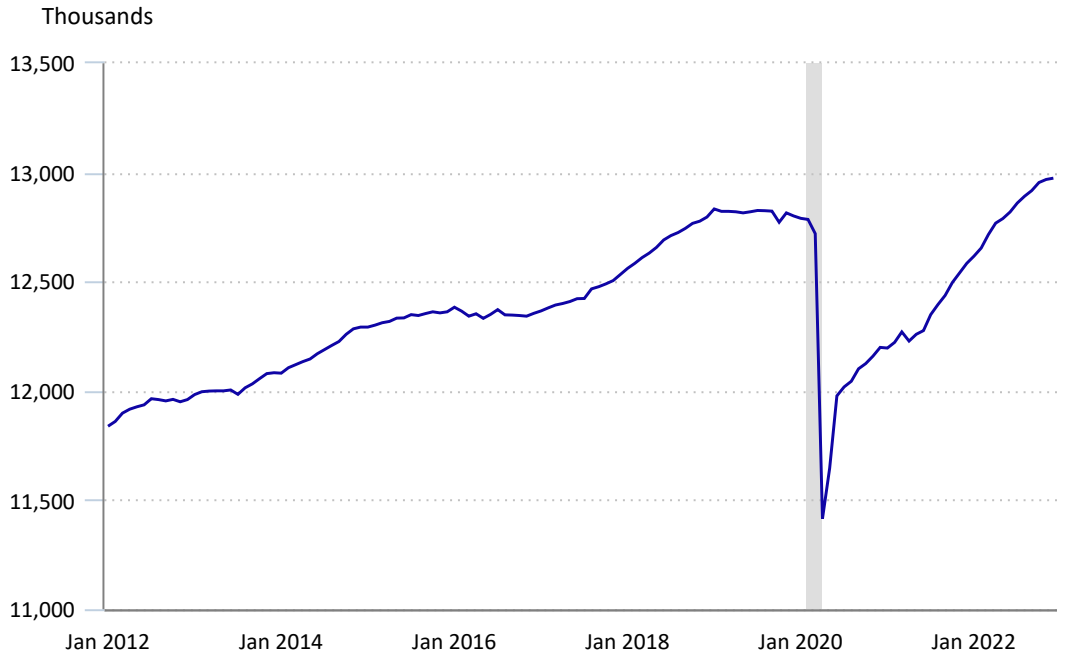
Manufacturing

Manufacturing employment recovered to its prepandemic level in May 2022 and increased by 390,000 jobs over the year, nearly the same number as the 385,000 jobs added in 2021. (See chart 16.) By the end of the year, employment in manufacturing exceeded its prepandemic level by 189,000 and had expanded above its most recent peak in January 2019 by 141,000.

Chart 16. Employment in manufacturing, seasonally adjusted, January 2012–December 2022



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Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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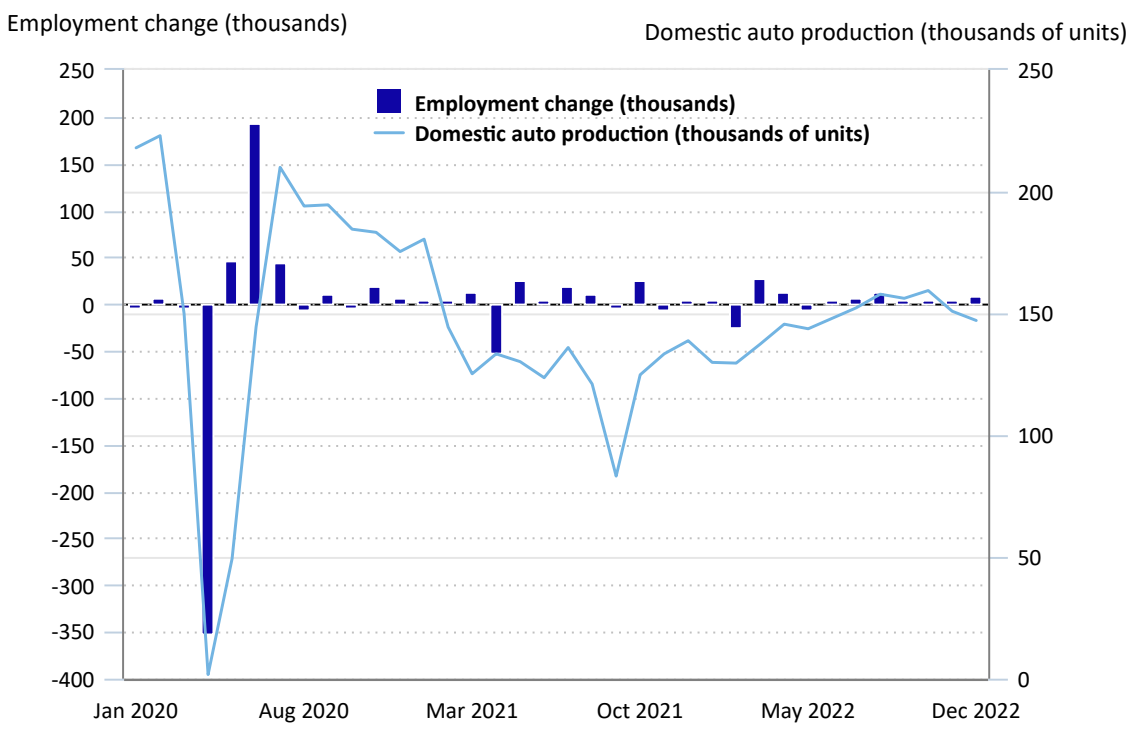
In 2022, job gains were widespread within durable goods manufacturing, led by transportation equipment manufacturing (+97,000), machinery manufacturing (+45,000), fabricated metal product manufacturing (+43,000), and computer and electronic product manufacturing (+31,000).

The gain in transportation equipment manufacturing was driven by an employment increase of 57,000 in motor vehicles and parts. Coincident with employment strength in the sector, motor vehicle production increased over the year (+5.4 percent).[18] (See chart 17.) The global semiconductor shortage that began in early 2021 and persisted in 2022 prompted automakers to order a surplus of semiconductors in an effort to ensure inventory and safeguard production amid high demand.[19] Related to these production demands, employment in semiconductors and other electronic component manufacturing, a component of computer and electronic product manufacturing, increased by 20,000 over the year.

Chart 17. Over-the-month employment change in motor vehicles and parts and total domestic auto production, seasonally adjusted, January 2020–December 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey (employment); and U.S. Bureau of Economic Analysis (auto production).

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Employment strength in durable goods manufacturing aligned with 2022 increases in new orders for manufactured durable goods.[20] The Purchasing Managers' Index (PMI) of the Institute for Supply Management, at 48.4 percent in December 2022, contracted for a second consecutive month following a 29-month period of growth.[21] A PMI lower than 50 percent indicates a contraction in manufacturing activity, while a PMI greater than 50 percent indicates an expansion in manufacturing activity. Although lower readings for November and December 2022 were reflected in manufacturing employment, which changed little during those months, both the PMI and manufacturing employment were consistently strong during the first 10 months of the year.

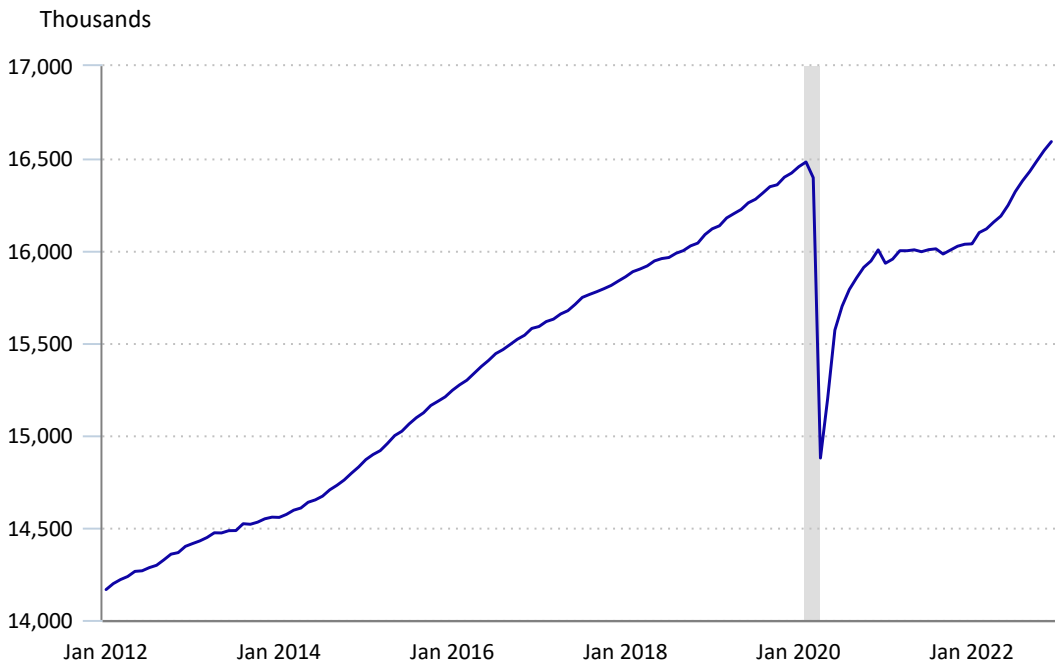
Among the component industries in nondurable goods manufacturing, employment increased over the year in food manufacturing (+56,000) and in chemical manufacturing (+32,000).

Private education and health services

Employment in private education and health services returned to its prepandemic level in September 2022, and by December it had expanded beyond that level by 251,000. Over the year, private education and health services added 935,000 jobs, up considerably from the 544,000 added in 2021.

Employment in health care grew by 556,000 in 2022, after changing little in 2021 (+31,000). (See chart 18.) The industry had recovered its pandemic-related job losses by October 2022, and by the end of the year, employment had expanded to 110,000 above its February 2020 level.

Chart 18. Employment in health care, seasonally adjusted, January 2012–December 2022



Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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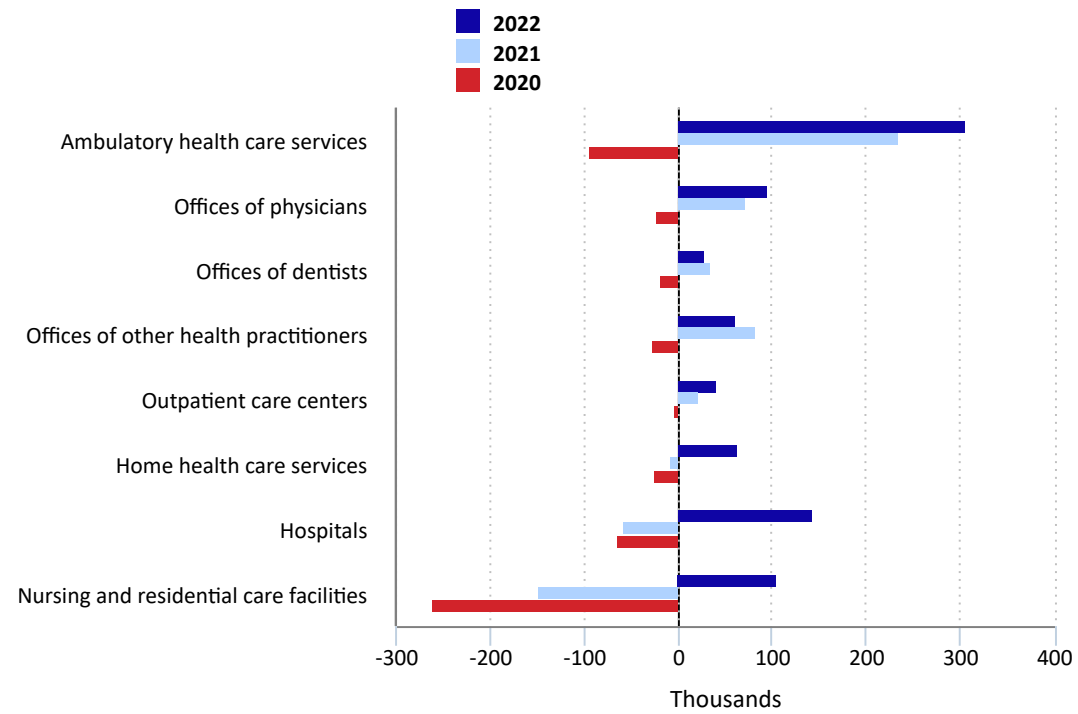
Within health care, employment gains were concentrated in ambulatory health care services, which added 307,000 jobs in 2022, compared with 234,000 in 2021. (See chart 19.) Among the components of ambulatory health care services, jobs were added over the year in offices of physicians (+94,000), home health care services (+63,000), offices of other health practitioners (+61,000), outpatient care centers (+40,000), and offices of dentists (+29,000).

Chart 19. Over-the-year employment change in health care, by selected component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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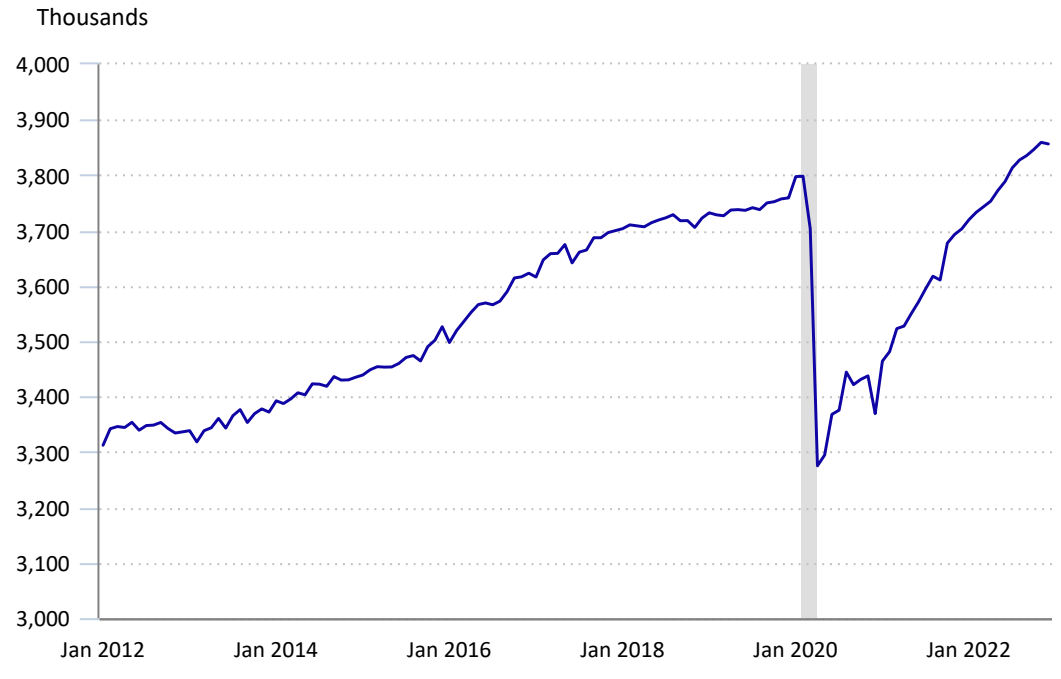
Elsewhere in health care, employment in hospitals rose by 143,000 in 2022, following declines of 57,000 in 2021 and 64,000 in 2020. Nursing and residential care facilities added 105,000 jobs in 2022, following declines of 147,000 in 2021 and 260,000 in 2020. As of December 2022, employment in nursing and residential care facilities was 112,000 above its January 2022 trough, but it remained 306,000 below its November 2019 peak.

Social assistance added 226,000 jobs in 2022, compared with 179,000 jobs added in 2021. The industry recovered its pandemic-related job losses in September 2022, and by the end of the year, employment was 82,000 above its February 2020 level. Within the industry, job gains in 2022 were led by individual and family services (+150,000) and child care services (+60,000).

Private educational services recovered its pandemic-related job losses in July 2022, and by the end of the year, employment had expanded to 58,000 above its February 2020 level. (See chart 20.) The industry added 153,000 jobs in 2022, less than half of the 334,000 jobs gained in 2021.

Chart 20. Employment in private educational services, seasonally adjusted, January 2012–December 2022



Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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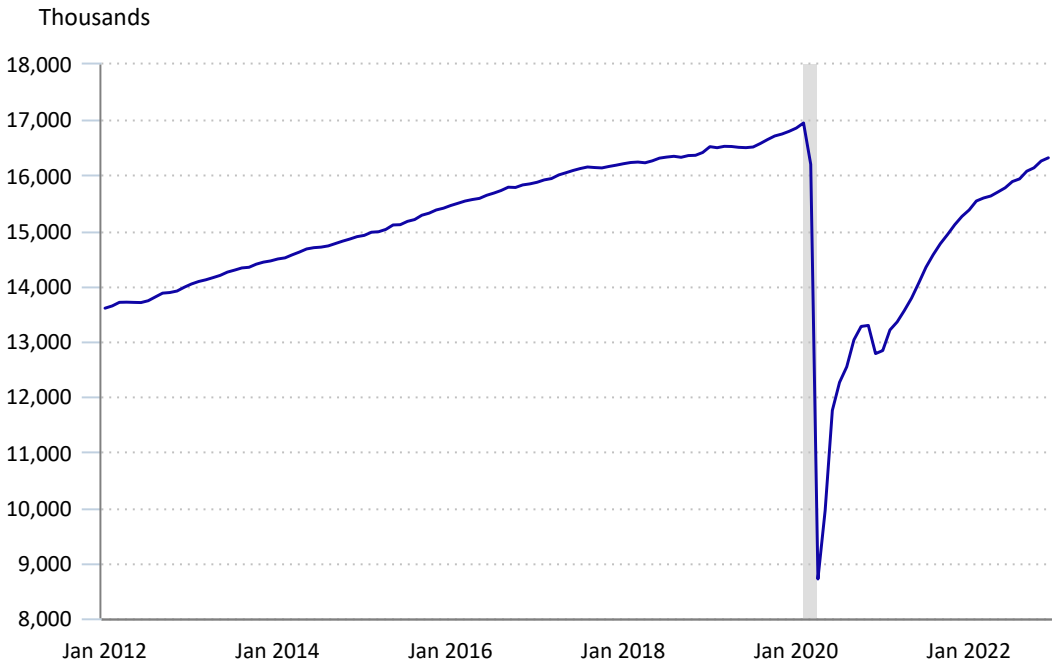
Continued employment recovery

Five major industry sectors have not yet recovered from their pandemic-related employment losses: leisure and hospitality, government, other services, mining and logging, and retail trade.

Leisure and hospitality

Leisure and hospitality added 1.1 million jobs in 2022, down substantially from the 2.5 million jobs added in 2021. (See chart 21.) As of December 2022, total employment in the industry was 629,000 below its February 2020 level.

Chart 21. Employment in leisure and hospitality, seasonally adjusted, January 2012–December 2022



Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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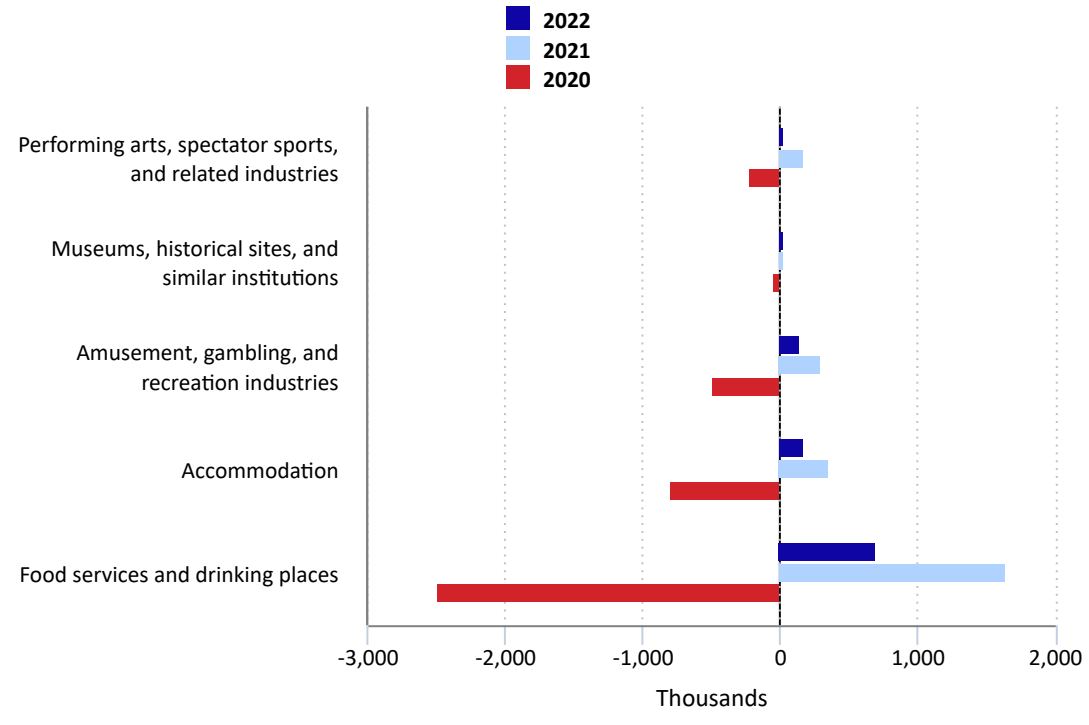
About two-thirds of the 2022 job growth in leisure and hospitality came from food services and drinking places, which added 702,000 jobs, compared with a gain of 1.6 million jobs in 2021. Food services and drinking places had lost 2.5 million jobs in 2020, and the industry's December 2022 employment level remained 267,000 below its February 2020 level. (See charts 22 and 23.) Consistent with the employment strength in 2022, sales in food services and drinking places increased by 13.9 percent over the year.[22] Inflation may explain some of why employment in food services and drinking places has not recovered to its prepandemic level, as the Consumer Price Index for All Urban Consumers (CPI-U) rose 6.4 percent over the year.[23] In addition, CES average hourly earnings of all employees in food services and drinking places rose by 6.7 percent in 2022, increasing labor costs for employers and decreasing their ability to hire additional workers.

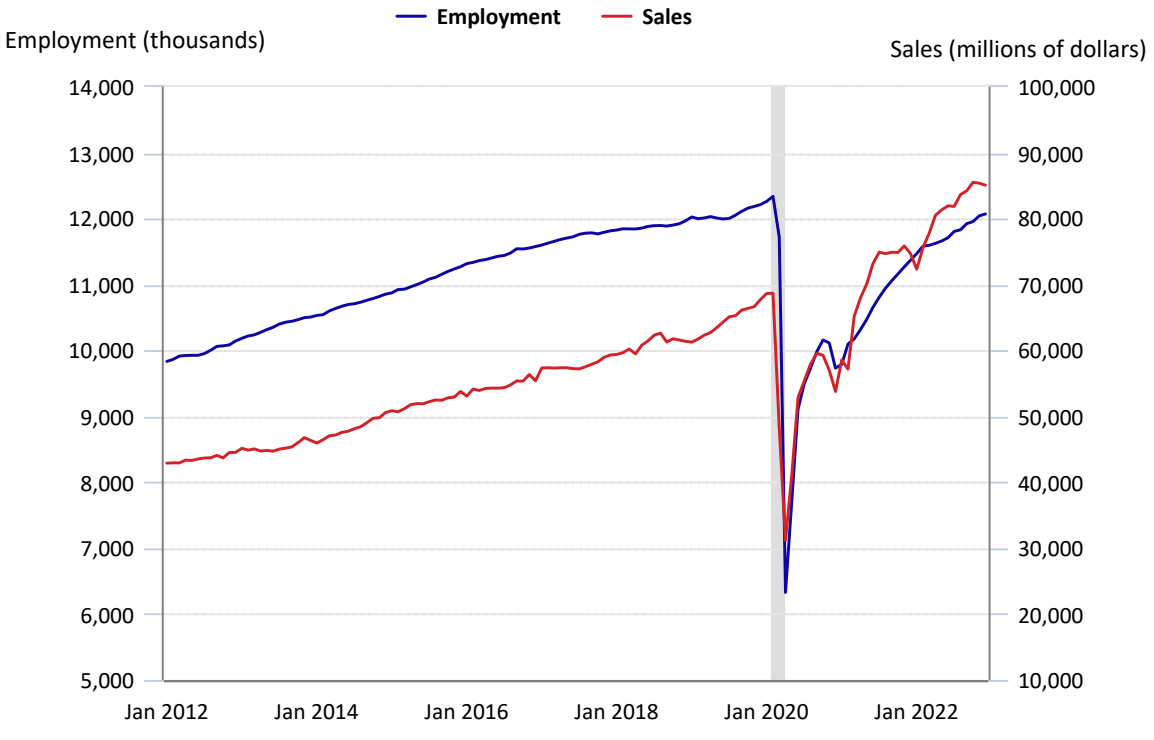
Chart 22. Over-the-year employment change in leisure and hospitality, by component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

View Chart Data

Chart 23. Employment and monthly sales in food services and drinking places, seasonally adjusted, January 2012–December 2022



Click legend items to change data display. Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey (employment); and U.S. Census Bureau (sales).

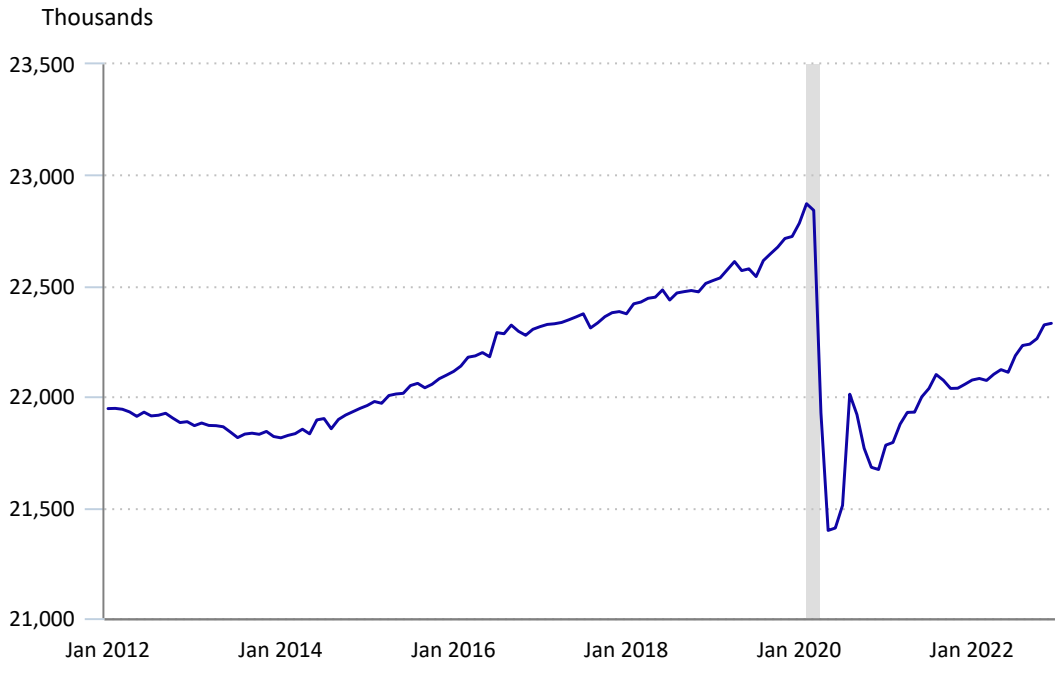
View Chart Data

Elsewhere within leisure and hospitality, notable job gains occurred in accommodation (+173,000) and in amusement, gambling, and recreation industries (+140,000), with both industries showing a similar trend of slowing recovery in 2022 compared with 2021.

Government

Employment in government grew by 275,000 in 2022, compared with 385,000 in 2021. (See chart 24.) As of December 2022, government employment was 540,000 below its February 2020 level.

Chart 24. Employment in government, seasonally adjusted, January 2012–December 2022

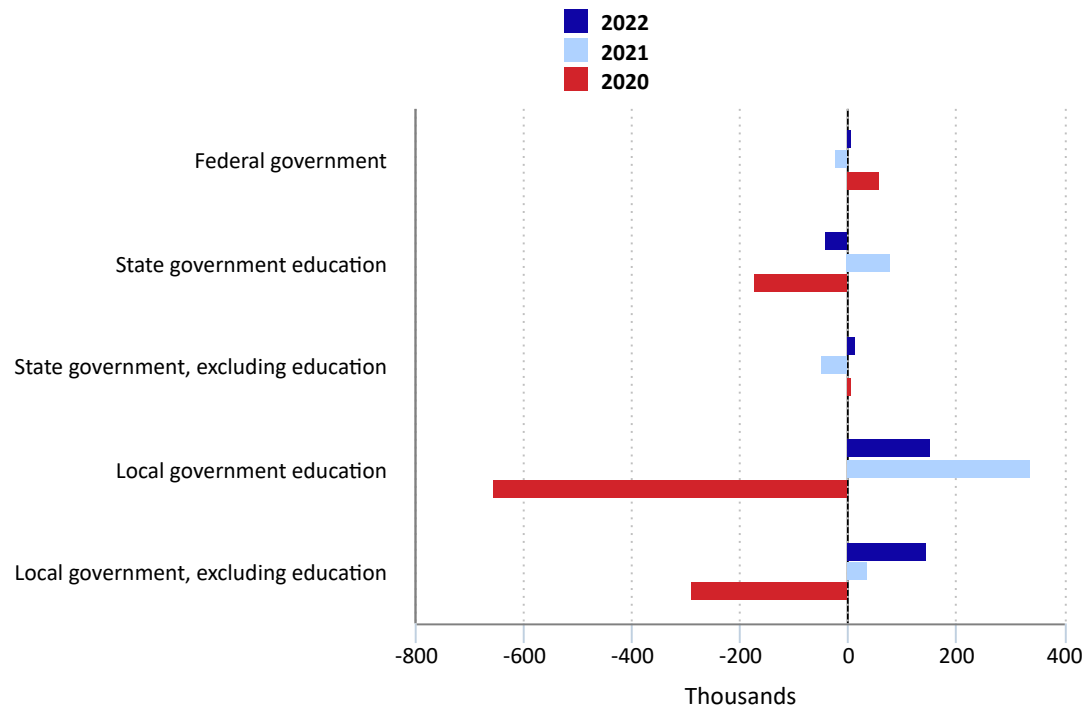


Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

View Chart Data

Job gains in 2022 were led by local government education (+154,000) and local government, excluding education (+145,000). (See chart 25.) As of December, employment in local government was 329,000 below its February 2020 level, with local government education accounting for 188,000 of those jobs. Similarly, employment in state government ended the year at 230,000 below its February 2020 level, with state government education accounting for 191,000 of those jobs. Over-the-year employment growth in state government education was somewhat hampered by a large university strike that was reflected in the December CES estimates.[24]

Chart 25. Over-the-year employment change in government, by selected component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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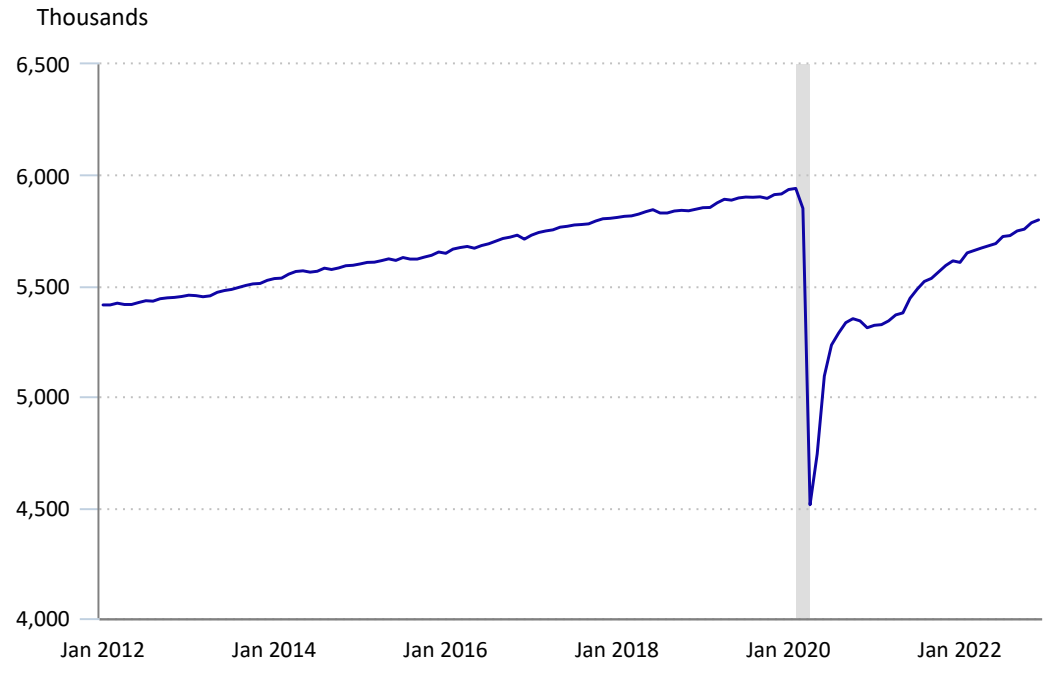
Federal government employment was unchanged, on net, in 2022, following a loss of 22,000 in 2021.

Other services

Employment in other services rose by 185,000 in 2022, considerably less than the increase of 302,000 in 2021. As of December 2022, employment in other services was 142,000 below its February 2020 level. (See chart 26.)

Chart 26. Employment in other services, seasonally adjusted, January 2012–December 2022



Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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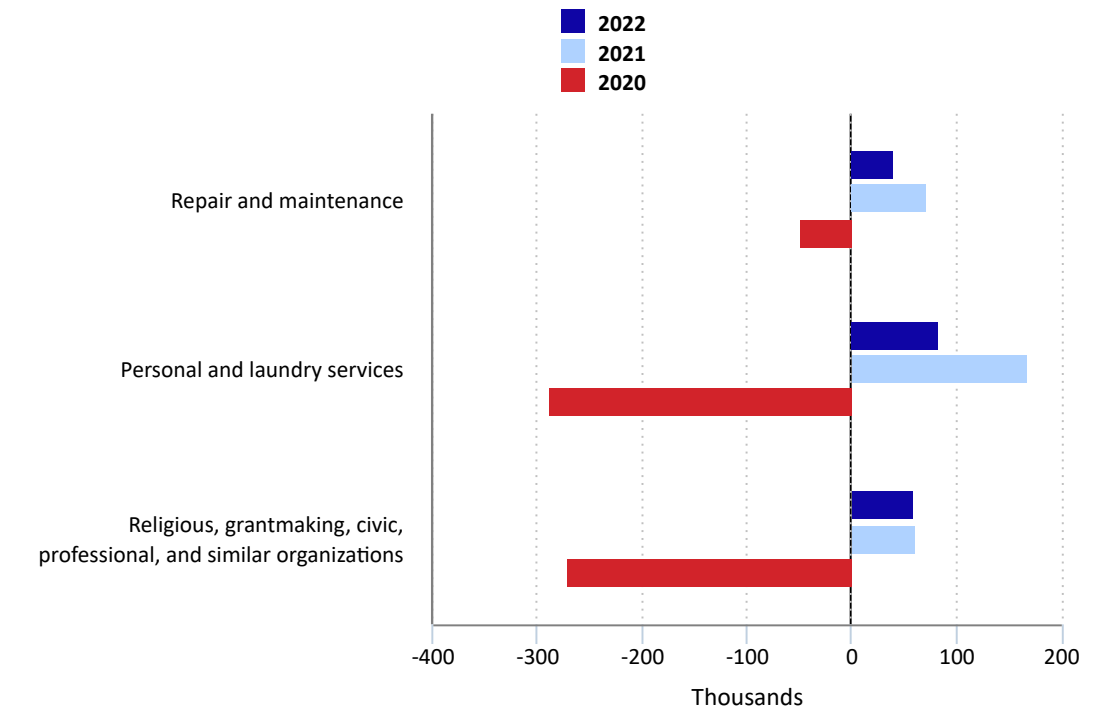
Within other services, employment increased over the year in personal and laundry services (+84,000) and in religious, grantmaking, civic, professional, and similar organizations (+60,000), while employment changed little in repair and maintenance (+40,000). (See chart 27.) Job growth in 2022 slowed considerably in both personal and laundry services and repair and maintenance, which added 169,000 jobs and 72,000 jobs, respectively, in 2021.

Chart 27. Over-the-year employment change in other services, by component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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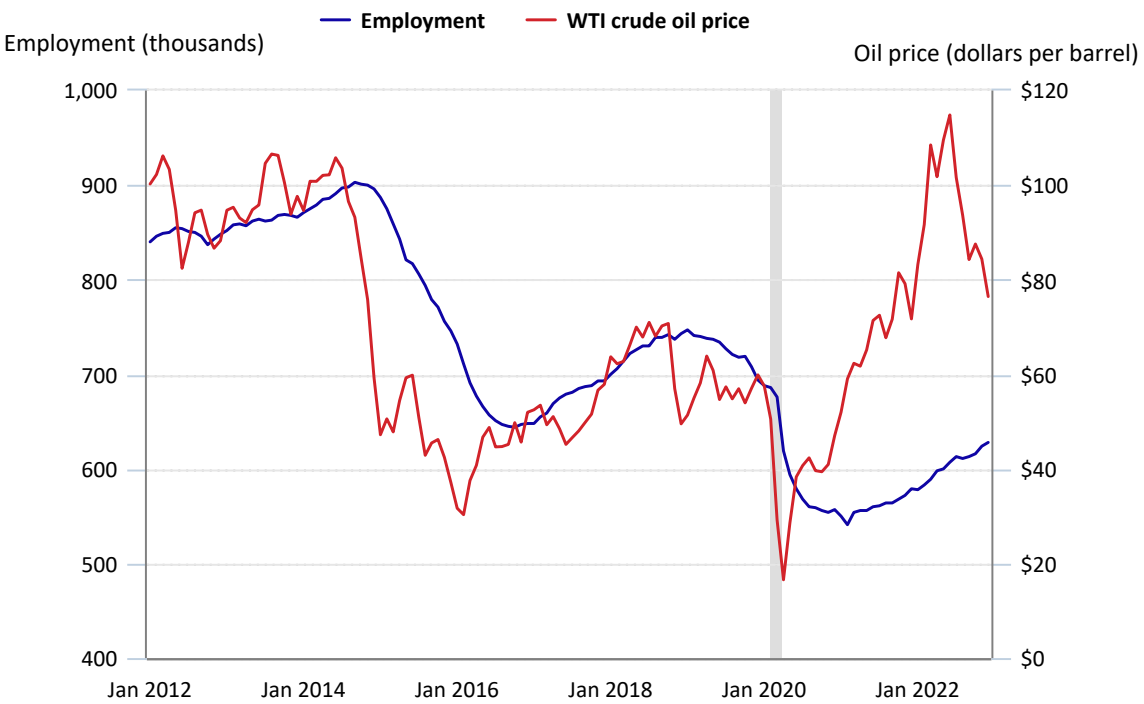
Mining and logging

Since reaching a trough in February 2021, employment in mining and logging has risen by 87,000, with 49,000 of those jobs added in 2022. (See chart 28.) The 2022 gains were concentrated in support activities for mining (+36,000). As of December, employment in mining and logging was 58,000 below its February 2020 level and 119,000 below its most recent peak in January 2019. Because mining and logging employment is highly sensitive to fluctuations in oil prices, gains in 2022 were likely driven by over-the-year increases in the price of crude oil (measured by the price of West Texas Intermediate crude oil).[25]

Chart 28. Employment in mining and logging, seasonally adjusted, and West Texas Intermediate (WTI) crude oil price, not seasonally adjusted, January 2012–December 2022



Click legend items to change data display. Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey (employment); and Federal Reserve Bank of St. Louis (crude oil prices).

View Chart Data

Retail trade

Retail trade employment briefly recovered to its prepandemic level in February 2022. However, by the end of the year, employment in retail trade was 86,000 below its February 2022 peak and 42,000 below its February 2020 level. (See chart 29.) Consistent with these employment trends, retail sales growth slowed in 2022 (+4.8 percent) to less than half the rate in 2021 (+14.7 percent).[26]

Chart 29. Employment in retail trade, seasonally adjusted, January 2012–December 2022

Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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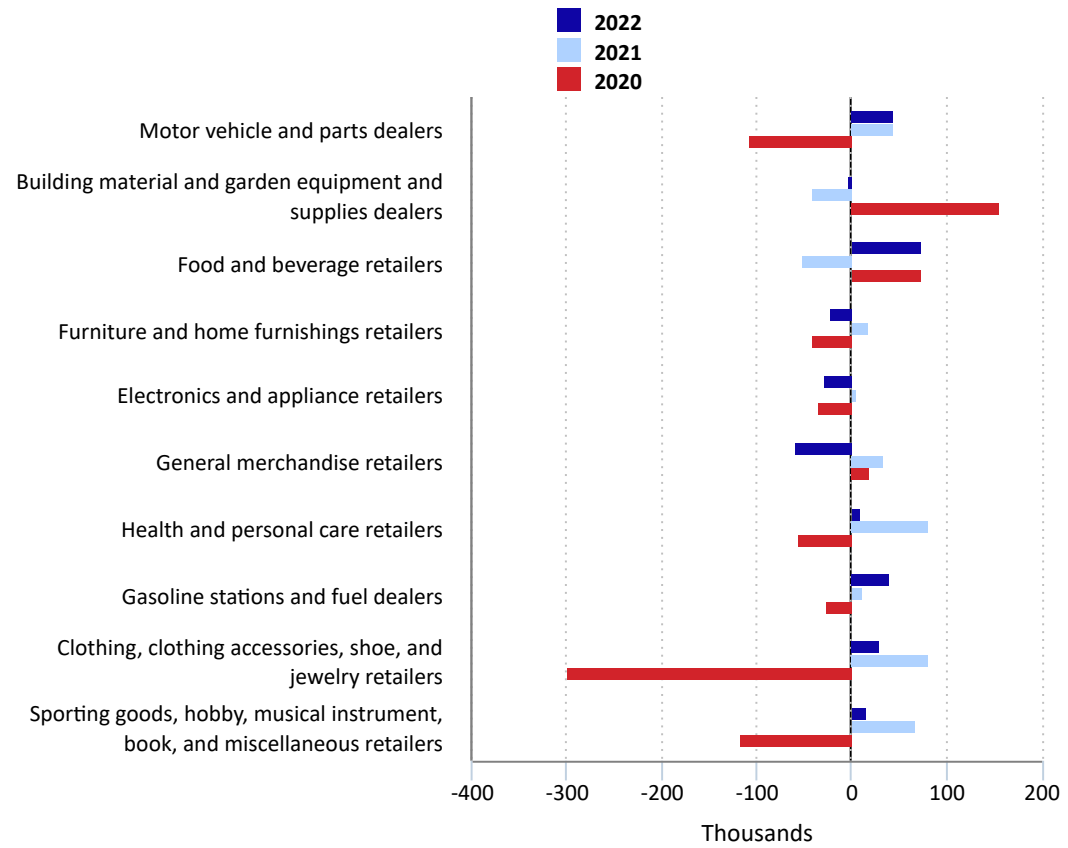
Within retail trade, food and beverage retailers led the employment gains in 2022, adding 74,000 jobs after losing 50,000 in 2021. (See chart 30.) Consistent with employment strength in the industry, food and beverage sales increased by 6.7 percent over the year.[27]

Chart 30. Over-the-year employment change in retail trade, by component industry, seasonally adjusted, 2020, 2021, and 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey.

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Elsewhere in retail trade, employment increased in motor vehicle and parts dealers (+44,000) and in gasoline stations and fuel dealers (+41,000), while it decreased in general merchandise retailers (–59,000), electronics and appliance retailers (–27,000), and furniture and home furnishings retailers (–22,000). Three industries in retail trade did not keep pace with their 2021 increases—employment changed little in 2022 in clothing accessories, shoe, and jewelry retailers (+30,000); sporting goods, hobby, musical instrument, book, and miscellaneous retailers (+16,000); and health and personal care retailers (+10,000), after increasing by 82,000, 67,000, and 82,000, respectively, in 2021.

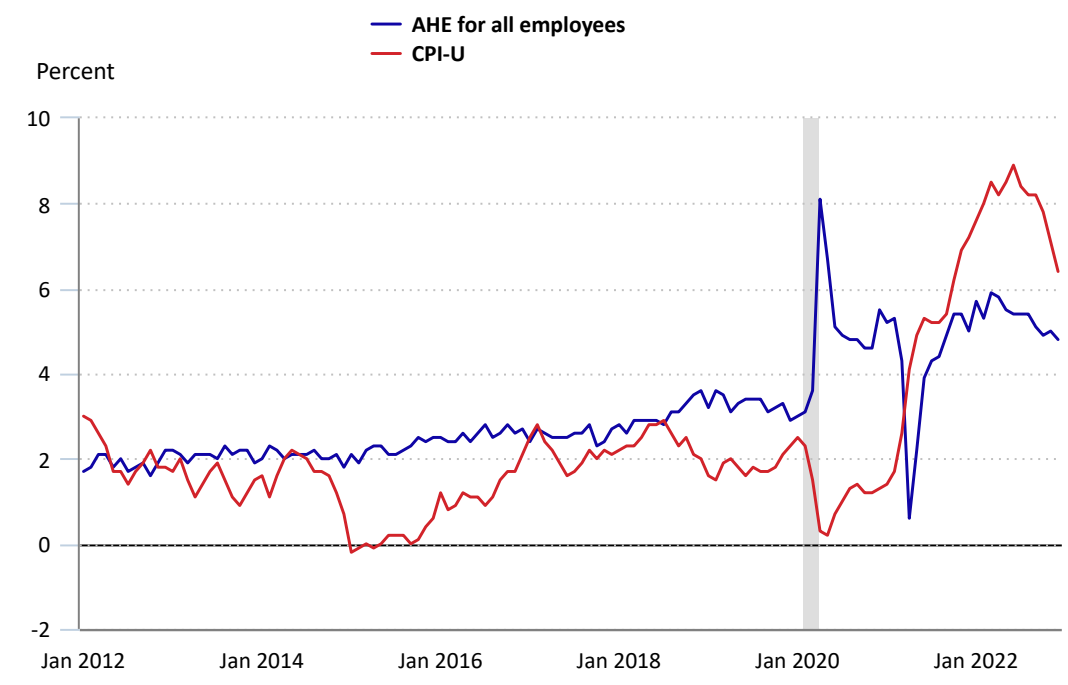
Hours and earnings

In 2022, average weekly hours of all private-sector employees fell by 0.4 hour, to 34.4 hours, while average weekly hours of private-sector production and nonsupervisory employees declined by 0.3 hour, to 33.8 hours. The over-the-year decline in average weekly hours for all employees was the largest since 2008, and the decline for production and nonsupervisory employees was the largest since 2016.

The index of aggregate weekly hours, which combines changes in both employment and the length of the workweek, increased by 2.7 points for all private-sector employees in 2022 and by 2.9 points for production and nonsupervisory employees. In addition, the indexes for all employees and for production and nonsupervisory employees were above their prepandemic levels by 2.4 and 2.0 points, respectively, in December 2022.

Average hourly earnings of all private-sector employees increased by 4.8 percent in 2022, the third-largest calendar-year gain since the series began in March 2006. The 2022 increase followed gains of 5.0 percent in 2021 and 5.5 percent in 2020. (See chart 31.) Average hourly earnings of production and nonsupervisory employees, which represent about 81 percent of all employees, increased by 5.4 percent over the year, following gains of 6.4 percent in 2021 and 5.5 percent in 2020.

Chart 31. Over-the-year percent change in average hourly earnings (AHE) for all employees and the Consumer Price Index for All Urban Consumers (CPI-U), seasonally adjusted, January 2012–December 2022



Click legend items to change data display. Hover over chart to view data.
Shaded area represents a recession as determined by the National Bureau of Economic Research.
Source: U.S. Bureau of Labor Statistics.

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As in 2021, the gains in average hourly earnings of all employees in 2022 were tied to inflationary effects. Real average hourly earnings for all employees, which are adjusted for inflation using the CPI-U, declined by 1.6 percent over the year. Real average hourly earnings for production and nonsupervisory employees, which are adjusted for

inflation using the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W), declined by 0.8 percent in 2022.

Conclusion

In 2022, total nonfarm employment rose by 4.8 million, recovering from job losses related to the onset of the COVID-19 pandemic and expanding beyond its February 2020 level. All major industry sectors added jobs over the year, with leisure and hospitality, private education and health services, and professional and business services leading the gains. Although some major industry sectors recovered from their pandemic-related job losses in 2022, employment remained below its February 2020 level in leisure and hospitality, government, other services, mining and logging, and retail trade. Average hourly earnings increased over the year, while average weekly hours declined.

SUGGESTED CITATION:

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Notes

[1] The U.S. Bureau of Labor Statistics (BLS) Current Employment Statistics (CES) program, which provides detailed industry data on employment, hours, and earnings of workers on nonfarm payrolls, is a monthly survey of about 122,000 businesses and government agencies representing approximately 666,000 individual worksites. For more information on the program's concepts and methodology, see "Current Employment Statistics–National," in *Handbook of Methods* (U.S. Bureau of Labor Statistics, last modified May 4, 2022), https://www.bls.gov/opub/hom/ces/. To access CES national data, see "Current Employment Statistics–CES (National)," https://www.bls.gov/ces. The CES data used in this article are seasonally adjusted unless otherwise noted.

[2] Private education and health services is the first example of industry titles used in this article that have recently changed. With the release of January 2023 data on February 3, 2023, the Current Employment Statistics (CES) survey revised the basis for industry classification from the 2017 North American Industry Classification System (NAICS) to the 2022 NAICS. The conversion to NAICS 2022 resulted in major revisions reflecting content and coding changes in the retail trade and information sectors, as well as minor revisions reflecting content and coding changes within the mining and logging, manufacturing, wholesale trade, financial activities, and other services sectors. Many industry titles and descriptions were updated to better reflect official NAICS titles. Approximately 10 percent of employment was reclassified into different industries as a result of the revision. Details of updated titles and new, discontinued, and collapsed industries resulting from the NAICS 2022 update, are available at "Current Employment Statistics–CES (National): the North American Industry Classification System in the Current Employment Statistics program" (U.S. Bureau of Labor Statistics, last modified February 3, 2023), https://www.bls.gov/ces/naics/naics-2022.htm.

[3] Goods-producing industries include mining and logging, construction, and manufacturing.

[4] See American Staffing Association, "Staffing employment declines in December," December 28, 2022, https://americanstaffing.net/posts/2022/12/28/staffing-employment-declines-in-december/.

[5] For more information on temporary help workers and how employment in the industry functions as an overall indicator of the U.S. economy, see Tian Luo, Amar Mann, and Richard J. Holden, "What happened to temps? Changes since the Great Recession," *Monthly Labor Review*, February 2021, https://doi.org/10.21916/mlr.2021.1. See also Jessica R. Nicholson, "Temporary help workers in the U.S. labor market," *ESA Issue Brief*, no. 03-15 (U.S. Department of Commerce, Economics and Statistics Administration, July 1, 2015), https://www.commerce.gov/sites/default/files/migrated/reports/temporary-help-workers-in-the-us-labor-market.pdf; and Tian Luo, Amar Mann, and Richard Holden, "The expanding role of temporary help services from 1990 to 2008," *Monthly Labor Review*, August 2010, https://www.bls.gov/opub/mlr/2010/08/art1full.pdf. For more on the growing fears of recession in 2022, see David J. Lynch, "Economy shows resilience despite mounting recession fears," *The Washington Post*, June 4, 2022, https://www.washingtonpost.com/business/2022/06/04/recession-fears-strong-economy/.

[6] See "Cass Freight Index: Shipments," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 14, 2023), https://fred.stlouisfed.org/series/FRGSHPUSM649NCIS.

[7] See "Truck Tonnage Index," FRED Economic Data (Federal Reserve Bank of St. Louis, updated March 8, 2023), https://fred.stlouisfed.org/series/TRUCKD11; and "Air Revenue Passenger Miles," FRED Economic Data (Federal Reserve Bank of St. Louis, updated March 8, 2023), https://fred.stlouisfed.org/series/AIRRPMTSID11.

[8] See Mayumi Brewster, "E-commerce sales surged during the pandemic" (U.S. Census Bureau, April 27, 2022), https://www.census.gov/library/stories/2022/04/ecommerce-sales-surged-during-pandemic.html; and "E-commerce retail sales as a percent of total sales," FRED Economic Data (Federal Reserve Bank of St. Louis, updated February 27, 2023), https://fred.stlouisfed.org/series/ECOMPCTSA.

[9] See Philip Plotch, "Transit ridership: not expected to return to pre-pandemic levels this decade," Eno Center for Transportation (website), July 1, 2022, https://www.enotrans.org/article/transit-ridership-not-expected-to-return-to-pre-pandemic-levels-this-decade/.

[10] See "Federal funds effective rate," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 3, 2023), https://fred.stlouisfed.org/series/FEDFUNDS; and Rob Wile, "How raising interest rates helps fight inflation and high prices," NBC News (website), June 16, 2022 (updated December 22, 2022), https://www.nbcnews.com/business/economy/how-raising-interest-rates-helps-fight-inflation-high-prices-recession-rcna33754.

[11] See "30-Year fixed rate mortgage average in the United States," FRED Economic Data (Federal Reserve Bank of St. Louis, April 27, 2023), https://fred.stlouisfed.org/series/MORTGAGE30US; and Erika Giovanetti, "Mortgage rates edge higher to close out a record-breaking 2022," U.S. News and World Report, January 3, 2023, https://money.usnews.com/loans/mortgages/articles/mortgage-market-news-dec-29-2022.

[12] See "S&P 500," FRED Economic Data (Federal Reserve Bank of St. Louis, April 26, 2023), https://fred.stlouisfed.org/series/SP500.

[13] See Casey Egan and Stefen Joshua Rasay, "U.S. motion picture, sound recording workers hit hard by job losses in April," S&P Global: Market Intelligence (website), https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/us-motion-picture-sound-recording-workers-hit-hard-by-job-losses-in-april-58565221.

[14] See "Total construction spending: residential in the United States," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 3, 2023), https://fred.stlouisfed.org/series/TLRESCONS; and "Total construction spending: nonresidential in the United States," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 3, 2023), https://fred.stlouisfed.org/series/TLNRESCONS.

[15] See "New privately-owned housing units started: total units," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 18, 2023), https://fred.stlouisfed.org/series/HOUST; "New privately-owned housing units authorized in permit-issuing places: total units," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 25, 2023), https://fred.stlouisfed.org/series/PERMIT; and "New one family houses sold: United States," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 25, 2023), https://fred.stlouisfed.org/series/HSN1F.

[16] See "NAHB/Wells Fargo Housing Market Index," National Association of Home Builders (website), April 17, 2023, https://www.nahb.org/news-and-economics/housing-economics/indices/housing-market-index.

[17] See Diana Olick, "Homebuilder sentiment drops for the 12th straight month, but a bottom may be near," CNBC (website), December 19, 2022, https://www.cnbc.com/2022/12/19/homebuilder-sentiment-falls-bottom-may-be-near.html.

[18] See "Domestic auto production," FRED Economic Data (Federal Reserve Bank of St. Louis, updated March 31, 2023), https://fred.stlouisfed.org/series/DAUPSA.

[19] See Ondrej Burkacky, Johannes Deichmann, Philipp Pfingstag, and Julia Werra, "Semiconductor shortage: How the automotive industry can succeed," McKinsey & Company (website), June 10, 2022, https://www.mckinsey.com/industries/semiconductors/our-insights/semiconductor-shortage-how-the-automotive-industry-can-succeed.

[20] See "Durable goods: U.S. total—seasonally adjusted new orders (millions of dollars)," Business and industry: time series/trend charts (U.S. Census Bureau, May 13, 2022), https://www.census.gov/econ/currentdata/dbsearch?programCode=M3ADV&startYear=2011&endYear=2022&categories[]=MDM&dataType=NO&geoLevel=US&adjusted=1&notAdjusted=0&errorData=0#table-results.

[21] See "Manufacturing PMI at 48.4%; December 2022 manufacturing ISM report on business," *PR Newswire*, January 4, 2023, https://www.prnewswire.com/news-releases/manufacturing-pmi-at-48-4-december-2022-manufacturing-ism-report-on-business-301712602.html.

[22] See "Retail sales: food services and drinking places (percent change from year ago)," FRED Economic Data (Federal Reserve Bank of St. Louis, updated May 16, 2023), https://fred.stlouisfed.org/series/MRTSSM722USS.

[23] See Databases, Tables & Calculators by Subject: CPI for All Urban Consumers (U.S. Bureau of Labor Statistics, accessed April 27, 2023), https://data.bls.gov/timeseries/CUSR0000SA0.

[24] See "Current Employment Statistics–CES (National): strikes occurring during CES survey reference period, 1990-present" (U.S. Bureau of Labor Statistics, last modified May 26, 2023), https://www.bls.gov/ces/publications/strike-history.htm. For more on how strikes affect the CES estimates, see John P. Mullins, "Understanding strikes in CES estimates," *Monthly Labor Review*, November 2015, https://www.bls.gov/opub/mlr/2015/article/understanding-strikes-in-ces-estimates.htm.

[25] See "Spot crude oil price: West Texas Intermediate (WTI)," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 5, 2023), https://fred.stlouisfed.org/series/WTISPLC.

[26] See "Advance retail sales: retail trade," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 24, 2023), https://fred.stlouisfed.org/series/RSXFS.

[27] See "Advance retail sales: food and beverage stores," FRED Economic Data (Federal Reserve Bank of St. Louis, updated April 24, 2023), https://fred.stlouisfed.org/series/RSDBS.

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June 2023

Improvements to the CPI index series for residential telecommunications services

Residential telecommunications services consist of a combination of telephone, internet, and television services. In February 2019, the U.S. Bureau of Labor Statistics (BLS) began to adjust the price quotes of residential telecommunications services to improve the accuracy of Consumer Price Index series. However, BLS analysts experienced a few challenges. This article identifies and addresses those challenges.

With the release of January 2019 Consumer Price Index (CPI) data, the U.S. Bureau of Labor Statistics (BLS) began to adjust the collected price quotes of residential telecommunications services to ensure they are of constant quality. In estimating the CPI, BLS measures only differences in price between comparable items, not differences in price that arise from differences in quality. As part of ongoing efforts of BLS to improve the accuracy of the CPI series, this article describes the challenges that led to the adoption of methodological changes to the CPI series for residential telecommunications services and briefly discusses the updated models that incorporate them.

Defining residential telecommunications services

The residential telecommunications services group comprises the indexes for residential telephone services; internet services and electronic information providers; and cable, satellite, and live streaming television service. It is now adjusted to account for the rapid technological change in these services.

The residential telephone services series includes all types of local, long-distance, and Voice over Internet Protocol (VoIP) residential telephone services. VoIP operates similarly to other residential telephone services, except that VoIP requires an internet connection. Over time, providers of these services have tended to increase the amount of allowed calling, with many firms adding unlimited calling. Many other features have also been added to available packages.

The internet services and electronic information providers component of the CPI is composed of charges for internet access through digital subscriber lines (DSLs), cable services, and fiber-optic services, as well as other online services such as web hosting, domain names, and file hosting for noncommercial use. Wireless telephone plans that include internet access are not eligible in this category (such plans are included in the wireless telephone service component). However, mobile internet access provided by wireless carriers through equipment, such as mobile hotspots, is eligible to be included. These plans can change rapidly with respect to upload and download speeds.

The CPI series for cable, satellite, and live streaming television service contain subscription fees for services such as basic cable, digital cable, expanded cable, streaming video services provided by cable or satellite television providers, live television on internet-connected devices, and premium movie channels. The category does not include third-party subscription video services or satellite radio services. Different television service packages can vary widely in the number and variety of channels offered, as well as the included additional services, such as high-definition reception or digital video recorder services.

Bundled packages of the three categories (telephone, internet, and television) of residential telecommunications services are also included in each of the three indexes. Taken together, residential telecommunications services represent about 2.1 percent of the CPI as of December 2022. This percentage represents a slight decline from around 2.8 percent of the CPI 10 years ago, although the distribution of the expenditure on the services has moved toward television and internet services and away from residential telephone services. A factsheet is available on measuring price change of telecommunications services in the CPI.[1]

Pricing telecommunications services

The CPI program uses a cost-of-living framework to address questions that arise in constructing the CPI. However, the collection of prices for telecommunications services is complicated by challenges particular to these expenditure categories.

The challenges: initiation and substitution

Two main factors affected the accuracy of these residential telecommunications services: (1) initiation, selecting a specific eligible product or service from among those offered by the outlet surveyed for inclusion in the CPI sample, and (2) substitution, choosing an eligible product or service to replace one that is no longer for sale. Ordinarily, a new price quote is initiated into the CPI sample with the help of a respondent employed by the firm being surveyed. The respondent can provide information about the share of the firm's revenue that is represented by a specific product offering. These revenue shares form the probability distribution used to select a unique item. That is, if an item represents 20 percent of a firm's revenue, it should be selected for inclusion in the CPI sample 20 percent of the time.

A large proportion of sampled items for telecommunications services, however, is collected online rather than collected in person with a visit to a retail location. Hence, data are generally collected without the aid of a respondent. So, the usual process of selecting a unique eligible product to initiate into the CPI sample for pricing by using a probability based on the product's proportion of the firm's sales is not possible. This difficulty in initiating new items can lead to a reliance on equal probability between available plans in selecting a unique service plan to track over time. Without a respondent's input about the share of the firm's revenue each plan comprises, no mechanism exists to weight the various options.

Consumer expenditures are not likely equally distributed between various plans and options. Some plans are more popular with consumers than others and represent a disproportionate share of consumer expenditures. Commercial household survey data obtained by BLS show that more than 95 percent of consumers purchasing residential telephone services, for example, are purchasing bundled packages with one or more other telecommunications services.[2] This propensity of consumers to purchase bundled

services can introduce some mismeasurement into the index because standalone prices have risen, on average, more quickly than bundled prices, especially for telephone and internet services.

Telecommunications services indexes collected online are also subject to high rates of substitution as the offered plans change. Compared with other item categories in the CPI, telecommunications services plans in the CPI sample need to be substituted with other plans more often as they become unavailable. This increased rate of substitution is observed, in part, because the firms' websites primarily provide information on new customer offerings, which can change rapidly. A review of commercial household survey data suggests that the CPI substitution rate for telecommunications services is 2 to 3 times larger than the actual rate at which consumers switch service plans.[3] This finding reveals that many consumers will continue to purchase these services on contracts that are no longer being offered to new consumers and will not appear on the firms' website. These substitutions are often to service plans that are not directly comparable to the plan previously priced for inclusion in the CPI. This result increases reliance on imputation to fill the uncollected observations with the average of quotes for similar items in the same area. Such increased reliance on imputation effectively reduces the sample size for these series, if quality adjustment techniques are not developed to allow such plans to be compared.

Addressing the challenges

To lessen the bias caused by relying on equal probability sampling in initiation, BLS began using commercial household survey data to guide field staff in selecting the most important characteristics and packages to price within new samples in February 2019. This new procedure allows CPI samples to include more bundled plans, mirror consumer behavior more closely, and reflect price changes more accurately.

To minimize the impact of substitutions between plans, CPI analysts developed five different hedonic regression models, one for each type of standalone plan (including wireless internet) and an additional model for bundled plans. These models help analysts adjust for the quality of substituted plans. The explanatory variables of interest with coefficients estimated by these models are the download speed and number of channels offered. Other categorical variables of interest for several calling features were also included in the model specifications, such as provided equipment, unlimited plans, premium packages, and various bundle combinations. The models also included a number of control variables, such as those for regional markets or specific firms. CPI analysts reestimate the models each year to ensure that the models remain relevant and continue to improve the accuracy of these series.

Conclusion

These methodological changes to the initiation and substitution processes for telecommunications services will improve the CPI estimates for these services. BLS is always working to improve the accuracy of the CPI series and will continue to introduce methodological improvements as appropriate.

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Notes

[1] For additional information on these item categories within the CPI, see "Measuring price change in the CPI: telecommunications services," Consumer Price Index (U.S. Bureau of Labor Statistics, last modified February 10, 2023), https://www.bls.gov/cpi/factsheets/telecommunications.htm.

[2] On the basis of respondent confidentiality, the source of this information is not publicly available.

[3] The source of this information is also not publicly available on the basis of respondent confidentiality.

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BOOK REVIEW

June 2023

The past as prologue: an industrial relations scholar reflects on his life's work

A Field in Flux: Sixty Years of Industrial Relations. By Robert B. McKersie. Ithaca, NY: Cornell University Press, 2019, 234 pp., $43.95 hardcover.

From the Great Resignation to the Great Reshuffle, the COVID-19 pandemic triggered seismic shifts in the U.S. workforce, including a resurgence of labor union activity. As employers and workers confronted unprecedented and unpredictable circumstances, particularly in the transportation, manufacturing, and healthcare industries, unions led the fight for new health and safety measures, wage increases, and expanded sick leave. These efforts seemingly resonated with the public. According to an August 2022 Gallup poll, 71 percent of Americans approve of labor unions—the highest approval rating since 1965. In addition, workers at corporate giants Starbucks, Amazon, and Apple led successful labor-organizing campaigns.

While written just prior to the pandemic, *A Field in Flux: Sixty Years of Industrial Relations* provides an insightful lens through which to view the labor movement's continuing evolution. In the book, author Robert B. McKersie, a renowned industrial relations scholar and a leading expert in the field of work and employment relations, takes the reader on a warts-and-all, 60-year journey through what he fondly calls his "life's work." McKersie's reflections are intimate, incisive, and rooted in historical context, as his career has intersected with momentous changes in industrial relations. From this perspective, he speculates on the future of the field, on the premise that the past is, indeed, prologue.

McKersie begins the book by sharing the early influences that shaped his perspective and led him into the field, including having family members in unions and an enduring love of transportation, particularly trains. He recounts how his undergraduate training as an electrical engineer at the University of Pennsylvania, which emphasized problem solving, prompted his attendance at Harvard Business School from 1954 to 1959, where a similar pedagogical approach—the case method—was used. At Harvard, labor relations courses cemented McKersie's interest in the field. This problem-solving focus is a recurrent theme in the book, with the author discussing his various roles as an academic, an arbitrator, and an activist. In his view, the field of industrial relations has been, and will continue to be, "uniquely positioned in the social sciences as a problem-oriented and problem-solving field of study."

As would often be the case in McKersie's life, his timing was fortuitous. He entered the field just as unions peaked in size and power, an ascent resulting from the 1935 passage of the National Labor Relations Act (Wagner Act). After receiving his Harvard doctorate, McKersie joined the faculty of the University of Chicago Graduate School of Business, remaining there from 1959 to 1971. This period was, in his words, "a heady time" at the school, and in Chicago. The university's faculty included George P. Schultz, who served as U.S. Secretary of Labor from 1969 to 1970, and later, between 1982 and 1989, as U.S. Secretary of State. Schulz, as dean of the School of Business, was a union proponent and a mentor and role model for McKersie.

McKersie does not conceal his own support for unions, declaring that, "when workers are represented by a union, good things happen." Yet, revealingly, he also ponders whether his view of unions has been "too romantic" given his personal background and his admiration for the leadership of AFL-CIO founders George Meany and Walter Reuther. Ultimately, McKersie admits to a predisposition "to being swept off [his] feet by social action," as evidenced by his civil rights involvement. He recalls that the burgeoning Chicago civil rights movement pulled him into an activist role "in a major way." He explains that the movement reflected the "energy and impact of the labor movement of earlier decades. In both cases, injustices needed to be addressed…and mobilizing the aggrieved in large numbers was the only way to effect change."

This interplay between discipline-based theory and practical engagement, honed during McKersie's Chicago tenure, would become a hallmark of his career. McKersie demonstrated a remarkable facility for moving beyond academia's ivory tower into the arenas of business and organized labor—often gaining a seat at the table, as consequential decisions were made. Such deftness of movement became a tool in McKersie's professional arsenal, fostering understanding between competing interests and, simultaneously, providing a fertile training ground for his industrial relations students.

While in Chicago, McKersie began contemplating the impact of automation in the manufacturing sector, an interest stimulated by the region's large meat-packing industry. As the book highlights, McKersie's concerns about new technologies leading to job elimination and worker displacement increased over time, focusing on technological innovations such as robotics, digital manufacturing, and artificial intelligence. The author opines that determining how "workers fit into the equation of technological change will occupy scholars…for the foreseeable future." His concerns have been validated by the rapid development of new technologies with the potential to disrupt the workforce.

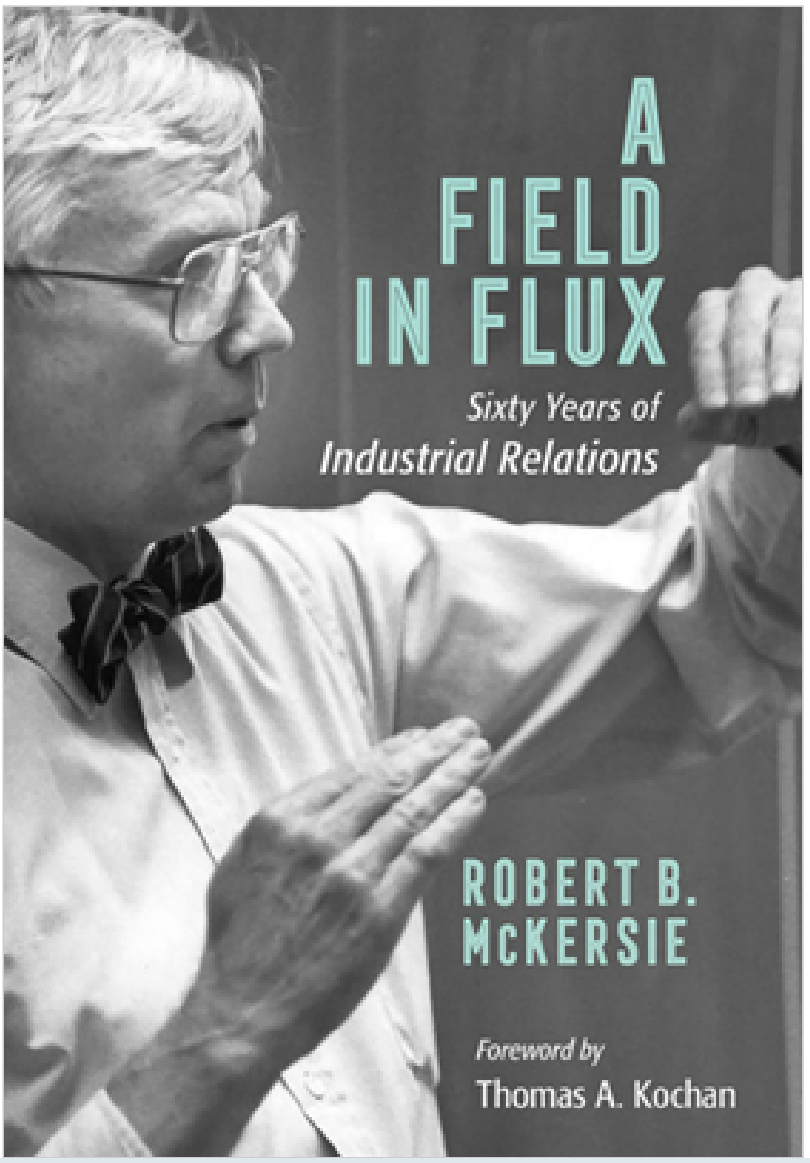
After leaving Chicago, McKersie served as Cornell University's dean of the New York State School of Industrial and Labor Relations, a position he held from 1971 to 1979. While at Cornell, he focused on the "hot" new area of public sector collective bargaining, which was fueled by the surge of union organizing activity in the public sector in the 1960s and 1970s, even as private sector unionization had begun to decline. McKersie notes that collective bargaining in the public sector has become quite contentious, a development he attributes to increasing financial constraints of state and local governments to fund worker benefits, coupled with public unions' resistance to, and fear of, change. He urges that sensible solutions be found to address these issues. His point is well taken, as the pandemic and its aftermath have only heightened tensions in collective bargaining.

Fittingly, in 1980, McKersie arrived at the engineer's mecca, the Massachusetts Institute of Technology (MIT), accepting an industrial relations faculty appointment at the Sloan School of Management. He has remained at the school, although now as an emeritus professor. Not surprisingly, McKersie explains that he was drawn to MIT's emphasis on problem solving and innovation, at a time when many problems needed to be solved as a result of "one of the major turning points in labor relations in the last half century." The turning point was, of course, the 1981 Professional Air Traffic Controllers Organization strike, which President Ronald Reagan declared illegal, firing all strikers who refused to return to work within 48 hours. McKersie states that President Reagan's actions "set the tone for labor relations in the years and decades to follow,

encouraging employers to adopt a hard line vis-à-vis unions." Consequently, the author began exhaustive research in order to understand the resulting transformations in industrial relations.

McKersie's retrospective concludes with reflections on the current state of industrial relations against the backdrop of greater workforce diversity, income inequality, globalization, and the shift from a production-centered economy to a knowledge-based economy. Charting the path forward, the author asserts that labor and management must work together, creatively, to solve the pressing problems of business and worker welfare. He also emphasizes that workers continue to want to voice and discuss their concerns in the workplace, with unions being a logical, though often unavailable, means by which to do so. In this vein, he maintains that there is one question that is as relevant now as it was prior to the New Deal: "Which future systems of worker voice and representation fit the needs of the present and future workforce and economy?" According to McKersie, a fundamental tenet of industrial relations is that a democratic society must "hear and heed the voice of the workforce in economic and political affairs."

For those interested in the practical and historical dimensions of labor relations, *A Field in Flux* is a great read filled with insightful reminiscences, lessons learned, and views. The book is relatively short, which is no small feat given the scope and breadth of McKersie's career. Over the course of six chapters, the author covers many topics, some of which the reader may wish had been discussed in greater depth. In my opinion, however, the book's focus on the big picture is part of its appeal. McKersie, the engineer turned professor, has, figuratively speaking, left problems on the board for the reader to solve and questions to ponder, research, and discuss. Moreover, by framing his narrative in a historical context, he is able to look ahead and to remind the reader that, as writer William Faulkner once remarked, "History is not was, it is."



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ARTICLE

June 2023

Unemployment rate returned to its prepandemic level in 2022

The U.S. labor market logged another year of recovery in 2022. Unemployment continued to decline early in the year and then leveled off. In the fourth quarter, both the number of unemployed people, at 5.9 million, and the unemployment rate, at 3.6 percent, were on par with levels recorded prior to the COVID-19 pandemic. Total employment, as measured by the Current Population Survey, continued to expand in 2022. The employment–population ratio, at 60.0 percent in the fourth quarter, increased over the year, but the labor force participation rate, at 62.2 percent, changed little. Both measures remained below their prepandemic levels.

In 2022, the U.S. labor market continued to recover from the recession induced by the COVID-19 pandemic.[1] In the fourth quarter of 2022, the unemployment rate averaged 3.6 percent, 0.6 percentage point below the rate from a year earlier.[2] The number of unemployed people, at 5.9 million in the fourth quarter, decreased over the year. Both measures returned to their prepandemic levels.[3]

Total employment, as measured by the Current Population Survey (CPS), rose over the year.[4] The employment–population ratio increased to 60.0 percent, but it remained below its prepandemic value. The labor force participation rate (the percentage of the population ages 16 and older who are either employed or actively seeking employment), at 62.2 percent in the fourth quarter, was essentially unchanged over the year (after removing the effects of annual adjustments to population controls) and remained below its prepandemic level. (See appendix A for more information about the CPS, as well as the Current Employment Statistics survey. See appendix B for more information on the annual adjustments to CPS population controls.)

This article highlights a broad range of economic indicators from the CPS, providing a picture of labor market performance in 2022, both overall and for various demographic groups. The article also provides 2022 updates on the trends in usual weekly earnings, labor force flows, the number of self-employed people, and it summarizes recent changes in the employment situations of veterans, people with a disability, and the foreign born.

The number of unemployed people and the unemployment rate declined for all major demographic groups

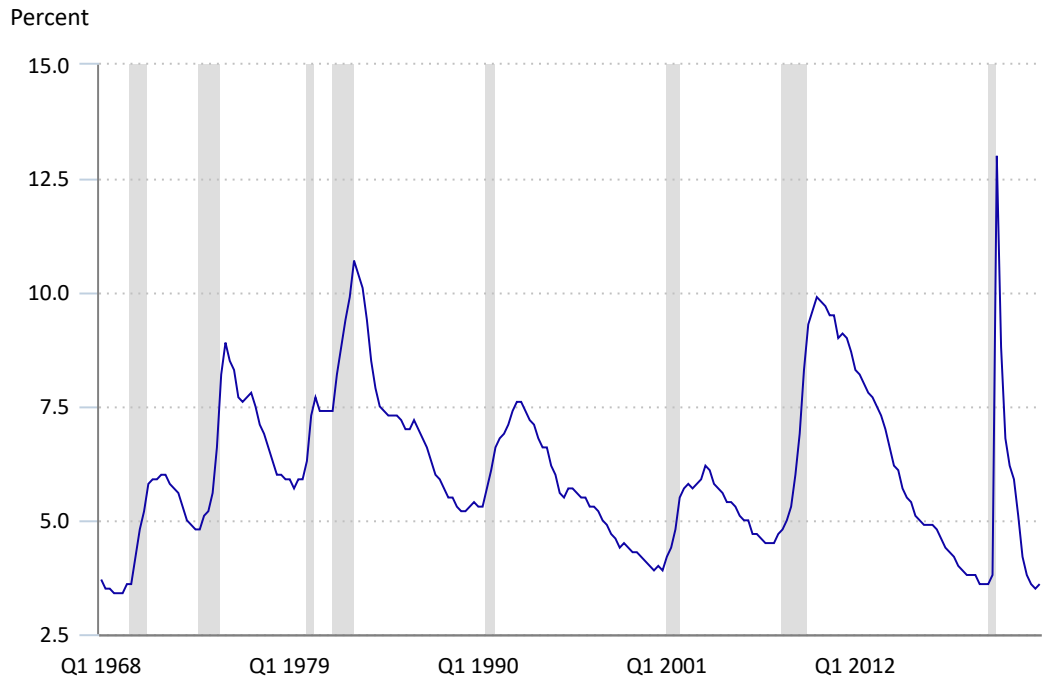
Both the number of unemployed people and the unemployment rate continued to decline in early 2022. From spring through the rest of the year, however, both measures held fairly steady. This general pattern held across most major demographic groups. The number of unemployed people was 5.9 million in the fourth quarter of 2022, down by roughly 900,000 from a year earlier. The unemployment rate averaged 3.6 percent in the fourth quarter of 2022, which is 0.6 percentage point below the rate in the fourth quarter of 2021. (See table 1.) With the continued improvement in 2022, the unemployment rate returned to its prepandemic rate. (See chart 1.)

Table 1. Employment status of the civilian noninstitutional population 16 years and older, by sex, race, and Hispanic or Latino ethnicity, quarterly averages, seasonally adjusted, 2021–2022 (levels in thousands)

Characteristic	Fourth quarter 2021	2022			
		First quarter	Second quarter	Third quarter	Fourth quarter
Total, 16 years and older					
Civilian labor force	162,155	163,932	164,077	164,441	164,713
Participation rate	61.9	62.3	62.2	62.2	62.2
Employed	155,337	157,680	158,113	158,605	158,788
Employment–population ratio	59.3	59.9	60.0	60.0	60.0
Unemployed	6,818	6,252	5,964	5,836	5,925
Unemployment rate	4.2	3.8	3.6	3.5	3.6
Men, 16 years and older					
Civilian labor force	85,949	87,294	87,256	87,336	87,810
Participation rate	67.8	68.0	67.9	67.8	68.1
Employed	82,347	83,938	84,047	84,175	84,665
Employment–population ratio	65.0	65.4	65.4	65.4	65.6
Unemployed	3,602	3,355	3,209	3,161	3,144
Unemployment rate	4.2	3.8	3.7	3.6	3.6
Women, 16 years and older					
Civilian labor force	76,206	76,638	76,821	77,105	76,903
Participation rate	56.3	56.8	56.8	56.9	56.7
Employed	72,990	73,742	74,066	74,430	74,122
Employment–population ratio	54.0	54.6	54.8	54.9	54.6
Unemployed	3,216	2,896	2,755	2,675	2,781
Unemployment rate	4.2	3.8	3.6	3.5	3.6
White					
Civilian labor force	124,693	125,995	125,682	126,000	126,163
Participation rate	61.7	62.1	61.9	62.0	62.0
Employed	120,161	121,832	121,600	122,079	122,142
Employment–population ratio	59.4	60.1	59.9	60.0	60.0
Unemployed	4,531	4,163	4,082	3,921	4,021
Unemployment rate	3.6	3.3	3.2	3.1	3.2
Black or African American					
Civilian labor force	20,530	21,106	21,293	21,188	21,343
Participation rate	60.9	62.1	62.5	62.0	62.3
Employed	19,081	19,725	20,015	19,900	20,105
Employment–population ratio	56.6	58.0	58.7	58.2	58.7
Unemployed	1,449	1,381	1,278	1,287	1,238
Unemployment rate	7.1	6.5	6.0	6.1	5.8
Asian					
Civilian labor force	10,770	10,736	10,886	11,055	11,006
Participation rate	65.1	63.8	64.6	65.0	64.6
Employed	10,348	10,403	10,578	10,767	10,713
Employment–population ratio	62.6	61.8	62.8	63.3	62.9
Unemployed	422	333	307	288	294
Unemployment rate	3.9	3.1	2.8	2.6	2.7
Hispanic or Latino ethnicity					
Civilian labor force	29,874	30,456	30,569	30,661	30,739
Participation rate	66.0	66.5	66.4	66.2	66.0
Employed	28,312	29,086	29,249	29,387	29,475
Employment–population ratio	62.6	63.5	63.5	63.5	63.3
Unemployed	1,562	1,370	1,320	1,275	1,265
Unemployment rate	5.2	4.5	4.3	4.2	4.1

Note: Estimates for the race groups (White, Black or African American, and Asian) do not sum to totals because data are not presented for all races. People whose ethnicity is identified as Hispanic or Latino may be of any race. Updated population controls are introduced annually with the release of January data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Chart 1. Unemployment rate for people 16 years and older, quarterly averages, seasonally adjusted, 1968–2022



Hover over chart to view data.
Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research. Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

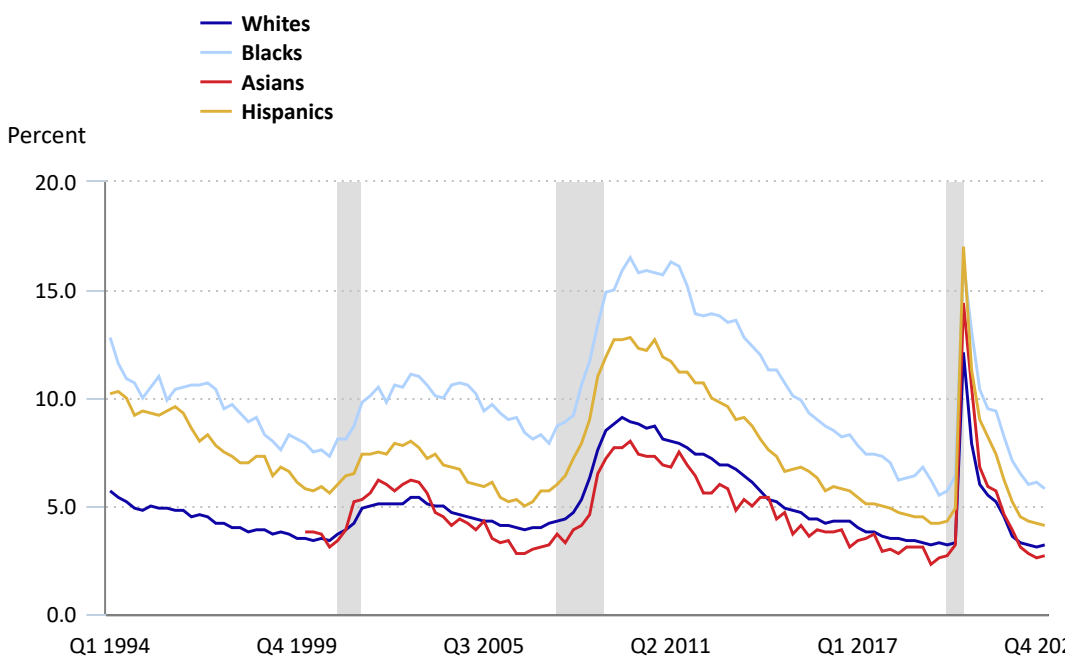
View Chart Data

Unemployment declined among men and women in 2022. The jobless rates for both men and women fell by 0.6 percentage point over the year, each averaging 3.6 percent in the fourth quarter. At the end of the year, the jobless rate for each group matched its prepandemic level. (See table 1.)

Unemployment rates decreased for all major race and ethnicity groups

The unemployment rates for all race and ethnicity groups declined in 2022. The jobless rate for Blacks fell by 1.3 percentage points, to 5.8 percent, and the rate for Asians fell by 1.2 percentage points, to 2.7 percent. The jobless rate for Hispanics declined by 1.1 percentage points, to 4.1 percent, and the rate for Whites fell by 0.4 percentage point, to 3.2 percent. Even with these improvements, the unemployment rates for Blacks and Hispanics remained considerably higher than the rates for Asians and Whites. (See chart 2.)

Chart 2. Unemployment rates, by race and Hispanic or Latino ethnicity, quarterly averages, seasonally adjusted, 1994–2022



Click legend items to change data display. Hover over chart to view data.
Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research. Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter. People of Hispanic or Latino ethnicity may be of any race. Data for Asians are not available before 2000 and are not seasonally adjusted before 2010.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Jobless rates declined for people of prime working age and older age groups

The unemployment rate for 16- to 24-year-olds changed little in 2022. Within this age group, the jobless rate for teenagers (those ages 16 to 19) changed little over the year, remaining below its prepandemic level. The jobless rate for young adults (those ages 20 to 24) also changed little over the year, but it remained above its prepandemic level. The unemployment rate for teenagers, at 10.9 percent, continued to be higher than the rate for young adults, at 7.0 percent. (See table 2.)

Table 2. Employment status of the civilian noninstitutional population 16 years and older, by age and sex, quarterly averages, seasonally adjusted, 2021–2022 (levels in thousands)

Characteristic	Fourth quarter 2021	2022			
		First quarter	Second quarter	Third quarter	Fourth quarter
Total, 16 to 24 years					
Civilian labor force	20,860	21,103	21,015	21,054	21,197
Participation rate	56.1	55.7	55.4	55.4	55.7
Employed	19,116	19,355	19,345	19,359	19,464
Employment–population ratio	51.4	51.1	51.0	51.0	51.2
Unemployed	1,744	1,748	1,670	1,695	1,733
Unemployment rate	8.4	8.3	7.9	8.0	8.2
Total, 16 to 19 years					
Civilian labor force	5,974	6,215	6,243	6,280	6,367
Participation rate	36.3	36.5	36.6	36.7	37.2
Employed	5,308	5,569	5,583	5,586	5,673
Employment–population ratio	32.3	32.7	32.7	32.7	33.1
Unemployed	667	646	660	694	694
Unemployment rate	11.2	10.4	10.6	11.1	10.9
Total, 20 to 24 years					
Civilian labor force	14,886	14,888	14,772	14,773	14,830
Participation rate	71.7	71.4	70.8	70.7	70.9
Employed	13,808	13,786	13,763	13,773	13,791
Employment–population ratio	66.5	66.1	65.9	65.9	65.9
Unemployed	1,078	1,102	1,009	1,000	1,039
Unemployment rate	7.2	7.4	6.8	6.8	7.0
Total, 25 to 54 years					
Civilian labor force	103,252	104,643	104,843	105,030	104,819
Participation rate	81.8	82.3	82.5	82.6	82.4
Employed	99,377	101,215	101,626	101,884	101,585
Employment–population ratio	78.8	79.6	79.9	80.1	79.9
Unemployed	3,875	3,428	3,217	3,146	3,234
Unemployment rate	3.8	3.3	3.1	3.0	3.1
Men, 25 to 54 years					
Civilian labor force	54,938	55,875	55,924	55,925	55,873
Participation rate	88.1	88.5	88.6	88.6	88.5
Employed	52,887	54,083	54,242	54,240	54,198
Employment–population ratio	84.8	85.7	86.0	85.9	85.8
Unemployed	2,051	1,792	1,682	1,685	1,674
Unemployment rate	3.7	3.2	3.0	3.0	3.0
Women, 25 to 54 years					
Civilian labor force	48,315	48,767	48,919	49,105	48,946
Participation rate	75.7	76.1	76.4	76.7	76.4
Employed	46,490	47,132	47,385	47,644	47,387
Employment–population ratio	72.8	73.6	74.0	74.4	74.0
Unemployed	1,825	1,635	1,535	1,461	1,559
Unemployment rate	3.8	3.4	3.1	3.0	3.2
Total, 55 years and older					
Civilian labor force	37,914	38,351	38,220	38,314	38,548
Participation rate	38.4	39.0	38.7	38.7	38.8
Employed	36,689	37,247	37,177	37,343	37,575
Employment–population ratio	37.2	37.9	37.7	37.7	37.8
Unemployed	1,225	1,104	1,043	971	972
Unemployment rate	3.2	2.9	2.7	2.5	2.5
Men, 55 years and older					
Civilian labor force	20,231	20,805	20,611	20,654	20,926
Participation rate	44.2	45.1	44.5	44.4	44.8
Employed	19,612	20,180	20,039	20,134	20,390
Employment–population ratio	42.9	43.7	43.2	43.3	43.7
Unemployed	619	625	572	520	535

Note: Updated population controls are introduced annually with the release of January data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Characteristic	Fourth quarter 2021	2022			
		First quarter	Second quarter	Third quarter	Fourth quarter
Unemployment rate	3.1	3.0	2.8	2.5	2.6
Women, 55 years and older					
Civilian labor force	17,680	17,566	17,615	17,638	17,618
Participation rate	33.4	33.7	33.7	33.6	33.4
Employed	17,078	17,067	17,138	17,209	17,185
Employment–population ratio	32.3	32.7	32.8	32.8	32.6
Unemployed	602	499	477	430	433
Unemployment rate	3.4	2.8	2.7	2.4	2.5

Note: Updated population controls are introduced annually with the release of January data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

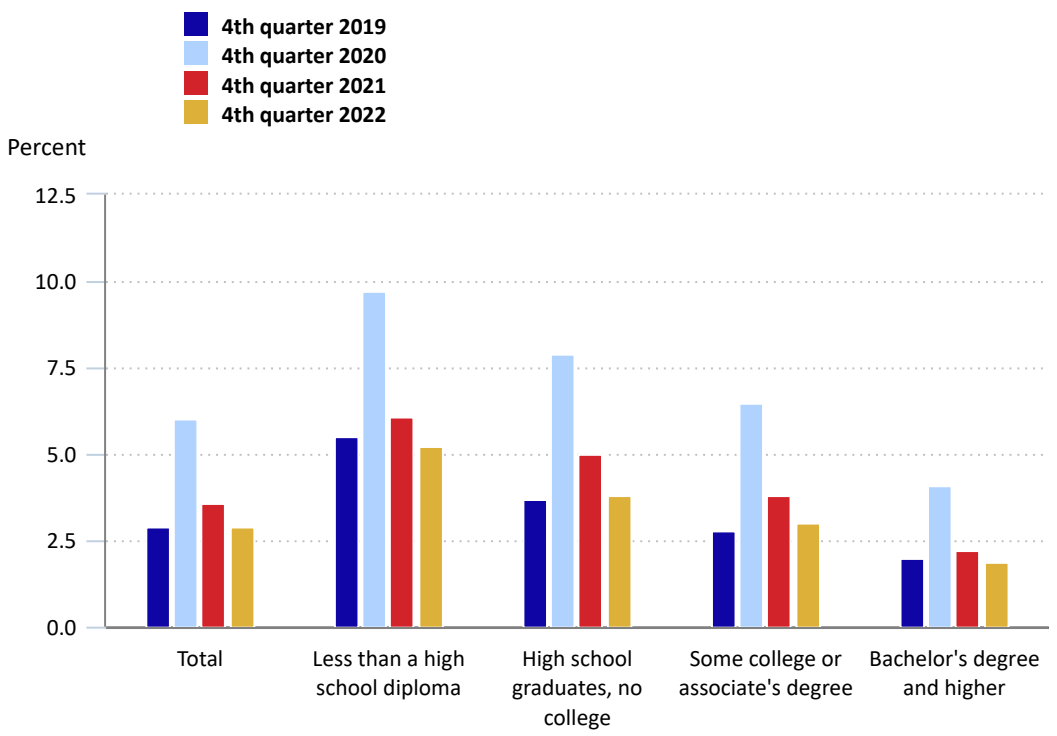
The unemployment rate for people of prime working age (those 25 to 54) declined over the year, to 3.1 percent in the fourth quarter, returning to its prepandemic level. The unemployment rates for both men and women of prime working age declined over the year, down to levels seen in the fourth quarter of 2019.

The unemployment rate for workers ages 55 and older was 2.5 percent in the fourth quarter of 2022, down by 0.7 percentage point over the year.[5] The jobless rates for men and women in this age group differed little from each other, at 2.6 percent for men and 2.5 percent for women. By the fourth quarter of the year, the rates for both groups differed little from the rates recorded in the fourth quarter of 2019, before the pandemic.

Jobless rates decreased over the year for people at all major educational attainment levels

Among workers ages 25 and older, jobless rates across all major educational attainment levels declined in 2022. The unemployment rate for people with less than a high school diploma declined by 0.9 percentage point over the year, to 5.2 percent in the fourth quarter. The rate for high school graduates with no college fell by 1.2 percentage points, to 3.8 percent by the end of 2022, the steepest drop among the educational attainment categories. The jobless rate for people with some college or an associate's degree, at 3.0 percent in the fourth quarter, decreased by 0.8 percentage point over the year. The jobless rate for people with a bachelor's degree and higher, at 1.9 percent in the fourth quarter of 2022, was 0.3 percentage point lower than it was a year earlier. As in the past, jobless rates in 2022 were much lower for people with higher levels of education than for those with less education. (See chart 3 and table 3.)

Chart 3. Unemployment rates for people 25 years and older, by educational attainment, seasonally adjusted, fourth quarter 2019–2022



Click legend items to change data display. Hover over chart to view data.
Note: The category "high school graduates, no college" includes people with a high school diploma or equivalent. The category "bachelor's degree and higher" includes people with bachelor's, master's, professional, and doctoral degrees.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Table 3. Employment status of the civilian noninstitutional population 25 years and older, by educational attainment, quarterly averages, seasonally adjusted, 2021–2022 (levels in thousands)

Characteristic	Fourth quarter 2021	2022			
		First quarter	Second quarter	Third quarter	Fourth quarter
Less than a high school diploma					
Civilian labor force	8,890	8,940	9,183	8,855	8,976
Participation rate	45.7	45.8	44.3	45.8	45.9
Employed	8,352	8,462	8,685	8,339	8,508
Employment–population ratio	42.9	43.3	41.9	43.1	43.5
Unemployed	538	478	498	516	468
Unemployment rate	6.1	5.4	5.4	5.8	5.2
High school graduates, no college[1]					
Civilian labor force	35,597	36,772	36,109	35,491	35,289
Participation rate	55.6	56.6	56.7	56.2	56.0
Employed	33,830	35,184	34,756	34,109	33,949
Employment–population ratio	52.8	54.2	54.6	54.0	53.8
Unemployed	1,767	1,589	1,353	1,381	1,340
Unemployment rate	5.0	4.3	3.7	3.9	3.8
Some college or associate's degree					
Civilian labor force	35,415	35,458	35,690	35,591	35,825
Participation rate	62.7	63.5	63.2	62.8	62.7
Employed	34,059	34,242	34,543	34,564	34,739
Employment–population ratio	60.3	61.3	61.1	61.0	60.8
Unemployed	1,356	1,216	1,147	1,027	1,086
Unemployment rate	3.8	3.4	3.2	2.9	3.0
Bachelor's degree and higher[2]					
Civilian labor force	61,175	61,804	62,103	63,491	63,168
Participation rate	72.1	72.6	73.2	72.9	72.6
Employed	59,805	60,490	60,848	62,290	61,939
Employment–population ratio	70.5	71.1	71.7	71.6	71.2
Unemployed	1,370	1,314	1,255	1,201	1,229
Unemployment rate	2.2	2.1	2.0	1.9	1.9

[1] This category includes people with a high school diploma or equivalent.

[2] This category includes people with bachelor's, master's, professional, and doctoral degrees.

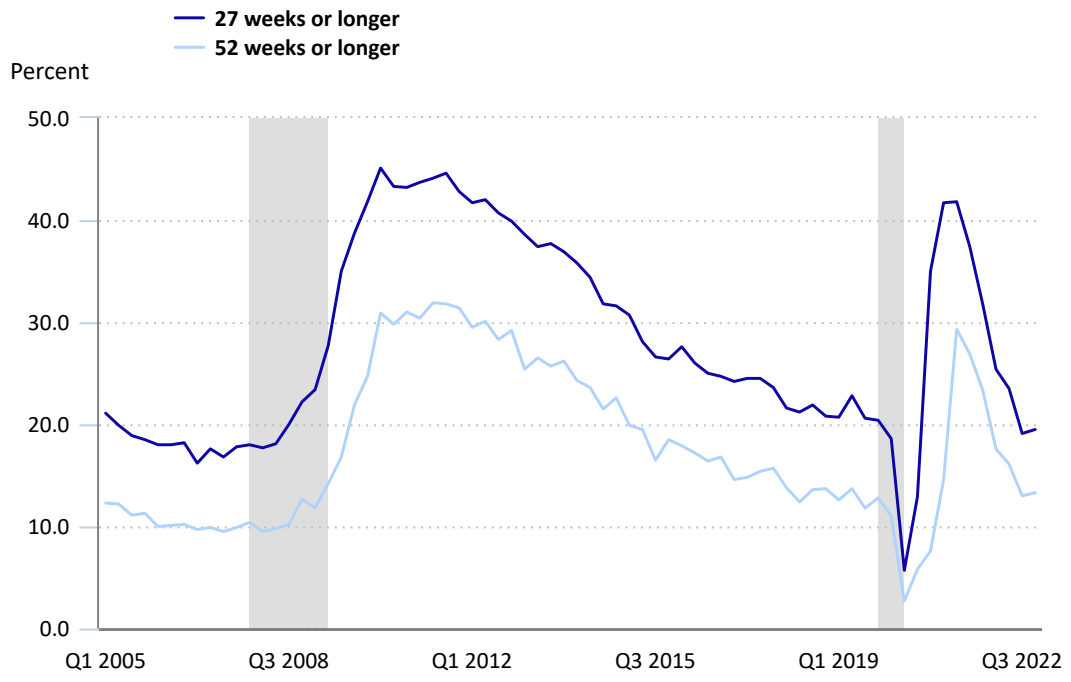
Note: Updated population controls are introduced annually with the release of January data.

Source: U.S. Bureau of Labor Statistics, Current Population Survey.

About 1 in 5 unemployed people had been jobless for 27 weeks or longer

The number of long-term unemployed people (those who were jobless for 27 weeks or longer) declined to 1.2 million by the end of 2022. This group accounted for 19.5 percent of the total number of unemployed people in the fourth quarter of 2022, down from 31.7 percent in the fourth quarter of 2021.[6] At the end of 2022, the number of long-term unemployed people and its share of total unemployment were little different from their levels before the pandemic. (See table 4 and chart 4.)

Chart 4. Long-term unemployed as a percentage of total unemployed, quarterly averages, 2005–2022



Click legend items to change data display. Hover over chart to view data.
Shaded areas represent recessions as determined by the National Bureau of Economic Research.
Data for 27 weeks or longer are seasonally adjusted, and data for 52 weeks or longer are not seasonally adjusted. Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

After reaching a record high of 4.5 million (not seasonally adjusted) in the second quarter of 2010, the number of people unemployed for 52 weeks or longer declined for nearly a decade. At the onset of the pandemic-related surge in unemployment in the second quarter of 2020, the number of people in this group, at 556,000, was the lowest it had been since 2003. The initial surge in unemployment continued to move through the longer duration categories for the remainder of 2020 and into 2021. The number of those unemployed for 52 weeks or longer declined by 756,000 from the fourth quarter of 2021 to the fourth quarter of 2022, settling at 729,000. The group's share of total unemployment fell from 23.3 percent in the fourth quarter of 2021 to 13.3 percent in the fourth quarter of 2022, nearly returning to its prepandemic share (12.8 percent).

Table 4. Unemployed people, by reason and duration of unemployment, quarterly averages, seasonally adjusted, 2021–2022 (levels in thousands)

Characteristic	Fourth quarter 2021	2022			
		First quarter	Second quarter	Third quarter	Fourth quarter
Reason for unemployment					
Job losers and people who completed temporary jobs	3,377	3,020	2,738	2,613	2,695
On temporary layoff	899	871	834	790	824
Not on temporary layoff	2,478	2,149	1,904	1,823	1,871
Permanent job losers	1,903	1,530	1,341	1,247	1,319
Persons who completed temporary jobs	575	619	562	576	552
Job leavers	803	902	798	881	838
Reentrants	2,114	1,986	1,926	1,830	1,813
New entrants	487	446	504	459	516
Percent distribution					
Job losers and people who completed temporary jobs	49.8	47.5	45.9	45.2	46.0
On temporary layoff	13.3	13.7	14.0	13.7	14.1
Not on temporary layoff	36.5	33.8	31.9	31.5	31.9
Job leavers	11.8	14.2	13.4	15.2	14.3
Reentrants	31.2	31.3	32.3	31.6	30.9
New entrants	7.2	7.0	8.4	7.9	8.8
Duration of unemployment					
Less than 5 weeks	2,016	2,291	2,184	2,157	2,231
5 to 14 weeks	1,718	1,703	1,659	1,736	1,702
15 weeks or longer	3,066	2,300	2,050	1,956	1,973
15 to 26 weeks	909	699	663	841	822
27 weeks or longer	2,157	1,601	1,386	1,116	1,151
Average (mean) duration, in weeks	28.0	25.0	23.2	21.6	20.6
Median duration, in weeks	12.8	9.0	8.4	8.4	8.7
Percent distribution					
Less than 5 weeks	29.7	36.4	37.1	36.9	37.8
5 to 14 weeks	25.3	27.1	28.1	29.7	28.8
15 weeks or longer	45.1	36.5	34.8	33.4	33.4
15 to 26 weeks	13.4	11.1	11.3	14.4	13.9
27 weeks or longer	31.7	25.4	23.5	19.1	19.5

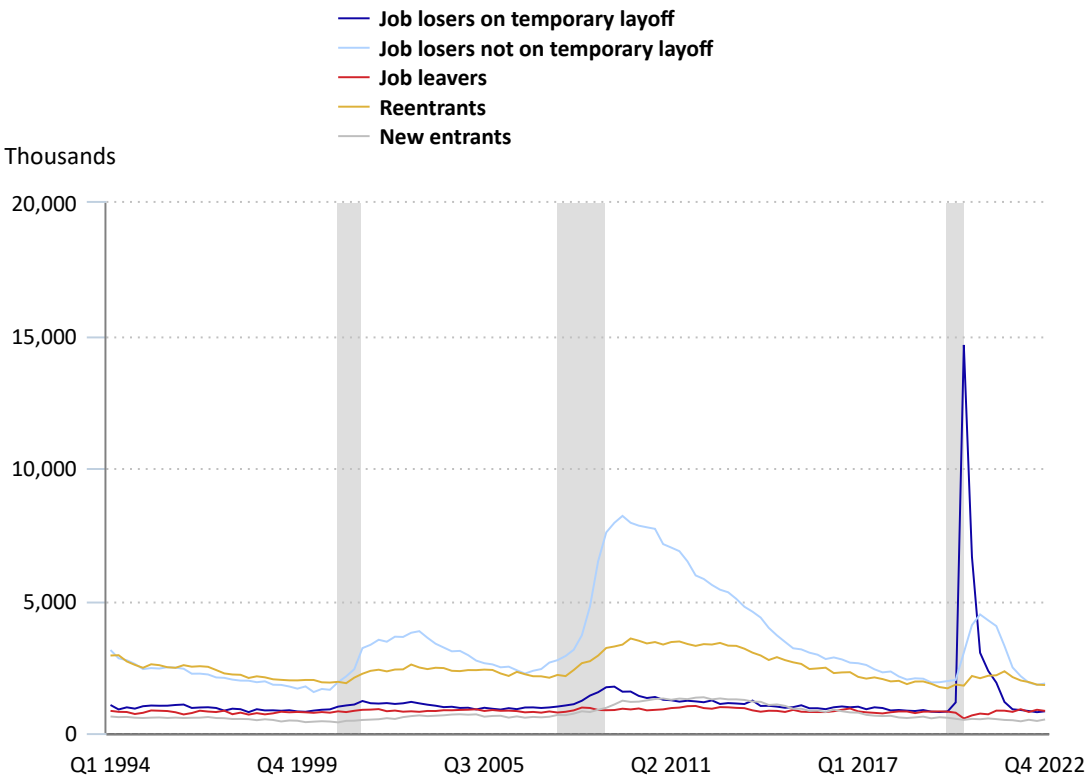
Note: Updated population controls are introduced annually with the release of January data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Number of people unemployed because they lost their job continued to decline

Unemployed people are grouped by their reasons for unemployment. People are unemployed because they either (1) were on temporary layoff, permanently lost their job, or completed a temporary job (job losers); (2) voluntarily left their job (job leavers); (3) reentered the labor force (reentrants); or (4) entered the labor force for the first time (new entrants).

The number of job losers and those who completed temporary jobs rose to an unprecedented level during the COVID-19 pandemic, surging to 17.7 million in the second quarter of 2020. (This was the highest quarterly average in the history of the data series, which began in 1967.) This number then declined markedly, a pattern that continued in 2022. The number of job losers averaged 2.7 million in the fourth quarter of 2022, roughly in line with its prepandemic level. (See table 4 and chart 5.)

Chart 5. Unemployed people, by reasons for unemployment, quarterly averages, seasonally adjusted, 1994–2022



Click legend items to change data display. Hover over chart to view data.
Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research. Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Most of the increase in the number of job losers in the second quarter of 2020, at the onset of the pandemic, consisted of people on temporary layoff.[7] The number of unemployed people on temporary layoff then fell sharply, returning to its prepandemic level by the end of 2021, and subsequently held at about this level throughout most of 2022.

The number of unemployed people not on temporary layoff, a group consisting mostly of permanent job losers, was 1.9 million at the end of 2022, accounting for 31.9 percent of the total number of unemployed people. This measure continued to decline during the first half of 2022, and by the end of the year, it was roughly at its prepandemic level. The number of unemployed reentrants to the labor force, at 1.8 million in the fourth quarter of 2022, declined by 301,000 over the year. Reentrants are people who had been in the labor force previously, had spent time out of the labor force, and were actively seeking work once again. Reentrants accounted for 30.9 percent of unemployed people at the end of 2022.

The number of unemployed job leavers—that is, people who voluntarily left their jobs—changed little over the year, averaging 838,000 in the fourth quarter of 2022. The number of new entrants to the labor force also changed little over the year, at 516,000 in the fourth quarter.

Unemployment declined the most in service occupations

From 2021 to 2022, the unemployment rate decreased for all five major occupational categories. (Data are annual averages.) The jobless rate for service occupations had the sharpest decrease, declining by 3.0 percentage points, to 4.8 percent in 2022. Within this category, food preparation and serving related occupations, with a jobless rate of 5.7 percent, and personal care and service occupations, with a jobless rate of 4.1 percent, had the largest declines in 2022. The jobless rates also declined for production, transportation, and material moving occupations (4.9 percent); natural resources, construction, and maintenance occupations (4.4 percent); sales and office occupations (3.7 percent); and management, professional, and related occupations (2.0 percent). (See table 5.)

Table 5. Unemployment rates, by occupational group and sex, annual averages, 2021–2022 (in percent)

Occupational group	Total			Men			Women		
	2021	2022	Change, 2021–22	2021	2022	Change, 2021–22	2021	2022	Change, 2021–22
Management, professional, and related occupations	2.8	2.0	-0.8	2.8	1.8	-1.0	2.9	2.1	-0.8
Management, business, and financial operations occupations	2.8	1.8	-1.0	2.7	1.6	-1.1	3.0	2.0	-1.0
Professional and related occupations	2.8	2.1	-0.7	2.9	2.0	-0.9	2.8	2.2	-0.6
Service occupations	7.8	4.8	-3.0	7.9	4.8	-3.1	7.7	4.8	-2.9
Healthcare support occupations	5.9	3.9	-2.0	5.3	3.3	-2.0	6.0	4.1	-1.9
Protective service occupations	3.9	3.4	-0.5	3.6	3.0	-0.6	4.8	4.6	-0.2
Food preparation and serving related occupations	10.3	5.7	-4.6	11.1	5.6	-5.5	9.7	5.8	-3.9
Building and grounds cleaning and maintenance occupations	7.5	5.4	-2.1	6.6	5.0	-1.6	8.8	5.9	-2.9
Personal care and service occupations	8.3	4.1	-4.2	12.5	5.6	-6.9	7.1	3.7	-3.4
Sales and office occupations	5.3	3.7	-1.6	4.9	3.6	-1.3	5.5	3.8	-1.7
Sales and related occupations	5.6	3.9	-1.7	4.6	3.2	-1.4	6.6	4.5	-2.1
Office and administrative support occupations	5.0	3.6	-1.4	5.5	4.2	-1.3	4.8	3.3	-1.5
Natural resources, construction, and maintenance occupations	6.6	4.4	-2.2	6.4	4.3	-2.1	9.1	6.0	-3.1
Farming, fishing, and forestry occupations	8.9	6.8	-2.1	8.3	6.3	-2.0	10.9	7.9	-3.0
Construction and extraction occupations	7.8	5.4	-2.4	7.7	5.4	-2.3	11.0	5.5	-5.5
Installation, maintenance, and repair occupations	3.9	2.2	-1.7	4.0	2.1	-1.9	3.7	4.5	0.8
Production, transportation, and material moving occupations	7.1	4.9	-2.2	6.9	4.7	-2.2	7.6	5.4	-2.2
Production occupations	5.8	3.9	-1.9	5.5	3.6	-1.9	6.3	4.6	-1.7
Transportation and material moving occupations	8.0	5.5	-2.5	7.8	5.4	-2.4	8.8	6.1	-2.7

Note: The unemployed are classified by occupation according to their last job, which may or may not be similar to the job they are currently seeking. Updated population controls are introduced annually with the release of January data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

All six alternative measures of labor underutilization declined

The U.S. Bureau of Labor Statistics (BLS) regularly publishes six alternative measures of labor underutilization.[8] These measures, known as U-1 through U-6 (U-3 is the official unemployment rate), tend to show similar cyclical patterns, but the alternative measures provide additional insight into the degree to which labor resources are being underutilized. (See the box that follows for more information about the six measures of labor underutilization.)

Alternative measures of labor underutilization

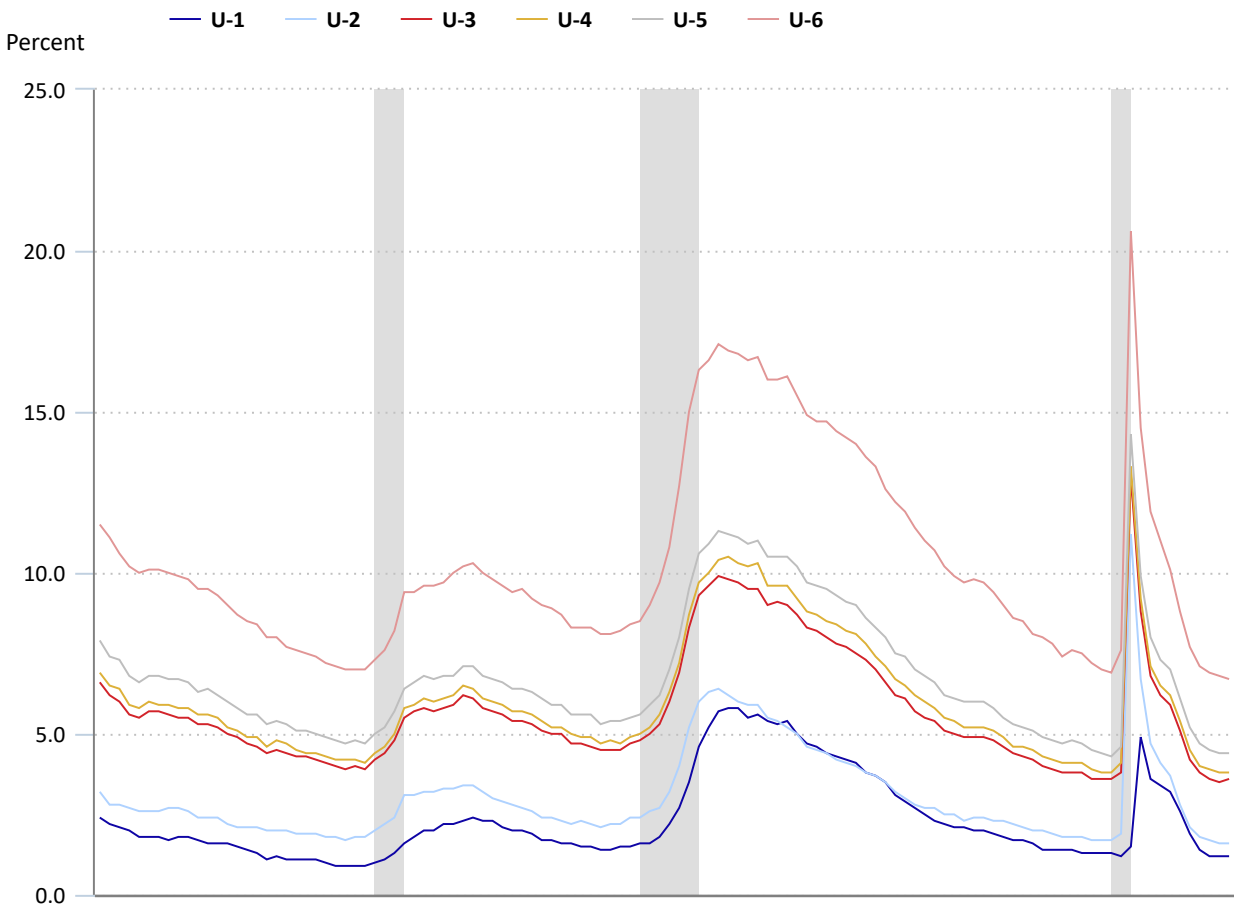
Six alternative measures of labor underutilization have long been available from the Current Population Survey for the United States as a whole. The official concept of unemployment—as measured in the CPS by U-3 in the range of alternative measures (U-1 through U-6)—includes all jobless people who are available to take a job and have actively sought work in the past 4 weeks. The other five measures encompass concepts both narrower (U-1 and U-2) and broader (U-4 through U-6) than the official concept of unemployment. The six measures are defined as follows:

- U-1: people unemployed 15 weeks or longer, as a percentage of the civilian labor force
- U-2: job losers and people who completed temporary jobs, as a percentage of the civilian labor force
- U-3: total unemployed, as a percentage of the civilian labor force (this is the definition used for the official unemployment rate)
- U-4: total unemployed plus discouraged workers, as a percentage of the civilian labor force plus discouraged workers
- U-5: total unemployed, plus discouraged workers, plus all other marginally attached workers, as a percentage of the civilian labor force plus all marginally attached workers
- U-6: total unemployed, plus all marginally attached workers, plus total employed part time for economic reasons, as a percentage of the civilian labor force plus all marginally attached workers

Discouraged workers (included in the U-4, U-5, and U-6 measures) are people who are not in the labor force, want and are available for work, and had looked for a job sometime in the prior 12 months. They are not counted as unemployed because they had not actively searched for work in the 4 weeks preceding the survey. Discouraged workers are not currently looking for work because they believe no jobs are available for them or there are none for which they qualify. The marginally attached category (included in the U-5 and U-6 measures) includes discouraged workers. The inclusion criteria for marginally attached workers are the same as those for discouraged workers, except that the marginally attached can cite any reason for their lack of active job search in the prior 4 weeks. People at work part time for economic reasons (included in the U-6 measure) are those working less than 35 hours per week who want to work full time, are available to do so, and give an economic reason for working part time (for example, their hours had been cut back or they were unable to find a full-time job). These individuals are sometimes referred to as involuntary part-time workers.

Each of the six measures of labor underutilization decreased from the fourth quarter of 2021 to the fourth quarter of 2022. U-2 (1.6 percent) and U-6 (6.7 percent) recorded their lowest levels since the current range of measures was introduced in 1994. Among the other measures, U-1 declined by 0.7 percentage point over the year, to 1.2 percent; U-3 fell by 0.6 percentage point, to 3.6 percent; and U-5 decreased by 0.8 percentage point, to 4.4 percent. (See chart 6.) In the fourth quarter of 2022, U-5 was the only measure to remain above its prepandemic level. The other five measures were either at or below the levels recorded in the fourth quarter of 2019.

Chart 6. Alternative measures of labor underutilization, quarterly averages, seasonally adjusted, 1994–2022



Click legend items to change data display. Hover over chart to view data. Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research. Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter. Measures of labor underutilization are defined as follows: U–1 = people unemployed 15 weeks or longer, as a percentage of the civilian labor force; U–2 = job losers and people who completed temporary jobs, as a percentage of the civilian labor force; U–3 = total unemployed, as a percentage of the civilian labor force (official unemployment rate); U–4 = total unemployed plus discouraged workers, as a percentage of the civilian labor force plus discouraged workers; U–5 = total unemployed, plus discouraged workers, plus all other marginally attached workers, as a percentage of the civilian labor force plus all marginally attached workers; U–6 = total unemployed, plus all marginally attached workers, plus total employed part time for economic reasons, as a percentage of the civilian labor force plus all marginally attached workers.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

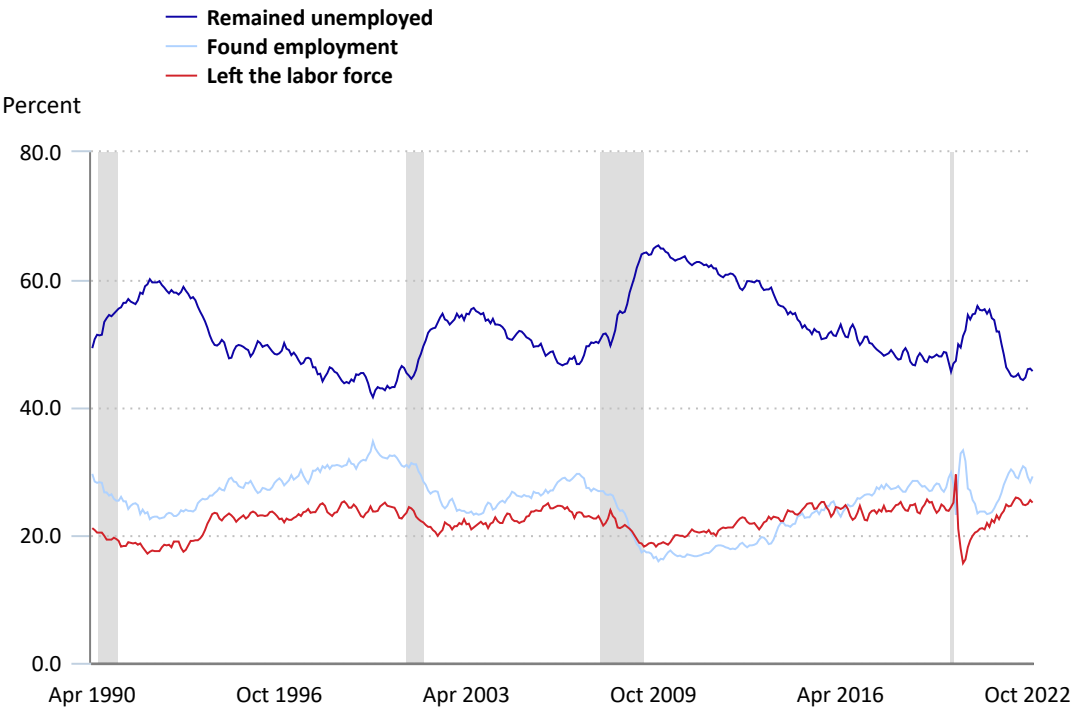
View Chart Data

Labor force status flows showed an improvement in unemployment

A great deal of underlying movement contributes to the relatively small over-the-month net changes that typically occur in the different labor force statuses. These gross movements are captured by data on labor force flows, which show that millions of people move between employment and unemployment each month, while millions of others leave or enter the labor force.[9] In 2022, 16.1 million people, or 6.1 percent of the population, changed their labor force status in an average month. Examining the current status (employed, unemployed, or not in the labor force) of people who were unemployed in the previous month provides a greater understanding of unemployment in 2022.

Historically, unemployed people have been more likely to remain unemployed from one month to the next than to either find employment or leave the labor force. The likelihood of unemployed people remaining unemployed tends to decrease during labor market recoveries. The share of unemployed people who remained unemployed was 45.7 percent in December 2022 (calculated as a 3-month moving average), which is below its value of 48.3 percent at the end of 2021. In December 2022, 29.2 percent of people who were unemployed a month earlier found work, while 25.1 percent stopped looking for work and left the labor force. These two measures were slightly above their levels of 27.9 and 23.8 percent, respectively, from a year earlier. (See chart 7.)

Chart 7. Percentage of the unemployed who remained unemployed, found employment, or left the labor force, 3-month moving average, seasonally adjusted, April 1990–December 2022



Click legend items to change data display. Hover over chart to view data.
Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research. Turning points are monthly.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Number of people not in the labor force who wanted a job changed little

People who are neither employed nor unemployed are classified as not in the labor force. In the fourth quarter of 2022, the number of people not in the labor force was 100.0 million, little changed from a year earlier. Most people who are not in the labor force do not want a job (about 95 percent at the end of 2022).[10] At the end of 2022, there were 5.5 million people outside the labor force who indicated they wanted a job.[11] Although this measure had declined since the 2020 recession, it was still above its prepandemic level of 4.8 million recorded in the fourth quarter of 2019.[12] (See table 6.)

Table 6. Number of people not in the labor force, quarterly averages, seasonally adjusted, 2021–2022 (in thousands)

Category	Fourth quarter 2021	2022			
		First quarter	Second quarter	Third quarter	Fourth quarter
Total not in the labor force	99,869	99,392	99,614	99,742	99,983
Persons who currently want a job	5,823	5,621	5,728	5,745	5,462
Marginally attached to the labor force[1]	1,639	1,459	1,536	1,522	1,415
Discouraged workers[2]	454	391	415	426	396

[1] This category includes people who want a job, have searched for work during the prior 12 months, and were available to take a job during the reference week but had not looked for work in the 4 weeks prior to the survey.

[2] This category includes people who did not actively look for work in the 4 weeks prior to the survey for reasons such as thinks no work available, could not find work, lacks schooling or training, employer thinks too young or old, and other types of discrimination.

Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Among people not in the labor force who currently want a job, those classified as marginally attached to the labor force numbered 1.4 million in the fourth quarter of 2022, higher than the level in the fourth quarter of 2019. These individuals wanted a job, had searched for work sometime in the previous year, and were available to work if a job had been offered to them. (Still, they were not counted as unemployed because they had not actively searched for work in the 4 weeks preceding the survey.) Among the marginally attached, people currently not looking for work because they felt that no jobs were available for them are defined as discouraged workers. The number of discouraged workers edged down because of population controls in 2022 and stood at 396,000 in the fourth quarter. (See chart 8.)

Chart 8. People not in the labor force, quarterly averages, seasonally adjusted, 1994–2022

Click legend items to change data display. Hover over chart to view data.
Shaded areas represent recessions as determined by the National Bureau of Economic Research.
Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Overall labor force participation rate changed little

The overall labor force participation rate, at 62.2 percent in the fourth quarter of 2022, held steady over the year (after accounting for the effects of the annual population controls introduced at the beginning of the year). The participation rate fell precipitously with the onset of the pandemic, but then it rebounded quickly and continued to trend up in 2021. However, the upward trend faded in early 2022, and by the end of the year, the participation rate was still more than a full percentage point below its prepandemic value.

Labor force participation showed little movement for most race and ethnicity groups

Among the major race and ethnicity groups, the labor force participation rates for Whites (62.0 percent), Hispanics (66.0 percent), and Asians (64.6 percent) in the fourth quarter of 2022 were about in line with their year-earlier figures. However, the labor force participation rate for Blacks, at 62.3 percent in the fourth quarter, rose markedly over the year.

Labor force participation increased for people of prime working age

After a steep pandemic-related decline, the labor force participation rate for prime-working-age people, those ages 25 to 54, increased in 2021 and then continued to trend up in 2022, averaging 82.4 percent in the fourth quarter. Despite this upward trend, the group's labor force participation rate remained below its prepandemic value recorded in the fourth quarter of 2019 (82.9 percent). (See table 2.)

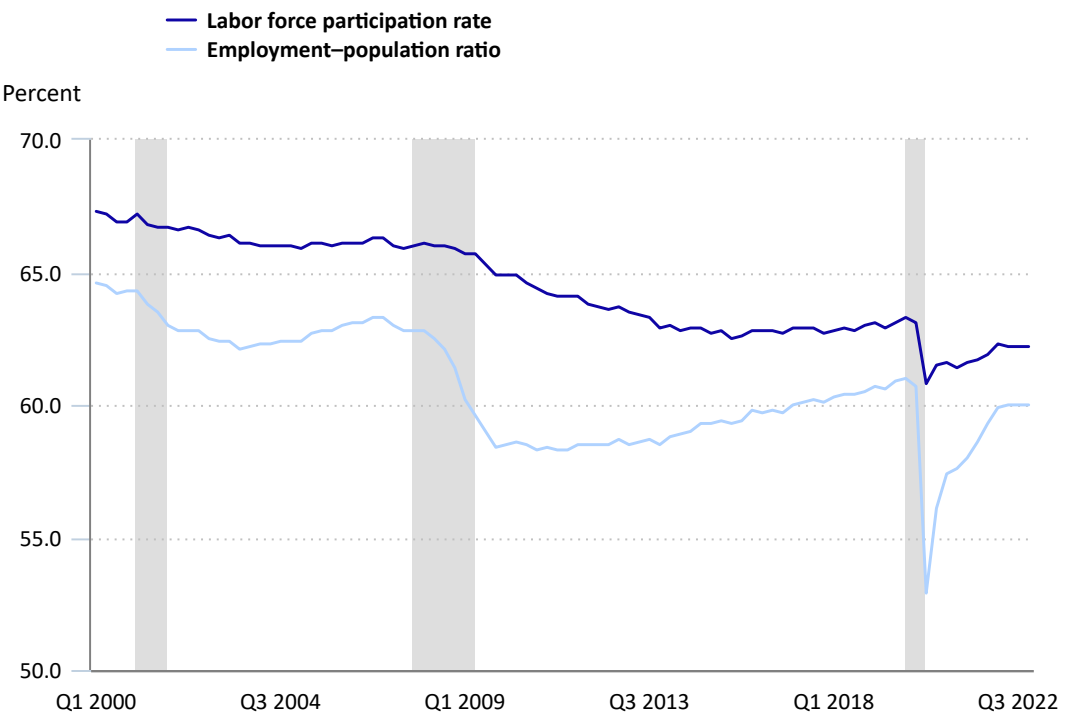
The labor force participation rate for older workers, those 55 years and older, declined in 2022 (after accounting for population controls), averaging 38.8 percent in the fourth quarter and remaining well below its value recorded in the fourth quarter of 2019 (40.3 percent). Recent research indicates that the shortfall in the overall U.S. labor force participation rate relative to its prepandemic level is partly due to excess retirements among older workers.[13]

For younger workers, those ages 16 to 24, the labor force participation rate showed little movement in 2022, averaging 55.7 percent in the fourth quarter, not much different from a year earlier.

Employment growth continued

In the fourth quarter of 2022, the number of employed people averaged 158.8 million. While employment growth continued in 2022 (after accounting for the effects of annual population controls introduced at the beginning of the year), the pace of job growth slowed from that observed in 2021. The employment–population ratio (the percentage of the population ages 16 and older who are employed) increased in 2022, but it remained below its level recorded for the fourth quarter of 2019. From the fourth quarter of 2021 to the fourth quarter of 2022, employment increased for both men and women. The employment–population ratio increased for men but changed little for women. (See table 1 and chart 9.)

Chart 9. Labor force participation rate and employment–population ratio, quarterly averages, seasonally adjusted, 2000–2022



Click legend items to change data display. Hover over chart to view data.
Shaded areas represent recessions as determined by the National Bureau of Economic Research.
Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Employment–population ratio rose sharply for Blacks

Employment rose for all major race and ethnicity groups in 2022. The employment–population ratio for Blacks increased sharply over the year. At 58.7 percent in the fourth quarter, this ratio was up about 2 percentage points from a year earlier. The employment–population ratios for Whites (60.0 percent in the fourth quarter), Hispanics (63.3 percent), and Asians (62.9 percent) showed little change over the year. (See table 1.)

Employment expanded for people of prime working age and older age groups

Employment for prime-working-age people, those ages 25 to 54, increased in 2022. The employment–population ratio for this group increased over the year, to 79.9 percent in the fourth quarter, which is slightly below the prepandemic value of 80.3 percent in the fourth quarter of 2019. (See table 2.)

The number of employed people ages 55 and older increased in 2022, with men accounting for much of that increase. The employment–population ratio for older workers was 37.8 percent in the fourth quarter, not much different from a year earlier (after taking population controls into account).

Employment for younger workers, those ages 16 to 24, changed little in 2022. While employment grew for people ages 16 to 19, it was essentially unchanged for 20-to 24-year-olds. The employment–population ratio for people ages 16 to 24 was 51.2 percent in the fourth quarter of 2022, little different from the value of 51.4 percent in the fourth quarter in 2021.

Employment growth was strongest for people with a bachelor's degree and higher

For people ages 25 and older, employment among those with less than a high school diploma (8.5 million) and the employment–population ratio for that group (43.5 percent) were essentially unchanged from the fourth quarter of 2021 to the fourth quarter of 2022 (after accounting for population controls). Employment for high school graduates with no college (33.9 million) and their employment–population ratio (53.8 percent) changed little over the year. Employment among people with some college or an associate's degree (34.7 million) changed little over the year, and the employment–population ratio for this group (60.8 percent) was essentially unchanged in 2022. Employment among people with a bachelor's degree and higher increased over the year, rising to 61.9 million in the fourth quarter of 2022. The employment–population ratio for this group, at 71.2 percent in the fourth quarter, was little changed from a year earlier. (See table 3.)

Employment increased for several major occupational groups

In 2022, employment in management, professional, and related occupations increased to 68.1 million. This category accounted for the largest increase in employment of the major occupational groups. (Data are annual averages.) Employment in management, professional, and related occupations made up 43.0 percent of the total number of employed people in 2022. (See table 7.)

Table 7. Employment, by occupational group and sex, annual averages, 2021–2022 (in thousands)

Occupational group	Total		Men		Women	
	2021	2022	2021	2022	2021	2022
Total, 16 years and over	152,581	158,291	80,829	84,203	71,752	74,089
Management, professional, and related occupations	64,744	68,099	31,109	33,016	33,636	35,083
Management, business, and financial operations occupations	27,864	29,350	15,231	16,188	12,633	13,162
Professional and related occupations	36,880	38,749	15,878	16,828	21,003	21,921
Service occupations	24,403	25,438	10,328	10,935	14,075	14,503
Healthcare support occupations	4,887	4,930	728	757	4,158	4,173
Protective service occupations	2,987	3,057	2,276	2,346	711	711
Food preparation and serving related occupations	7,370	7,907	3,343	3,690	4,027	4,218
Building and grounds cleaning and maintenance occupations	5,482	5,576	3,198	3,235	2,285	2,341
Personal care and service occupations	3,676	3,968	783	907	2,893	3,061
Sales and office occupations	30,166	30,412	11,604	11,764	18,563	18,649
Sales and related occupations	14,369	14,316	7,219	7,237	7,150	7,079
Office and administrative support occupations	15,797	16,096	4,384	4,527	11,413	11,570
Natural resources, construction, and maintenance occupations	13,959	14,260	13,181	13,442	778	818
Farming, fishing, and forestry occupations	1,061	980	804	723	257	257
Construction and extraction occupations	8,057	8,427	7,746	8,070	311	357
Installation, maintenance, and repair occupations	4,840	4,853	4,630	4,649	210	204
Production, transportation, and material moving occupations	19,309	20,082	14,608	15,046	4,700	5,036
Production occupations	7,950	8,256	5,703	5,797	2,247	2,459
Transportation and material moving occupations	11,359	11,826	8,906	9,249	2,453	2,578

Note: Updated population controls are introduced annually with the release of January data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Employment in service occupations increased to 25.4 million in 2022. Employment in this occupational group remained below its 2019 prepandemic level. Within the service occupational group, employment in food preparation and serving related occupations increased to 7.9 million. Employment in natural resources, construction, and maintenance occupations (14.3 million) showed little change from the 2021 average. Similarly, employment in sales and office occupations (30.4 million) showed little change. At the same time, the number of employed workers in production, transportation, and material moving occupations increased to 20.1 million.

Number of self-employed workers was little changed

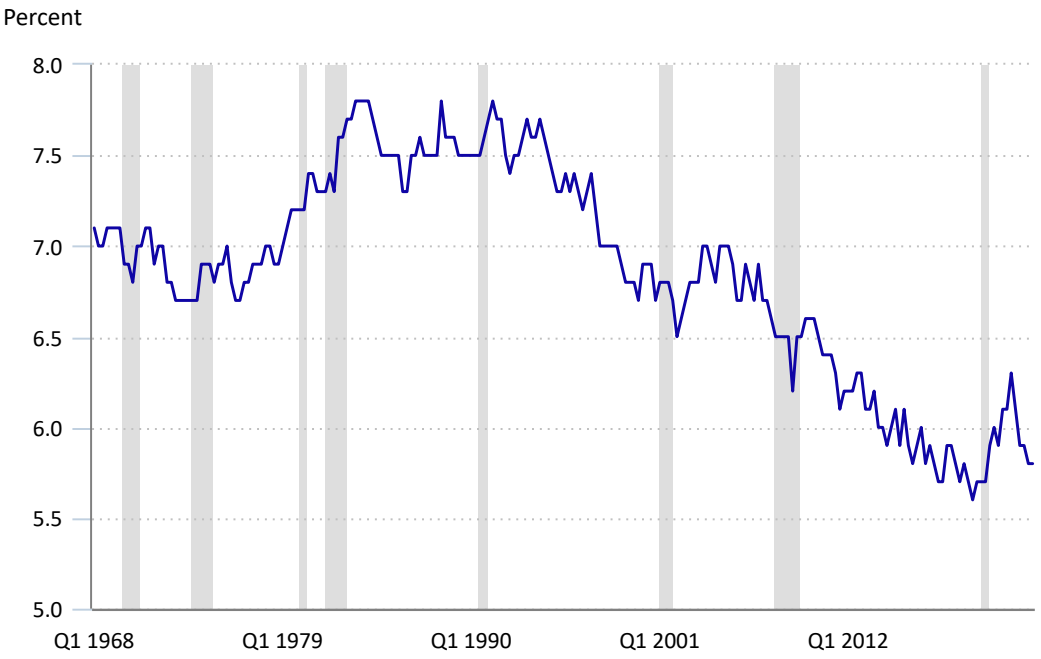
In the fourth quarter of 2022, the total number of nonagricultural self-employed workers, at 9.1 million, changed little over the year. This is in contrast to the employment increase of nonagricultural self-employed workers in 2021.[14] The nonagricultural self-employment rate (the proportion of total nonagricultural employment made up of self-employed workers) was 5.8 percent at the end of 2022, down from 6.1 percent in the fourth quarter of 2021. (See table 8 and chart 10.)

Table 8. Employed people, by class of worker, quarterly averages, seasonally adjusted, 2021–2022 (in thousands)

Class of worker	Fourth quarter 2021	2022			
		First quarter	Second quarter	Third quarter	Fourth quarter
Agriculture and related industries	2,278	2,346	2,323	2,254	2,248
Wage and salary workers	1,480	1,530	1,520	1,520	1,494
Self-employed workers, unincorporated	768	776	773	698	733
Nonagricultural industries	153,065	155,096	155,858	156,479	156,578
Wage and salary workers	143,736	146,262	146,409	147,126	147,459
Self-employed workers, unincorporated	9,320	9,180	9,205	9,041	9,089

Note: Both agricultural and nonagricultural wage and salary workers include self-employed workers whose businesses are incorporated.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Chart 10. Nonagricultural self-employment rate, quarterly averages, seasonally adjusted, 1968–2022



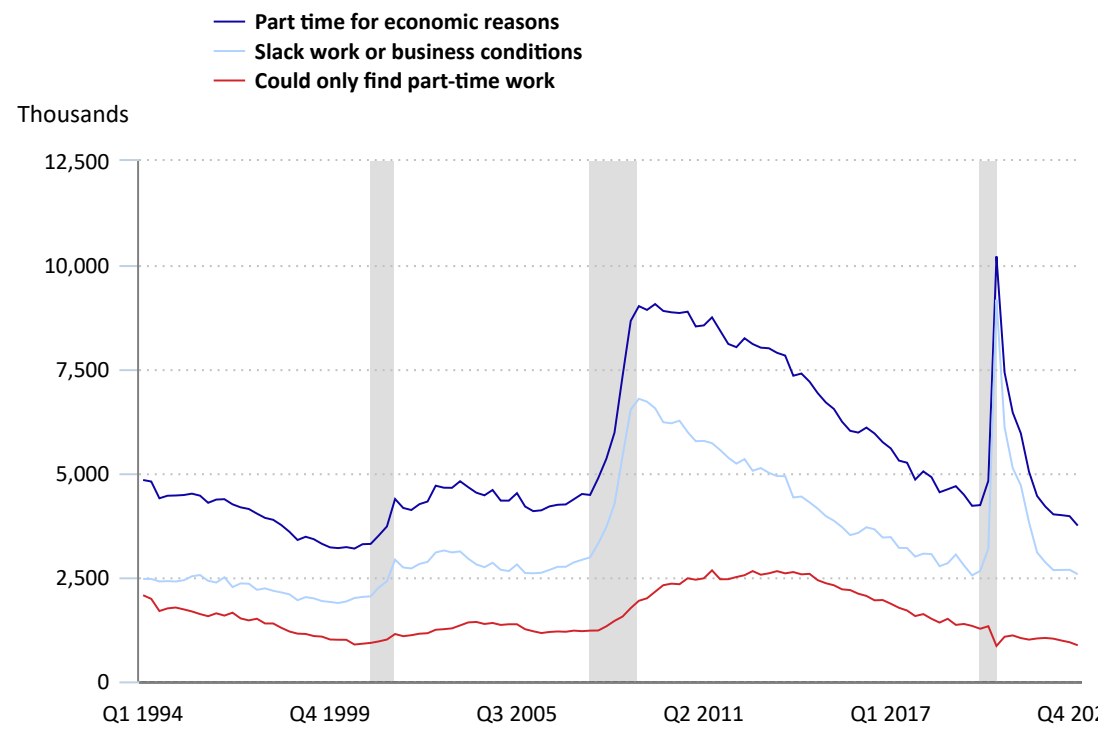
Hover over chart to view data.
Shaded areas represent recessions as determined by the National Bureau of Economic Research.
Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter.
The nonagricultural self-employment rate is the number of nonagricultural self-employed workers as a percentage of total nonagricultural employment.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Number of people employed part time for economic reasons fell below its prepandemic level

The number of people who worked part time for economic reasons (those who worked less than 35 hours per week but would have preferred full-time employment, also referred to as involuntary part-time employment) was 3.7 million in the fourth quarter of 2022, slightly below prepandemic levels.[15] Historically, slack work or unfavorable business conditions, rather than an inability to find full-time work, has been the primary reason for involuntarily working part time. The number of involuntary part-time workers has been decreasing since it reached a high of 10.2 million in the second quarter of 2020. (See chart 11.)

Chart 11. Number of people employed part time for economic reasons, quarterly averages, seasonally adjusted, 1994–2022



Click legend items to change data display. Hover over chart to view data.
Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research.
Turning points are quarterly. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

At the end of 2022, men continued to make up slightly more than half of all involuntary part-time workers. The number of men who worked part time for economic reasons decreased from the fourth quarter of 2021 to 2.0 million in the fourth quarter of 2022. Over the same period, the number of women working part time for economic reasons decreased to 1.6 million. (These data are not seasonally adjusted.)

Unemployment rate for veterans continues to decline

There were 18.3 million veterans in the civilian noninstitutional population in the fourth quarter of 2022. The largest share of veterans (33.5 percent) served during World War II, the Korean War, and the Vietnam-era (6.1 million). Veterans who served during Gulf War-era II accounted for the second-largest share of the veteran population, at 5.0 million, and there were 3.2 million veterans who served during Gulf War-era I. Also, there were 3.9 million veterans who served on active duty outside these designated wartime periods. Among veterans from all service periods, women accounted for 11.1 percent of the total veteran population in the fourth quarter of 2022.[16] (See table 9.)

Table 9. Employment status of people 18 years and older, by veteran status, period of service, and sex, quarterly averages, not seasonally adjusted, 2021–2022 (levels in thousands)

Employment status, veteran status, and period of service	Total		Men		Women	
	Fourth quarter 2021	Fourth quarter 2022	Fourth quarter 2021	Fourth quarter 2022	Fourth quarter 2021	Fourth quarter 2022
Veterans, 18 years and older						
Civilian noninstitutional population	17,951	18,266	16,029	16,233	1,921	2,033
Civilian labor force	8,409	8,771	7,247	7,576	1,162	1,195
Participation rate	46.8	48.0	45.2	46.7	60.5	58.8
Employed	8,102	8,521	6,991	7,349	1,111	1,172
Employment–population ratio	45.1	46.7	43.6	45.3	57.8	57.7
Unemployed	307	249	256	226	51	23
Unemployment rate	3.6	2.8	3.5	3.0	4.4	1.9
Gulf War-era II veterans						
Civilian labor force	3,620	4,030	3,048	3,339	572	691
Participation rate	78.7	80.6	80.5	81.7	70.3	75.7
Employed	3,471	3,911	2,924	3,236	547	675
Employment–population ratio	75.5	78.2	77.2	79.2	67.3	73.9
Unemployed	149	119	125	103	25	16
Unemployment rate	4.1	2.9	4.1	3.1	4.3	2.3
Gulf War-era I veterans						
Civilian labor force	2,257	2,213	1,911	1,915	346	298
Participation rate	71.7	69.2	72.0	70.2	70.2	63.7
Employed	2,194	2,158	1,861	1,861	333	297
Employment–population ratio	69.7	67.5	70.1	68.2	67.6	63.4
Unemployed	62	55	49	54	13	1
Unemployment rate	2.8	2.5	2.6	2.8	3.7	0.3
World War II, Korean War, and Vietnam-era veterans						
Civilian labor force	1,011	920	960	879	51	41
Participation rate	16.1	15.0	15.8	14.9	23.0	16.9
Employed	971	888	925	849	46	40
Employment–population ratio	15.4	14.5	15.2	14.4	20.8	16.3
Unemployed	40	32	35	30	5	2
Unemployment rate	3.9	3.5	3.6	3.5	[1]	[1]
Veterans of other service periods						
Civilian labor force	1,521	1,608	1,328	1,443	193	165
Participation rate	38.9	40.8	37.8	40.8	49.0	40.5
Employed	1,466	1,564	1,281	1,404	185	161
Employment–population ratio	37.5	39.7	36.5	39.7	47.0	39.4
Unemployed	55	43	47	39	8	4
Unemployment rate	3.6	2.7	3.6	2.7	4.1	2.6
Nonveterans, 18 years and older						
Civilian noninstitutional population	235,053	237,076	106,245	108,027	128,808	129,049
Civilian labor force	151,277	153,228	77,328	78,742	73,949	74,485
Participation rate	64.4	64.6	72.8	72.9	57.4	57.7
Employed	145,399	148,198	74,289	76,163	71,110	72,034
Employment–population ratio	61.9	62.5	69.9	70.5	55.2	55.8
Unemployed	5,877	5,030	3,039	2,579	2,838	2,451
Unemployment rate	3.9	3.3	3.9	3.3	3.8	3.3

[1] No data available, data do not meet publication criteria, or base is less than 60,000.

Note: Veterans are men and women who previously served on active duty in the U.S. Armed Forces and were not on active duty at the time of the survey. Nonveterans never served on active duty in the U.S. Armed Forces. Veterans could have served anywhere in the world during these periods of service: Gulf War-era II (September 2001–present), Gulf War-era I (August 1990–August 2001), Vietnam-era (August 1964–April 1975), Korean War (July 1950–January 1955), World War II (December 1941–December 1946), and other service periods (all other periods). Veterans are only counted in one period of service: their most recent wartime period. Veterans who served in both a wartime period and any other service period are classified in the wartime period.

Source: U.S. Bureau of Labor Statistics, Current Population Survey.

In the fourth quarter of 2022, the unemployment rate for all veterans was 2.8 percent (not seasonally adjusted). This fourth quarter rate is 0.8 percentage point lower than the previous year's rate and 7.0 percentage points lower from its peak in the second quarter of 2020 (9.8 percent). In comparison, the jobless rate for nonveterans declined by 0.6 percentage point to 3.3 percent in the fourth quarter of 2022.

The labor force participation rate for veterans increased over the year to 48.0 percent in the fourth quarter of 2022, while the rate for nonveterans changed little, at 64.6 percent. Labor force participation rates, for veterans and nonveterans, tend to be lower for older people than they are for people of prime working age. For instance, the labor

force participation rate for those who served during World War II, the Korean War, and the Vietnam-era, who are all over age 60, was 15.0 percent in the fourth quarter of 2022, little changed from the year prior. In contrast, Gulf War-era II veterans, who tend to be younger, had a much higher participation rate, 80.6 percent in the fourth quarter of 2022, also little changed from a year earlier.

Labor market improved for both people with and people with no disability

Although the job market remains especially challenging for people with a disability, the employment situation for this group showed some improvement in 2022. In the fourth quarter, their labor force participation rate was little changed, at 23.7 percent; however, their employment–population ratio increased to 22.3 percent. (Data are not seasonally adjusted.) Among people with no disability, the labor force participation rate was 67.6 percent, and the employment–population ratio was 65.4 percent. (See table 10.)

In the fourth quarter of 2022, the unemployment rate for people with a disability reached its lowest level (6.1 percent) since collection of these data began in 2008.[17] But the unemployment rate for people with a disability continues to be substantially higher than the unemployment rate for people with no disability (3.2 percent).

Table 10. Employment status of the civilian noninstitutional population, by sex, age, and disability status, quarterly averages, not seasonally adjusted, 2021–2022 (levels in thousands)

Employment status, sex, and age	Persons with a disability		Persons with no disability	
	Fourth quarter 2021	Fourth quarter 2022	Fourth quarter 2021	Fourth quarter 2022
Total, 16 years and older				
Civilian noninstitutional population	31,859	32,818	230,165	231,877
Civilian labor force	7,229	7,776	154,657	156,641
Participation rate	22.7	23.7	67.2	67.6
Employed	6,634	7,304	148,865	151,617
Employment–population ratio	20.8	22.3	64.7	65.4
Unemployed	595	471	5,792	5,023
Unemployment rate	8.2	6.1	3.7	3.2
Men, 16 to 64 years				
Civilian labor force	3,018	3,236	76,510	77,986
Participation rate	38.3	39.6	82.0	82.4
Employed	2,748	3,020	73,573	75,435
Employment–population ratio	34.9	37.0	78.9	79.7
Unemployed	270	216	2,937	2,551
Unemployment rate	8.9	6.7	3.8	3.3
Women, 16 to 64 years				
Civilian labor force	2,904	3,146	68,490	68,856
Participation rate	35.9	38.1	71.4	71.6
Employed	2,652	2,945	65,905	66,631
Employment–population ratio	32.7	35.6	68.7	69.3
Unemployed	252	201	2,585	2,225
Unemployment rate	8.7	6.4	3.8	3.2
Total, 65 years and over				
Civilian noninstitutional population	15,887	16,389	41,006	41,080
Civilian labor force	1,306	1,393	9,657	9,799
Participation rate	8.2	8.5	23.6	23.9
Employed	1,233	1,339	9,387	9,552
Employment–population ratio	7.8	8.2	22.9	23.3
Unemployed	73	54	271	247
Unemployment rate	5.6	3.9	2.8	2.5

Note: A person with a disability has at least one of the following conditions: is deaf or has serious difficulty hearing; is blind or has serious difficulty seeing even when wearing glasses; has serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition; has serious difficulty walking or climbing stairs; has difficulty dressing or bathing; or has difficulty doing errands alone such as visiting a doctor's office or shopping because of a physical, mental, or emotional condition. Updated population controls are introduced annually with the release of January data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Unemployment rate for the foreign-born population slightly lower than that of the native-born population

The foreign-born population accounted for 18.5 percent of the U.S. civilian labor force ages 16 years and older in the fourth quarter of 2022, up from 17.8 percent a year earlier. Over the year, both the foreign-born and native-born populations saw a decrease in their unemployment rates, to 3.2 percent and 3.4 percent, respectively.[18] (Data are not seasonally adjusted.) The employment–population ratios for foreign-born workers (64.0 percent) and native-born workers (59.2 percent) edged up over the year. (See table 11.)

Table 11. Employment status of the foreign- and native-born populations, by sex, quarterly averages, not seasonally adjusted, 2021–2022 (levels in thousands)

Employment status and nativity	Total		Men		Women	
	Fourth quarter 2021	Fourth quarter 2022	Fourth quarter 2021	Fourth quarter 2022	Fourth quarter 2021	Fourth quarter 2022
Foreign born, 16 years and older						
Civilian noninstitutional population	43,890	45,945	21,386	22,474	22,503	23,470
Civilian labor force	28,740	30,359	16,575	17,434	12,165	12,925
Participation rate	65.5	66.1	77.5	77.6	54.1	55.1
Employed	27,628	29,400	15,999	16,886	11,630	12,514
Employment–population ratio	62.9	64.0	74.8	75.1	51.7	53.3
Unemployed	1,112	960	576	548	535	412
Unemployment rate	3.9	3.2	3.5	3.1	4.4	3.2
Native born, 16 years and older						
Civilian noninstitutional population	218,134	218,751	105,390	106,502	112,744	112,249
Civilian labor force	133,146	134,057	69,044	70,025	64,102	64,032
Participation rate	61.0	61.3	65.5	65.7	56.9	57.0
Employed	127,870	129,522	66,222	67,633	61,648	61,889
Employment–population ratio	58.6	59.2	62.8	63.5	54.7	55.1
Unemployed	5,276	4,535	2,822	2,392	2,454	2,143
Unemployment rate	4.0	3.4	4.1	3.4	3.8	3.3

Note: The foreign born are people residing in the United States who were not U.S. citizens at birth. That is, they were born outside the United States or one of its outlying areas, such as Puerto Rico or Guam, to parents who were not U.S. citizens. This group includes legally admitted immigrants, refugees, students, temporary workers, and undocumented immigrants. The survey data, however, do not separately identify the number of people in these categories. The native born are people who were born in the United States or one of its outlying areas, such as Puerto Rico or Guam, or who were born abroad of at least one parent who was a U.S. citizen.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Foreign-born workers continued to have a higher labor force participation rate than native-born workers in 2022. The labor force participation rates for foreign-born (66.1 percent) and native-born workers (61.3 percent) were little changed over the year.

Median weekly earnings of full-time wage and salary workers increased but did not keep pace with inflation

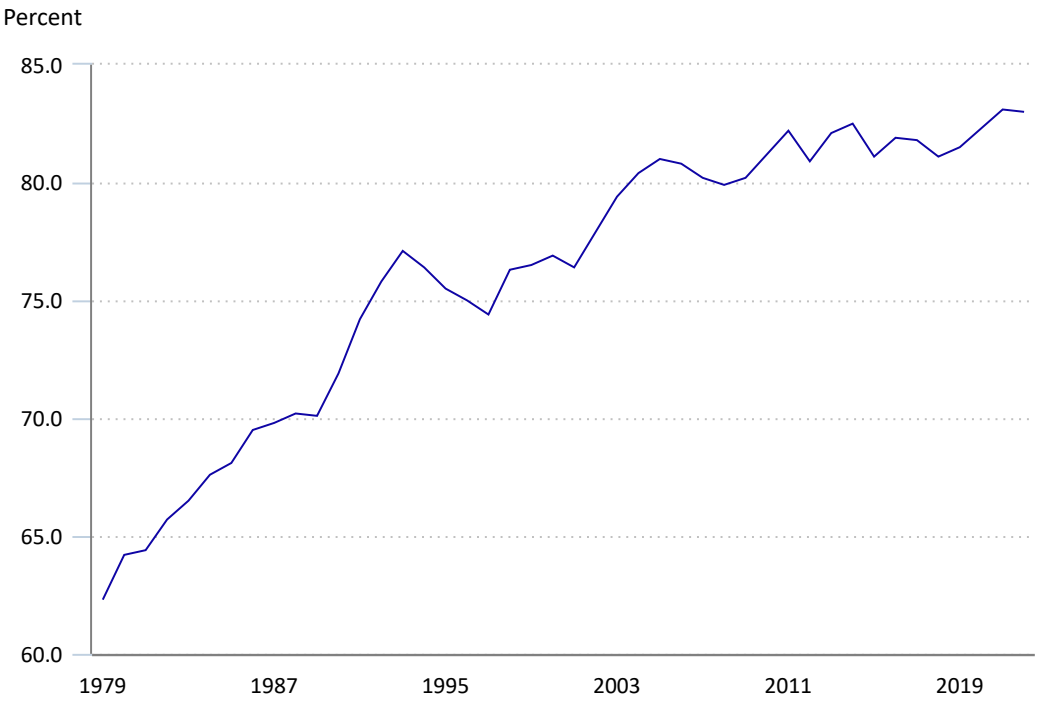
Median weekly earnings for full-time wage and salary workers were $1,059 in 2022, up by 6.1 percent from 2021.[19] (Data are annual averages.) During the same period, inflation was 8.0 percent, as measured by the Consumer Price Index for All Urban Consumers (CPI-U). Real median usual weekly earnings (adjusted with the use of the CPI-U) declined 1.6 percent from 2021.[20] (See table 12.) Women's median weekly earnings were $958 in 2022; this was 83.0 percent of men's median weekly earnings ($1,154). In 1979, the first year for which comparable data on usual weekly earnings are available, women's earnings were 62.3 percent of men's earnings. (See chart 12.)

Table 12. Median usual weekly earnings of full-time wage and salary workers, by selected characteristics, annual averages, 2021–2022

Characteristic	Current dollars			Constant (1982–84) dollars		
	2021	2022	Percent change, 2021–22	2021	2022	Percent change, 2021–22
Total, 16 years and older	$998	$1,059	6.1	$368	$362	-1.6
Men	1,097	1,154	5.2	405	394	-2.7
Women	912	958	5.0	336	327	-2.7
White	1,018	1,085	6.6	376	371	-1.3
Men	1,125	1,172	4.2	415	401	-3.4
Women	925	973	5.2	341	333	-2.3
Black or African American	801	878	9.6	296	300	1.4
Men	825	921	11.6	304	315	3.6
Women	776	835	7.6	286	285	-0.3
Asian	1,328	1,401	5.5	490	479	-2.2
Men	1,453	1,559	7.3	536	533	-0.6
Women	1,141	1,234	8.2	421	422	0.2
Hispanic or Latino ethnicity	777	823	5.9	287	281	-2.1
Men	820	887	8.2	303	303	0.0
Women	718	761	6.0	265	260	-1.9
Total, 25 years and older	1,057	1,123	6.2	390	384	-1.6
Less than a high school diploma	626	682	8.9	231	233	0.9
High school graduate, no college	809	853	5.4	299	291	-2.4
Some college or associate's degree	925	969	4.8	341	331	-3.0
Bachelor's degree or higher	1,452	1,544	6.3	536	528	-1.5

Note: The Consumer Price Index for All Urban Consumers is used to convert current dollars to constant (1982–84) dollars.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Chart 12. Women's median usual weekly earnings as a percentage of men's, full-time wage and salary workers, annual averages, 1979–2022

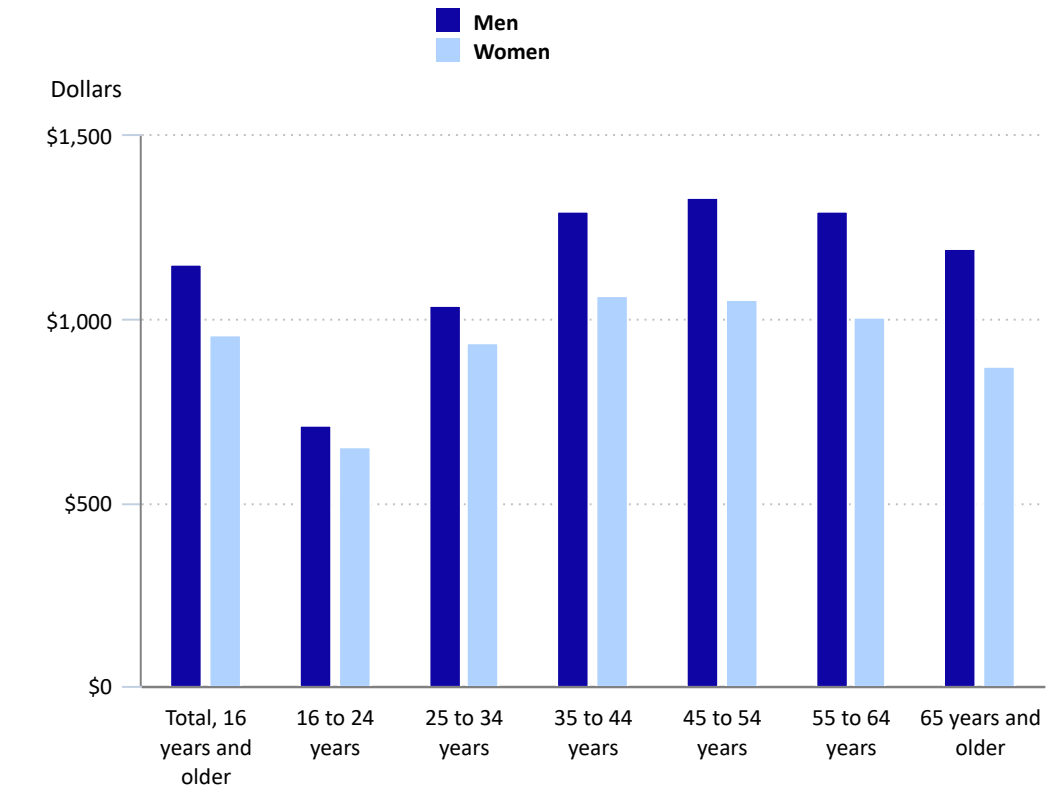


Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Median weekly earnings were highest for men ages 35 to 64. By age group, median weekly earnings were $1,297 for men ages 35 to 44, $1,336 for men ages 45 to 54, and $1,294 for men ages 55 to 64. Women's median weekly earnings were also highest for workers ages 35 to 64. Median weekly earnings were $1,065 for women ages 35 to 44, $1,058 for women ages 45 to 54, and $1,007 for women ages 55 to 64. Men and women ages 16 to 24 had the lowest median weekly earnings, $713 and $656, respectively. Men's and women's earnings were closer among younger workers than older workers. For example, women ages 16 to 24 earned 92.0 percent as much as men in the same age group, while the women's-to-men's earnings ratio was 73.1 percent for those ages 65 and over. (See chart 13.)

Chart 13. Median usual weekly earnings of full-time wage and salary workers, by age and sex, annual averages, 2022



Click legend items to change data display. Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

View Chart Data

Among the major race and ethnicity groups, median weekly earnings increased for all groups. From 2021 to 2022, earnings increased (in nominal terms) by 9.6 percent for Blacks ($878), 6.6 percent for Whites ($1,085), 5.9 percent for Hispanics ($823), and 5.5 percent for Asians ($1,401). (See table 12.) The women's-to-men's earnings ratio varied by race and ethnicity; the ratio was higher among Blacks and Hispanics. For example, White women earned 83.0 percent as much as White men; Black women earned 90.7 percent as much as Black men; Asian women earned 79.2 percent as much as Asian men; and Hispanic women earned 85.8 percent as much as Hispanic men.

Among workers ages 25 years and older, those with less than a high school diploma had the largest over-the-year increase in median weekly earnings in comparison with other educational attainment groups. Earnings for workers with less than a high school diploma ($682) rose by 8.9 percent from 2021 to 2022. (See table 12.)

Among the major occupational groups, people employed full time in management, professional, and related occupations had the highest median weekly earnings in 2022: $1,726 for men and $1,284 for women. As has historically been the case, men ($767) and women ($643) employed in service occupations earned the least among the major occupational groups in 2022. (See table 13.)

Table 13. Median usual weekly earnings of full-time wage and salary workers, by occupation and sex, annual averages, 2021–2022

Occupation and sex	Number of workers (in thousands)		Median weekly earnings		
	2021	2022	2021	2022	Percent change, 2021–22
Total, 16 years and over	114,316	118,869	$998	$1,059	6.1
Management, professional, and related occupations	51,166	53,962	1,390	1,465	5.4
Management, business, and financial operations occupations	21,529	22,707	1,482	1,569	5.9
Professional and related occupations	29,637	31,255	1,335	1,392	4.3
Service occupations	14,630	15,468	644	697	8.2
Sales and office occupations	21,748	21,978	826	880	6.5
Sales and related occupations	9,281	9,170	887	941	6.1
Office and administrative support occupations	12,467	12,808	806	847	5.1
Natural resources, construction, and maintenance occupations	11,182	11,386	919	965	5.0
Farming, fishing, and forestry occupations	800	762	623	645	3.5
Construction and extraction occupations	6,171	6,406	904	943	4.3
Installation, maintenance, and repair occupations	4,211	4,218	1,017	1,043	2.6
Production, transportation, and material moving occupations	15,590	16,076	774	821	6.1
Production occupations	7,107	7,352	809	862	6.6
Transportation and material moving occupations	8,483	8,724	738	796	7.9
Men, 16 years and over	62,928	65,554	1,097	1,154	5.2
Management, professional, and related occupations	24,561	26,229	1,609	1,726	7.3
Management, business, and financial operations occupations	11,231	12,079	1,672	1,772	6.0
Professional and related occupations	13,330	14,150	1,555	1,647	5.9
Service occupations	7,000	7,463	723	767	6.1
Sales and office occupations	8,677	8,741	970	1,019	5.1
Sales and related occupations	5,090	5,048	1,049	1,139	8.6
Office and administrative support occupations	3,587	3,693	899	933	3.8
Natural resources, construction, and maintenance occupations	10,635	10,823	930	979	5.3
Farming, fishing, and forestry occupations	651	582	637	661	3.8
Construction and extraction occupations	5,965	6,195	908	951	4.7
Installation, maintenance, and repair occupations	4,019	4,047	1,023	1,051	2.7
Production, transportation, and material moving occupations	12,056	12,298	825	891	8.0
Production occupations	5,251	5,314	884	943	6.7
Transportation and material moving occupations	6,804	6,984	786	842	7.1
Women, 16 years and over	51,388	53,315	912	958	5.0
Management, professional, and related occupations	26,605	27,733	1,222	1,284	5.1
Management, business, and financial operations occupations	10,299	10,629	1,306	1,409	7.9
Professional and related occupations	16,306	17,104	1,167	1,229	5.3
Service occupations	7,630	8,005	598	643	7.5
Sales and office occupations	13,071	13,236	766	810	5.7
Sales and related occupations	4,191	4,122	720	783	8.8
Office and administrative support occupations	8,880	9,115	779	818	5.0
Natural resources, construction, and maintenance occupations	547	562	696	700	0.6
Farming, fishing, and forestry occupations	149	180	585	611	4.4
Construction and extraction occupations	207	211	720	796	10.6
Installation, maintenance, and repair occupations	192	171	836	861	3.0
Production, transportation, and material-moving occupations	3,535	3,778	638	694	8.8
Production occupations	1,856	2,038	653	700	7.2
Transportation and material-moving occupations	1,679	1,740	624	687	10.1

Note: Updated population controls are introduced annually with the release of January data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Summary

In 2022, the labor market continued to recover from the recession caused by the COVID-19 pandemic, and several labor market measures returned to their prepandemic levels. Over the year, the national unemployment rate declined to 3.6 percent, which was down 0.6 percentage point from 2021. Total employment continued to expand; the employment–population ratio increased from the previous year, but the labor force participation rate changed little. The jobless rate declined for all major race and ethnicity groups. The number of people working part time for economic reasons also declined over the year. Median usual weekly earnings increased to $1,059 in 2022; this was 6.1 percent higher than earnings in 2021, but the increase did not keep pace with inflation as measured by the Consumer Price Index.

Appendix A: The CPS and the CES

BLS produces two monthly employment series obtained from two different surveys: an estimate of total nonfarm jobs, derived from the Current Employment Statistics (CES) survey, also called the establishment or payroll survey; and an estimate of total civilian employment, derived from the Current Population Survey (CPS), also called the household survey. The two surveys use different definitions of employment, as well as different survey and estimation methods. The CES survey is a survey of employers that provides a measure of the number of payroll jobs in nonfarm industries. The CPS is a survey of households that provides a measure of employed people ages 16 years and older in the civilian noninstitutional population.

Employment estimates from the CPS provide information about workers in both the agricultural and nonagricultural sectors and in all types of work arrangements: workers with wage and salary jobs (including employment in a private household), workers who are self-employed, and workers doing unpaid work for at least 15 hours per week in a business or farm operated by a family member. CES payroll employment estimates are restricted to nonagricultural wage and salary jobs and exclude private household workers. As a result, employment estimates from the CPS are higher than those from the CES survey. In the CPS, however, workers who hold multiple jobs (referred to as "multiple jobholders") are counted only once, regardless of how many jobs these workers held during the survey reference period. By contrast, because the CES survey counts the number of jobs rather than the number of people, each nonfarm job is counted separately, even when two or more jobs are held by the same person.

The reference periods for the surveys also differ. In the CPS, the reference period is generally the calendar week that includes the 12th day of the month. In the CES survey, employers report the number of workers on their payrolls for the pay period that includes the 12th of the month. Because pay periods vary in length among employers and may be longer than 1 week, the CES employment estimates can reflect longer reference periods.

For more information on the two monthly employment measures, see "Comparing employment from the BLS household and payroll surveys," Labor Force Statistics from the Current Population Survey (U.S. Bureau of Labor Statistics, last modified February 3, 2023), https://www.bls.gov/web/empsit/ces_cps_trends.htm.

Appendix B: Adjustments to population estimates for the CPS

Updated population controls for the CPS are introduced annually with the publication of January data in *The Employment Situation* news release. The change in population reflected in the estimates introduced in January 2022 is based on a blended 2020 population base, which combines population totals from the 2020 census and demographic characteristics from other sources. Consequently, data for 2022 are not strictly comparable to those for earlier years. For the analysis presented in this article, the effects of the updated population controls have been taken into account.

The adjustment increased the estimated size of the civilian noninstitutional population in December 2021 by 973,000, the civilian labor force by 1,530,000, employment by 1,471,000, and unemployment by 59,000. People not in the labor force decreased by 557,000. Although the adjustment did not affect the total unemployment rate, it did increase the labor force participation rate and the employment–population ratio, each by 0.3 percentage point. These increases were due mostly to an increase in the population in age groups that participate in the labor force at high rates (those ages 35 to 64) and a large decrease in the population ages 65 and older, whose members participate in the labor force at a low rate.

For additional information on the population adjustments and their effect on national labor force estimates, see "Adjustments to household survey population estimates in January 2022" (U.S. Bureau of Labor Statistics, February 2022), https://www.bls.gov/cps/population-control-adjustments-2022.pdf.

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Notes

[1] For more information, see "Effects of COVID-19 pandemic on the Employment Situation news release and data" (U.S. Bureau of Labor Statistics, last modified September 1, 2022), https://www.bls.gov/covid19/effects-of-covid-19-pandemic-and-response-on-the-employment-situation-news-release.htm.

[2] Although data from the Current Population Survey (CPS) are published monthly, the data analyzed in this article are seasonally adjusted quarterly averages, and all over-the-year changes are comparisons of fourth-quarter 2021 data with fourth-quarter 2022 data, unless noted otherwise. Comparisons to prepandemic levels refer to data for the fourth quarter of 2019.

[3] In the CPS, unemployed people are defined as those ages 16 and older who were not employed during the survey reference week, had actively searched for work during the 4 weeks prior to the survey, and were available for work. People who were on temporary layoff and available for work are counted as unemployed and do not need to have searched for work.

[4] The U.S. Bureau of Labor Statistics (BLS) produces two sets of national employment estimates each month from two different surveys: an estimate of total nonfarm jobs, derived from the Current Employment Statistics survey, also known as the establishment or payroll survey, and an estimate of total civilian employment, based on the CPS, also called the household survey. The two surveys use different definitions of employment, as well as different survey and estimation methods. For more information on the two monthly employment measures, see appendix A and appendix B of this article and "Comparing employment from the BLS household and payroll surveys," Labor Force Statistics from the Current Population Survey (U.S. Bureau of Labor Statistics, last modified February 3, 2023), https://www.bls.gov/web/empsit/ces_cps_trends.htm.

[5] For more information, see Teresa Ghilarducci, "In the latest jobs report, older workers tell us a lot about the economy," *Forbes*, November 4, 2022, https://www.forbes.com/sites/teresaghilarducci/2022/11/04/mixed-unemployment-report-for-older-workers/?sh=610652967478.

[6] The duration of joblessness is the length of time (through the current reference week) that people classified as unemployed have been looking for work. This measure refers to the duration of the current spell of unemployment, rather than to that of a completed spell. Data for 27 weeks or longer are seasonally adjusted. Data for 52 weeks or longer are not seasonally adjusted.

[7] The Current Population Survey collects data on the different reasons people are unemployed, including being on temporary layoff. Unemployed people on temporary layoff are those who (1) said they were laid off or were not at work during the survey reference week because of layoff (temporary or indefinite) or slack work/business conditions, (2) have been given a date to return or expect to be recalled within the next 6 months, and (3) could have returned to work if they had been recalled (except for their own temporary illness). Unlike other unemployed people, those on temporary layoff do not need to look for work to be classified as unemployed. Pay status is not a criterion to be unemployed on temporary layoff. People absent from work because of temporary layoff are classified as unemployed on temporary layoff, whether or not they are paid for the time they are off work.

[8] For more information, see Steven E. Haugen, "Measures of labor underutilization from the Current Population Survey," Working Paper 424 (U.S. Bureau of Labor Statistics, March 2009), https://www.bls.gov/osmr/research-papers/2009/pdf/ec090020.pdf, and John E. Bregger and Steven E. Haugen, "BLS introduces new range of alternative unemployment measures," *Monthly Labor Review*, October 1995, https://www.bls.gov/opub/mlr/1995/10/art3full.pdf.

[9] For more information, see "Research series on labor force status flows from the Current Population Survey," Labor Force Statistics from the Current Population Survey (U.S. Bureau of Labor Statistics, last modified October 8, 2015), www.bls.gov/cps/cps_flows.htm.

[10] For more information, see Monica D. Castillo, "Persons outside the labor force who want a job," *Monthly Labor Review*, July 1998, https://www.bls.gov/opub/mlr/1998/07/art3full.pdf

[11] People not in the labor force who "want a job" is a measure of people who reported wanting a job without having necessarily looked for one; this group includes all people who responded to the question "Do you currently want a job, either full or part time?" with the answer "Yes or maybe, it depends."

[12] See Ron Wirtz, "Why is there a labor shortage? Ask workers" (Federal Reserve Bank of Minneapolis, February 24, 2023), https://www.minneapolisfed.org/article/2023/why-is-there-a-labor-shortage-ask-workers.

[13] For more information, see Jerome H. Powell, “Inflation and the Labor Market” (Board of Governors of the Federal Reserve System, November 30, 2022), https://www.federalreserve.gov/newsevents/speech/powell20221130a.htm.

[14] Since the late 1940s, data on self-employment have been collected regularly as part of the CPS. In addition to classifying employment by occupation and industry, the CPS subdivides the employed by “class of worker”—that is, wage and salary employees, self-employed, and unpaid family workers. In 1967, it became possible to identify another group of self-employed workers: those who reported in the CPS they were self-employed and had incorporated their businesses. Individuals choose to incorporate their businesses for several reasons, such as legal and tax considerations. Since 1967, the estimates of self-employment regularly published by BLS have included only the unincorporated self-employed workers. Although it is possible to identify the incorporated self-employed workers separately, these individuals are counted as wage and salary workers in the statistics because, from a legal standpoint, they are employees of their own businesses. For more information, see Steven F. Hipple and Laurel A. Hammond, “Self-employment in the United States,” *Spotlight on Statistics* (U.S. Bureau of Labor Statistics, March 2016), https://www.bls.gov/spotlight/2016/self-employment-in-the-united-states/.

[15] BLS produces measures of people at work part time for economic and noneconomic reasons from the CPS. People at work part time for economic reasons, also referred to as involuntary part-time workers, include those who gave an economic reason when asked why they worked 1 to 34 hours during the reference week (the week including the 12th of the month). Economic reasons include the following: slack work, unfavorable business conditions, inability to find full-time work, and seasonal declines in demand. People who usually work part time and were at work part time during the reference week must indicate that they wanted and were available for full-time work to be classified as part time for economic reasons.

[16] In the CPS, veterans are defined as men and women ages 18 and over who previously served on active duty in the U.S. Armed Forces and who were civilians at the time the survey was conducted. Veterans are categorized as having served in the following periods of service: (1) Gulf War-era II (September 2001 to the present), (2) Gulf War-era I (August 1990 to August 2001), (3) World War II (December 1941 to December 1946), (4) Korean War (July 1950 to January 1955), (5) Vietnam-era (August 1964 to April 1975), and (6) other service period (all other periods). Veterans who served in more than one wartime period are classified into only the most recent period. Veterans who served in both a wartime period and any other service period are classified in the wartime period.

[17] Labor force statistics for people with and without a disability are available beginning in June 2008, the first month disability questions were added to the basic CPS.

[18] Foreign-born people are people who reside in the United States but were born outside the country or outside one of its outlying areas, such as Puerto Rico or Guam, to parents who were not U.S. citizens. Foreign-born people include legally admitted immigrants; refugees; temporary residents, such as students and temporary workers; and undocumented immigrants.

[19] Data are annual averages and are in current dollars. The CPS data on earnings represent earnings before taxes and other deductions and include any overtime pay, commissions, or tips typically received. For multiple jobholders, only earnings received at their main job are included. Earnings reported on a nonweekly basis are converted to a weekly equivalent. The term “usual” reflects each survey respondent’s understanding of the term. If the respondent asks for a definition of “usual,” interviewers are instructed to define the term as more than half the weeks worked during the past 4 or 5 months. Wage and salary workers are defined as those who receive wages, salaries, commissions, tips, payment in kind, or piece rates. This definition includes both public- and private-sector employees but excludes all self-employed people, regardless of whether their businesses are incorporated or unincorporated. Earnings comparisons made in this article are on a broad level and do not control for many factors that help explain earnings differences, such as job skills and responsibilities, work experience, and specialization. Finally, full-time workers are those who usually work 35 hours or more per week at their main job.

[20] The Consumer Price Index for All Urban Consumers (CPI-U) is used to convert current dollars to constant (1982-84) dollars.

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BEYOND BLS

Beyond BLS briefly summarizes articles, reports, working papers, and other works published outside BLS on broad topics of interest to MLR readers.

June 2023

Can stimulus checks pay for themselves?

Summary written by: Harry Nitzberg

During the COVID-19 pandemic, the U.S. government issued stimulus checks to support demand and keep the economy afloat. To pay for the stimulus, the government increased its annual budget deficit and, by extension, increased its total debt. Logically, the debt that the U.S. government incurred to pay for the stimulus checks will need to be eventually paid off by higher taxes. Yet, an emerging body of work suggests that this might not be entirely true. In their article "Can deficits finance themselves?" (National Bureau of Economic Research, Working Paper 31185, April 2023), George-Marios Angeletos, Chen Lian, and Christian K. Wolf argue that, under specific circumstances, government deficits can indirectly pay for themselves. The crux of the argument is that, over time, government deficits indirectly increase government revenue and indirectly erode the real value of government debt.

Theoretically, when a government issues stimulus checks, the money trickles down throughout the rest of the economy and spurs economic activity. With more economic activity comes more tax revenue. According to the authors, the extra tax revenue can then be used to pay off the debt incurred from the initial deficit. One tradeoff of issuing stimulus checks is the possibility of rising inflation.

If all households immediately spend a large portion of their stimulus checks, the supply of goods and services in the economy may not be able to keep up with consumer demand. That is, the level of "demand" might not be able to keep up with "supply." If supply cannot meet demand, prices will rise; that is, inflation will increase. Although inflation is often perceived as negative, in this case, it may have an unintended benefit.

A deficit is created when, in a given fiscal year, a government spends more money than it raises. To finance the spending that a government's revenue cannot cover, the government will issue bonds (essentially an "IOU"). Bonds are like loans; at a specified point in the future, the amount of the original loan must be repaid. In addition, the government must pay interest on its bonds. Even if prices rise, the initial amount that needs to be repaid does not change. So, if the inflation rate becomes bigger than the interest rate on government loans, the real (inflation-adjusted) value of government debt decreases, making debt easier to pay off.

For stimulus checks to raise tax revenue and erode the value of government debt, the authors lay out a series of specific conditions:

- The country's central bank (the Federal Reserve for instance) cannot substantially raise interest rates to calm the inflation created by the boom.
- People must spend the bulk of their stimulus checks and do so quickly.
- If, in the future, the government raises taxes to pay off the debt incurred from the initial deficit, the farther in the future the tax hike is, the more the original deficit becomes self-financing.

Despite the positive implications for stimulus spending, Angeletos, Lian, and Wolf note that their model has an important limitation. The model assumes a large economy that is relatively closed to international finance and trade. In a more open economy, some of the stimulus payments could be spent on imports or invested overseas, reducing the size and longevity of the domestic economic boom. A smaller boom means less tax revenue and lower inflation, giving the government less money to pay off the deficit and less domestic inflation to erode the debt's value.

FEATURED ARTICLE

June 2023

Two plus two really does equal four: simulating official BLS gasoline price measures

Gasoline prices are a major contributor to inflation and have exhibited significant volatility over the last 3 years. Several price series of the U.S. Bureau of Labor Statistics (BLS) track changes in gas prices throughout the supply chain from oil extraction to gas stations. This article uses novel statistical methods that simulate these BLS price measures along the gasoline supply chain to demonstrate their internal statistical consistency and to better understand the impact of gas station markups on gasoline inflation. The statistical results of this article show that BLS price measures are accurately simulated by statistically backing-out each index from its respective supply-chain counterparts. Additionally, this article shows that gas station markups may have had a modest inflationary impact over the course of the COVID-19 pandemic.

Gasoline prices are a major contributor to inflation and have recently exhibited significant volatility.[1] Several price series of the U.S. Bureau of Labor Statistics (BLS) track changes in gas prices throughout the supply chain from petroleum extraction to gas stations.[2] The role of profits in driving inflation has been a closely followed issue in 2022 and 2023, and some research indicates that profits drove inflation in these years.[3] BLS research on other industries, such as the automotive industry, shows that intermediaries in the supply chain can have an impact on consumer pricing, and that the impact of these intermediaries can be identified by examining the implicit statistical relationship between the BLS price indexes for each respective portion of the supply chain.[4] The prices and indexes for wholesalers, retailer intermediaries, and final consumers should have statistically strong and economically meaningful relationships in industries in which quality change is low (this occurs with gasoline and other homogenous commodities). This article uses novel statistical methods that simulate the BLS gasoline price measures along the supply chain to demonstrate the internal statistical consistency of these methods, to show the validity of the methods, and to better understand the impact of gas station markups on gasoline inflation.[5] Overall, gas station markups had volatile and varying impacts and pressures on gasoline price changes during the COVID-19 pandemic. There were three periods of price changes:

- March 2020 through April 2020, a period of rapid and strong inflationary pressure from gas station markup increases
- May 2020 through January 2021, a period of modest deflationary pressure from gas station markup decreases
- January 2021 through May 2023, a period of modest and steady inflationary impact from gas station markup increases

Theory and industry background

It is possible to simulate BLS price indexes by statistically isolating producer commodity, producer margins, or consumer commodity indexes from each of their respective supply chain counterparts. For example, Kevin M. Camp, Michael Havlin, and Sara Stanley show that the BLS margins index for dealership services in the auto industry can be approximated by the residual between the Producer Price Index (PPI) for completed vehicles and the Consumer Price Index (CPI) for completed vehicles.[6] Camp, Havlin, and Stanley show that the residual between commodity indexes for completed vehicles generally tracked the dealership profit-margins index of the PPI. However, it is unclear in Camp, Havlin, and Stanley what is the true statistical relationship between the residual and the official margins index. Additionally, Michael Havlin introduces some additional methods showing that the CPI for completed vehicles can be simulated with an input price index that includes dealership markups.[7]

Although the methods used in the automotive market worked reasonably well, they are likely to work much better in a homogenous industry. There are several factors that could prevent the margins-simulation method from working perfectly for heterogenous goods like automobiles and other manufactured goods. First, a strong statistical correlation between approximated and official margins indexes may not be possible to simulate because BLS quality adjusts the commodity PPIs and CPIs but does not quality adjust the margins indexes. Gaps between the simulated approximation index and the official margins index could partially represent the isolated quality-adjustment differences between each commodity index and other technical differences. Second, time lags on either side of the retailing intermediaries could prevent a strong correlation between the approximated and the official margins indexes. Finally, one must add the regression residuals to the other regression parameters, namely, the intercept and beta coefficient, to complete the margins-simulation process suggested in Camp, Havlin, and Stanley.[8]

Industries are excellent test cases for examining the implicit theoretical interdependencies of the commodity and margins indexes in the CPI and PPI. A good test case is an industry that has a high degree of product overlap in the intermediate indexes, does not have a substantial amount of product-quality change, does not have large time lags in the supply chain, and has a high degree of product-flow overlap between supply-chain participants.

Also, industries that produce homogenous commodities, such as gasoline, are excellent test cases for examining the conditions and characteristics that may support the use of the methods developed in Havlin and Camp, Havlin, and Stanley. These methods can be tested with fewer confounding variables (such as quality change, sample-size differences, product-composition differences, and product-flow differences) in analyses of highly homogeneous gasoline indexes with large sample sizes. Nevertheless, technical differences between price-relative calculations, such as those involving geometric means and Laspeyres indexes, may continue to cause differences. Because of assumptions regarding consumer behavior, the CPI uses geometric means that tend to weaken the impact of large changes. Because the PPI does not use geometric means, large price changes may have a larger impact on PPIs than on CPIs. To test the methods developed in Havlin and Camp, Havlin, and Stanley, this article focuses on the CPI for gasoline, the PPI for gasoline, the PPI for automotive fuels and lubricants retailing (PPI for gasoline margins), CPI data on average gasoline prices, and Energy Information Administration (EIA) data on wholesale gasoline prices.

The regression model from Camp, Havlin, and Stanley suggests how the error term ϵ_t, plus the model intercept β_0, and plus the beta coefficient β_1 of a regression model fitted on the index levels Gasoline CPI_t and Gasoline PPI_t should estimate the PPI for gasoline margins for each month after rebasing to the same index levels.[9] The gasoline margins PPI short-term price relative can also be simulated by inflating the CPI data on average gasoline prices by the CPI for gasoline each month and then subtracting from that figure the EIA data on wholesale gasoline prices inflated each month by the PPI for gasoline. These short-term price relatives can then be used to reconstruct the PPI for gasoline margins. (See appendix.)

Furthermore, Havlin demonstrates that the interdependencies of the PPI for a particular good and the PPI margin for that good should closely correlate—if not equal—the CPI for that same good. The gasoline input price index including markups is a weighted composite of the PPI for gasoline and the PPI for gasoline margins (demonstrated in the appendix). This index is conceptually similar to the composite input price indexes demonstrated by Jayson Pollock and Jonathan C. Weinhagen.[10] Also, the gasoline input price index including markups is an application of the model used by Havlin.

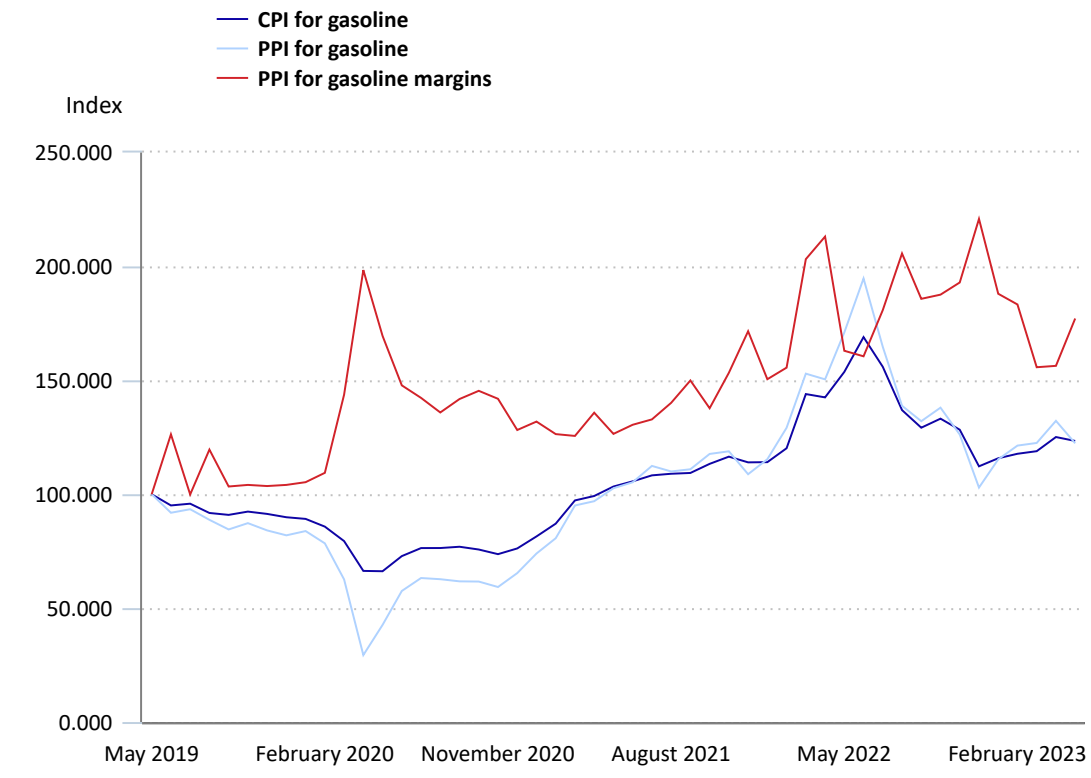
The accuracy of the gasoline input price index including markups can be determined by regressing the index against the CPI for gasoline. This method is demonstrated by Don A. Fast and Susan E. Fleck.[11] In this regression, because margins are explicitly incorporated into the model with a weighted-interaction term, the residual term between the CPI for gasoline and the gasoline input price index including markups should equal the cumulative impact of technical differences between the PPI for gasoline and the CPI for gasoline (this equality is similar to geometric means and sample-frame differences).

Both Fast and Fleck and Don Fast, Susan E. Fleck, and Dominic A. Smith provide a useful roadmap for assessing the performance of indexes designed to simulate official government statistics.[12] Various test statistics are used by these researchers to assess the performance of simulations of margins and commodity indexes described above and shown below. The correlation coefficient, beta coefficients, and *p*-values from regressions on the percent changes of indexes (short-term price relatives) are used to assess short-term correlations. Longer term correlations are tested by graphical analysis of the index levels (long-term price relatives).

Data analysis and results

A comparison of the commodity and margins indexes in the gasoline industry shows their implicit relationships. These relationships are alluded to by Camp et al. and demonstrated by Havlin.[13] Chart 1 shows that the PPI for gasoline margins increases when the PPI for gasoline falls at a faster rate than the CPI for gasoline. Similarly, when the PPI for gasoline rises at a faster rate than the CPI for gasoline, then the PPI for gasoline margins increases. For example, because of pandemic-related volatility, producer gas prices fell by 64.9 percent from January 2020 through April 2020, while consumer prices only fell by 25.6 percent. As a result of producer prices falling 153.6 percent more than consumer prices, the PPI for gasoline margins increased by 88.4 percent over the same period. Similarly, from April 2020 through July 2020, consumer prices increased by 15.1 percent while producer prices increased by 115.0 percent; as a result, the PPI for gasoline margins decreased by 28.3 percent over the same period.

Chart 1. BLS official gasoline price measures

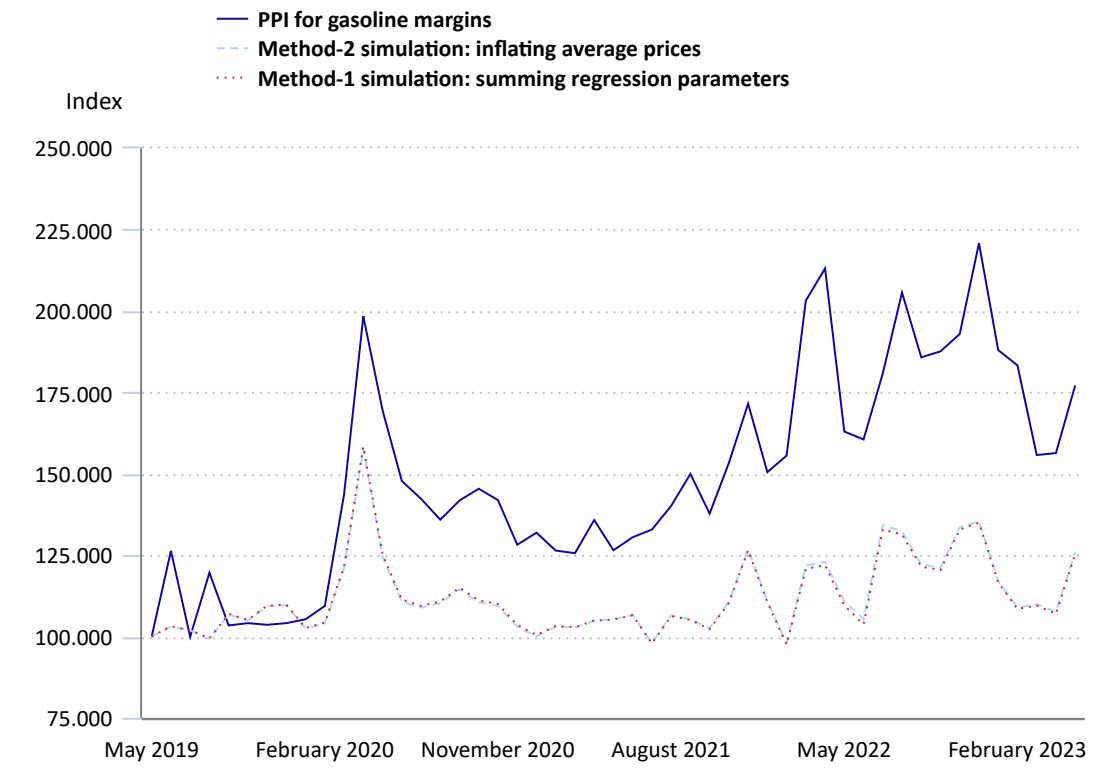


Click legend items to change data display. Hover over chart to view data.
Note: CPI = Consumer Price Index; PPI = Producer Price Index; BLS = U.S. Bureau of Labor Statistics.
Source: U.S. Bureau of Labor Statistics.

View Chart Data

Chart 2 and table 1 show the results of different methods for simulating the gasoline margins PPI. The first method, an enhancement of Camp, Havlin, and Stanley's method, adds the residual of an ordinary least squares (OLS) model between the index levels of the PPI for gasoline and the CPI for gasoline to the intercept and the beta coefficient of the model and is then rebased. The intercept and beta coefficient represent the average gas station markup, and the residual represents deviations from that markup. Adding the three parameters together provides an index estimate of the markup. The second method, first demonstrated by Havlin,[14] takes the CPI data for the average price of gasoline (starting from May 2019) and the EIA wholesale price (starting from May 2019) and then inflates each series by the CPI and PPI monthly percent changes for gasoline. Next, this sum is subtracted from the inflated difference for each month to create an index.[15] Graphically, the results for the two methods are nearly identical, so observing both their levels in chart 2 is not possible without the use of dashes. Two very different methods yielding nearly identical results (both graphically and statistically correlated with the PPI for gasoline margins) demonstrate the effectiveness of the simulation methods. While graphical analysis is useful, statistical analysis is also important for evaluating the effectiveness of the simulation methods because nonstationarity in index levels can overstate the impact of outlier short-term changes.[16]

Chart 2. Margins simulations and official margin index



Click legend items to change data display. Hover over chart to view data.
Note: PPI = Producer Price Index.
Source: Author's calculations based on data from the U.S. Bureau of Labor Statistics and the Energy Information Administration.

View Chart Data

Table 1. Margins correlations

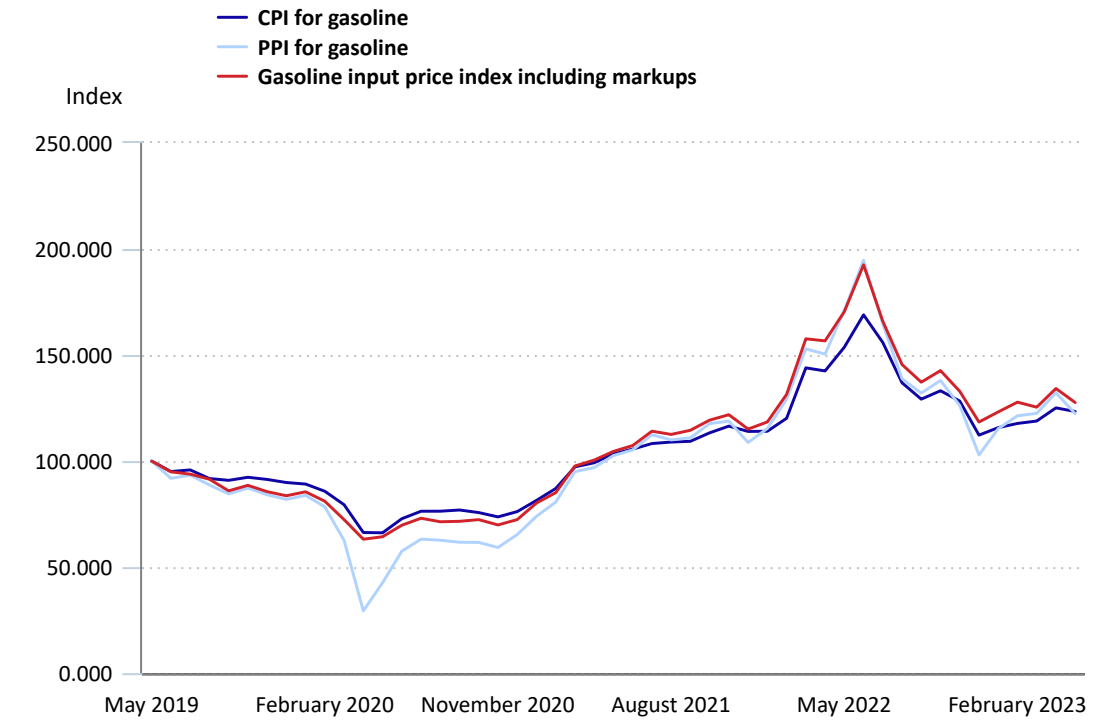
Method/parameter	Correlation coefficient	Beta of STR OLS	*P*-value of beta STR OLS	RSME
Method 1: sum of regression parameters	0.70	0.89	0.00	0.09
Method 2: inflating average prices	0.70	0.90	0.00	0.09

Note: STR = short-term price relative. OLS = ordinary least squares. RSME = root-mean-square error.
Source: Author's calculations based on data from the U.S. Bureau of Labor Statistics and the Energy Information Administration.

Table 1 shows the test statistics used to compare the simulated indexes with the official PPI for gasoline margins. The results of the comparisons show that the performance metrics far exceed what some economists characterize as a "good" fit.[17] BLS economists classified a number of simulated BLS indexes by using various statistical thresholds.[18] The results of creating a price index by summing the parameters of the OLS model with the CPI and PPI commodity indexes exceed the statistical thresholds used to determine "good" fits established in the academic literature. The theoretical analysis discussed above, the graphical results in chart 2, and the test statistics in table 1 provide robust evidence demonstrating the internal consistency of the BLS measures. Also, these analyses show that BLS price indexes can be simulated with the algebraic and statistical methods used in this article.

It is also possible to simulate the CPI for gasoline by using the PPI for gasoline and the PPI for gasoline margins. The gasoline input price index including markups, introduced in this article, has a higher correlation with the official CPI than with the PPI for gasoline. The OLS regression can be viewed as a model with a variably weighted interaction term as the independent variable and the CPI as the dependent variable. The weights in the gasoline input price index including markups are defined as the margin in the prior period, and the initial margin is assumed to be 6.7 percent.[19] Chart 3 graphically compares the CPI for gasoline and the PPI for gasoline with the gasoline input price index including markups.

Chart 3. Gasoline input price index including markups and official BLS gasoline measures



Click legend items to change data display. Hover over chart to view data.
Note: CPI = Consumer Price Index; PPI = Producer Price Index; BLS = U.S. Bureau of Labor Statistics.
Source: Author's calculations based on data from the U.S. Bureau of Labor Statistics and the Energy Information Administration.

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Table 2 shows the test statistics used to compare the gasoline input price index including markups with the CPI for gasoline. The correlation statistic for the gasoline input price index including markups is appreciably higher than the correlation statistic for the official PPI for gasoline. These correlation statistics exceed the threshold that BLS-domain-hosted articles consider are "good" fits.[20] The theoretical analysis discussed above, the graphical results in chart 3, and the test statistics in table 2 provide robust evidence demonstrating the internal consistency of these BLS measures. Again, these results show that BLS price indexes can be simulated with the algebraic and statistical methods used in this article.

Table 2. Correlation with CPI

Correlation with CPI for gasoline	Correlation coefficient	Beta of STR OLS	*P*-value of STR OLS	RMSE
Gasoline input price index including markups	0.94	0.82	0.00	0.02
PPI for gasoline	0.79	0.35	0.00	0.04

Note: STR = short-term price relative; OLS = ordinary least squares; RSME = root-mean-square error; CPI = Consumer Price Index; PPI = Producer Price Index.
Source: Author's calculations based on data from the U.S. Bureau of Labor Statistics and the Energy Information Administration.

Overall, the results of this article show that, because margins were not constant, gas stations had inflationary and deflationary roles in gas-price changes over the 3-year study period. All three of the index methods, that for the official PPI for gasoline margins and those for the two simulations, show the same trends in price changes of gasoline margins. Gas station margins contributed substantially to inflationary pressures early in the pandemic, from January 2020 through April 2020, but then contributed substantially to deflationary pressures from April 2020 through July 2020. More noteworthy, there had been a steady but modest inflationary impact from gas station margins from January 2021 through May 2023. This result can be observed in the steady increase of all three simulated gas station margins. All three margins exhibited similar volatility and similar trends.

Overview and discussion

The models suggested by Camp, Havlin, and Stanley and by Havlin work well when applied to the homogenous and timely gasoline indexes.[21] The results documented in this article demonstrate the internal consistency of the simulated indexes and show that index simulation and estimation methods may be applied to other homogeneous industries. Researchers may try this approach in simulating price changes in other industries, attempt a vector autoregression, or even attempt a simulation of hypothetical margins indexes based on multidecade commodity indexes that predate the official margins indexes published by BLS. These results are of interest to the general public because they help explain how gas prices at the pump may be affected by gas station profits. Over the past 3 years, the impact of gas station margins on gasoline prices has been volatile. This impact of gas station margins was sometimes inflationary and at other times deflationary.

Appendix

Margin simulation method 1:

$$\text{CPI for gasoline}_t = \beta_0 + \beta_1 \text{PPI for gasoline}_t + \epsilon_t,$$

where β_0 and β_1 capture the average gas station markup over time period t, and ϵ_t represents upward or downward deviations from the average markup. Therefore, in time t,

$$\text{PPI for Gasoline Margins}_t \approx \beta_0 + \beta_1 + \epsilon_t.$$

Margin simulation method 2:

$$\text{PPI for Gasoline Margins}_t \approx \frac{(\text{AGTP}_{t-1} \times \text{CPI STR G}_t) - (\text{AGWP}_{t-1} \times \text{PPI STR G}_t)}{(\text{AGTP}_{t-2} \times \text{CPI STR G}_{t-1}) - (\text{AGWP}_{t-2} \times \text{PPI STR G}_{t-1})},$$

where AGTP_{t-1} and AGTP_{t-2} are the average gasoline transaction prices in, respectively, periods *t*–1 and *t*–2; AGWP_{t-1} and AGWP_{t-2} are the average EIA wholesale-gasoline prices in, respectively, periods *t*–1 and *t*–2; CPI STR G_t and CPI STR G_{t-1} are the CPI short-term price relatives (STRs) for gasoline in, respectively, periods *t* and *t*–1; and PPT STR G_t and PPI STR G_{t-1} are the PPI STRs for gasoline in, respectively, periods *t* and *t*–1.

The values of AGTP_{t-i} and AGWP_{t-i} are calculated as follows:

$$\text{AGTP}_{t-i} = \text{AGTP}_{t-i-1} \times \text{CPI STR G}_{t-i}$$

$$\text{AGWP}_{t-i} = \text{AGWP}_{t-i-1} \times \text{CPI STR G}_{t-i}$$

The initial base-period values AGTP and AGWP are calculated as follows:

$$\text{AGTP}_{t-i-1} = \text{CPI Average Retail Transaction Price}_{\text{May 2019}}$$

$$\text{AGWP}_{t-i-1} = \text{EIA Average Wholesale Price}_{\text{May 2019}}$$

$$\text{CPI Average Retail Transaction Price}_{\text{May 2019}} = 2.963$$

$$\text{EIA Average Wholesale Price}_{\text{May 2019}} = 2.11$$

Gasoline Input Price Index Including Markups_T are calcualted as follows:

$$= \left(\frac{(\text{Gasoline PPI}_T)(1 - w_T) + (\text{Gasoline Margin PPI}_T)(w_T)}{(\text{Gasoline PPI}_t)(1 - w_t) + (\text{Gasoline Margin PPI}_t)(w_t)} \right) \times 100$$

The values of W_T and W_t are calculated as follows:

$$W_T = \text{Wm}_t \times \frac{\text{PPI DM}_T}{\text{PPI DM}_t}$$

$$W_t = \text{Wm}_{t-i} \times \frac{\text{PPI DM}_t}{\text{PPI DM}_{t-i}}$$

The initial base-period value *W* is calculated as follows:

$$W_{\text{january 2019}} = \frac{\text{Average Markup}_{\text{January 2019}}}{\text{CPI Average Price}_{\text{January 2019}}}$$

$$\text{Average Markup}_{\text{January 2019}} = \text{CPI Average Price}_{\text{January 2019}} - \text{EIA Average DTW Price}_{\text{January 2019}}$$

$$\text{CPI Average Price}_{\text{May 2019}} = 2.963$$

$$\text{EIA Average DTW Price}_{\text{May 2019}} = 2.765$$

The Gasoline CPI_t is calculated as follows:

$$\text{Gasoline CPI}_t = \beta_0 + \beta_1 \text{Gasoline Input Index}_t + \epsilon_t,$$

where β_0 and β_1 represent the average difference between the indexes in period t, and ϵ_t represents deviations from that average. Because profit margins have now been controlled for, the average difference arguably represents the cumulative technical difference between the PPI and CPI measurement methods.

SUGGESTED CITATION:

Michael Havlin, "Two plus two really does equal four: simulating official BLS gasoline price measures," *Monthly Labor Review,* U.S. Bureau of Labor Statistics, June 2023, https://doi.org/10.21916/mlr.2023.14

Notes

[1] Readers interested in the relative contribution figures for the different commodities in the Consumer Price Index (CPI) can refer to “Measuring price change in the CPI: motor fuel,” Consumer Price Index (U.S Bureau of Labor Statistics, February 2023), https://www.bls.gov/cpi/factsheets/motor-fuel.htm; and Kevin M. Camp, David Mead, Stephen B. Reed, Christopher Sitter, and Derek Wasilewski, "From the barrel to the pump: the impact of the COVID-19 pandemic on prices for petroleum products," *Monthly Labor Review*, U.S. Bureau Labor Statistics, October 2020, https://doi.org/10.21916/mlr.2020.24.

[2] Camp, Mead, Reed, Sitter, and Wasilewski, "From the barrel to the pump.”

[3] Andrew Glover, José Mustre-del-Río, and Alice von Ende-Becker, “How much have corporate profits contributed to recent inflation?,” *Economic Review* (Federal Reserve Bank of Kansas City, first quarter 2023), https://www.kansascityfed.org/Economic%20Review/documents/9329/EconomicReviewV108N1GloverMustredelRiovonEndeBecker.pdf.

[4] Kevin M. Camp, Michael Havlin, and Sara Stanley, "Automotive dealerships 2007–19: profit-margin compression and product innovation," *Monthly Labor Review*, U.S. Bureau of Labor Statistics, October 2022, https://doi.org/10.21916/mlr.2022.26.

[5] Each of the three kinds of indexes, CPIs for physical goods, producer price indexes (PPIs) for physical goods, and PPIs for retail trade, measures certain goods and services at different stages of the supply chain with the scope of one index beginning where the other ends. Being able to simulate an index by using the other two indexes shows that each index is tracking the transactions and prices that each index is ostensibly intended for.

[6] Camp, Havlin, and Stanley, "Automotive dealerships 2007–19.”

[7] Michael Havlin, “Automotive dealerships 2019–22: dealer markup increases drive new-vehicle consumer inflation,” *Monthly Labor Review*, U.S. Bureau of Labor Statistics, April 2023, https://doi.org/10.21916/mlr.2023.7.

[8] Camp, Havlin, and Stanley, "Automotive dealerships 2007–19.”

[9] Ibid.

[10] Jayson Pollock and Jonathan C. Weinhagen, "A new BLS satellite series of net inputs to industry price indexes: methodology and uses," *Monthly Labor Review*, U.S. Bureau of Labor Statistics, September 2020, https://doi.org/10.21916/mlr.2020.22.

[11] Don A. Fast and Susan E. Fleck, “Unit values for import and export price indexes: a proof of concept,” in *Big Data for 21st Century Economic Statistics*, edited by Katharine G. Abraham, Ron S. Jarmin, Brian Moyer, and Matthew D. Shapiro, pp. 275-296, National Bureau of Economic Research and University of Chicago Press, 2022, https://www.bls.gov/mxp/data/unit-values-import-export-price-indexes.pdf.

[12] Fast and Fleck, “Unit values for import and export price indexes;” and Don Fast, Susan E. Fleck, and Dominic A. Smith, “Unit value indexes for exports—new developments using administrative trade data,” *Journal of Official Statistics*, March 2022, https://doi.org/10.2478/jos-2022-0005.

[13] Camp, Havlin, and Stanley, "Automotive dealerships 2007–19;” and Havlin, “Automotive dealerships 2019–22.”

[14] Havlin, “Automotive dealerships 2019–22.”

[15] Ibid.

[16] Nonstationarity in time-series data means that the data have a nonrandom trend that results in the data trending in a direction. Put differently, nonstationarity means that a current value has a non-random relationship with the prior value. This can make graphical analysis misleading because two lines going in the same direction could merely be doing so by coincidence of nonstationarity. To ensure that there truly is a statistical relationship, tests should be run to determine nonstationarity.

[17] A “good” fit is a subjective measure defined in Fast, Fleck, and Smith, “Unit value indexes for exports.” A “good” fit is evaluated through an informal assessment of various statistical tests and graphical correlations. The models used in this article outperform the average performance of the “good” fit indexes demonstrated by Fast, Fleck, and Smith.

[18] Fast and Fleck, “Unit values for import and export price indexes;” and Fast, Fleck, and Smith, “Unit value indexes for exports.”

[19] This is the difference between the Energy Information Administration (EIA) Dealer Tank Wagon Sales (DTW) price and the average consumer price from EIA and U.S. Bureau of Labor Statistics data in May 2019.

[20] Fast and Fleck, “Unit values for import and export price indexes;” and Fast, Fleck, and Smith, “Unit value indexes for exports.”

[21] Camp, Havlin, and Stanley, "Automotive dealerships 2007–19;” and Havlin, “Automotive dealerships 2019–22.”

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Michael Havlin is an economist at the U.S. Federal Maritime Commission.

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