U.S. labor market shows improvement in 2021, but the COVID-19 pandemic continues to weigh on the economy

The U.S. labor market continued to recover in 2021 from the recession caused by the coronavirus disease 2019 pandemic. Both the number of people who were unemployed and the unemployment rate decreased over the year. Although both measures are still above their prepandemic levels, the number of unemployed fell by 4.1 million over the year, to 6.8 million, and the unemployment rate decreased by 2.6 percentage points, averaging 4.2 percent in the fourth quarter of 2021. The employment–population ratio increased by 1.8 percentage points, to 59.2 percent, while the labor force participation rate showed more modest improvement, increasing by 0.3 percentage point during the year, to 61.8 percent in the fourth quarter. The number of unemployed on temporary layoff and those unemployed for 27 weeks or longer decreased over the year, but both measures are still above their prepandemic levels. The number of people working part time for economic reasons returned to its prepandemic level, and the number of self-employed increased by 7.8 percent in 2021.

The recession induced by the coronavirus disease 2019 (COVID-19) pandemic resulted in steep job losses, pushed the unemployment rate to a high of 13.0 percent in the second quarter of 2020, and caused many people to leave the labor force. By the end of 2021, even after substantial strides were made in combating the COVID-19 pandemic, the labor market still had not fully recovered. The jobless rate continued to trend downward, and by the fourth quarter of 2021, it was 4.2 percent, 2.6 percentage points below the rate from the prior year. The number of unemployed, at 6.8 million in the fourth quarter of 2021, decreased by 4.1 million over the year.

Total employment, as measured by the Current Population Survey (CPS), rose by 5.4 million over the year, to 155.2 million, which was well below its prepandemic level of 158.5 million in the fourth quarter of 2019. The employment–population ratio increased by 1.8 percentage points, to 59.2 percent. The labor force participation rate (the percentage of the population ages 16 years and older who are either employed or actively seeking employment) rose by 0.3 percentage point over the year, to 61.8 percent.

This article highlights a broad range of economic indicators from the CPS to provide a picture of labor market performance in 2021, both overall and for various demographic groups. The article also summarizes the number of people who, because of the COVID-19 pandemic, teleworked, were unable to work or worked reduced hours, or were prevented from looking for work. These data were collected through supplemental questions that were added to the CPS in the early stages of the pandemic. This article also provides 2021 updates on the trends in usual weekly earnings, labor force status flows, and the number of self-employed people and summarizes recent changes in the employment situations of veterans, people with a disability, and the foreign born.

Both the number of unemployed and the unemployment rate declined for all major demographic groups, but both measures remained above their prepandemic levels

The number of unemployed people was 6.8 million in the fourth quarter of 2021, a decrease of 4.1 million from a year earlier. Despite the large decline in 2021, however, the total number of unemployed was still 908,000 more than it was in the fourth quarter of 2019, before the pandemic began. The unemployment rate also declined in 2021. (See table 1.) The unemployment rate averaged 4.2 percent in the fourth quarter of 2021, which is 2.6 percentage points below the rate in the fourth quarter of 2020. Even with this improvement, the unemployment rate remained above the rate of 3.6 percent in the fourth quarter of 2019. (See chart 1.)
Table 1. Employment status of the civilian noninstitutional population 16 years and older, by gender, race, and Hispanic or Latino ethnicity, quarterly averages, seasonally adjusted, 2020–21 (levels in thousands)

| Characteristics | Fourth quarter 2020 | 2021 | Change, fourth quarter 2020–21 |
|-----------------|---------------------|------|------------------------------|
|                 | First quarter | Second quarter | Third quarter | Fourth quarter |
| Total, 16 years and older | 160,681 | 160,391 | 160,964 | 161,451 | 162,010 | 1,329 |
| Participation rate | 61.5 | 61.5 | 61.6 | 61.7 | 61.8 | 0.3 |
| Employed | 149,788 | 150,437 | 151,474 | 153,226 | 155,178 | 5,390 |
| Employment–population ratio | 57.4 | 57.7 | 58.0 | 58.6 | 59.2 | 1.8 |
| Unemployed | 10,894 | 9,954 | 9,491 | 8,225 | 6,832 | -4,062 |
| Unemployment rate | 6.8 | 6.2 | 5.9 | 5.1 | 4.2 | -2.6 |
| Men, 16 years and older | 85,285 | 85,108 | 85,389 | 85,654 | 85,870 | 585 |
| Participation rate | 67.5 | 67.4 | 67.6 | 67.7 | 67.7 | 0.2 |
| Employed | 79,391 | 79,738 | 80,188 | 81,128 | 82,258 | 2,867 |
| Employment–population ratio | 62.9 | 63.2 | 63.5 | 64.1 | 64.9 | 2.0 |
| Unemployed | 5,894 | 5,370 | 5,200 | 4,526 | 3,611 | -2,283 |
| Unemployment rate | 6.9 | 6.3 | 6.1 | 5.3 | 4.2 | -2.7 |
| Women, 16 years and older | 75,396 | 75,283 | 75,575 | 75,796 | 76,140 | 744 |
| Participation rate | 55.9 | 55.9 | 56.0 | 56.1 | 56.3 | 0.4 |
| Employed | 70,397 | 70,698 | 71,285 | 72,098 | 72,919 | 2,522 |
| Employment–population ratio | 52.2 | 52.5 | 52.9 | 53.4 | 53.9 | 1.7 |
| Unemployed | 4,999 | 4,585 | 4,290 | 3,699 | 3,221 | -1,778 |
| Unemployment rate | 6.6 | 6.1 | 5.7 | 4.9 | 4.2 | -2.4 |
| White | 124,316 | 123,832 | 123,938 | 124,235 | 124,579 | 263 |
| Participation rate | 61.6 | 61.4 | 61.4 | 61.5 | 61.6 | 0.0 |
| Employed | 116,835 | 116,982 | 117,487 | 118,624 | 120,070 | 3,235 |
| Employment–population ratio | 57.9 | 58.0 | 58.2 | 58.7 | 59.4 | 1.5 |
| Unemployed | 7,481 | 6,850 | 6,451 | 5,611 | 4,509 | -2,972 |
| Unemployment rate | 6.0 | 5.5 | 5.2 | 4.5 | 3.6 | -2.4 |
| Black or African American | 20,149 | 20,232 | 20,568 | 20,579 | 20,516 | 367 |
| Participation rate | 60.2 | 60.4 | 61.3 | 61.2 | 60.8 | 0.6 |
| Employed | 18,043 | 18,311 | 18,646 | 18,887 | 19,054 | 1,011 |
| Employment–population ratio | 53.9 | 54.6 | 55.5 | 56.1 | 56.5 | 2.6 |
| Unemployed | 2,106 | 1,920 | 1,921 | 1,692 | 1,462 | -644 |
| Unemployment rate | 10.5 | 9.5 | 9.3 | 8.2 | 7.1 | -3.4 |
| Asian | 10,345 | 10,353 | 10,423 | 10,638 | 10,763 | 418 |
| Participation rate | 62.5 | 62.7 | 63.2 | 64.3 | 65.1 | 2.6 |
| Employed | 9,638 | 9,747 | 9,836 | 10,147 | 10,333 | 695 |
| Employment–population ratio | 58.2 | 59.0 | 59.6 | 61.4 | 62.5 | 4.3 |
| Unemployed | 707 | 607 | 587 | 491 | 430 | -277 |
| Unemployment rate | 6.8 | 5.9 | 5.6 | 4.6 | 4.0 | -2.8 |
| Hispanic or Latino ethnicity | 29,155 | 29,087 | 29,207 | 29,511 | 29,842 | 487 |
| Participation rate | 65.4 | 65.2 | 65.2 | 65.6 | 66.0 | 0.6 |
| Employed | 26,541 | 26,704 | 27,061 | 27,672 | 28,274 | 1,733 |
| Employment–population ratio | 59.6 | 59.9 | 60.4 | 61.5 | 62.5 | 2.9 |
| Unemployed | 2,613 | 2,383 | 2,146 | 1,839 | 1,568 | -1,045 |
| Unemployment rate | 9.0 | 8.2 | 7.3 | 6.2 | 5.3 | -3.7 |

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.
Unemployment declined among both men and women in 2021. The jobless rate for men fell by 2.7 percentage points over the year, to 4.2 percent in the fourth quarter, and by 2.4 percentage points for women, to 4.2 percent. Although the unemployment rates for men and women declined in 2021, they remained above their prepandemic levels, when the rates for both men and women were 3.6 percent in the fourth quarter of 2019. (See table 1.)

Unemployment rates declined over the year for all demographic groups

The unemployment rates for all race and ethnicity groups declined in 2021, with the rate for Hispanics showing the largest over-the-year decrease. The jobless rate for Hispanics fell by 3.7 percentage points, to 5.3 percent, and the rate for Blacks fell by 3.4 percentage points, to 7.1 percent. The jobless rate for Asians declined by 2.8 percentage points, to 4.0 percent, and the rate for Whites fell by 2.4 percentage points, to 3.6 percent. Even with these improvements, the unemployment rates for Blacks and Hispanics remained considerably higher than the rates for Asians and Whites. Despite substantial improvements in 2021, particularly in the second half of the year, they were not enough to make up for the steep increases that occurred in the second quarter of 2020, when the rates for Whites, Asians, and Hispanics reached historic highs. (See chart 2.)

Jobless rates for younger workers declined more than the rates for older workers

The unemployment rate for 16- to 24-year-olds decreased by 3.6 percentage points over the year, to 8.4 percent in the fourth quarter of 2021. Within this age group, the jobless rate for teenagers (ages 16 to 19) fell by 3.3 percentage points over the year, to 11.2 percent in the fourth quarter of 2021. The rate for teenagers was well below its high of 28.4 percent in the second quarter of 2020 and lower than it had been before the pandemic (12.3 percent in the fourth quarter of 2019). The jobless rate for people ages 20 to 24 declined by 3.8 percentage points in 2021, to 7.2 percent, down from its high of 22.6 percent in the second quarter of 2020 but slightly above its prepandemic rate. Although unemployment rates rose sharply at the onset of the pandemic for all age groups, the increase was greatest among younger workers. A reverse pattern occurred in 2021, when younger workers experienced larger decreases in their jobless rates than did older workers. (See table 2.)

After hitting double digits (11.3 percent) in the second quarter of 2020, the unemployment rate for people in the prime working ages of 25 to 54 averaged 3.8 percent in the fourth quarter of 2021. This represents a decline of 2.4 percentage points over the year. The unemployment rates for both men and women of prime working age declined over the year, although these measures are still above the rates seen in the fourth quarter of 2019.
### Table 2. Employment status of the civilian noninstitutional population 16 years and older, by age and gender, quarterly averages, seasonally adjusted, 2020–21 (levels in thousands)

| Characteristics | Fourth quarter 2020 | 2021 | Change, fourth quarter 2020–21 |
|-----------------|--------------------|------|-------------------------------|
|                 | First quarter      | Second quarter | Third quarter | Fourth quarter |
| Total, 16 to 24 years | 20,704          | 20,615          | 20,672          | 20,605          | 20,847          | 143 |
| Civilian labor force | 55.3           | 55.2            | 55.5            | 55.3            | 56.0            | 0.7 |
| Participation rate | 18,218          | 18,336          | 18,578          | 18,675          | 19,103          | 885 |
| Employed         | 48.6            | 49.1            | 49.8            | 50.1            | 51.3            | 2.7 |
| Employment–population ratio | 2,486         | 2,278           | 2,093           | 1,930           | 1,743           | -743 |
| Unemployed       | 12.0            | 11.1            | 10.1            | 9.4             | 8.4             | -3.6 |
| Unemployment rate | 5,942           | 5,948           | 5,991           | 5,948           | 5,966           | 24  |
| Civilian labor force | 35.9           | 36.1            | 36.4            | 36.2            | 36.3            | 0.4 |
| Participation rate | 5,080          | 5,131           | 5,342           | 5,286           | 5,300           | 220 |
| Employed         | 30.7            | 31.2            | 32.5            | 32.1            | 32.2            | 1.5 |
| Employment–population ratio | 862            | 817             | 649             | 662             | 667             | -195 |
| Unemployed       | 14.5            | 13.7            | 10.8            | 11.1            | 11.2            | -3.3 |
| Unemployment rate | 102,211         | 102,366         | 102,751         | 103,110         | 103,217         | 1,006 |
| Civilian labor force | 81.0           | 81.2            | 81.5            | 81.8            | 81.8            | 0.8 |
| Participation rate | 95,924          | 96,597          | 97,230          | 98,326          | 99,310          | 3,386 |
| Employed         | 76.1            | 76.6            | 77.1            | 78.0            | 78.7            | 2.6 |
| Employment–population ratio | 6,286          | 5,769           | 5,522           | 4,784           | 3,907           | -2,379 |
| Unemployed       | 0.2             | 5.6             | 5.4             | 4.6             | 3.8             | -2.4 |
| Unemployment rate | 54,506          | 54,544          | 54,781          | 54,988          | 54,933          | 427 |
| Civilian labor force | 87.5           | 87.6            | 88.0            | 88.3            | 88.1            | 0.6 |
| Participation rate | 51,090          | 51,482          | 51,745          | 52,353          | 52,868          | 1,778 |
| Employed         | 82.0            | 82.7            | 83.1            | 84.0            | 84.8            | 2.8 |
| Employment–population ratio | 3,416          | 3,062           | 3,036           | 2,634           | 2,065           | -1,351 |
| Unemployed       | 6.3             | 5.6             | 5.5             | 4.8             | 3.8             | -2.5 |
| Unemployment rate | 47,704          | 47,822          | 47,970          | 48,122          | 48,285          | 581 |
| Civilian labor force | 74.7           | 75.0            | 75.2            | 75.4            | 75.7            | 1.0 |
| Participation rate | 44,834          | 45,115          | 45,485          | 45,973          | 46,442          | 1,608 |
| Employed         | 70.2            | 70.7            | 71.3            | 72.1            | 72.8            | 2.6 |
| Employment–population ratio | 2,870          | 2,707           | 2,485           | 2,149           | 1,842           | -1,028 |
| Unemployed       | 6.0             | 5.7             | 5.2             | 4.5             | 3.8             | -2.2 |
| Unemployment rate | 37,737          | 37,323          | 37,544          | 37,816          | 37,914          | 177 |
| Civilian labor force | 38.7           | 38.3            | 38.4            | 38.5            | 38.4            | -0.3 |
| Participation rate | 35,545          | 35,438          | 35,713          | 36,333          | 36,674          | 1,129 |
| Employed         | 36.5            | 36.3            | 36.5            | 37.0            | 37.2            | 0.7 |
| Employment–population ratio | 2,192          | 1,885           | 1,831           | 1,483           | 1,240           | -952 |
| Unemployed       | 5.8             | 5.1             | 4.9             | 3.9             | 3.3             | -2.5 |
| Unemployment rate | 20,165          | 19,977          | 20,072          | 20,218          | 20,221          | 56  |
| Civilian labor force | 44.6           | 44.2            | 44.2            | 44.4            | 44.2            | -0.4 |
| Participation rate | 19,027          | 18,939          | 19,093          | 19,415          | 19,605          | 578 |
| Employed         | 42.1            | 41.9            | 42.1            | 42.6            | 42.8            | 0.7 |
| Employment–population ratio | 1,138          | 1,038           | 979             | 804             | 617             | -521 |

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

Source: U.S. Bureau of Labor Statistics, Current Population Survey.
Among workers ages 55 years and older, the unemployment rate was 3.3 percent in the fourth quarter of 2021, down by 2.5 percentage points over the year. The jobless rates for men and women in this age group had similar over-the-year declines: 2.6 percentage points for men and 2.5 percentage points for women. The rates for both groups remained above the levels seen in the fourth quarter of 2019.

Jobless rates declined for people of all education levels
Among workers ages 25 years and older, jobless rates across all education levels declined in 2021, although they remained higher than they were in the fourth quarter of 2019, before the pandemic. The unemployment rate for people with less than a high school diploma declined by 3.7 percentage points in 2021, to 6.0 percent in the fourth quarter, the steepest drop among the educational attainment categories. Still, the jobless rate for this group remained 0.5 percentage point higher than its rate in the fourth quarter of 2019, when it was 5.5 percent. The rate for high school graduates with no college fell by 3.0 percentage points over the year, to 5.0 percent by the end of 2021. The jobless rate for people with some college or an associate’s degree, at 3.9 percent, decreased by 2.6 percentage points over the year. The jobless rate for people with a bachelor’s degree and higher, at 2.2 percent in the fourth quarter of 2021, was 1.9 percentage points lower than it was a year earlier and 0.2 percentage point higher than it was in the fourth quarter of 2019. The rates for both those with less than a high school diploma and those with a bachelor’s degree and higher have nearly returned to their prepandemic levels. As in the past, jobless rates in 2021 were much lower for people with higher levels of education than for those with less education. (See chart 3 and table 3.)

## Characteristics

| Characteristics | Fourth quarter 2020 | 2021 | Change, fourth quarter 2020–21 |
|-----------------|---------------------|------|-------------------|
|                 | First quarter | Second quarter | Third quarter | Fourth quarter |                 |
| Unemployment rate | 5.6            | 5.2            | 4.9            | 4.0            | 3.0            | -2.6            |

### Women, 55 years and older

| Characteristics          | Fourth quarter 2020 | 2021 | Change, fourth quarter 2020–21 |
|--------------------------|---------------------|------|-------------------|
| Civilian labor force     | 17,560              | 17,365 | 17,486          | 17,580         | 17,678         | 118               |
| Participation rate       | 33.6                | 33.2            | 33.3            | 33.4            | 33.4            | -0.2              |
| Employed                 | 16,518              | 16,499 | 16,620          | 16,918         | 17,069         | 551               |
| Employment–population ratio | 31.6              | 31.5            | 31.7            | 32.1            | 32.3            | 0.7               |
| Unemployed               | 1,042               | 866            | 866            | 662             | 609             | -433              |
| Unemployment rate        | 5.9                 | 5.0            | 5.0            | 3.8             | 3.4             | -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.
Table 3. Employment status of the civilian noninstitutional population 25 years and older, by educational attainment, quarterly averages, seasonally adjusted, 2020–21 (levels in thousands)

| Characteristics                        | Fourth quarter 2020 | 2021 | Change, fourth quarter 2020–21 |
|----------------------------------------|---------------------|------|-------------------------------|
|                                       | First quarter       | Second quarter | Third quarter | Fourth quarter |                                   |
| Less than a high school diploma        |                     |                  |                |                |                                    |
| Civilian labor force                   | 9,208               | 9,026           | 8,970          | 9,188          | 8,843                             | -365 |
| Participation rate                     | 45.6                | 45.1            | 43.6           | 46.0           | 45.5                              | -0.1 |
| Employed                               | 8,316               | 8,205           | 8,114          | 8,426          | 8,309                             | -7   |
| Employment–population ratio            | 41.2                | 41.0            | 39.5           | 42.1           | 42.7                              | 1.5  |
| Unemployed                             | 893                 | 822             | 857            | 763            | 534                               | -359 |
| Unemployment rate                      | 9.7                 | 9.1             | 9.6            | 8.3            | 6.0                               | -3.7 |
| High school graduates, no college [1]  |                     |                  |                |                |                                    |
| Civilian labor force                   | 35,156              | 34,360          | 34,926         | 35,143         | 35,518                            | 362  |
| Participation rate                     | 55.5                | 54.8            | 55.7           | 55.4           | 55.5                              | 0.0  |
| Employed                               | 32,338              | 31,970          | 32,511         | 33,061         | 33,733                            | 1,395|
| Employment–population ratio            | 51.0                | 51.0            | 51.8           | 52.1           | 52.7                              | 1.7  |
| Unemployed                             | 2,818               | 2,390           | 2,415          | 2,082          | 1,786                             | -1,032|
| Unemployment rate                      | 8.0                 | 7.0             | 6.9            | 5.9            | 5.0                               | -3.0 |
| Some college or associate's degree     |                     |                  |                |                |                                    |
| Civilian labor force                   | 35,770              | 35,587          | 35,892         | 35,805         | 35,430                            | -340 |
| Participation rate                     | 62.5                | 62.8            | 63.3           | 63.1           | 62.7                              | 0.2  |
| Employed                               | 33,430              | 33,469          | 33,783         | 34,107         | 34,057                            | 0.2  |
| Employment–population ratio            | 58.5                | 59.1            | 59.5           | 60.1           | 60.3                              | 1.8  |
| Unemployed                             | 2,341               | 2,118           | 2,110          | 1,699          | 1,372                             | -969 |
| Unemployment rate                      | 6.5                 | 6.0             | 5.9            | 4.7            | 3.9                               | -2.6 |
| Bachelor's degree and higher [2]       |                     |                  |                |                |                                    |
| Civilian labor force                   | 59,702              | 60,690          | 60,641         | 60,835         | 61,134                            | 1,432|
| Participation rate                     | 72.0                | 72.0            | 72.3           | 72.3           | 72.1                              | 0.1  |
| Employed                               | 57,265              | 58,353          | 58,603         | 59,141         | 59,758                            | 2,493|
| Employment–population ratio            | 69.1                | 69.3            | 69.9           | 70.2           | 70.4                              | 1.3  |
| Unemployed                             | 2,437               | 2,337           | 2,038          | 1,694          | 1,375                             | -1,062|
| Unemployment rate                      | 4.1                 | 3.9             | 3.4            | 2.8            | 2.2                               | -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 3 unemployed people had been jobless for 27 weeks or longer

As unemployment surged following the onset of the COVID-19 pandemic, there was an increase in the number of people who were newly unemployed—that is, those unemployed for less than 5 weeks—but that number began to decrease as people either returned to work, stopped looking, or moved into the longer duration categories. In 2021, the number of short-term unemployed decreased by 615,000, or 23.5 percent, to 2.0 million in the fourth quarter. This group accounted for 29.5 percent of the total number of unemployed in the fourth quarter of 2021. (See table 4.)
Table 4. Unemployed people, by reason and duration of unemployment, quarterly averages, seasonally adjusted, 2020–21 (levels in thousands)

| Characteristics                      | Fourth quarter 2020 | 2021 | Change, fourth quarter 2020–21 |
|--------------------------------------|---------------------|------|--------------------------------|
|                                      | First quarter       | Second quarter | Third quarter | Fourth quarter |                                    |
| Reason for unemployment              |                     |                 |               |               |                                    |
| Job losers and people who completed temporary jobs | 7,517               | 6,611           | 5,940         | 4,450         | 3,388      | -4,129   |
| On temporary layoff                  | 3,040               | 2,351           | 1,903         | 1,167         | 909        | -2,131   |
| Not on temporary layoff              | 4,477               | 4,260           | 4,037         | 3,283         | 2,478      | -1,999   |
| Permanent job losers                 | 3,600               | 3,471           | 3,262         | 2,553         | 1,903      | -1,697   |
| People who completed temporary jobs  | 877                 | 789             | 775           | 730           | 575        | -302     |
| Job leavers                          | 736                 | 709             | 849           | 850           | 802        | 66       |
| Reentrants                           | 2,088               | 2,128           | 2,197         | 2,336         | 2,133      | 45       |
| New entrants                         | 532                 | 541             | 540           | 491           | 501        | -31      |
| Percent distribution                 |                     |                 |               |               |            |          |
| Job losers and people who completed temporary jobs | 69.1                | 66.2            | 62.4          | 54.8          | 49.7       | -19.4    |
| On temporary layoff                  | 28.0                | 23.5            | 20.0          | 14.4          | 13.3       | -14.7    |
| Not on temporary layoff              | 41.2                | 42.6            | 42.4          | 40.4          | 36.3       | -4.9     |
| Job leavers                          | 6.8                 | 7.1             | 8.9           | 10.5          | 11.8       | 5.0      |
| Reentrants                           | 19.2                | 21.3            | 23.1          | 28.8          | 31.3       | 12.1     |
| New entrants                         | 4.9                 | 5.4             | 5.7           | 6.0           | 7.3        | 2.4      |
| Duration of unemployment             |                     |                 |               |               |            |          |
| Less than 5 weeks                    | 2,619               | 2,248           | 2,115         | 2,194         | 2,004      | -615     |
| 5 to 14 weeks                        | 2,375               | 2,230           | 2,127         | 1,816         | 1,717      | -658     |
| 15 weeks or longer                   | 5,854               | 5,498           | 5,218         | 4,226         | 3,064      | -2,790   |
| 15 to 26 weeks                       | 2,030               | 1,364           | 1,243         | 1,166         | 884        | -1,146   |
| 27 weeks or longer                   | 3,824               | 4,134           | 3,975         | 3,060         | 2,180      | -1,644   |
| Average (mean) duration in weeks     | 23.1                | 27.8            | 29.8          | 29.0          | 28.2       | 5.1      |
| Median duration, in weeks            | 18.9                | 17.7            | 19.4          | 14.1          | 13.1       | -5.8     |
| Percent distribution                 |                     |                 |               |               |            |          |
| Less than 5 weeks                    | 24.1                | 22.5            | 22.4          | 26.6          | 29.5       | 5.4      |
| 5 to 14 weeks                        | 21.9                | 22.4            | 22.5          | 22.0          | 25.3       | 3.4      |
| 15 weeks or longer                   | 54.0                | 55.1            | 55.2          | 51.3          | 45.2       | -8.8     |
| 15 to 26 weeks                       | 18.7                | 13.7            | 13.1          | 14.2          | 13.0       | -5.7     |
| 27 weeks or longer                   | 35.2                | 41.4            | 42.0          | 37.2          | 32.1       | -3.1     |

The number of long-term unemployed (people who were jobless for 27 weeks or longer) had been declining for about a decade prior to the onset of the pandemic. This measure rose to 4.1 million in the first quarter of 2021 but declined to 2.2 million by the end of the year. The number of long-term unemployed declined by 43.0 percent over the year. This group accounted for 32.1 percent of the total unemployed in the fourth quarter of 2021, down from 35.2 percent in the fourth quarter of 2020. Both measures, the number of long-term unemployed and their share of total unemployment, remained well above the levels seen before the pandemic. (See chart 4.)
After reaching a record high of 4.5 million (not seasonally adjusted) in the second quarter of 2010, the number of people unemployed for a year or longer (those jobless for 52 weeks or more) declined for nearly a decade. At the time of the surge in unemployment in the second quarter of 2020, the number of people unemployed for 52 weeks or longer, at 556,000, was the lowest level 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. Those unemployed for 52 weeks or more rose to 2.7 million in the second quarter of 2021, before declining to 1.5 million in the fourth quarter of 2021. Their share of total unemployment spiked to 29.3 percent in the second quarter of 2021, before falling to 23.3 percent in the fourth quarter of 2021.

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 (referred to as 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, 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 declined during the remainder of 2020 and through 2021. The number of job losers averaged 3.4 million in the fourth quarter of 2021. Virtually all of the increase in the number of job losers in the second quarter of 2020 consisted of people on temporary layoff. However, the composition of unemployed job losers shifted to people not on temporary layoff in 2021. The number of unemployed people not on temporary layoff, which is made up mostly of permanent job losers, was 2.5 million at the end of 2021, accounting for 36.3 percent of the total unemployed. This represented an increase of 21.5 percentage points from the second quarter of 2020.

Among those unemployed who were not on temporary layoff, the number of people who permanently lost their jobs, at 1.9 million, decreased by 1.7 million over the year, but the number remained above its prepandemic level. (See table 4 and chart 5.)

The number of unemployed reentrants to the labor force, at 2.1 million in the fourth quarter of 2021, changed little 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 31.3 percent of unemployed people at the end of 2021.

The number of unemployed job leavers—that is, people who voluntarily left their jobs—changed little over the year, averaging 802,000 in the fourth quarter of 2021. The number of new entrants to the labor force was essentially unchanged over the year, at 501,000.

The sharpest decline in unemployment occurred in service occupations

After rising with the onset of the COVID-19 pandemic in 2020, the unemployment rate decreased for all five major occupational categories from 2020 to 2021. (Data are annual averages.) The jobless rate for service occupations had the sharpest decrease, declining by 5.2 percentage points, to 7.8 percent in 2021. Within this category, food preparation and serving-related occupations, with a jobless rate of 10.3 percent, and personal care and service occupations, with a jobless rate of 8.3 percent, had the largest declines in 2021. Even with the sharp declines in 2021, the jobless rate in service occupations was still well above its prepandemic level at the end of the year. Most notably, the rate for personal care and service occupations was twice as high as the rate in 2019. The jobless rates also declined in 2021 for production, transportation, and material-moving occupations (7.1 percent); natural resources, construction, and maintenance occupations (6.6 percent); sales and office occupations (5.3 percent); and management, professional, and related occupations (2.8 percent). The unemployment rates for all of the major occupational categories remained above their prepandemic values.

Unemployment rates decreased more for women than for men in four of the five major occupational categories from 2020 to 2021. For service occupations, the over-the-year decline in the unemployment rate was 4.7 percentage points for men and 5.6 percentage points for women. (See table 5.)
Table 5. Unemployment rates, by occupational group and gender, annual averages, not seasonally adjusted, 2020–21 (in percent)

| Occupational group | Total 2020 | 2021 | Change, 2020–21 | Total 2020 | 2021 | Change, 2020–21 | Total 2020 | 2021 | Change, 2020–21 |
|--------------------|------------|------|-----------------|------------|------|-----------------|------------|------|-----------------|
| Management, ... | 4.5 | 2.8 | -1.7 | 4.2 | 2.8 | -1.4 | 4.9 | 2.9 | -2.0 |
| Management, ... | 4.1 | 2.8 | -1.3 | 3.8 | 2.7 | -1.1 | 4.4 | 3.0 | -1.4 |
| Professional ... | 4.9 | 2.8 | -2.1 | 4.6 | 2.9 | -1.7 | 5.1 | 2.8 | -2.3 |
| Service occupations | 13.0 | 7.8 | -5.2 | 12.6 | 7.9 | -4.7 | 13.3 | 7.7 | -5.6 |
| Healthcare support occupations | 7.3 | 5.9 | -1.4 | 7.5 | 5.3 | -2.2 | 7.3 | 6.0 | -1.3 |
| Protective service occupations | 5.1 | 3.9 | -1.2 | 3.9 | 3.6 | -0.3 | 8.7 | 4.8 | -3.9 |
| Food preparation and serving-related occupations | 19.6 | 10.3 | -9.3 | 20.8 | 11.1 | -9.7 | 18.5 | 9.7 | -8.8 |
| Building and grounds cleaning and maintenance occupations | 10.9 | 7.5 | -3.4 | 9.4 | 6.6 | -2.8 | 13.1 | 8.8 | -4.3 |
| Personal care and service occupations | 18.0 | 8.3 | -7.7 | 17.5 | 12.5 | -5.0 | 15.5 | 7.1 | -8.4 |
| Sales and office occupations | 8.0 | 5.3 | -2.7 | 7.2 | 4.9 | -2.3 | 8.5 | 5.5 | -3.0 |
| Sales and related occupations | 8.8 | 5.6 | -3.2 | 6.9 | 4.6 | -2.3 | 10.8 | 6.6 | -4.2 |
| Office and administrative support occupations | 7.3 | 5.0 | -2.3 | 7.9 | 5.5 | -2.4 | 7.1 | 4.8 | -2.3 |
| Natural resources, construction, and maintenance occupations | 8.9 | 6.6 | -2.3 | 8.6 | 6.4 | -2.2 | 12.5 | 9.1 | -3.4 |
| Farming, fishing, and forestry occupations | 10.3 | 8.9 | -1.4 | 8.4 | 8.3 | -0.1 | 15.7 | 10.9 | -4.8 |
| Construction and extraction occupations | 10.1 | 7.8 | -2.3 | 10.0 | 7.7 | -2.3 | 10.6 | 11.0 | 0.4 |
| Installation, maintenance, and repair occupations | 6.4 | 3.9 | -2.5 | 6.2 | 4.0 | -2.2 | 10.9 | 3.7 | -7.2 |
| Production, transportation, and material moving occupations | 10.2 | 7.1 | -3.1 | 9.8 | 6.9 | -2.9 | 11.6 | 7.6 | -4.0 |
| Production occupations | 9.0 | 5.8 | -3.2 | 8.5 | 5.5 | -3.0 | 10.0 | 6.3 | -3.7 |
| Transportation and material moving occupations | 11.1 | 8.0 | -3.1 | 10.6 | 7.8 | -2.8 | 13.2 | 8.8 | -4.4 |

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. Effective with January 2020 data, occupations reflect the introduction of the 2018 Census occupational classification system into the Current Population Survey, or household survey. This classification system is derived from the 2018 Standard Occupational Classification. No historical data have been revised. Data for 2020 are not strictly comparable with earlier years.

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

All six alternative measures of labor underutilization declined over the year

The U.S. Bureau of Labor Statistics (BLS) uses CPS data to construct six alternative measures of labor underutilization, known as U-1 through U-6 (U-3 is the official unemployment rate), these measures tend to show similar cyclical patterns, but they provide additional insight into the degree to which labor resources are being underutilized. Each of the six measures decreased in 2021, but they all remained above their prepandemic levels. U-3 decreased by 2.6 percentage points, to 4.2 percent in the fourth quarter of 2021. All six measures continued to trend down since reaching highs early in the COVID-19 pandemic. (See chart 6.) (See the box that follows for more information about the six measures of labor underutilization.)

Chart 6. Alternative measures of labor underutilization, quarterly averages, seasonally adjusted, 1994–2021

Click legend items to change data display. Hover over chart to view data.

Note: Shaded regions represent recessions as designated by the National Bureau of Economic Research (NBER). Turning points are quarterly. 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; U-6 = total unemployed, plus discouraged workers, plus all other marginally attached workers, as a percentage of the civilian labor force plus all marginally attached workers. Q1 = first quarter, Q2 = second quarter, Q3 = third quarter, and Q4 = fourth quarter.

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

Alternative measures of labor underutilization

Six alternative measures of labor underutilization have long been available on a monthly basis from the Current Population Survey (CPS) for the United States as a whole. The official concept of unemployment (as measured in the CPS by U-3 in the U-1 to U-6 range of alternative measures) includes all jobless people who are
available to take a job and have actively sought work in the past 4 weeks. The other 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 percent of the civilian labor force;
- **U-2**: job losers and people who completed temporary jobs, as a percent of the civilian labor force;
- **U-3**: total unemployed, as a percent of the civilian labor force (this is the definition used for the official unemployment rate);
- **U-4**: total unemployed plus discouraged workers, as a percent of the civilian labor force plus discouraged workers;
- **U-5**: total unemployed, plus discouraged workers, plus all other marginally attached workers, as a percent 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 percent 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 specifically because they believe no jobs are available for them or there are none for which they are qualified. The marginally attached (included in the U-5 and U-6 measures) category includes discouraged workers. The criteria for the marginally attached are the same as for discouraged workers, with the exception that any reason can be cited for the 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.

**Improvements in unemployment were also reflected in labor force status flows**

Each month, BLS reports on the number of people who are employed, unemployed, and not in the labor force, as measured by the CPS. 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 labor force status flows data, which show that millions of people move between employment and unemployment each month, while millions of others leave or enter the labor force. In 2021, 17.2 million people, or 6.6 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 2021.

Historically, unemployed people are 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 increase during labor market downturns, as it did after the onset of the COVID-19 pandemic. The share of unemployed people who remained unemployed declined in 2021; at about 50 percent in December 2021 (calculated as a 3-month moving average), the share is roughly comparable with its value at the end of 2019. The likelihood of unemployed people finding employment edged up over the year, and the percentage who stopped looking and left the labor force increased in 2021. In December 2021, 27.7 percent of people who were unemployed a month earlier found work, while 24.0 percent stopped looking for work and left the labor force. (See chart 7.)

**Number of people not in the labor force who wanted a job continued to trend down**

People who are neither employed nor unemployed are classified as not in the labor force. In 2021, the number of people not in the labor force decreased by 385,000, reaching 100.0 million by the end of the year. Although most people who are not in the labor force do not want a job (about 95 percent at the end of 2021), the number of people not in the labor force who indicated that they did want a job fell by 1.2 million, to 5.8 million at the end of 2021. The measure remains above its prepandemic level of 4.8 million in the fourth quarter of 2019. The remaining people not in the labor force, numbering 94.2 million in the fourth quarter of 2021, did not want a job. (See table 6.)
Table 6. Number of people not in the labor force, quarterly averages, seasonally adjusted, 2020–21 (in thousands)

| Category                                      | Fourth quarter 2020 | 2021                      | Change, fourth quarter 2020–21 |
|-----------------------------------------------|---------------------|---------------------------|-------------------------------|
|                                               |                     | First quarter 2021        | Second quarter 2021           | Third quarter 2021 | Fourth quarter 2021 |               |
| Total not in the labor force                  | 100,399             | 100,533                   | 100,253                       | 100,165            | 100,014            | -385          |
| People who currently want a job               | 7,027               | 6,900                     | 6,545                         | 6,049              | 5,822              | -1,205        |
| Marginally attached to the labor force [1]    | 2,074               | 1,882                     | 1,874                         | 1,727              | 1,645              | -429          |
| Discouraged workers [2]                       | 633                 | 553                       | 586                           | 446                | 456                | -177          |

[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, the number defined as marginally attached to the labor force, at 1.6 million in the fourth quarter of 2021, fell by 429,000 over the year. 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 are not counted as unemployed because they had not actively searched for work in the 4 weeks preceding the survey. In addition to declining unemployment and increasing employment, another measure that reflected the improvement in the labor market in 2021 is the number of discouraged workers. Among the marginally attached, people currently not looking for work specifically because they felt that no jobs were available for them are defined as discouraged workers. The number of discouraged workers declined by 177,000 over the year, to 456,000 in the fourth quarter of 2021. (See chart 8.)

Employment continued to trend up in 2021

After falling by 20.1 million in the second quarter of 2020 following the onset of the COVID-19 pandemic, employment growth recovered more than half (12.2 million) of those losses in the second half of that year. Employment growth continued in 2021, and by the fourth quarter, the number of people employed averaged 155.2 million, up by 5.4 million from the previous year. The employment–population ratio (the percentage of the population ages 16 years and older who are employed) also increased in 2021. This ratio increased by 1.8 percentage points over the year, to 59.2 percent, but it remains 1.8 percentage points below its level in the fourth quarter of 2019. (See table 1 and chart 9.)
Labor market conditions improved for both women and men in 2021. From the fourth quarter of 2020 to the fourth quarter of 2021, employment increased by 2.5 million for women and by 2.9 million for men. The employment–population ratio increased by 1.7 percentage points for women, compared with 2.0 percentage points for men. (See table 1.)

Employment–population ratios increased for all race and ethnicity groups

Employment rose for all race and ethnicity groups, and this was reflected in their employment–population ratios. The over-the-year increase in the employment–population ratio was greatest for Asians, followed by Hispanics, Blacks, and Whites.

The employment–population ratio for Asians rose by 4.3 percentage points, to 62.5 percent in 2021. The ratio is essentially the same as the prepandemic figure of 62.6 percent in the fourth quarter of 2019. The employment–population ratio for Hispanics, at 62.5 percent in the fourth quarter of 2021, increased by 2.9 percentage points over the year. The employment–population ratio for Blacks increased by 2.6 percentage points, to 56.5 percent, after having fallen below 50.0 percent in the second quarter of 2020. (See table 1.) The employment–population ratio for Whites, at 59.4 percent in the fourth quarter of 2021, rose by 1.5 percentage points over the year. The ratios for Blacks, Hispanics, and Whites were still below the ratios seen before the COVID-19 pandemic.

People ages 16 to 24 did well in the labor market in 2021

Among people ages 16 to 24, employment rose over the year by 885,000, or 4.9 percent. Much of that rise in employment occurred in the 20- to 24-year age group, which accounted for 75.4 percent of the increase. The employment–population ratio for people ages 16 to 24 was 51.3 percent in the fourth quarter of 2021, 2.7 percentage points higher than it was a year earlier, and essentially the same as in the fourth quarter of 2019 (51.4 percent). (See table 2.)

The number of employed people ages 25 to 54 rose by 3.4 million, or 3.5 percent, from the fourth quarter of 2020 to the fourth quarter of 2021. The employment–population ratio rose by 2.6 percentage points over the year, to 78.7 percent. Both measures are still below their prepandemic levels.

Employment rose for all race and ethnicity groups, and this was reflected in their employment–population ratios. The over-the-year increase in the employment–population ratio was greatest for Asians, followed by Hispanics, Blacks, and Whites.

Employment growth was strongest for people with more education

For people ages 25 years and older, employment among those with less than a high school diploma, at 8.3 million, was essentially unchanged from the fourth quarter of 2020 to the fourth quarter of 2021. However, the employment–population ratio for this group rose by 1.5 percentage points, to 42.7 percent in 2021. Employment increased by 4.3 percent over the year for high school graduates with no college, raising the level to 33.7 million. The employment–population ratio for this group increased by 1.7 percentage points over the year, to 52.7 percent. Employment among people with some college or an associate’s degree increased by 1.9 percent in 2021, to 34.1 million. The employment–population ratio for this group rose by 2.6 percentage points over the year, to 73.7 percent. Both measures are still below their prepandemic levels.

Labor force participation rates increased slightly over the year for most race and ethnicity groups, with Asians showing the most improvement

Even as the unemployment rate declined to a level that is relatively low by historical standards and employment continued to grow, the net effect was a moderate increase in the labor force. The labor force participation rate increased by 0.3 percentage point over the year, to 61.8 percent in the fourth quarter of 2021; the rate was 63.3 percent in the fourth quarter of 2019, before the pandemic. The labor force participation rate increased for men by 0.2 percentage point, to 67.7 percent, and for women by 0.4 percentage point, to 56.3 percent. (See table 1.)

The labor force participation rate for Asians increased by 2.6 percentage points over the year, to 65.1 percent, slightly higher than the prepandemic rate of 64.4 percent. Labor force participation rates for Blacks and Hispanics edged up by 0.6 percentage point each in 2021. The rate for Blacks was 60.8 percent in the fourth quarter, while the rate for Hispanics was 66.0 percent. Hispanics had the highest participation rate among the major race and ethnicity groups. However, the rates for Blacks and Hispanics are still below their prepandemic levels. The labor force participation rate for Whites was unchanged over the year, at 61.6 percent, and remained below the prepandemic rate of 63.2 percent in the fourth quarter of 2019. (See table 1.)

Recent improvements in relation to the effects of the COVID-19 pandemic and in labor market conditions have narrowed the differences in the labor force participation rates among demographic groups. However, other factors help explain the relatively moderate increase in the labor force participation rate in 2021, such as people choosing not to
Growth in labor force participation rates was similar for young people and those of prime working age

The labor force participation rate for prime-working-age people, those ages 25 to 54, rose by 0.8 percentage point over the year, to 81.8 percent in the fourth quarter of 2021. Among people ages 16 to 24, the rate increased by 0.7 percentage point, to 56.0 percent. Within this group, the labor force participation rate for those ages 20 to 24 increased by 1.2 percentage points in 2021, to 71.7 percent. Although labor force participation rates for young workers have historically been lower than the rates for older age groups, they have rebounded more quickly than those of the other age groups since the COVID-19 pandemic began. The labor force participation rate for people ages 55 years and older was 38.4 percent in the fourth quarter of 2021, compared with 40.3 percent in the fourth quarter of 2019. Some researchers have suggested that this decline may reflect an increase in the number of early retirements, what has sometimes been called the “Great Resignation,” which could be dragging down the overall labor force participation rate. (See table 2.)

Labor force participation rates changed little across different educational groups

For workers ages 25 years and older with less than a high school diploma, the labor force participation rate was 45.5 percent in the fourth quarter of 2021, essentially unchanged from the fourth quarter of 2020. (See table 3.) Although this rate is 0.9 percentage point below the rate for the fourth quarter of 2019, before the pandemic, it is closer to the prepandemic rate than are the comparable rates for other educational attainment groups. The labor force participation rate for high school graduates with no college, at 55.5 percent in the fourth quarter of 2021, was unchanged over the year but down by 2.4 percentage points from its prepandemic level. The rate for workers with some college or an associate’s degree, at 62.7 percent, was little changed from a year earlier and down by 2.0 percentage points from the fourth quarter of 2019. The labor force participation rate for people with higher levels of education—those with a bachelor’s degree and higher—at 72.1 percent in the fourth quarter of 2021, was also little changed from the prior year. The 2021 rate for this group was 1.7 percentage points below the prepandemic rate.

Employment rose substantially in all major occupation groups

Of the major occupation groups, the largest employment growth in 2021 occurred in service occupations, with an increase of 1.6 million workers, or 6.8 percent. (These are annual averages.) Service occupations saw the sharpest decline in employment at the onset of the COVID-19 pandemic, in early 2020. Within this occupational group, employment in food preparation and serving-related occupations rose sharply over the year. (See table 7.)

Table 7. Employment, by occupational group and gender, annual averages, 2020–21 (in thousands)

| Occupational group                                      | Total                  | Men                     | Women                   |
|--------------------------------------------------------|------------------------|-------------------------|-------------------------|
|                                                        | 2020 | Change, 2020–21 | 2020 | Change, 2020–21 | 2020 | Change, 2020–21 |
| Total, 16 years and older                              | 147,795 | 152,581 | 4,786 | 78,560 | 80,829 | 2,269 | 69,234 | 71,752 | 2,518 |
| Management, professional, and related occupations      | 63,644 | 64,744 | 1,100 | 30,734 | 31,109 | 375 | 32,910 | 33,636 | 726 |
| Management, business, and financial operations occupations | 27,143 | 27,864 | 721 | 15,028 | 15,231 | 203 | 12,114 | 12,633 | 519 |
| Professional and related occupations                   | 36,502 | 36,880 | 378 | 15,706 | 15,878 | 172 | 20,796 | 21,003 | 207 |
| Service occupations                                    | 22,853 | 24,403 | 1,550 | 9,820 | 10,328 | 508 | 13,033 | 14,075 | 1,042 |
| Healthcare support occupations                         | 4,790 | 4,887 | 97 | 703 | 728 | 25 | 4,087 | 4,158 | 71 |
| Protective service occupations                         | 3,024 | 2,987 | -37 | 2,310 | 2,276 | -34 | 714 | 711 | -3 |
| Food preparation and serving related occupations       | 6,556 | 7,370 | 814 | 2,989 | 3,343 | 354 | 3,566 | 4,027 | 461 |
| Building and grounds cleaning and maintenance occupations | 5,084 | 5,482 | 398 | 3,036 | 3,198 | 162 | 2,049 | 2,285 | 237 |
| Personal care and service occupations                  | 3,399 | 3,676 | 277 | 781 | 783 | 2 | 2,618 | 2,893 | 275 |
| Sales and office occupations                           | 29,726 | 30,166 | 440 | 11,506 | 11,604 | 98 | 18,221 | 18,563 | 342 |
| Sales and related occupations                          | 14,168 | 14,369 | 201 | 7,261 | 7,219 | -42 | 6,907 | 7,150 | 243 |
| Office and administrative support occupations           | 15,558 | 15,797 | 239 | 4,244 | 4,384 | 140 | 11,314 | 11,413 | 99 |
| Natural resources, construction, and maintenance occupations | 13,357 | 13,895 | 802 | 6,267 | 6,357 | 90 | 7,090 | 7,245 | 155 |
| Farming, fishing, and forestry occupations              | 1,045 | 1,061 | 16 | 783 | 804 | 11 | 252 | 257 | 5 |
| Construction and extraction occupations                | 7,710 | 8,057 | 347 | 7,402 | 7,746 | 344 | 308 | 311 | 3 |
| Installation, maintenance, and repair occupations       | 4,602 | 4,840 | 238 | 4,411 | 4,630 | 219 | 190 | 210 | 20 |
| Production, transportation, and material moving occupations | 18,215 | 18,409 | 1,094 | 13,894 | 14,608 | 714 | 4,321 | 4,700 | 379 |
| Production occupations                                 | 7,590 | 7,950 | 360 | 5,443 | 5,703 | 260 | 2,147 | 2,247 | 100 |
| Transportation and material moving occupations         | 10,625 | 11,359 | 734 | 8,451 | 8,906 | 455 | 2,174 | 2,453 | 279 |

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

Management, professional, and related occupations is the largest of the major occupational groups, accounting for about 42.4 percent of the total number of employed people in 2021. Employment in this group grew by 1.1 million from 2020 to 2021, or 1.7 percent. This occupational group had the smallest decline in employment at the onset of the pandemic. Within this group, employment in management, business, and financial operations expanded by 721,000 in 2021, and the number of workers in professional and related occupations was little changed.

Employment in production, transportation, and material-moving occupations increased by 6.0 percent over the year, to 19.3 million. Employment in this occupational group is up by 681,000 from its prepandemic level in 2019. Employment in sales and office occupations increased by 1.5 percent over the year, to 30.2 million. Employment in natural resources, construction, and maintenance occupations increased from 13.4 million in 2020 to 14.0 million in 2021, little changed from its prepandemic level of 14.3 million.

Number of self-employed workers continued to trend up
In general, during labor market downturns, employment drops, although the degree of the decline often varies by industry and occupation, depending on the underlying causes of the economic contraction. This was certainly the case during the recent recession caused by the COVID-19 pandemic. This procyclical response affects many of the self-employed, whose businesses often suffer from the drop in demand for their products and services, sometimes resulting in the failure of the business. At the same time, a countercyclical effect could result in a rise in self-employment, if laid-off wage and salary workers decide to start businesses of their own.

The number of nonagricultural self-employed workers whose businesses were unincorporated declined sharply at the onset of the pandemic but was essentially the same as its prepandemic level by the first quarter of 2021. During 2021, the total number of nonagricultural self-employed trended up, reaching 9.3 million in the fourth quarter, up by 678,000 over the year. This amounts to an increase of 7.8 percent over the year, compared with a gain of 3.7 percent for total employment growth in nonagricultural industries. The increase coincides with complaints from many U.S. companies about not being able to find and retain enough employees in the aftermath of the pandemic.

Table 8. Employed people, by class of worker, quarterly averages, seasonally adjusted, 2020–21 (in thousands)

| Class of worker                                      | Fourth quarter 2020 | 2021   | Change, fourth quarter 2020–21 |
|------------------------------------------------------|---------------------|--------|-------------------------------|
|                                                      | First quarter       | Second quarter | Third quarter | Fourth quarter |                                  |
| Agriculture and related industries                   | 2,464               | 2,329  | 2,292                         | 2,281          | 2,272                     | -192 |
| Wage and salary workers                              | 1,576               | 1,537  | 1,551                         | 1,547          | 1,471                     | -105 |
| Self-employed workers, unincorporated                | 845                 | 724    | 701                           | 718            | 766                       | -79  |
| Nonagricultural industries                           | 147,218             | 147,947| 149,308                       | 151,110        | 152,804                   | 5,586|
| Wage and salary workers                              | 138,615             | 139,244| 139,998                       | 141,227        | 143,495                   | 4,880|
| Self-employed workers, unincorporated                | 8,656               | 8,942  | 9,140                         | 9,491          | 9,334                     | 678  |

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.

The nonagricultural self-employment rate—the proportion of total nonagricultural employment made up of the self-employed—was 6.0 percent at the end of 2021, compared with its prepandemic level of 5.6 percent in the fourth quarter of 2019. (See chart 10.)

Number of people employed part time for economic reasons declined over the year

Also referred to as involuntary part-time employment and thought of as one type of underemployment, 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—ended the fourth quarter of 2021 at 2.3 million lower than a year earlier, returning to prepandemic levels. Historically, slack work or unfavorable business conditions, rather than an inability to find full-time work, have been the primary reason for working part time involuntarily. 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. The number of people employed part time involuntarily, at 4.2 million in the fourth quarter of 2021, was little different from the level seen in 2019. (See chart 11.)
At the end of 2020, 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 by 1.1 million, or 34.4 percent, from the fourth quarter of 2020 to the fourth quarter of 2021, ending the year at 2.2 million. Over the same period, the number of women working part time for economic reasons decreased by 1.1 million, or 36.7 percent, to 1.9 million. (These data are not seasonally adjusted.)

Unemployment rate for veterans remained lower than the rate for nonveterans

There were 18.0 million veterans ages 18 years and older in the civilian noninstitutional population in the fourth quarter of 2021. Veterans who served during World War II, the Korean War, and the Vietnam era account for the largest share of the veteran population, at 6.3 million, followed by veterans who served during Gulf War era II (4.6 million) and Gulf War era I (3.1 million). Nearly 3.9 million veterans served on active duty during “other service periods,” mainly between the Korean War and the Vietnam era and between the Vietnam era and Gulf War era I. Among veterans, women accounted for 10.7 percent of the total veteran population in the fourth quarter of 2021.

The unemployment rate for veterans was 3.6 percent in the fourth quarter of 2021 (not seasonally adjusted), down by 2.1 percentage points over the year. This rate is down by 6.2 percentage points from its peak in the second quarter of 2020, when it was 9.8 percent. The unemployment rate for nonveterans, at 3.9 percent in the fourth quarter of 2021, decreased by 2.6 percentage points over the year. The unemployment rate for male veterans, at 3.5 percent, decreased by 2.4 percentage points in 2021, while the jobless rate for female veterans, at 4.4 percent, changed little over the same period. The jobless rate for Gulf War-era II veterans (those who served from September 2001 to the present) decreased by 2.0 percentage points from a year earlier, to 4.1 percent. (See table 9.)
### Table 9. Employment status of people 18 years and older, by veteran status, period of service, and gender, quarterly averages, not seasonally adjusted, 2020–21 (levels in thousands)

| Employment status, veteran status, and period of service | Total | Men | Women |
|---------------------------------------------------------|-------|-----|-------|
|                                                        | Fourth quarter 2020 | Fourth quarter 2021 | Change, fourth quarter 2020–21 | Fourth quarter 2020 | Fourth quarter 2021 | Change, fourth quarter 2020–21 |
| Veterans, 18 years and older                            |       |     |       |       |       |       |
| Civilian noninstitutional population                   | 1,841 | 1,781 | -60 | 1,853 | 1,768 | -85 |
| Participation rate                                     | 67.6  | 67.1 | -0.5 | 67.8  | 67.3  | -0.5 |
| Employed                                               | 1,782 | 1,543 | -24 | 1,808 | 1,579 | -23 |
| Employment–population ratio                            | 7.1   | 7.0  | -0.1 | 7.3   | 7.2   | -0.1 |
| Unemployed                                             | 108   | 88   | -20 | 109   | 89    | -20 |
| Unemployment rate                                      | 6.0   | 5.8  | -0.2 | 6.2   | 5.9   | -0.3 |
| Gulf War-era II veterans                               |       |     |       |       |       |       |
| Civilian labor force                                   | 48.8  | 44.6 | -4.2 | 51.7  | 47.3  | -4.4 |
| Participation rate                                     | 71.4  | 71.1 | -0.2 | 71.4  | 71.2  | -0.2 |
| Employed                                               | 1,108 | 1,026 | -82 | 1,121 | 1,044 | -77 |
| Employment–population ratio                            | 0.7   | 0.6  | -0.1 | 0.7   | 0.6   | -0.1 |
| Unemployed                                             | 100   | 90   | -10 | 101   | 91    | -10 |
| Unemployment rate                                      | 6.3   | 6.0  | -0.3 | 6.5   | 6.2   | -0.3 |
| Gulf War-era I veterans                                |       |     |       |       |       |       |
| Civilian labor force                                   | 1,676 | 1,602 | -74 | 1,710 | 1,626 | -84 |
| Participation rate                                     | 69.6  | 69.4 | -0.1 | 69.7  | 69.5  | -0.2 |
| Employed                                               | 1,621 | 1,542 | -79 | 1,665 | 1,587 | -78 |
| Employment–population ratio                            | 0.7   | 0.6  | -0.1 | 0.7   | 0.6   | -0.1 |
| Unemployed                                             | 101   | 90   | -11 | 102   | 91    | -11 |
| Unemployment rate                                      | 6.3   | 6.0  | -0.3 | 6.5   | 6.2   | -0.3 |
| World War II, Korean War, and Vietnam-era veterans     |       |     |       |       |       |       |
| Civilian labor force                                   | 1,672 | 1,602 | -70 | 1,706 | 1,629 | -77 |
| Participation rate                                     | 67.3  | 69.3 | 1.9  | 67.5  | 69.6  | 1.9 |
| Employed                                               | 1,617 | 1,545 | -72 | 1,660 | 1,592 | -68 |
| Employment–population ratio                            | 0.7   | 0.6  | -0.1 | 0.7   | 0.6   | -0.1 |
| Unemployed                                             | 101   | 90   | -11 | 102   | 91    | -11 |
| Unemployment rate                                      | 6.3   | 6.0  | -0.3 | 6.5   | 6.2   | -0.3 |
| Veterans of other service periods                       |       |     |       |       |       |       |
| Civilian labor force                                   | 1,795 | 1,698 | -97 | 1,838 | 1,734 | -104 |
| Participation rate                                     | 67.2  | 68.7 | 1.6  | 67.3  | 68.7  | 1.6 |
| Employed                                               | 1,740 | 1,640 | -100 | 1,780 | 1,680 | -100 |
| Employment–population ratio                            | 0.7   | 0.6  | -0.1 | 0.7   | 0.6   | -0.1 |
| Unemployed                                             | 101   | 90   | -11 | 102   | 91    | -11 |
| Unemployment rate                                      | 6.3   | 6.0  | -0.3 | 6.5   | 6.2   | -0.3 |
| Nonveterans, 18 years and older                        |       |     |       |       |       |       |
| Civilian noninstitutional population                   | 2,330 | 2,355 | 25  | 2,337 | 2,360 | 27  |
| Civilian labor force                                   | 149,779 | 151,277 | 1,498 | 149,842 | 151,328 | 1,486 |
| Participation rate                                     | 64.4  | 64.4 | 0.0  | 64.4  | 64.4  | 0.0 |
| Employed                                               | 140,099 | 145,399 | 5,300 | 140,159 | 150,699 | 10,540 |
| Employment–population ratio                            | 0.4   | 0.4  | 0.0  | 0.4   | 0.4   | 0.0 |
| Unemployed                                             | 9,680 | 8,577 | -1,103 | 9,703 | 8,628 | -1,075 |
| Unemployment rate                                      | 6.5   | 5.9  | -0.6 | 6.7   | 6.1   | -0.6 |

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 1945), 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.
The labor force participation rate for veterans, at 46.8 percent in the fourth quarter of 2021, changed little over the year, while the rate for nonveterans increased by 0.4 percentage point, to 64.4 percent. Labor force participation rates are generally lower for older people than they are for people of prime working age. Thus, the labor force participation rate for those who served during World War II, the Korean War, and the Vietnam era—who are all over the age of 60 and accounted for 35.1 percent of the veteran population—was 16.1 percent in the fourth quarter of 2021, down by 1.4 percentage points over the year. By contrast, Gulf War-era II veterans, who tend to be younger, had a much higher participation rate, 78.7 percent, which was little changed from a year earlier. The employment–population ratio for veterans, at 45.1 percent, also changed little over the year, while the ratio for nonveterans rose by 2.0 percentage points, to reach 61.9 percent in the fourth quarter of 2021. The employment–population ratio for Gulf War-era II veterans increased by 2.8 percentage points over the year, to 75.5 percent in the fourth quarter of 2021.

Unemployment rate for people with a disability more than twice that of those with no disability
Many demographic groups faced challenging labor market conditions in 2021, including people with a disability. The unemployment rate for people with a disability, at 8.2 percent in the last quarter of 2021, was more than double the rate for those without a disability (3.7 percent). (Data are not seasonally adjusted.) The rate for people with a disability decreased by 3.3 percentage points in 2021, compared with a decrease of 2.6 percentage points for those without a disability.

Among the 31.9 million people ages 16 years and older with a disability in the fourth quarter of 2021, 7.2 million, or 22.7 percent, participated in the labor force. By contrast, the participation rate for people with no disability was 67.2 percent. The lower rate for people with a disability reflects, in part, the older age profile of those with a disability; older people, regardless of disability status, are less likely to be in the labor force. About half of all people with a disability were ages 65 years and older, nearly 3 times the share of those with no disability. (See table 10.)

Table 10. Employment status of the civilian noninstitutional population, by gender, age, and disability status, quarterly averages, not seasonally adjusted, 2020–21 (levels in thousands)

| Employment status, gender, and age | People with a disability | People with no disability | Change, fourth quarter 2020–21 |
|-----------------------------------|--------------------------|---------------------------|-------------------------------|
|                                   | Fourth quarter 2020      | Fourth quarter 2021      | Fourth quarter 2020–21       | Fourth quarter 2021 | Change, fourth quarter 2020–21 |
| Total, 16 years and older         |                          |                          |                               |                     |                               |
| Civilian noninstitutional population | 29,880                   | 31,859                   | 1,979                       | 231,200              | 230,165                      |
| Civilian labor force              | 6,078                    | 7,229                    | 1,151                       | 154,434              | 154,657                      |
| Participation rate                | 20.3                     | 22.7                     | 2.4                         | 66.8                 | 67.2                          |
| Employed                          | 5,381                    | 6,634                    | 1,253                       | 144,702              | 148,865                      |
| Employment–population ratio       | 18.0                     | 20.8                     | 2.8                         | 62.6                 | 64.7                          |
| Unemployed                        | 697                      | 595                      | -102                        | 9,732                | 5,792                         |
| Unemployment rate                 | 11.5                     | 8.2                      | -3.3                        | 6.3                  | 3.7                           |
| Men, 16 to 64 years               |                          |                          |                               |                     |                               |
| Civilian labor force              | 2,651                    | 3,018                    | 367                         | 76,445               | 76,510                        |
| Participation rate                | 35.0                     | 38.3                     | 3.3                         | 81.5                 | 82.0                          |
| Employed                          | 2,342                    | 2,748                    | 406                         | 71,392               | 73,573                        |
| Employment–population ratio       | 30.9                     | 34.9                     | 4.0                         | 78.1                 | 78.9                          |
| Unemployed                        | 310                      | 270                      | -40                         | 5,053                | 2,937                         |
| Unemployment rate                 | 11.7                     | 8.9                      | -2.8                        | 6.6                  | 3.8                           |
| Women, 16 to 64 years             |                          |                          |                               |                     |                               |
| Civilian labor force              | 2,344                    | 2,904                    | 560                         | 68,389               | 68,490                        |
| Participation rate                | 31.7                     | 35.9                     | 4.2                         | 70.5                 | 71.4                          |
| Employed                          | 2,037                    | 2,652                    | 615                         | 64,221               | 65,905                        |
| Employment–population ratio       | 27.5                     | 32.7                     | 5.2                         | 66.2                 | 68.7                          |
| Unemployed                        | 307                      | 252                      | -55                         | 4,168                | 2,585                         |
| Unemployment rate                 | 13.1                     | 8.7                      | -4.4                        | 6.1                  | 3.8                           |
| Total, 65 years and older         |                          |                          |                               |                     |                               |
| Civilian noninstitutional population | 14,907                  | 15,887                   | 980                         | 40,429               | 41,006                        |
| Civilian labor force              | 1,083                    | 1,306                    | 223                         | 9,600                | 9,657                         |
| Participation rate                | 7.3                      | 8.2                      | 0.9                         | 23.7                 | 23.6                          |
| Employed                          | 1,003                    | 1,233                    | 230                         | 9,089                | 9,387                         |
| Employment–population ratio       | 6.7                      | 7.8                      | 1.1                         | 22.5                 | 22.9                          |
| Unemployed                        | 80                       | 73                       | -7                          | 511                  | 271                           |
| Unemployment rate                 | 7.4                      | 5.6                      | -1.8                        | 5.3                  | 2.8                           |

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 foreign-born workers differed little from that of native-born workers
The foreign born accounted for 17.8 percent of the U.S. civilian labor force ages 16 years and older in the fourth quarter of 2021, up from 17.0 percent a year earlier. For the past few years, the unemployment rate for the foreign born has been slightly lower than the jobless rate for the native born; however, after the rates for both groups peaked in
the second quarter of 2020, the jobless rate for the foreign born remained slightly above the rate for the native born for the rest of 2020 and the first half of 2021. At the end of 2021, the jobless rate for the foreign born, at 3.9 percent, and the rate for the native born, at 4.0 percent, were nearly the same.

The unemployment rate for foreign-born people decreased more over the year (down by 3.3 percentage points) than did the rate for native-born people (down by 2.3 percentage points). The foreign-born jobless rate increased sharply in 2020, partly because of the relatively high concentration of foreign-born workers in the leisure and hospitality industry, which was hit particularly hard by the COVID-19 pandemic. This industry’s strong (though incomplete) recovery in 2021 may help explain the larger decrease in the foreign-born unemployment rate. 25

The employment–population ratio for the foreign born increased by 3.3 percentage points over the year, rising to 62.9 percent in the fourth quarter of 2021, while the ratio for the native born increased by 1.5 percentage points, reaching 58.6 percent. (See table 11.)

### Table 11. Employment status of the foreign- and native-born populations, by gender, quarterly averages, not seasonally adjusted, 2020–21 (levels in thousands)

| Employment status and nativity | Total | Men | Women |
|-------------------------------|-------|-----|-------|
| | Fourth quarter 2020 | Fourth quarter 2021 | Change, fourth quarter 2020–21 | Fourth quarter 2020 | Fourth quarter 2021 | Change, fourth quarter 2020–21 | Fourth quarter 2020 | Fourth quarter 2021 | Change, fourth quarter 2020–21 |
| Foreign born, 16 years and older | | | | | | | | | |
| Civilian noninstitutional population | 42,523 | 43,890 | 1,367 | 20,442 | 21,386 | 944 | 22,081 | 22,503 | 422 |
| Civilian labor force | 27,314 | 28,740 | 1,426 | 15,692 | 16,575 | 883 | 11,623 | 12,165 | 542 |
| Participation rate | 64.2 | 65.5 | 1.3 | 76.8 | 77.5 | 0.7 | 52.6 | 54.1 | 1.5 |
| Employed | 25,340 | 27,628 | 2,288 | 14,712 | 15,999 | 1,287 | 10,628 | 11,630 | 1,002 |
| Employment-population ratio | 59.6 | 62.9 | 3.3 | 72.0 | 74.8 | 2.8 | 48.1 | 51.7 | 3.6 |
| Unemployed | 1,974 | 1,112 | -862 | 979 | 576 | -403 | 995 | 535 | -460 |
| Unemployment rate | 7.2 | 3.9 | -3.3 | 6.2 | 3.5 | -2.7 | 8.6 | 4.4 | -4.2 |
| Native born, 16 years and older | | | | | | | | | |
| Civilian noninstitutional population | 218,557 | 218,134 | -423 | 105,852 | 105,390 | -462 | 112,705 | 112,744 | 39 |
| Civilian labor force | 133,198 | 133,146 | -52 | 69,322 | 69,044 | -278 | 63,876 | 64,102 | 226 |
| Participation rate | 60.9 | 61.0 | 0.1 | 65.5 | 65.5 | 0.0 | 56.7 | 56.9 | 0.2 |
| Employed | 124,743 | 127,870 | 3,127 | 64,634 | 66,222 | 1,588 | 60,109 | 61,648 | 1,539 |
| Employment-population ratio | 57.1 | 58.6 | 1.5 | 61.1 | 62.8 | 1.7 | 53.3 | 54.7 | 1.4 |
| Unemployed | 8,455 | 5,276 | -3,179 | 4,688 | 2,822 | -1,866 | 3,767 | 2,454 | -1,313 |
| Unemployment rate | 6.3 | 4.0 | -2.3 | 6.8 | 4.1 | -2.7 | 5.9 | 3.8 | -2.1 |

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.

The labor force participation rate increased for both the native born and the foreign born. Foreign-born people continued to have a higher labor force participation rate than native-born people. The rate for the foreign born, at 65.5 percent in the fourth quarter of 2021, increased by 1.3 percentage points over the year. By way of comparison, the rate for the native born was about unchanged over the year, at 61.0 percent.

### Share of workers who teleworked because of the pandemic decreased over the year

In May 2020, new questions were added to the CPS to help measure the impact of the COVID-19 pandemic on the labor market. 26 The questions gathered information on whether people teleworked because of the pandemic, whether people were unable to work because their employer closed or lost business because of the pandemic, whether they received pay for the time they were unable to work, and whether people were unable to look for work because of the pandemic. 27 (These data are not seasonally adjusted and are available as monthly estimates.) The share of the employed who teleworked because of the COVID-19 pandemic trended downward during the second half of 2020 and throughout 2021. In December of 2021, 11.1 percent of employed people teleworked or worked from home because of the pandemic. (See table 12.)
In December 2021, 3.3 percent of workers ages 16 to 24 had teleworked in the 4 weeks prior to the survey because of the COVID-19 pandemic, compared with 13.0 percent of workers ages 25 to 54 and 10.2 percent of workers ages 55 years and older. Although some workers were able to continue to work remotely in 2021, telework was not a viable option for people who work in food preparation and serving-related occupations (who tend to be younger), and this was reflected in the data on COVID-19 pandemic-related telework. (See table 13.)

### Table 12. Percentage of people who teleworked, were prevented from working, were paid for hours not worked, and did not look for work because of the COVID-19 pandemic, not seasonally adjusted, January–December 2021

| Month   | Teleworked[1] | Prevented from working[2] | Paid for hours not worked[3] | Did not look for work[4] |
|---------|---------------|----------------------------|-----------------------------|--------------------------|
| January | 23.2          | 5.7                        | 12.7                        | 4.6                      |
| February| 22.7          | 5.1                        | 10.5                        | 4.1                      |
| March   | 21.0          | 4.4                        | 10.2                        | 3.7                      |
| April   | 18.3          | 3.6                        | 9.3                         | 2.8                      |
| May     | 16.6          | 3.0                        | 9.3                         | 2.5                      |
| June    | 14.4          | 2.4                        | 10.0                        | 1.6                      |
| July    | 13.2          | 2.0                        | 9.1                         | 1.6                      |
| August  | 13.4          | 2.2                        | 13.9                        | 1.5                      |
| September | 13.2        | 1.9                        | 15.5                        | 1.6                      |
| October | 11.6          | 1.5                        | 13.3                        | 1.3                      |
| November| 11.3          | 1.4                        | 15.8                        | 1.2                      |
| December| 11.1          | 1.2                        | 15.9                        | 1.1                      |

[1] People who teleworked or worked from home because of the coronavirus disease 2019 (COVID-19) pandemic in the 4 weeks prior to the survey. Only employed people are asked this question. This group does not include people whose telework was not related to the pandemic.
[2] People who were unable to work during the 4 weeks prior to the survey because their employer closed or lost business as a result of the COVID-19 pandemic.
[3] People who received pay from their employer for hours not worked in the 4 weeks prior to the survey. The question is asked of people who were unable to work because of the COVID-19 pandemic.
[4] People who were prevented from looking for work during the 4 weeks prior to the survey because of the COVID-19 pandemic. The question is asked of people who were not in the labor force at the time of the survey.

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

In December 2021, 3.3 percent of workers ages 16 to 24 had teleworked in the 4 weeks prior to the survey because of the COVID-19 pandemic, compared with 13.0 percent of workers ages 25 to 54 and 10.2 percent of workers ages 55 years and older. Although some workers were able to continue to work remotely in 2021, telework was not a viable option for people who work in food preparation and serving-related occupations (who tend to be younger), and this was reflected in the data on COVID-19 pandemic-related telework. (See table 13.)

### Table 13. Employed people who teleworked or worked at home for pay at any time in the 4 weeks prior to the survey because of the COVID-19 pandemic, by selected characteristics, December 2021 (levels in thousands)

| Characteristic                          | Total employed | People who teleworked because of the COVID-19 pandemic | Percent distribution |
|----------------------------------------|----------------|-------------------------------------------------------|----------------------|
|                                        |                | Total | Percent of total employed | Total | Percent of total employed | Total | Percent of total employed |
| Total, 16 years and over               | 155,732        | 17,358 | 11.1                        | 100.0 | 100.0                      |
| 16 to 24 years                         | 18,825         | 620   | 3.3                         | 12.1 | 3.6                        |
| 25 to 54 years                         | 100,016        | 12,988 | 13.0                        | 64.2 | 74.8                       |
| 55 years and over                      | 36,891         | 3,750 | 10.2                        | 23.7 | 21.6                       |
| Total, 25 years and over               | 136,907        | 16,738 | 12.2                        | 100.0 | 100.0                      |
| Less than a high school diploma        | 8,271          | 80    | 1.0                         | 6.0 | 0.5                        |
| High school graduates, no college      | 34,154         | 1,184 | 3.5                         | 24.9 | 7.1                        |
| Some college or associate's degree     | 34,335         | 2,566 | 7.5                         | 25.1 | 15.3                       |
| Bachelor’s degree and higher[2]        | 60,147         | 12,908 | 21.5                        | 43.9 | 77.1                       |
| Bachelor’s degree only                 | 37,052         | 7,268 | 19.6                        | 27.1 | 43.4                       |
| Advanced degree                        | 23,096         | 5,639 | 24.4                        | 16.9 | 33.7                       |

[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: People who teleworked because of the coronavirus disease 2019 (COVID-19) pandemic are those who teleworked or worked at home for pay specifically because of the pandemic. This does not include those whose telework was unrelated to the pandemic, such as those who worked entirely from home before the pandemic began. Data are not seasonally adjusted.

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

People with higher levels of educational attainment were more likely to telework because of the COVID-19 pandemic than those with less education. This largely reflects the occupational and industry differences among these workers. In December 2021, among workers ages 25 years and older, 24.4 percent of people with an advanced degree and 19.6 percent of those with only a bachelor’s degree had teleworked or worked from home because of the pandemic in the 4 weeks prior to the survey. By contrast, only 1.0 percent of people with less than a high school diploma had teleworked in the prior 4 weeks because of the pandemic.

In May 2020, 49.8 million people (19.2 percent of the population) reported that at some point during the 4 weeks prior to the survey they were unable to work because their employer closed or lost business because of the COVID-19 pandemic. This measure includes people whose hours had been reduced and those who did not work at all. By December 2021, the number of people unable to work because of the pandemic had decreased considerably, to 3.1 million, or 1.2 percent of the population ages 16 years and older.
People who could not work because of the COVID-19 pandemic were asked if they had received any pay from their employer for hours they did not work in the 4 weeks prior to the survey. In May 2020, 17.6 percent of those unable to work because of the pandemic received at least some pay for the hours they did not work. This estimate was slightly lower in December 2021 (15.9 percent).

People who were not in the labor force were asked if the COVID-19 pandemic had prevented them from looking for work in the previous 4 weeks. In May 2020, 9.7 million people did not look for work because of the pandemic. In December 2021, 1.1 million were prevented from looking for work, down by 3.4 million from a year earlier.

Median weekly earnings for full-time wage and salary workers increased in 2021, but at a considerably slower pace than inflation

Median weekly earnings were $998 in 2021, up by 1.4 percent from 2020.28 (Data are annual averages.) During the same period, inflation—as measured by the Consumer Price Index for All Urban Consumers (CPI-U)—increased by 4.7 percent. Real median usual weekly earnings (adjusted with the use of the CPI-U) showed a decline of 3.1 percent from 2020.29 (See table 14.) Women’s median weekly earnings increased more than those of men; however, changes in median weekly earnings during the year should be interpreted with caution because they continue to reflect the impact of the pandemic on the labor market.

| Characteristic                          | Current dollars | Constant (1982–84) dollars |
|-----------------------------------------|-----------------|-----------------------------|
|                                         | 2020 2021       | Percent change, 2020–21     | 2020 2021       | Percent change, 2020–21 |
| Total, 16 years and older               | $984 $998       | 1.4 $380 $368               | -3.1 |
| Men                                     | 1,082 1,097     | 1.4 418 405                 | -3.2 |
| Women                                   | 891 912         | 2.4 344 337                 | -2.2 |
| White                                   | 1,003 1,018     | 1.5 388 376                 | -3.1 |
| Men                                     | 1,110 1,125     | 1.4 429 415                 | -3.2 |
| Women                                   | 905 925         | 2.2 350 341                 | -2.4 |
| Black or African American               | 794 801         | 0.9 307 296                 | -3.6 |
| Men                                     | 830 825         | -0.6 321 304                | -5.1 |
| Women                                   | 764 778         | 1.6 295 286                 | -3.0 |
| Asian                                   | 1,310 1,328     | 1.4 506 490                 | -3.2 |
| Men                                     | 1,447 1,453     | 0.4 559 536                 | -4.1 |
| Women                                   | 1,143 1,141     | -0.2 442 421                | -4.7 |
| Hispanic or Latino ethnicity            | 758 777         | 2.5 293 287                 | -2.1 |
| Men                                     | 797 820         | 2.9 308 303                 | -1.7 |
| Women                                   | 705 718         | 1.8 272 265                 | -2.7 |
| Total, 25 years and older               | 1,029 1,057     | 2.7 398 390                 | -1.9 |
| Less than a high school diploma         | 619 626         | 1.1 239 231                 | -3.4 |
| High school graduate, no college        | 781 809         | 3.6 302 299                 | -1.1 |
| Some college or associate's degree      | 903 925         | 2.4 349 341                 | -2.2 |
| Bachelor's degree or higher             | 1,421 1,452     | 2.2 549 536                 | -2.4 |

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, 1979–2021

Hover over chart to view data.
Source: U.S. Bureau of Labor Statistics, Current Population Survey.
For both men and women, earnings were lowest for those ages 16 to 24, followed by 25- to 34-year-olds. Median weekly earnings of those ages 35 to 64 ranged between $1,241 to $1,295 for men and $976 to $1,012 for women. The women’s-to-men’s earnings ratio was higher among younger workers than among older workers. For example, the ratio was 93.1 percent for 16- to 24-year-olds, compared with 78.1 percent among 45- to 54-year-olds. (See chart 13.)

Among the major race and ethnicity groups, median weekly earnings increased for all groups. In 2021, earnings increased by 2.5 percent for Hispanics ($777), 1.5 percent for Whites ($1,018), 1.4 percent for Asians ($1,328), and 0.9 percent for Blacks ($801). The women’s-to-men’s earnings ratio varied by race and ethnicity; the ratio was higher among Blacks and Hispanics. White women earned 82.2 percent as much as their male counterparts, compared with 94.1 percent for Black women, 78.5 percent for Asian women, and 87.6 percent for Hispanic women.

Among workers ages 25 years and older, high school graduates with no college had the largest over-the-year increase in median weekly earnings compared with other educational attainment groups. Earnings for high school graduates rose by 3.6 percent, to $809 in 2021. (See table 14.)

Among the major occupational groups, people employed full time in management, professional, and related occupations had the highest median weekly earnings: $1,609 for men and $1,222 for women. As has historically been the case, men ($723) and women ($598) employed in service occupations earned the least in 2021. (See table 15.)
Table 15. Median usual weekly earnings of full-time wage and salary workers, by occupation and gender, annual averages, 2020–21

| Occupation and gender                                      | Number of workers (in thousands) | Median weekly earnings |
|-----------------------------------------------------------|----------------------------------|------------------------|
|                                                            | 2020                             | 2021                   | 2020   | 2021   | Percent change, 2020–21 |
| Total, 16 years and older                                  | 110,387                          | 114,316                | $984   | $998   | 1.4                      |
| Management, professional, and related occupations         | 50,023                           | 50,166                 | 1,356  | 1,390  | 2.5                      |
| Management, business, and financial operations occupations| 20,811                           | 20,529                 | 1,461  | 1,482  | 1.4                      |
| Professional and related occupations                      | 29,213                           | 29,637                 | 1,270  | 1,335  | 5.1                      |
| Service occupations                                       | 13,771                           | 14,630                 | 621    | 644    | 3.7                      |
| Sales and office occupations                              | 21,165                           | 21,748                 | 809    | 826    | 2.1                      |
| Sales and related occupations                             | 8,958                            | 9,281                  | 880    | 887    | 0.8                      |
| Office and administrative support occupations              | 12,207                           | 12,467                 | 781    | 806    | 3.2                      |
| Natural resources, construction, and maintenance occupations| 10,690                           | 11,182                 | 905    | 919    | 1.5                      |
| Farming, fishing, and forestry occupations                 | 787                              | 800                    | 589    | 623    | 5.8                      |
| Construction and extraction occupations                   | 5,826                            | 6,171                  | 906    | 904    | -0.2                     |
| Installation, maintenance, and repair occupations          | 4,077                            | 4,211                  | 984    | 1,017  | 3.4                      |
| Production, transportation, and material moving occupations| 14,738                           | 15,590                 | 746    | 774    | 3.8                      |
| Production occupations                                    | 6,820                            | 7,107                  | 775    | 809    | 4.4                      |
| Transportation and material moving occupations             | 7,917                            | 8,483                  | 719    | 738    | 2.6                      |
| Men, 16 years and older                                    | 60,911                           | 62,928                 | 1,082  | 1,097  | 1.4                      |
| Management, professional, and related occupations         | 24,090                           | 24,561                 | 1,578  | 1,609  | 2.0                      |
| Management, business, and financial operations occupations| 11,082                           | 11,231                 | 1,667  | 1,672  | 0.3                      |
| Professional and related occupations                      | 13,008                           | 13,330                 | 1,532  | 1,555  | 1.5                      |
| Service occupations                                       | 6,740                            | 7,000                  | 704    | 723    | 2.7                      |
| Sales and office occupations                              | 8,435                            | 8,677                  | 956    | 970    | 1.5                      |
| Sales and related occupations                             | 4,991                            | 5,090                  | 1,046  | 1,049  | 0.3                      |
| Office and administrative support occupations              | 3,445                            | 3,587                  | 868    | 899    | 3.6                      |
| Natural resources, construction, and maintenance occupations| 10,152                           | 10,635                 | 917    | 930    | 1.4                      |
| Farming, fishing, and forestry occupations                 | 600                              | 651                    | 608    | 637    | 4.8                      |
| Construction and extraction occupations                   | 5,635                            | 5,965                  | 910    | 908    | -0.2                     |
| Installation, maintenance, and repair occupations          | 3,917                            | 4,019                  | 991    | 1,023  | 3.2                      |
| Production, transportation, and material moving occupations| 11,494                           | 12,056                 | 796    | 825    | 3.6                      |
| Production occupations                                    | 5,055                            | 5,251                  | 841    | 884    | 5.1                      |
| Transportation and material moving occupations             | 6,439                            | 6,804                  | 759    | 786    | 3.6                      |
| Women, 16 years and older                                  | 49,476                           | 51,388                 | 891    | 912    | 2.4                      |
| Management, professional, and related occupations         | 25,933                           | 26,605                 | 1,164  | 1,222  | 5.0                      |
| Management, business, and financial operations occupations| 9,729                            | 10,299                 | 1,274  | 1,306  | 2.5                      |
| Professional and related occupations                      | 16,204                           | 16,306                 | 1,121  | 1,167  | 4.1                      |
| Service occupations                                       | 7,032                            | 7,630                  | 574    | 598    | 4.2                      |
| Sales and office occupations                              | 12,729                           | 13,071                 | 746    | 766    | 2.7                      |
| Sales and related occupations                             | 3,967                            | 4,191                  | 715    | 720    | 0.7                      |
| Office and administrative support occupations              | 8,762                            | 8,880                  | 756    | 779    | 3.0                      |
| Natural resources, construction, and maintenance occupations| 538                              | 547                    | 682    | 696    | 2.1                      |
| Farming, fishing, and forestry occupations                 | 187                              | 149                    | 528    | 585    | 10.8                     |
| Construction and extraction occupations                   | 191                              | 207                    | 796    | 720    | -9.5                     |
| Installation, maintenance, and repair occupations          | 160                              | 192                    | 801    | 836    | 4.4                      |
| Production, transportation, and material moving occupations| 3,243                            | 3,535                  | 614    | 638    | 3.9                      |
| Production occupations                                    | 1,765                            | 1,856                  | 630    | 653    | 3.7                      |
| Transportation and material moving occupations             | 1,478                            | 1,679                  | 600    | 624    | 4.0                      |

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 summary, major employment and unemployment measures from the CPS continued to show improvement in 2021. The national unemployment rate trended down in each quarter of 2021, reaching 4.2 percent by the end of the year. The jobless rate decreased for men and women, as well as for all major race and ethnicity groups. The unemployment rate decreased among all occupations, with the sharpest decline in service occupations. The employment–population ratio increased by 1.8 percentage points, to 59.2 percent in the fourth quarter of 2021, while the labor force participation rate improved at a much slower pace, rising by 0.3 percentage point to reach 61.8 percent by the end of the year. The level of self-employment in nonagricultural industries increased throughout 2021. The percentage of people who teleworked because of the COVID-19 pandemic declined throughout 2021 and ended the year at 11.1 percent.
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.

2 Research suggests that, to some extent, the decrease in the number of long-term unemployed over the year can be explained by federal unemployment benefits that ended at the end of the third quarter of 2021, pushing down the number of long-term unemployed. For more information on the expiration of federal benefits, see Jim Tankersly and Ben Casselman, “Unemployment benefits expire for millions without pushback from Biden,” The New York Times, September 6, 2021, https://www.nytimes.com/2021/09/06/business/economy/unemployment-benefits.html.

3 For more information about duration of unemployment in 2020, see “36.9 percent of unemployed jobless 27 weeks or more as pandemic continues, November 2020,” The Economics Daily (U.S. Bureau of Labor Statistics, December 9, 2020), www.bls.gov/omb/ted/2020/36-point-9-percent-of-unemployed-jobless-27-weeks-or-more-as-pandemic-continues-november-2020.htm.

4 The CPS collects data on the different reasons that people are unemployed, including being on temporary layoff. Unemployed people on temporary layoff are those who (1) said they were laid off or were fired not at work during the survey reference week because of a layoff (temporary or indefinite) or slack work or 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 those who had a temporary illness that prevented them from returning to work). Unlike other unemployed people, those on temporary layoff do not need to be actively looking for work to be classified as unemployed. Pay status is not part of the criteria for being classified as unemployed on temporary layoff. People absent from work because of temporary layoff are classified as unemployed on temporary layoff, whether or not they were paid during the time they were off work. Since March 2020, household survey interviewers have been instructed to classify employed people absent from work because of temporary, pandemic-related business closures or cutbacks as unemployed on temporary layoff. However, some workers affected by the pandemic who should have been classified as unemployed on temporary layoff were instead misclassified as employed but not at work. The share of responses that may have been misclassified was highest in the early months of the pandemic and has been considerably lower since. If the misclassified workers who were recorded as employed but not at work for the entire survey reference week had been classified as “unemployed on temporary layoff,” the total number of unemployed people and the unemployment rate would have been higher than reported. For more information, see “Effects of COVID-19 pandemic on the Employment Situation news release and data,” especially question 12, “Household survey: What is the misclassification issue?”

5 Some research has suggested that the number of reentrants to the labor force will increase as the economy improves, as some workers who left the labor force during the coronavirus disease 2019 (COVID-19) pandemic may reenter the labor market. See, for example, Rakesh Kochhar and Jesse Bennett, “U.S. labor market inches back from the COVID-19 shock, but recovery is far from complete” (Pew Research Center, April 14, 2021), https://www.pewresearch.org/fact-tank/2021/04/14/u-s-labor-market-inches-back-from-the-covid-19-shock-but-recovery-is-far-from-complete/.

6 Beginning with data for January 2020, the CPS has classified occupations according to the 2018 Census occupational classification system, which is derived from the 2018 Standard Occupational Classification (SOC) system. The 2018 SOC system replaced the earlier 2010 Census occupational classification based on the 2010 SOC system, which was used in the CPS from January 2011 through December 2019. As a result of this change, CPS occupational data from January 2020 and later are not comparable with occupational data from earlier years. Although many of the broad- and intermediate-level occupational categories in the 2018 SOC system remain the same, some detailed occupations were reclassified between the broader groups, which substantially affects data comparability over time. For example, within sales and office occupations, the office and administrative support occupations group is now smaller in scope. (The titles of the groups were unchanged.) Stock clerks and order fillers, which employed 1.5 million people in 2019, moved out of the broad group office and administrative support occupations and into transportation and material-moving occupations. Similarly, computer operators, which employed 72,000 people in 2019, moved out of office and administrative support occupations and into computer and mathematical occupations. In addition, within production, transportation, and material-moving occupations, the transportation and material-moving occupations group is now larger in scope because it includes stock clerks and order fillers. Finally, some detailed occupations affected by the pandemic who should have been classified as unemployed on temporary layoff were instead misclassified as employed but not at work. The share of responses that may have been misclassified was highest in the early months of the pandemic and has been considerably lower since. If the misclassified workers who were recorded as employed but not at work for the entire survey reference week had been classified as “unemployed on temporary layoff,” the total number of unemployed people and the unemployment rate would have been higher than reported. For more information, see “Effects of COVID-19 pandemic on the Employment Situation news release and data,” especially question 12, “Household survey: What is the misclassification issue?”

7 For more information on employment declines in the first year of the pandemic, see “Employment trends of Asians and Native Hawaiians and other Pacific Islanders,” Commissioner’s Corner (U.S. Bureau of Labor Statistics, May 24, 2021), https://bls.gov/bls/2021/05/24/employment-trends-of-asians-and-native-hawaiians-and-other-pacific-islanders/.

8 For more information on employment declines in the first year of the pandemic, see “Employment trends of Asians and Native Hawaiians and other Pacific Islanders,” Commissioner’s Corner (U.S. Bureau of Labor Statistics, May 24, 2021), https://bls.gov/bls/2021/05/24/employment-trends-of-asians-and-native-hawaiians-and-other-pacific-islanders/.

9 For more information on employment declines in the first year of the pandemic, see “Employment trends of Asians and Native Hawaiians and other Pacific Islanders,” Commissioner’s Corner (U.S. Bureau of Labor Statistics, May 24, 2021), https://bls.gov/bls/2021/05/24/employment-trends-of-asians-and-native-hawaiians-and-other-pacific-islanders/.

10 For more information on employment declines in the first year of the pandemic, see “Employment trends of Asians and Native Hawaiians and other Pacific Islanders,” Commissioner’s Corner (U.S. Bureau of Labor Statistics, May 24, 2021), https://bls.gov/bls/2021/05/24/employment-trends-of-asians-and-native-hawaiians-and-other-pacific-islanders/.

11 For more information on employment declines in the first year of the pandemic, see “Employment trends of Asians and Native Hawaiians and other Pacific Islanders,” Commissioner’s Corner (U.S. Bureau of Labor Statistics, May 24, 2021), https://bls.gov/bls/2021/05/24/employment-trends-of-asians-and-native-hawaiians-and-other-pacific-islanders/.

12 For more information on employment declines in the first year of the pandemic, see “Employment trends of Asians and Native Hawaiians and other Pacific Islanders,” Commissioner’s Corner (U.S. Bureau of Labor Statistics, May 24, 2021), https://bls.gov/bls/2021/05/24/employment-trends-of-asians-and-native-hawaiians-and-other-pacific-islanders/.

13 For more information on employment declines in the first year of the pandemic, see “Employment trends of Asians and Native Hawaiians and other Pacific Islanders,” Commissioner’s Corner (U.S. Bureau of Labor Statistics, May 24, 2021), https://bls.gov/bls/2021/05/24/employment-trends-of-asians-and-native-hawaiians-and-other-pacific-islanders/.
The composition of the labor force and base effects help explain wage growth after the economy lost millions of jobs in April 2020. For more information, see Chair Cecilia Rouse and Mark K. Seides. "The pandemic's effect on measured wage growth," Council of Economic Advisors (White House, April 19, 2021), https://www.whitehouse.gov/cea/written-materials/2021/04/19/the-pandemics-effect-on-measured-wage-growth/

See Mark Wasson, "Rising wages draw teen workers across region," West Central Tribune, December 27, 2021, https://www.wctrib.com/business/trending/rising-wages-draw-teen-workers-across-region.

For more information on the "Great Resignation," see Andrew Van Dam "The latest twist in the 'Great Resignation': retiring but delaying Social Security," The Washington Post, November 1, 2021, https://www.washingtonpost.com/business/2021/11/01/latest-twist-great-resignation-retiring-delaying-social-security/. See also Peter Coy, "The pandemic prompted people to retire early. Will they return to work?" The New York Times, November 17, 2021, https://www.nytimes.com/2021/11/17/opinion/retirement-pandemic.html.

For more on this issue, see Jeanna Smialek and David McCabe, "The luckiest workers in America? Teenagers," The New York Times, May 30, 2021, https://www.nytimes.com/2021/05/30/business/economy/pandemic-jobs-teenagers.html.

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.

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.

As of 1967, the official estimates of self-employment published by BLS have included only the unincorporated self-employed. Although it is possible to identify the incorporated self-employed separately, these individuals are counted as wage and salary workers in the official 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/news.release/spotlight2016/self-employment-in-the-united-states.

See Josh Mitchell and Kathryn Dill, "Workers quit jobs in droves to become their own bosses," The Wall Street Journal, May 29, 2021, https://www.wsj.com/articles/workers-quit-jobs-in-droves-to-become-their-own-bosses-11638199199. See also Eric Morath, "Millions are unemployed. Why can't companies find workers?" The Wall Street Journal, May 6, 2021, https://www.wsj.com/articles/millions-are-unemployed-why-can-t-companies-find-workers-11620302440.

See Rakesh Kochhar and Jesse Bennett, "Immigrants in the U.S. experienced higher unemployment in the pandemic but have closed the gap" (Pew Research Center, July 26, 2021), https://www.pewresearch.org/fact-tank/2021/07/26/immigrants-in-u-s-experienced-higher-unemployment-in-the-pandemic-but-have-closed-the-gap/.

For more information about the effects of the COVID-19 pandemic on the labor market, see "Supplemental data measuring the effects of the coronavirus (COVID-19) pandemic on the labor market," Labor Force Statistics from the Current Population Survey (U.S. Bureau of Labor Statistics, last modified April 22, 2022), https://www.bls.gov/cps/effects-of-the-coronavirus-covid-19-pandemic.htm.
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JUNE 2022

Job openings and quits reach record highs in 2021, layoffs and discharges fall to record lows

Estimates from the Job Openings and Labor Turnover Survey (JOLTS) highlighted large increases in job openings and quits throughout 2021. Job openings reached a series high in December 2021 of 11.4 million, and quits reached a series high in November of 4.5 million. By contrast, layoffs and discharges trended lower throughout 2021, reaching a series low of 1.3 million in December. The series lows followed the large increase in layoffs and discharges that occurred at the onset of the COVID-19 pandemic, when this measure reached a series high of 13.0 million in March 2020. The movement in these JOLTS estimates signaled a stronger demand for labor in 2021, following the February–April 2020 pandemic-induced recession.

The Job Openings and Labor Turnover Survey (JOLTS) estimates showed large increases in job openings and quits throughout 2021, despite the surge of two coronavirus disease 2019 (COVID-19) variants, Delta in the summer and Omicron at the end of the year. Layoffs and discharges declined throughout the year and reached a series low at the end of 2021. This article reviews the JOLTS estimates for 2021 at the total nonfarm, industry, and regional levels. (For definitions of JOLTS terms, see the box that follows.)

Definitions of JOLTS terms

Job openings

Job openings include all positions that are open on the last business day of the reference month. A job is open only if it meets the following three conditions: (1) a specific position exists and there is work available for that position; the position can be full time or part time, and it can be permanent, short term, or seasonal; (2) the job could start within 30 days, whether or not the employer can find a suitable candidate during that time; and (3) the employer is actively recruiting workers from outside the establishment to fill the position; active recruiting means that the establishment is taking steps to fill a position and may include advertising in newspapers, on television, or on the radio; posting Internet notices, posting “help wanted” signs, networking or making “word-of-mouth” announcements; accepting applications; interviewing candidates; contacting employment agencies; or soliciting employees at job fairs, state or local employment offices, or similar sources.

Excluded are positions open only to internal transfers, promotions or demotions, or recalls from layoffs. Also excluded are openings for positions with start dates more than 30 days in the future; positions for which employees have been hired but not yet reported for work; and positions to be filled by employees of temporary help agencies, employee leasing companies, outside contractors, or consultants.

Hires

Hires include all additions to the payroll during the entire reference month, including newly hired and rehired employees; full-time and part-time employees; permanent, short-term, and seasonal employees; employees who were recalled to a job at the location following a layoff (formal suspension from pay status) lasting more than 7 days; on-call or intermittent employees who returned to work after having been formally separated; workers who were hired and separated during the month; and transfers from other locations.

Excluded are transfers or promotions within the reporting location; employees returning from a strike; and employees of temporary help agencies, employee leasing companies, outside contractors, or consultants.

Separations

Separations include all separations from the payroll during the entire reference month and are reported by type of separation: quits, layoffs and discharges, and other separations. Quits include employees who left voluntarily, except for retirements or transfers to other locations. Layoffs and discharges include involuntary separations initiated by the employer, including layoffs with no intent to rehire; layoffs (formal suspensions from pay status) lasting or expected to last more than 7 days; discharges resulting from mergers, downsizing, or closings; firings or other discharges for cause; terminations of permanent or short-term employees; and terminations of seasonal employees (whether or not they are expected to return the next season). Other separations include retirements, transfers to other locations, separations due to employee disability, and deaths.

Excluded are transfers within the same location; employees on strike; and employees of temporary help agencies, employee leasing companies, outside contractors, or consultants.

Job openings

The job openings level is an indicator for the demand for labor between employers and potential employees. An increase in job openings signals that employers are in need of additional employees. This signal is further confirmed by the relationship between job openings and employment, as the two measures tend to increase and decrease together.
The job openings level can also be a sign of shifts in the economy and often increases when approaching an economic expansion or decreases when approaching an economic contraction. Over-the-month estimates show that job openings continued to increase throughout 2021 after the large decline in the spring of 2020 as a result of the February–April 2020 economic recession. From December 2020 to December 2021, job openings increased by 67.0 percent to a not seasonally adjusted level of 10.4 million. (See table 1.)

Table 1. Change in level and percentage of job openings, by industry and region, not seasonally adjusted, December 2019–December 2021 (levels in thousands)

| Industry and region                  | Level by month and year | Change, December 2019–December 2021 | Change, December 2019–December 2021 |
|--------------------------------------|-------------------------|--------------------------------------|--------------------------------------|
|                                      | December 2019 | December 2020 | December 2021 | Level | Percent | Level | Percent |
| Total nonfarm                        | 6,060          | 6,204          | 10,353         | 144   | 2.4      | 4,149 | 66.9     |
| Industry                             |              |                |                |       |          |       |          |
| Total private                        | 5346          | 5557           | 9313           | 211   | 3.9      | 3,756 | 67.6     |
| Mining and logging                   | 11            | 13             | 31             | 2     | 18.2     | 18    | 138.5    |
| Construction                         | 208           | 211            | 301            | 3     | 1.4      | 90    | 42.7     |
| Manufacturing                        | 353           | 443            | 725            | 90    | 25.5     | 282   | 63.7     |
| Durable goods                        | 211           | 261            | 413            | 50    | 23.7     | 152   | 58.2     |
| Nondurable goods                     | 143           | 183            | 313            | 40    | 28.0     | 130   | 71.0     |
| Trade, transportation, and utilities | 1,073         | 1,120          | 1,755          | 47    | 4.4      | 635   | 56.7     |
| Wholesale trade                      | 169           | 164            | 256            | -5    | -3.0     | 92    | 56.1     |
| Retail trade                         | 640           | 665            | 916            | 25    | 3.9      | 251   | 37.7     |
| Transportation, warehousing, and utilities | 264     | 291            | 583            | 27    | 10.2     | 292   | 100.3    |
| Information                          | 136           | 119            | 242            | -17   | -12.5    | 123   | 103.4    |
| Financial activities                 | 516           | 275            | 448            | -41   | -13.0    | 173   | 62.9     |
| Finance and insurance                | 229           | 218            | 334            | -11   | -4.8     | 116   | 53.2     |
| Real estate and rental and leasing   | 88            | 57             | 114            | -31   | -35.2    | 57    | 100.0    |
| Professional and business services   | 1,056         | 1,356          | 1,883          | 300   | 28.4     | 507   | 37.4     |
| Education and health services        | 1,188         | 1,217          | 2,083          | 29    | 2.4      | 866   | 71.2     |
| Educational services                 | 103           | 75             | 197            | -28   | -27.2    | 122   | 162.7    |
| Healthcare and social assistance     | 1,085         | 1,142          | 1,886          | 57    | 5.3      | 744   | 65.1     |
| Leisure and hospitality              | 748           | 609            | 1,516          | -139  | -18.6    | 907   | 148.9    |
| Arts, entertainment, and recreation  | 108           | 50             | 144            | -58   | -53.7    | 94    | 188.0    |
| Accommodation and food services      | 640           | 559            | 1,371          | -81   | -12.7    | 812   | 145.3    |
| Other services                       | 256           | 192            | 350            | -64   | -25.0    | 158   | 82.3     |
| Government                           | 714           | 647            | 1,040          | -67   | -9.4     | 393   | 60.7     |
| Federal                              | 85            | 87             | 153            | 2     | 2.4      | 66    | 75.9     |
| State and local                      | 629           | 561            | 887            | -68   | -10.8    | 326   | 58.1     |
| Education                            | 220           | 194            | 320            | -26   | -11.8    | 126   | 64.9     |
| Excluding education                  | 409           | 367            | 567            | -42   | -10.3    | 200   | 54.5     |
| Region                               |              |                |                |       |          |       |          |
| Northeast                            | 1,064         | 1,027          | 1,817          | -37   | -3.5     | 790   | 76.9     |
| South                                | 2,272         | 2,491          | 3,899          | 219   | 9.6      | 1,408 | 56.5     |
| Midwest                              | 1,258         | 1,333          | 2,264          | 75    | 6.0      | 931   | 69.8     |
| West                                 | 1,467         | 1,353          | 2,374          | -114  | -7.8     | 1,021 | 75.5     |

Note: Details may not sum to totals because of rounding. Source: U.S. Bureau of Labor Statistics.

Job openings by industry

During 2021, the monthly job openings level for 16 of 19 industries reached an all-time series high. The three industries with the most job openings were professional and business services, at 2.0 million in October; healthcare and social assistance, at 2.0 million in December; and accommodation and food services, at 1.8 million in December. (See table 2.)
## Table 2. Monthly series highs by industry and region, seasonally adjusted, 2021 (in thousands)

| Data element              | Industry and region | Month | Level |
|---------------------------|---------------------|-------|-------|
| Job openings              | Durable goods       | September | 560  |
| Job openings              | Nondurable goods    | October | 394  |
| Job openings              | Wholesale trade     | October | 345  |
| Job openings              | Retail trade        | August  | 1,177|
| Job openings              | Transportation, warehousing, and utilities | December | 611  |
| Job openings              | Information         | December | 232  |
| Job openings              | Finance and insurance | November | 372  |
| Job openings              | Real estate and rental and leasing | July | 192  |
| Job openings              | Professional and business services | October | 2,043|
| Job openings              | Educational services | December | 217  |
| Job openings              | Healthcare and social assistance | December | 1,970|
| Job openings              | Arts, entertainment, and recreation | July | 257  |
| Job openings              | Accommodation and food services | December | 1,785|
| Job openings              | Other services      | May    | 466  |
| Job openings              | State and local government education | December | 361  |
| Job openings              | State and local government, excluding education | September | 580  |
| Hires                     | Finance and insurance | September | 224  |
| Hires                     | Professional and business services | July | 1,325|
| Hires                     | Educational services | January | 125  |
| Hires                     | State and local government education | June | 211  |
| Quits                     | Durable goods       | November | 185  |
| Quits                     | Wholesale trade     | August  | 145  |
| Quits                     | Retail trade        | December | 786  |
| Quits                     | Transportation, warehousing, and utilities | April | 200  |
| Quits                     | Professional and business services | November | 834  |
| Quits                     | Healthcare and social assistance | November | 626  |
| Quits                     | Accommodation and food services | November | 813  |
| Quits                     | State and local government, excluding education | November | 119  |
| Other separations         | Finance and insurance | September | 65   |
| Other separations         | Professional and business services | June | 118  |

| Region                    |                     |       |       |
|---------------------------|---------------------|-------|-------|
| Job openings              | Northeast           | December | 1,923|
| Job openings              | South               | December | 4,330|
| Job openings              | Midwest             | December | 2,530|
| Job openings              | West                | December | 2,664|
| Quits                     | Northeast           | November | 608  |
| Quits                     | South               | November | 1,883|
| Quits                     | Midwest             | November | 1,008|
| Quits                     | West                | November | 1,010|

Source: U.S. Bureau of Labor Statistics.

Job openings increased over the year from December 2020 to December 2021 in all 19 JOLTS industrial supersectors and total nonfarm. The largest over-the-year increases in job openings occurred in arts, entertainment, and recreation (+188.0 percent); educational services (+162.7 percent); and accommodation and food services (+145.3 percent).

**Job openings by region**

All four census regions reached series highs for job openings in December 2021. The Northeast series high was 2.0 million, the South was 4.3 million, the Midwest was 2.5 million, and the West was 2.7 million. (See table 2.) Comparing December 2020 and December 2021, job openings increased less in the South (+56.5 percent) than in the Midwest (+69.8 percent), the West (+75.5 percent), and the Northeast (+76.9 percent). (See table 1.)

**Job openings and unemployment**

One way to evaluate the number of job openings is to compare it with the number of unemployed people, published by the Current Population Survey. These measures tend to move in opposite directions. This relationship can be explored by dividing the number of unemployed by the number of job openings. This creates a measure referred to as the number of unemployed people per job openings ratio. If the resulting ratio is high, it indicates a high level of unemployed and a low level of job openings. The relationship between unemployed people and job openings is a useful comparison and can often signal times of economic expansion or contraction.

At the beginning of 2021, the unemployed people per job openings ratio was 1.4, continuing a decline that started after the recent high of 4.9 in April 2020. The ratio continued to steadily decline, falling to 1.0 in April 2021. The ratio remained unchanged until July before resuming the downward trend. Unemployed people per job opening fell to the lowest ratio in the history of the JOLTS series at 0.6 in November and December. The decline in the ratio reflects both the increase in job openings throughout the year and a decrease in the number of unemployed. (See chart 1.)
Hires

The total number of annual hires increased to a level of 75.6 million in 2021 (+4.0 percent), compared with 2019, during which the annual hires level increased to 72.6 million (+3.9 percent). The increase in 2021 marked the 12th consecutive year in which the annual hires level increased. (See table 3.)
### Table 3. Change in level and percentage of annual hires, by industry and region, not seasonally adjusted, 2019–21 (levels in thousands)

| Industry and region | Level by year 2019 | Level by year 2020 | Level by year 2021 | Change, 2019–20 | Change, 2020–21 |
|---------------------|---------------------|---------------------|---------------------|-----------------|-----------------|
|                     | 2019               | 2020               | 2021               | Level           | Percent         |
|                     | 69,911             | 72,635             | 75,550             | 2,724           | 3.9             |
| Industry            |                     |                     |                     | 2,915           | 4.0             |
|                      |                    |                     |                     | 2,713           | 4.0             |
| Total               | 65,505             | 68,451             | 71,164             | 2,946           | 4.5             |
| Mining and logging  | 304                | 199                | 237                | -105            | -34.5           |
| Construction        | 4,994              | 4,984              | 4,357              | -157            | -3.9            |
| Manufacturing       | 4,052              | 4,810              | 5,271              | 2,259           | 54.5            |
| Durable goods       | 2,721              | 2,750              | 2,937              | 479             | 17.1            |
| Nondurable goods    | 1,780              | 2,061              | 2,335              | 281             | 15.8            |
| Trade, transportation, and utilities | 13,889          | 15,436             | 16,118             | 1,547           | 11.1            |
| Wholesale trade     | 1,776              | 1,815              | 2,053              | 39              | 2.2             |
| Retail trade        | 9,011              | 9,822              | 10,391             | 811             | 8.8             |
| Transportation, warehousing, and utilities | 3,069           | 3,799              | 3,673              | 700             | 22.6            |
| Information         | 1,135              | 978                | 1,304              | -157            | -13.8           |
| Financial activities | 2,653              | 2,660              | 2,659              | 7               | 0.3             |
| Finance and insurance | 1,683           | 1,667              | 1,762              | -16             | -1.0            |
| Real estate and rental and leasing | 971            | 994                | 897                | 23              | 2.4             |
| Professional and business services | 13,785         | 13,419             | 14,771             | -366            | -2.7            |
| Education and health services | 8,650            | 9,365              | 9,374              | 715             | 8.3             |
| Educational services | 1,160              | 1,133              | 1,214              | -27             | -2.3            |
| Healthcare and social assistance | 7,494           | 8,232              | 8,132              | 738             | 9.8             |
| Leisure and hospitality | 13,432             | 13,565             | 14,227             | 133             | 1.0             |
| Arts, entertainment, and recreation | 1,998            | 1,960              | 1,960              | -358            | -17.9           |
| Accommodation and food services | 11,434          | 11,925             | 12,267             | 491             | 4.3             |
| Other services      | 2,605              | 3,033              | 2,849              | 428             | 16.4            |
| Government          | 4,403              | 4,185              | 4,385              | -218            | -5.0            |
| Federal             | 503                | 887                | 522                | 384             | 76.3            |
| State and local     | 3,904              | 3,297              | 3,860              | -607            | -15.5           |
| Education           | 2,013              | 1,647              | 2,075              | -365            | -18.2           |
| Excluding education | 1,890              | 1,649              | 1,787              | -241            | -12.8           |
| Region              |                    |                     |                     |                 |                 |
| Northeast           | 10,853             | 11,653             | 11,366             | 800             | 7.4             |
| South               | 28,247             | 28,003             | 30,619             | -244            | -0.9            |
| Midwest             | 14,878             | 15,810             | 16,479             | 932             | 6.3             |
| West                | 15,930             | 17,168             | 17,084             | 1,236           | 7.8             |

Note: Details may not sum to totals because of rounding.
Source: U.S. Bureau of Labor Statistics.

**Hires by industry**

Annual hires increased in 13 of 19 industry supersectors and in total nonfarm in 2021 and decreased in 6 industries. The largest percentage increases in the annual hires levels were in information (+33.3 percent); state and local government education (+26.0 percent); and arts, entertainment, and recreation (+19.5 percent). The largest percentage decreases in hires occurred in federal government (−41.1 percent), construction (−12.6 percent), and real estate and rental and leasing (−9.8 percent). (See table 3.) Seven industries experienced annual series highs for the level of hires in 2021. Hires in professional and business services peaked at 14.8 million, accommodation and food services peaked at 12.3 million, and retail trade peaked at 10.4 million. (See table 4.)
Table 4. Annual series highs, by industry and region, not seasonally adjusted, 2021 (in thousands)

| Data element | Industry and region | Level |
|--------------|---------------------|-------|
| Hires        | Durable goods       | 2,937 |
| Hires        | Nondurable goods    | 2,335 |
| Hires        | Retail trade        | 10,391|
| Hires        | Professional and business services | 14,771 |
| Hires        | Educational services | 1,241 |
| Hires        | Accommodation and food services | 12,267 |
| Hires        | State and local government education | 2,075 |
| Quits        | Durable goods       | 1,885 |
| Quits        | Nondurable goods    | 1,572 |
| Quits        | Wholesale trade     | 1,334 |
| Quits        | Retail trade        | 7,792 |
| Quits        | Transportation, warehousing, and utilities | 2,077 |
| Quits        | Professional and business services | 8,597 |
| Quits        | Healthcare and social assistance | 6,115 |
| Quits        | Accommodation and food services | 8,574 |
| Quits        | State and local government, excluding education | 1,101 |
| Other separations | Finance and insurance | 346 |

As the nation’s economy continued to recover from the 2020 recession, four industries experienced seasonally adjusted monthly series highs in hires in 2021. The four industries were professional and business services (1.3 million in July), finance and insurance (224,000 in September), state and local government education (211,000 in June), and educational services (125,000 in January). (See table 2.)

**Hires by region**

In percentage terms, annual hires increased in 2021 by 9.3 percent in the South and by 4.2 percent in the Midwest, while hires in the Northeast and West declined by 2.5 and 0.5 percent, respectively. This differs from the pattern of regional hires in 2020, when the West had the greatest percentage increase in annual hires of 7.8 percent. This was followed by the Northeast (+7.4 percent) and the Midwest (+6.3 percent). The South (-0.9 percent) declined in 2020. (See table 3.). None of the regions experienced monthly series highs for hires.

**Hires and job openings**

In January 2021, job openings reached a level of 7.2 million, following increases after the February–April 2020 recession. Job openings continued to increase throughout 2021, reaching a series high in December 2021 of 11.4 million. While hires trended in a similar direction as job openings, the increases were less dramatic. Given the larger increases in job openings compared with hires, the difference between the two data elements reached its largest amount ever in the JOLTS series history, at 5.0 million in December. (See chart 2.)
Total separations

After annual total separations rose to an all-time JOLTS series high in 2020 because of the COVID-19 pandemic, figures in 2021 more closely resembled previous years. Total separations remained consistent as 2021 progressed, with the lowest level recorded in January (5.2 million) and the highest level recorded in November (6.2 million). Compared with 2020, annual total separations in 2021 fell from 80.8 million to 69.0 million, a decrease of 14.5 percent. However, the annual level for 2021 is still 1.4 percent higher than the level of 68.1 million in 2019. (See table 5.)

### Table 5. Change in level and percentage of annual total separations, by industry and region, not seasonally adjusted, 2019–21 (levels in thousands)

| Industry and region | 2019 | 2020 | 2021 | Level, Percent | Change, 2019–20 | Level, Percent | Change, 2020–21 |
|---------------------|------|------|------|---------------|----------------|---------------|----------------|
| Total               | 68,097 | 80,778 | 69,045 | 12,681 | 18.6 | -11,733 | -14.5 |
| **Industry**        |      |      |      |      |      |      |      |
| Total private       | 63,852 | 75,642 | 65,055 | 11,790 | 18.5 | -10,587 | -14.0 |
| Mining and logging  | 352   | 332   | 205   | -20   | -5.7 | -127  | -38.3 |
| Construction        | 4,870  | 4,970  | 4,216  | 100   | 2.1  | -754  | -15.2 |
| Manufacturing       | 4,046  | 5,378  | 4,923  | 1,332  | 32.9 | -455  | -8.5 |
| Durable goods       | 2,296  | 3,158  | 2,713  | 862   | 37.5 | -445  | -14.1 |
| Nondurable goods    | 1,748  | 2,219  | 2,209  | 471   | 26.9 | -10   | -0.5 |
| Trade, transportation, and utilities | 13,722 | 16,108 | 15,096 | 2,386 | 17.4 | -1,012 | -6.3 |
| Wholesale trade     | 1,742  | 2,105  | 1,904  | 363   | 20.8 | -201  | -9.5 |
| Retail trade        | 9,124  | 10,345 | 9,945  | 1,221  | 13.4 | -400  | -3.9 |
| Transportation, warehousing, and utilities | 2,854 | 3,654 | 3,249 | 800 | 28.0 | -405 | -11.1 |
| Financial activities | 1,101 | 1,172 | 1,101 | 71 | 6.4 | -71 | -6.1 |
| Finance and insurance | 2,491 | 2,729 | 2,505 | 238 | 9.6 | -224 | -8.2 |
| Real estate and rental and leasing | 1,584 | 1,636 | 1,716 | 52 | 3.3 | 80 | 4.9 |
| Professional and business services | 909 | 1,091 | 788 | 182 | 20.0 | -303 | -27.8 |
| Education and health services | 13,512 | 13,931 | 13,644 | 419 | 3.1 | -287 | -2.1 |
| Educational services | 8,068 | 10,364 | 8,823 | 2,296 | 28.5 | -1,541 | -14.9 |
| Healthcare and social assistance | 1,117 | 1,466 | 915 | 349 | 31.2 | -551 | -37.6 |
| Leisure and hospitality | 6,951 | 8,897 | 7,908 | 1,946 | 28.0 | -989 | -11.1 |
| Arts, entertainment, and recreation | 13,146 | 17,071 | 11,968 | 3,925 | 29.9 | -5,103 | -29.9 |
| Accommodation and food services | 1,960 | 2,262 | 1,510 | 302 | 15.4 | -752 | -33.2 |
| Other services       | 11,187 | 14,807 | 10,458 | 3,620 | 32.4 | -4,349 | -29.4 |
| Government           | 2,543 | 3,588 | 2,573 | 1,045 | 41.1 | -1,015 | -28.3 |
| Federal              | 4,245 | 5,138 | 3,991 | 893 | 21.0 | -1,147 | -22.3 |
| State and local      | 469 | 825 | 544 | 356 | 75.9 | -281 | -34.1 |
| Education            | 3,774 | 4,312 | 3,444 | 538 | 14.3 | -868 | -20.1 |
| Excluding education  | 1,959 | 2,434 | 1,622 | 475 | 24.2 | -812 | -33.4 |
| **Region**           |      |      |      |      |      |      |      |
| Northeast            | 10,405 | 13,497 | 10,040 | 3,092 | 29.7 | -3,457 | -25.6 |
| South               | 27,046 | 30,200 | 28,429 | 3,154 | 11.7 | -1,771 | -5.9 |
| Midwest             | 14,420 | 17,956 | 15,115 | 3,536 | 24.5 | -2,841 | -15.8 |
| West                | 16,223 | 19,129 | 15,462 | 2,906 | 17.9 | -3,667 | -19.2 |

Note: Details may not sum to totals because of rounding.
Source: U.S. Bureau of Labor Statistics.

Total separations include quits, layoffs and discharges, and other separations. Each of these data elements has its own unique trend and cyclical movements. Quits are procyclical, which means that the number of quits typically rises when the economy expands and declines when the economy contracts.

In 2021, quits reached new series highs for both monthly and annual levels. The first new series high was recorded in March 2021 with 3.7 million quits, and that level continued to trend upward, reaching a peak of 4.5 million in November. The annual total of 47.8 million surpassed the annual level for 2020 of 35.9 million by 33 percent and is a new series high. The previous series high of 42.2 million quits was set in 2019.

Layoffs and discharges are countercyclical, which means that the estimates typically rise during economic contractions and fall during economic expansions. Layoffs and discharges levels reached historic lows in 2021. After recording the first new series low of 1.5 million in March, the level continued to trend downward, and reached its bottom in December with 1.3 million. The annual total of 17.0 million is a new series low and contrasts greatly with the series high of 40.8 million recorded in 2020. The previous series low was in 2013 at 21.0 million, and layoffs and discharges levels rose every year from 2016 through 2020.

In 2021, monthly other separations—which include retirements and transfers—increased as the year progressed. The lowest monthly level was recorded in January, at 278,000, matching the series low set in May 2009. The largest monthly level came in June, at 397,000. The annual total of 4.2 million marks the third consecutive year that annual other separations have increased and is the highest annual level since the 4.4 million recorded in 2016.
Chart 3 shows the relationship of the three components of total separations by displaying the percentage of total separations attributed to each type of separation. Quits as a percentage of total separations increased to 69.3 percent in 2021, the highest share ever recorded. Layoffs and discharges as a percentage of total separations decreased to 24.6 percent in 2021, the lowest share ever recorded. Other separations as a percentage of total separations increased to 6.1 percent in 2021 after a series low of 5.1 percent in 2020.

The number of annual quits rose considerably, from 35.9 million in 2020 to 47.8 million in 2021, for an increase of 33 percent. (See table 6.) The annual quits level has increased in 11 of the past 12 years, with 2020 being the only exception in that span. Annual layoffs and discharges fell notably, from 40.8 million in 2020 to 17.0 million in 2021, for a decrease of 58.3 percent. (See table 7.) The annual level of other separations rose, from 4.1 million in 2020 to 4.2 million in 2021, for an increase of 2.3 percent. (See table 8.)
| Industry and region                          | Level by year | Change, 2019–20 | Change, 2020–21 |
|---------------------------------------------|---------------|-----------------|-----------------|
|                                             | 2019  | 2020  | 2021  | Level | Percent | Level | Percent |
| Total                                       | 42,193 | 35,870 | 47,825 | -6,323 | -15.0   | 11,955 | 33.3    |
| **Industry**                                |        |        |       |       |         |        |         |
| Total private                               | 39,951 | 33,535 | 45,456 | -6,416 | -16.1   | 11,921 | 35.5    |
| Mining and logging                          | 179    | 106    | 117   | -73    | -40.8   | 11     | 10.4    |
| Construction                                | 2,083  | 1,597  | 2,198 | -486   | -23.3   | 601    | 37.6    |
| Manufacturing                               | 2,492  | 2,347  | 1,885 | -122   | -8.7    | 611    | 48.0    |
| Durable goods                               | 1,396  | 1,274  | 1,885 | -122   | -8.7    | 611    | 48.0    |
| Nondurable goods                            | 1,092  | 1,070  | 1,572 | -22    | -2.0    | 502    | 46.9    |
| Trade, transportation, and utilities        | 8,816  | 8,313  | 11,204 | -603 | -7.0 | 2,891 | 34.8 |
| Wholesale trade                             | 1,029  | 1,002  | 1,334 | -27    | -2.6    | 332    | 33.1    |
| Retail trade                                | 6,236  | 5,650  | 7,792 | -586   | -9.4    | 2,142  | 37.9    |
| Transportation, warehousing, and utilities  | 1,650  | 1,661  | 2,077 | 11     | 0.7     | 416    | 25.0    |
| Information                                 | 553    | 444    | 626   | -109   | -19.7   | 182    | 41.0    |
| Financial activities                        | 1,546  | 1,314  | 1,565 | -232   | -15.0   | 251    | 19.1    |
| Finance and insurance                       | 1,004  | 903    | 1,045 | -101   | -10.1   | 142    | 15.7    |
| Real estate and rental and leasing          | 544    | 410    | 522   | -134   | -24.6   | 112    | 27.3    |
| Professional and business services          | 7,768  | 6,639  | 8,597 | -1,129 | -14.5   | 1,958  | 29.5    |
| Education and health services               | 5,537  | 5,370  | 6,728 | -167   | -3.0    | 1,358  | 25.3    |
| Educational services                        | 648    | 486    | 613   | -162   | -25.0   | 127    | 26.1    |
| Healthcare and social assistance            | 4,888  | 4,882  | 6,115 | 6      | 0.1     | 1,233  | 25.3    |
| Leisure and hospitality                     | 9,242  | 6,361  | 9,413 | -2,881 | -31.2   | 3,052  | 48.0    |
| Arts, entertainment, and recreation         | 941    | 538    | 843   | -403   | -42.8   | 305    | 56.7    |
| Accommodation and food services             | 8,301  | 5,824  | 8,574 | -2,477 | -29.8   | 2,750  | 47.2    |
| Other services                              | 1,634  | 1,046  | 1,552 | -586   | -36.0   | 506    | 48.4    |
| Government                                  | 2,243  | 2,337  | 2,372 | 94     | 4.2     | 35     | 1.5     |
| Federal                                     | 209    | 236    | 260   | 27     | 12.9    | 24     | 10.2    |
| State and local                             | 2,033  | 2,101  | 2,109 | 68     | 3.3     | 8      | 0.4     |
| Education                                   | 1,108  | 1,191  | 1,009 | 83     | 7.5     | -182   | -15.3   |
| Excluding education                         | 927    | 909    | 1,101 | -18    | -1.9    | 192    | 21.1    |
| **Region**                                  |        |        |       |       |         |        |         |
| Northeast                                   | 5,706  | 4,797  | 6,387 | -909   | -15.9   | 1,590  | 33.1    |
| South                                       | 17,273 | 15,213 | 20,192 | -2,060 | -11.9   | 4,979  | 32.7    |
| Midwest                                     | 9,199  | 8,005  | 10,541 | -1,194 | -13.0   | 2,536  | 31.7    |
| West                                        | 10,013 | 7,856  | 10,708 | -2,157 | -21.5   | 2,852  | 36.3    |

Note: Details may not sum to totals because of rounding.
Source: U.S. Bureau of Labor Statistics.
| Industry and region                        | Level | Change, 2019–20 | Change, 2020–21 | Change, 2020–21 |
|-------------------------------------------|-------|-----------------|-----------------|-----------------|
|                                            | 2019  | 2020 | 2021 | Level | Percent | Level | Percent | Level | Percent |
| Total                                      | 21,893 | 40,801 | 17,019 | 18,908 | 86.4 | -23782 | -58.3 |
| Industry                                   |       |       |       |       |       |       |       |       |       |
| Total private                              | 20,639 | 38,911 | 16,137 | 18,908 | 88.5 | -22774 | -58.5 |
| Mining and logging                         | 154    | 206   | 73    | 52    | 33.8 | -133   | -64.4 |
| Construction                               | 2,587  | 3,221 | 1,863 | 634   | 24.5 | -1358  | -42.2 |
| Manufacturing                              | 1,311  | 2,754 | 1,183 | 1,443 | 110.1 | -1571  | -57.0 |
| Durable goods                              | 748    | 1,721 | 646   | 973   | 130.1 | -1075  | -62.5 |
| Nondurable goods                           | 563    | 1,032 | 536   | 469   | 83.3 | -496   | -48.1 |
| Trade, transportation, and utilities       | 4,058  | 7,162 | 3,238 | 3104  | 76.5 | -3924  | -54.8 |
| Wholesale trade                            | 611    | 1,029 | 472   | 418   | 68.4 | -557   | -59.2 |
| Retail trade                               | 2,421  | 4,368 | 1,781 | 1947  | 76.5 | -2587  | -59.2 |
| Transportation, warehousing, and utilities | 1,027  | 1,762 | 987   | 735   | 71.6 | -775   | -44.0 |
| Information                                | 464    | 662   | 367   | 198   | 42.7 | -295   | -46.6 |
| Financial activities                       | 640    | 1,110 | 537   | 470   | 73.4 | -573   | -51.6 |
| Finance and insurance                      | 319    | 494   | 328   | 175   | 54.9 | -166   | -33.6 |
| Real estate and rental leasing             | 317    | 614   | 211   | 297   | 93.7 | -403   | -65.6 |
| Professional and business services         | 5,045  | 6,466 | 4,170 | 1,421 | 28.2 | -2296  | -35.5 |
| Education and health services              | 2,037  | 4,473 | 1,602 | 2,436 | 119.6 | -2871  | -64.2 |
| Educational services                       | 404    | 925   | 246   | 521   | 129.0 | -679   | -73.4 |
| Healthcare and social assistance           | 1,635  | 3,549 | 1,357 | 1,914 | 117.1 | -2192  | -61.8 |
| Leisure and hospitality                    | 3,570  | 10,412| 2,219 | 6842  | 191.7 | -8193  | -78.7 |
| Arts, entertainment, and recreation        | 982    | 1,693 | 628   | 711   | 72.4 | -1065  | -62.9 |
| Accommodation and food services            | 2,587  | 8,719 | 1,590 | 6132  | 237.0 | -7129  | -81.8 |
| Other services                             | 767    | 2,443 | 885   | 1,676 | 218.5 | -1558  | -63.8 |
| Government                                 | 1,257  | 1,892 | 882   | 635   | 50.5 | -1010  | -53.4 |
| Federal                                   | 121    | 436   | 121   | 315   | 260.3 | -315   | -72.7 |
| State and local                            | 1,137  | 1,455 | 759   | 318   | 28.0 | -696   | -47.8 |
| Education                                  | 556    | 821   | 373   | 265   | 47.7 | -448   | -54.6 |
| Excluding education                        | 579    | 631   | 385   | 52    | 9.0 | -246   | -39.0 |
| Region                                     |       |       |       |       |       |       |       |       |       |
| Northeast                                  | 3,977  | 8,045 | 2,950 | 4068  | 102.3 | -5095  | -63.3 |
| South                                     | 8,264  | 13,472| 6,611 | 5208  | 63.0 | -6861  | -50.9 |
| Midwest                                   | 4,426  | 9,089 | 3,688 | 4663  | 105.4 | -5401  | -59.4 |
| West                                      | 5,230  | 10,195| 3,770 | 4965  | 94.9 | -6425  | -63.0 |

Note: Details may not sum to totals because of rounding.
Source: U.S. Bureau of Labor Statistics.
Table 8. Change in level and percentage of annual other separations, by industry and region, not seasonally adjusted, 2019–21 (levels in thousands)

| Industry and region                        | Level | Change, 2019–20 | Change, 2020–21 |
|--------------------------------------------|-------|-----------------|-----------------|
|                                            | 2019  | 2020            | 2021            | Level | Percent | Level | Percent |
| Total                                      | 4,006 | 4,105           | 4,199           | 99    | 2.5      | 94    | 2.3     |
| Industry                                   |       |                 |                 |       |          |       |         |
| Total private                              | 3,263 | 3,194           | 3,462           | -69   | -2.1     | 268   | 8.4     |
| Mining and logging                         | 17    | 19              | 16              | 2     | 11.8     | -3    | -15.8   |
| Construction                               | 202   | 153             | 158             | -49   | -24.3    | 5     | 3.3     |
| Manufacturing                              | 244   | 278             | 283             | 34    | 13.9     | 5     | 1.8     |
| Durable goods                              | 152   | 165             | 182             | 13    | 8.6      | 17    | 10.3    |
| Non-durable goods                          | 89    | 114             | 102             | 25    | 28.1     | -12   | -10.5   |
| Trade, transportation, and utilities       | 748   | 632             | 657             | -116  | -15.5    | 25    | 4.0     |
| Wholesale trade                            | 101   | 76              | 98              | -25   | -24.8    | 22    | 28.9    |
| Retail trade                               | 467   | 325             | 374             | -142  | -30.4    | 49    | 15.1    |
| Transportation, warehousing, and utilities | 177   | 232             | 184             | 55    | 31.1     | -48   | -20.7   |
| Information                                | 85    | 66              | 110             | -19   | -22.4    | 44    | 66.7    |
| Financial activities                        | 303   | 308             | 400             | 5     | 1.7      | 92    | 29.9    |
| Finance and insurance                      | 260   | 240             | 346             | -20   | -7.7     | 106   | 44.2    |
| Real estate and rental and leasing         | 44    | 68              | 55              | 24    | 54.5     | -13   | -19.1   |
| Professional and business services         | 699   | 827             | 877             | 128   | 18.3     | 50    | 6.0     |
| Education and health services              | 494   | 522             | 493             | 28    | 5.7      | -29   | -5.6    |
| Educational services                       | 64    | 55              | 59              | -9    | -14.1    | 4     | 7.3     |
| Healthcare and social assistance           | 427   | 466             | 433             | 39    | 9.1      | -33   | -7.1    |
| Leisure and hospitality                    | 333   | 296             | 336             | -37   | -11.1    | 40    | 13.5    |
| Arts, entertainment, and recreation        | 36    | 28              | 41              | -8    | -22.2    | 13    | 46.4    |
| Accommodation and food services            | 295   | 263             | 298             | -32   | -10.8    | 35    | 13.3    |
| Other services                             | 143   | 98              | 136             | -45   | -31.5    | 38    | 38.8    |
| Government                                 | 743   | 910             | 735             | 167   | 22.5     | -175  | -19.2   |
| Federal                                    | 139   | 151             | 163             | 12    | 8.6      | 12    | 7.9     |
| State and local                            | 603   | 756             | 575             | 153   | 25.4     | -181  | -23.9   |
| Education                                  | 294   | 420             | 241             | 126   | 42.9     | -179  | -42.8   |
| Excluding education                        | 309   | 337             | 336             | 28    | 9.1      | -1    | -0.3    |

| Region                                     |       |                 |                 |       |          |       |         |
| Northeast                                  | 723   | 645             | 698             | -78   | -10.8    | 53    | 8.2     |
| South                                     | 1,507 | 1,525           | 1,636           | 18    | 1.2      | 111   | 7.3     |
| Midwest                                   | 796   | 861             | 888             | 65    | 8.2      | 27    | 3.1     |
| West                                      | 982   | 1,073           | 981             | 91    | 9.3      | -92   | -8.6    |

Note: Details may not sum to totals because of rounding.
Source: U.S. Bureau of Labor Statistics.

Components of separations by industry
Separations are the total number of employees separated from their employer at any time during the reference month. Separations consist of quits, layoffs and discharges, and other separations. This section discusses what happened in 2021 with the components of separations by industry.

Quits
Quits include employees who left their job voluntarily, excluding retirements or transfers to other locations. In 2021, the number of annual quits grew in 18 of 19 industries, while the remaining industry had fewer quits. The largest percentage increases in annual quits levels were in arts, entertainment, and recreation (+56.7 percent), followed by other services (+48.4 percent) and durable goods manufacturing (+48.0 percent). The only decrease in annual quits levels was in state and local government education (−15.3 percent), which had set a series high in 2020. (See table 6.)

Nine of 19 industries reached a series high for the annual level of quits. Among these industries, highs occurred in professional and business services and in accommodation and food services (8.6 million each), and in retail trade (7.8 million). (See table 4.) In addition, 8 of 19 industries reached monthly seasonally adjusted series highs for quits in 2021. (See table 2.)

Layoffs and discharges
Layoffs and discharges includes involuntary separations initiated by the employer, including layoffs with no intent to rehire. In 2021, annual layoffs and discharges decreased in all 19 industries from the COVID-19-induced spikes in 2020. The largest percentage decreases in annual layoffs and discharges were in accommodation and food services (−81.8 percent), educational services (−73.4 percent), and federal government (−72.2 percent). The industries with the lowest percentage decreases in annual layoffs and discharges were in finance and insurance (−33.6 percent), professional and business services (−35.5 percent), and state and local government, excluding education (−39.0 percent). (See table 7.)

During 2021, seven industries reached a series low for monthly layoffs and discharges. These industries include real estate and rental and leasing, at 6,000 in June; wholesale trade, at 20,000 in December; and state and local government education, at 21,000 in January. (See table 9.)
An analysis of each region by quits, layoffs and discharges, and other separations as percentages of total separations illustrates the different characteristics of the JOLTS separations. (See table 9.)

Other separations
In 2021, annual other separations increased in 12 of 19 industries, with 7 industries having fewer annual other separations than in the previous year. The largest percentage increases in annual other separations were in information (+66.7 percent); arts, entertainment, and recreation (+46.4 percent); and finance and insurance (+44.2 percent). The industries with the largest percentage declines in annual other separations were in state and local government education (−42.6 percent); transportation, warehousing, and utilities (−20.7 percent); and real estate and rental and leasing (−19.1 percent). (See table 8.) One of the 19 industries reached a series high for the annual level of other separations: finance and insurance at 346,000. (See table 4.) There were two monthly seasonally adjusted series highs in other separations: professional and business services at 118,000 in June, and finance and insurance at 65,000 in September. (See table 2.)

Components of separations by region
This section describes the differences between the components of separations among the four census regions in 2021.

Northeast region
In 2021, the Northeast had an annual level of 10.0 million total separations, a decrease of 25.6 percent compared to 2020, and the largest decrease of all the regions. The Northeast quits level increased to a new series high of 6.4 million (+33.1 percent) but remained the lowest level regionally. For layoffs and discharges, the Northeast notably fell to 3.0 million, the largest percentage (−63.3 percent) decrease of the four regions. The Northeast other separations level rose to 698,000, the largest percentage (+8.2 percent) increase regionally.

South region
In the South, the annual level of total separations fell to 28.4 million, the smallest percentage (−5.9 percent) decrease regionally. Within total separations, the quits level rose to a new series high of 20.2 million for the South, an increase of 32.7 percent. The South layoffs and discharges level fell to 6.6 million, the lowest percentage decrease (−50.9 percent) of the regions, and the other separations level rose to 1.6 million, an increase of 7.3 percent compared to 2020.

Midwest region
In the Midwest, the annual total separations level fell to 15.1 million (−15.8 percent). Within total separations, there were 10.5 million (+31.7 percent) quits in the Midwest, a new series high. There were 3.7 million (−59.4 percent) layoffs and discharges, and other separations rose to 888,000 (+3.1 percent).

West region
In 2021, the West annual total separations level decreased to 15.5 million (−19.2 percent). Within total separations in the West, the quits level rose to 10.7 million, the largest percentage (+36.3 percent) increase among the regions and a new series high. The layoffs and discharges level fell to 3.8 million (−63.0 percent) and the other separations level fell to 981,000. (See tables 5, 6, 7, and 8.)

Separations for the regions
All regions reached series highs for annual quits in 2021. (See table 4.) In addition, all regions saw monthly series highs for quits in November 2021. The Northeast quits level reached a monthly series high of 608,000, the South quits level reached a monthly series high of 1.9 million, and the Midwest and West both reached a monthly series high of 1.0 million. None of the four regions reached monthly series highs for total separations, layoffs and discharges, or other separations. (See tables 2 and 4.)

All regions saw new series lows for annual layoffs and discharges. In addition, all regions reached monthly series lows for layoffs and discharges in 2021. The Northeast layoffs and discharges level reached a series low of 156,000 in December, the South reached a series low of 502,000 in April, the Midwest reached a series low of 244,000 in November, and the West reached a series low of 273,000 in both June and September. None of the four regions reached a series low in total separations, quits, or other separations. (See table 9.)

An analysis of each region by quits, layoffs and discharges, and other separations as percentages of total separations illustrates the different characteristics of the JOLTS estimates at the regional level. The Northeast had the smallest percentage of quits within total separations, at 63.6 percent in 2021. The South experienced the highest percentage of quits, at 71.0 percent. In 2021, the Northeast had the largest percentage of layoffs and discharges, at 29.4 percent. The South had the lowest percentage of layoffs and discharges, at 23.3 percent. The Northeast had the highest percentage of other separations, at 7.0 percent, while the South had the lowest percentage, at 5.8 percent. (See chart 4.)
Quits compared with layoffs and discharges

As 2021 progressed, the difference between quits and layoffs and discharges continued to grow. In March, quits exceeded layoffs and discharges by 2.2 million. As 2021 continued and quits kept increasing while layoffs and discharges kept decreasing, the gap grew even larger. In November, when quits reached its monthly peak at 4.5 million, the difference between quits and layoffs and discharges also peaked at 3.2 million. The previous series high was 1.8 million in March 2019. (See chart 5.)

Summary

JOLTS estimates reflected a vastly different labor market in 2021 compared with the 2020 labor market. In 2020, layoffs and discharges spiked at the onset of the COVID-19 pandemic while job openings, hires, and quits fell sharply. Layoffs declined markedly in May 2020 and hires saw a large increase, while the other measures recovered more gradually. Improvement continued in 2021. Job openings increased throughout the year as the demand for labor increased, culminating in a new monthly seasonally adjusted series high of 11.4 million in December. Annual hires increased for the 12th consecutive year, to a new series high of 75.6 million. Quits increased throughout the year, resulting in a monthly series high in November. By contrast, layoffs and discharges fell to a monthly series low in December, as employers sought workers.

SUGGESTED CITATION:
Rick Penn and Eric Nezamis, "Job openings and quits reach record highs in 2021, layoffs and discharges fall to record lows," Monthly Labor Review, U.S. Bureau of Labor Statistics, June 2022, https://doi.org/10.21916/mlr.2022.17

Notes

1. Job Openings and Labor Turnover Survey publishes rates and levels of job openings, hires, quits, layoffs and discharges, other separations, and total separations (also known as turnover) for the nation as a whole and by state, by ownership (private versus public), region, and supersector and select sectors based on the North American Industry Classification System (NAICS). Annual estimates are not seasonally adjusted, and monthly estimates are both seasonally adjusted and not seasonally adjusted. Over-the-year changes are calculated from December of the previous year through December of the reference year. For more information on the program’s concepts and methodology, see “Job Openings and Labor Turnover Survey,” Handbook of Methods (Washington, DC: U.S. Bureau of Labor Statistics, July 13, 2020), https://www.bls.gov/opub/hom/jlt/home.htm. See also the JOLTS page on the BLS website, at https://www.bls.gov/jlt/.
According to the finance and investment education website Investopedia, procyclical "refers to a condition of a positive correlation between the value of a good, a service, or an economic indicator and the overall state of the economy. In other words, the value of the good, service, or indicator tends to move in the same direction as the economy, growing when the economy grows and declining when the economy declines." For more information, see Akhilesh Ganti, "Procyclic," Investopedia, updated September 13, 2021, http://www.investopedia.com/terms/p/procyclical.asp.

The National Bureau of Economic Research is the official arbiter of the beginning and ending dates of U.S. business cycle expansions and contractions. For more information, see "U.S. Business Cycle Expansions and Contractions" (Cambridge, MA: National Bureau of Economic Research, September 20, 2010), http://www.nber.org/cycles/.

BLS considers job openings a stock measure and does not produce job openings annual totals.

The large decrease in annual hires for the federal government was largely due to the lack of temporary Census workers in 2021 following the 2020 Decennial Census.
Noncompete agreements, bargaining, and wages: evidence from the National Longitudinal Survey of Youth 1997

We examine the use of noncompete agreements (NCAs) and their relationship with wage bargaining and wage outcomes using new data from the National Longitudinal Survey of Youth 1997. NCAs cover 18 percent of the workers in our sample, and adoption patterns are broadly consistent with prior research. The NCA–wage correlation is positive and highly sensitive to controls for demographics and job characteristics, suggesting selection into NCAs causes positive bias in the estimates. While it is not obvious what the baseline level of the NCA–wage relationship is, some heterogeneous effects are more stable: the NCA–wage differential is lower for workers who do not bargain over wages, have less education, have lower ability, or live in a state that enforces NCAs. Notably, wage bargaining—which is only marginally more likely with NCAs in our most saturated model—does not explain the heterogeneous effects across subgroups. We discuss these findings in light of competing theories of the social value of NCAs.

Amid a decades-long trend of wage stagnation and reduction in job mobility, the last few years have witnessed renewed policy and research interest in the use of noncompete agreements (NCAs). NCAs are employment provisions that prohibit departing workers from joining or starting competing businesses, often within time and geographic limits. These proposals join a centuries-long debate over the value of NCAs, which juxtaposes the potential for NCAs to constrain the upward mobility of workers against the potential for NCAs to incentivize firm investment in the development and sharing of valuable information.1

A growing stream of academic research has aided this debate by seeking to understand how NCAs, and the policies that regulate them, influence economic activity. Most of this research examines NCAs policies alone; that is, without any information on the actual use of NCAs. This omission is critical, given that the limited data we do have on NCAs suggest that they are frequently found in states where they are legally unenforceable. The data also suggest that workers perceive their NCAs to be enforceable when they are not and that NCAs can limit employee mobility regardless of the law. More broadly, existing data on NCAs have four limitations: (1) they are not publicly available, (2) they come from either selected occupations or nonrandom sampling schemes, (3) they are cross-sectional, and (4) they are not repeated cross-sections of the same population or sampling frame. As a result, researchers have not been able to study the evolution of NCA use and how NCAs affect a variety of economic dynamics, like wage stagnation and the historical decline in business dynamism.

To address these concerns, in 2017 the Bureau of Labor Statistics (BLS) added a question on NCAs to the National Longitudinal Survey of Youth 1997 (NLSY97)—a panel dataset consisting of individuals born between 1980 and 1984. The first NLSY97 wave with NCA data was published in December 2019, and data collection efforts are ongoing. These data address the gaps highlighted above by providing a publicly available, longitudinal dataset that will allow researchers to develop new evidence on this important labor market friction.

In this article, we introduce the first wave of these data. We begin with a brief discussion of the theoretical tensions related to NCAs, focusing on bargaining and holdup. Then we describe the NLSY97 and the new NCA question. In our empirical work, we examine the use of NCAs and their correlates, drawing parallels to prior work where possible. We then focus on how NCAs relate to wages, in light of competing predictions made by existing theories. Our estimates here should not be interpreted causally—indeed, one of our key findings is that the sensitivity of the NCA–wage relationship to controls suggests substantial selection into NCA use. In our analysis, we also seek to understand how NCAs relate to wage bargaining and the role of such bargaining in explaining (1) differences in the overall NCA–wage relationship and (2) for differences in effects across gender, education, ability, and NCA enforceability. We conclude with a discussion of research directions as future waves of data become available.

Guiding theory and institutional background

Since the first legal case dating back to 1414, NCAs have been a topic of significant theoretical debate. The essence of the debate is to understand whether, and under what circumstances, it is worth preventing workers from deploying their full set of human capital in a competing firm (typically within some time and geographic boundaries). Courts have generally been concerned that NCAs, like other restraints of trade, can impose significant hardship on workers, since workers who wish to leave the firm without violating their NCA will either have to change industries, leave the geographic area, or sit out of the labor market. Moreover, since NCAs increase the costs of moving to a competitor, they shield the firm from labor market competition, potentially curtailing wage growth for workers.11

However, theories rooted in efficient contracting posit that NCAs will be used mostly in

Despite a burgeoning literature on NCAs, which of these theories is most accurate is still an open question. These competing theories make different predictions both about where NCAs should be used and (among other things) how NCAs relate to wages. Regarding the use of NCAs, the holdup theory suggests that NCAs will be used mostly in
jobs that have access to valuable information (such as trade secrets and client lists) and only in places where they can be enforced (since court enforcement underlies firm confidence that NCAs will resolve the holdup problem). In contrast, theories that firms are using NCAs as value extraction tools posit that they will be used much more broadly—potentially even with low-wage workers who have no access to valuable information and in places where NCAs cannot be enforced. With regards to wages, three possibilities arise: (1) workers may receive higher pay (whether they had to negotiate for it or if it was included in the offer) for signing an NCA, but then suffer lower wage growth as the NCA prohibits workers from taking jobs with higher paying competitors; (2) wage growth may rise if NCAs indeed spur productivity-enhancing investments and wages are tied to productivity; (3) workers may not receive higher pay (because, for example, they just sign the NCA when asked) and experience lower wage growth. Prior research finds some evidence in favor of each of these arguments. NCAs are adopted widely, and they tend to be more common in states that enforce them and for workers in technical jobs. Regarding wage outcomes, prior research on NCA enforceability finds negative effects on wage levels and wage growth, while studies of NCA use find positive wage effects and positive wage growth. The discrepancy in wage results could arise from the specific occupations studied, differences between the actual effects of NCA enforceability and NCAs themselves, the period studied, selection into NCA use, the cross-sectional nature of the studies of NCA use, or lack of data on key variables (wage bargaining, job tasks, ability, etc.).

In this regard, new data collected via the National Longitudinal Survey of Youth 1997 offer an important opportunity to push this literature forward, especially as more waves of data are collected over time.

Data
In this section we discuss the details of the NLSY97 and how the NCA question fits into the survey.

Background on the NLSY97 and NCA question design
The National Longitudinal Survey of Youth 1997 (NLSY97) is a nationally representative sample of 8,984 people born in the years 1980 to 1984. Sample members were first interviewed in 1997 when they were ages 12 to 17; the latest data available when we began this article are from the 2017–18 interview, when the sample members were ages 32 to 38. A particular strength of the NLSY97 is the collection of respondents’ employment histories from their teenage years until the present. The employment module of the NLSY97 contains a core set of questions that are asked in each survey round about each job held since the date of the last interview, but certain additional modules of interest to research and public policy rotate in and out.

Recent added questions include those on NCAs, job tasks, and wage bargaining. The NCA questions first appeared in the 2017–18 survey and are also in the 2019–20 survey (data released in November 2021). In the 2017–18 survey, the NCA questions were asked of all jobs that were not military or self-employed. In the 2019–20 survey, the NCA questions were restricted to newly reported jobs since the date of the last interview.

In the 2017–18 survey, for each job held since the date of the last interview, the respondent is asked about a series of job characteristics. The NCA question is as follows:

“Some employers try to restrict what their employees can do after they leave their job. In this job, did you agree that if you [leave/left] your employer, you [will/would] not start or join a competing business? This is often called a non-compete agreement.”

Because prior research has documented uncertainty in who signs NCAs, a followup question asks, “How confident are you in your answer?” The wording of the two NLSY97 questions on NCA agreements were based on those asked in prior surveys on the same topic.

Sample construction
To construct our sample, we take the full NLSY97 sample (sample size of 8,984) and keep those who responded to the 2017–18 (round 18) interview (sample size of 6,734). We then restrict the sample to those who reported a job in the interview (sample size of 5,970). We drop the self-employed, government, and military workers, and those who are working for their family without pay (sample size of 4,481). We also drop those whose geographic region is missing (do not reside in the United States at the 2017–18 interview date) (sample size of 4,443). We then restrict our sample to those working at their main job at least 30 hours per week (sample size of 3,589). We use the Consumer Price Index for all Urban Consumers (CPI-U) to inflation-adjust hourly wages to 2017 dollars, and we drop those who earn less than $2 an hour and those who make above $250 an hour or those missing wage information (sample size of 3,490). Finally, we drop those whose NCA variable is missing (sample size of 3,426), those with missing wage bargaining questions (whether they bargained over pay when they were first offered their job) (sample size of 3,092), and a few observations with an unclassifiable occupation (Standard Occupational Classification code of 9990). Our final sample consists of 3,090 people. We use the NLSY97 weights for the 2017–18 interview, which account for the oversamples of Black and Hispanic individuals in the NLSY97 data and the complex survey design.

The incidence of NCAs
We begin by examining the incidence of NCAs. Table 1 provides summary statistics on NCA incidence from the NLSY97 in columns 1 and 2, and, for comparison purposes, data from the 2014 Noncompete Survey Project in column 3 and data from the 2019 Cornell National Social Survey (CNSS), collected by Stewart Schwab and Evan Starr, in column 4. Overall, 18.1 percent of the NLSY97 sample is bound by an NCA, identical to the overall multiple imputation estimates reported by Starr, Prescott, and Bishara in 2021, but slightly larger than the lower-bound estimates for this age group. The estimates are also nearly identical to the CNSS estimates. With regards to uncertainty regarding whether they have an NCA, 90.4 percent are very confident in their answer, whereas 9.0 percent are somewhat confident and 0.7 percent are not confident.
Table 1. Incidence of NCAs across worker and firm characteristics in the NLSY97, 2014 NSP, and 2019 CNSS

| Characteristic                        | NLSY97    | 2014 NSP, lower bound NCA incidence (in percent) | 2019 CNSS, NCA incidence (in percent) |
|--------------------------------------|-----------|-------------------------------------------------|--------------------------------------|
|                                      | NCA incidence (in percent) | Observations |                                      |                                      |
| Overall                              | 18.07     | 3,090                                           | 16.09                                | 19.23                                |
| Male                                 | 20.08     | 1,665                                           | 16.56                                | 18.95                                |
| Female                               | 15.37     | 1,425                                           | 15.01                                | 10.00                                |
| Non-Black, non-Hispanic              | 19.21     | 1,625                                           | 15.01                                | 10.00                                |
| Black, non-Hispanic                  | 15.69     | 777                                              | 16.26                                | 11.90                                |
| Hispanic                             | 14.84     | 685                                              | 11.06                                | 13.85                                |
| Less than a bachelor’s degree        | 14.77     | 2,125                                           | 11.06                                | 13.85                                |
| Bachelor’s degree or higher          | 24.27     | 953                                              | 25.15                                | 22.22                                |
| State enforces NCAs                  | 18.45     | 2,683                                           | 15.62                                | 19.94                                |
| State does not enforce NCAs          | 15.19     | 407                                              | 19.02                                | 11.11                                |
| Hourly wage less than $20            | 14.36     | 1,687                                           | 10.81                                | [1]                                  |
| Hourly wage greater or equal to $20  | 21.74     | 1,403                                           | 20.34                                | [1]                                  |
| Tenure less than 3 years             | 16.76     | 1,431                                           | 10.96                                | [1]                                  |
| Tenure greater or equal to 3 years   | 19.51     | 1,619                                           | 18.75                                | [1]                                  |
| Private sector                       | 19.64     | 2,653                                           | 17.05                                | [1]                                  |
| Nonprofit sector                     | 7.41      | 325                                             | 4.78                                 | [1]                                  |
| Union                                | 16.57     | 254                                             | 20.33                                | [1]                                  |
| No union                             | 18.59     | 2,499                                           | 15.70                                | [1]                                  |
| Employer size                        |           |                                                 |                                       |                                       |
| Less than 20 employees               | 17.22     | 747                                             | 12.95                                | [1]                                  |
| 20 to 99 employees                   | 17.84     | 725                                             | 18.89                                | [1]                                  |
| 100 or more employees                | 19.58     | 1,168                                           | 16.50                                | [1]                                  |

Notes: NCA = noncompete agreement. n = sample size. 2014 NSP = 2014 Noncompete Survey Project (data are limited to workers ages 32–38 in 2014, n = 1649); incidence estimates from the NSP are lower bound estimates. 2019 CNSS = 2019 Cornell National Social Survey, collected by Stewart Schwab and Evan Starr in 2019 via random digit dial survey (data are limited to ages 25–50 in 2019: n = 338). NLSY97 = National Longitudinal Survey of Youth 1997.

[1] Not applicable.

Source: U.S. Bureau of Labor Statistics, NLSY97 (2017–18 interview); 2014 NSP; 2019 CNSS. Authors’ calculation.

We briefly describe some of the NLSY97 NCA incidence results from table 1. In the NLSY97, men are about 5 percentage points more likely than women to report signing an NCA at their job (20 percent versus 15 percent), while non-Black, non-Hispanic workers are 4 percentage points more likely to be bound by an NCA than either Black or Hispanic workers. Chart 1 shows that NCA incidence rises with education, with 15 percent of those without a bachelor’s degree signing one, compared with 24 percent with at least a bachelor’s degree.

Chart 1. Incidence (in percent) of NCAs in the NLSY97 by highest level of educational degree

In terms of worker and firm characteristics, table 1 shows that NCAs rise with tenure and that NCAs are 12 percentage points more common for those working in the for-profit sector than the nonprofit sector (19.6 percent versus 7.4 percent). Unionized workers are only somewhat less likely to sign NCAs (16.6 percent versus 18.6 percent). With regards to wages, chart 2 shows that the incidence of NCAs is 9 to 11 percent for those in the bottom two wage deciles and rises with wages such that those with wages in the top decile (at least $45 per hour) have a 32 percent chance of having an NCA. Overall, NCAs are still found at the low end of the wage distribution, with 14.4 percent of workers earning less than median hourly wages signing one.
Charts 3 and 4 show the distribution of NCAs by two-digit occupational and industrial codes (conditional on having at least 20 observations in the occupation or industry).

Chart 3. Incidence (in percent) of NCAs in the NLSY97 by occupation

- Engineering
- Computer, mathematical
- Sales, related
- Management
- Business and finance
- Life, physical, social science
- Production
- Personal care services
- Installation, repair
- Arts entertainment
- Healthcare practitioner, technical
- Transportation
- Construction, extraction
- Office support
- Protective service
- Building, grounds maintenance
- Healthcare support
- Food prep and serving
- Education, training
- Community, social services
- Legal

Hover over chart to view data.
Notes: NCA = noncompete agreement. NLSY97 = National Longitudinal Survey of Youth 1997.
Source: Authors’ calculations based on data from the 2017-18 interview of the NLSY97 cohort.

View Chart Data
Consistent with holdup theories, occupations in which NCAs are found most frequently are in more technical areas such as engineering (38 percent), computer science (36 percent), sales (28 percent), and management (24 percent). Occupations such as food preparation (7 percent) and social services (4 percent) have very low reported NCA incidences. Similarly, chart 4 shows that workers in industries such as professional services and information have high rates of NCAs (33 percent and 30 percent, respectively) in contrast to workers in social services, food services (10 percent), or agriculture (6 percent).

We also consider whether NCAs are deployed even in states that would not enforce them. Only three states—California, North Dakota, and Oklahoma—will void all NCAs agreed to in the employment context, and these policies have been in place since the 1800s. Table 1 shows that 15.0 percent of workers who live in these states are bound by NCAs, compared with 18.5 percent elsewhere.

Overall, while there are some discrepancies between the magnitude or direction of the NLSY97 results relative to both the 2014 NSP and the 2019 CNSS, the general patterns and magnitudes are roughly in line. In table 2 we examine variables unique to the NLSY97. First, although investing in worker training is an oft-referenced rationale for using NCAs, workers whose employers have provided at least some training in the past are only marginally more likely to have NCAs (19.8 percent to 17.7 percent). Second, the NLSY97 includes a unique measure of ability—the Armed Forces Qualification Test (AFQT) (math and verbal aptitude percentile score). Chart 5 breaks down AFQT scores by decile, showing that the incidence of NCAs is 11 percent for those with the lowest AFQT scores but rises consistently such that those with the highest AFQT score have a 25-percent likelihood of agreeing to an NCA.

Table 2. Incidence of NCAs across variables specific to the NLSY97

| Characteristic                                         | NCA incidence (in percent) | Observations |
|--------------------------------------------------------|----------------------------|--------------|
| Some employer-provided training                        | 19.76                      | 523          |
| No employer-provided training                          | 17.68                      | 2,567        |
| AFQT score below 50th percentile                       | 15.08                      | 1,346        |
| AFQT score equal or above 50th percentile              | 20.91                      | 1,177        |
| Job tasks                                              |                            |              |
| Repetitive tasks for more than half the workday        | 14.86                      | 1,511        |
| Repetitive tasks for less than half the workday        | 21.39                      | 1,434        |
| Physical tasks for more than half the workday          | 14.18                      | 1,490        |
| Physical tasks less than half the workday              | 22.20                      | 1,463        |
| Supervise or manage more than half the workday         | 20.53                      | 1,037        |
| Supervise or manage less than half the workday         | 17.12                      | 1,913        |
| Problem solve every day                               | 23.99                      | 1,255        |
| Problem solve less than every day                      | 13.60                      | 1,697        |
| Read long documents                                   | 23.80                      | 635          |
| Does not read long documents                           | 16.51                      | 2,315        |
| A lot of face-to-face contact with noncoworkers        | 17.85                      | 1,467        |
| Not a lot of face-to-face contact with noncoworkers    | 18.73                      | 1,487        |

Notes: AFQT = Armed Forces Qualification Test. NCA = noncompete agreement. NLSY97 = National Longitudinal Survey of Youth 1997. Source: U.S. Bureau of Labor Statistics, NLSY97 (2017–18 interview). Authors’ calculation.
Lastly, job tasks show considerable variation with NCA use. Individuals in jobs that require more physical and repetitive tasks are about 7 percentage points less likely to report signing an NCA, whereas individuals in jobs with more problem solving, reading long documents, and supervising are much more likely to sign one.

Since many of the characteristics described above are likely to be correlated with each other, in table 3 we incorporate these variables into a linear probability model to assess which characteristics are correlated with NCA use, conditional on the other variables. We cluster the standard errors by state. Several patterns emerge: Across all models, having a bachelor’s degree is associated with a greater chance of signing an NCA, even though AFQT scores are uncorrelated with NCA use. Nonprofit jobs are also far less likely to have NCAs relative to for-profit jobs (9.1 percentage points in the model with the most controls). Although the use of NCAs appears to be lower in states that cannot legally enforce NCAs, this difference becomes statistically insignificant with more controls. We also see that, even conditional on occupation and industry, several job tasks are still correlated with NCA use, including face-to-face contact with others (+4.4 percentage points), reading longer documents (+4.5 percentage points), solving problems daily (+6.3 percentage points), or frequent physical tasks (-3.3 percentage points).
Table 3. Multivariate model of NCA incidence in the NLSY97

| Variable                        | Model specification 1 | Model specification 2 | Model specification 3 | Model specification 4 |
|---------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| At least a bachelor’s degree    | 0.093 \[1\]           | 0.085 \[1\]           | 0.093 \[1\]           | 0.064 \[1\]           |
|                                 | (0.017)               | (0.021)               | (0.021)               | (0.022)               |
| Hispanic                        | -0.015                | -0.015                | -0.018                | -0.018                |
|                                 | (0.019)               | (0.019)               | (0.018)               | (0.018)               |
| Black, non-Hispanic             | -0.011                | -0.001                | 0.002                 | 0.001                 |
|                                 | (0.017)               | (0.016)               | (0.016)               | (0.017)               |
| Mixed race                      | -0.054                | -0.045                | -0.027                | -0.057                |
|                                 | (0.057)               | (0.053)               | (0.052)               | (0.057)               |
| Female                          | -0.057                | -0.033 \[2\]          | -0.035 \[2\]          | -0.013                |
|                                 | (0.014)               | (0.016)               | (0.017)               | (0.017)               |
| AFQT percentile score           |                       |                       |                       |                       |
| 25 percent to 50 percent        | 0.011                 | 0.006                 | -0.005                | -0.004                |
|                                 | (0.018)               | (0.020)               | (0.020)               | (0.021)               |
| 50 percent to 75 percent        | 0.024                 | 0.013                 | 0.000                 | -0.002                |
|                                 | (0.018)               | (0.017)               | (0.018)               | (0.019)               |
| 75 percent or higher            | 0.019                 | 0.006                 | -0.012                | -0.018                |
|                                 | (0.025)               | (0.025)               | (0.025)               | (0.024)               |
| State does not enforce NCAs     | -0.031                | -0.035 \[2\]          | -0.031                | -0.026                |
|                                 | (0.018)               | (0.020)               | (0.020)               | (0.018)               |
| Nonprofit                       | -0.144 \[1\]          | -0.156 \[1\]          | -0.091 \[1\]          |                       |
|                                 | (0.019)               | (0.021)               | (0.025)               |                       |
| Hourly wage                     |                       |                       |                       |                       |
| 2nd quartile                    |                       | 0.051 \[2\]           | 0.042 \[2\]           | 0.043 \[2\]           |
|                                 |                       | (0.020)               | (0.021)               | (0.020)               |
| 3rd quartile                    |                       | 0.045 \[2\]           | 0.018                 | 0.011                 |
|                                 |                       | (0.018)               | (0.017)               | (0.018)               |
| 4th quartile                    |                       | 0.073 \[2\]           | 0.032 \[2\]           | 0.016                 |
|                                 |                       | (0.018)               | (0.018)               | (0.021)               |
| Employer size                   |                       |                       |                       |                       |
| 21 to 100 employees             |                       |                       |                       |                       |
|                                 |                       | 0.003                 | 0.001                 | 0.014                 |
|                                 |                       | (0.022)               | (0.023)               | (0.022)               |
| Greater than 100 employees      |                       | 0.002                 | 0.001                 | 0.003                 |
|                                 |                       | (0.019)               | (0.020)               | (0.021)               |
| Employer ever trained worker    |                       | -0.003                | -0.013                | -0.017                |
|                                 |                       | (0.021)               | (0.022)               | (0.022)               |
| Unionized                       | -0.005                | 0.012                 | 0.026                 |                       |
|                                 | (0.032)               | (0.032)               | (0.034)               |                       |
| Tenure, 3 years or more         |                       | 0.007                 | 0.010                 | 0.010                 |
|                                 |                       | (0.012)               | (0.012)               | (0.011)               |
| Frequency with which contact with others is "a lot" |                       |                       |                       |                       |
|                                 |                       | 0.023                 | 0.044 \[2\]           |                       |
|                                 |                       | (0.019)               | (0.020)               |                       |
| Longest document read at work is at least 11 pages |                       |                       |                       |                       |
|                                 |                       | 0.024                 | 0.045 \[2\]           |                       |
|                                 |                       | (0.019)               | (0.019)               |                       |
| Use math to solve problems at least once a day |                       |                       |                       |                       |
|                                 |                       | -0.009                | -0.015                |                       |
|                                 |                       | (0.024)               | (0.022)               |                       |
| Solve problems at least once a day |                       |                       |                       |                       |
|                                 |                       | 0.073 \[1\]           | 0.063 \[1\]           |                       |

Notes: Observations = 3,090. AFQT = Armed Forces Qualification Test. NCA = noncompete agreement. NLSY97 = National Longitudinal Survey of Youth 1997. Standard errors, clustered by state of residence, are in parentheses. Regressions are weighted with round 18 survey weights. If the variable of interest is missing for some values, an indicator is included (but not reported) which equals 1 if the variable is missing. Results are available from the authors.

\[1\] \( p < 0.01. \]
\[2\] \( p < 0.05. \]
\[3\] \( p < 0.10. \]
\[4\] Variable is not used in this model specification.

Source: U.S. Bureau of Labor Statistics, NLSY97 (2017–18 interview). Authors’ calculation.
NCAs, bargaining, and wages

In this section we use NLSY97 wage and wage bargaining data to examine how NCAs relate to wage bargaining and wage outcomes.

Empirical approach

We begin with a discussion of the ideal empirical designs to estimate the effect of NCAs, what our approach is, and why, ultimately, our results should be thought of as correlational and not causal. The ideal empirical design to estimate the causal effect of NCAs on bargaining and wages is to randomly ask some sample of workers to sign NCAs. Then one could consider who turns down the offer outright, who negotiates over the NCA or the terms of the offer, and wage outcomes. If NCAs were randomly assigned, then no other firm or worker characteristics (observed or unobserved) would differ between who received an NCA and who did not—at least before the NCA was deployed—allowing us to isolate the effect of NCAs. To our knowledge, such an experiment has yet to be run in the real world.

An alternative approach to estimating the causal effect of NCAs is to find an instrument—something that would randomly cause some firms to use NCAs but would not be correlated with wages or bargaining through any other pathway. The most natural instrument, it might seem, would be the enforceability of NCAs, which might exogenously increase the firm’s willingness to use them. However, the fact that firms still use NCAs relatively frequently in states that do not enforce NCAs poses some challenges for this approach. The exclusion restriction is also likely to be violated if the instrument is just cross-sectional state NCA enforceability, since other state characteristics might be correlated with the policy and outcomes of interest. Variation over time in state NCA enforceability, combined with variation over time in NCA use, is likely to be a more plausible identification strategy. Another approach that future data collection makes possible could use Barik-style instruments that interact industry shares with national growth rates.\(^2\)

To date, no research has been able to use these research designs, mostly because of the cross-sectional nature of data on NCAs. Instead, prior work documents conditional correlations. With just one cross-section of data, we face the same challenges (even though the NLSY97 contains some rich measures of job attributes) and so we also estimate conditional correlations.

We estimate models of the form \(y_i = b_0 + b_1NCA + \alpha X_i + \epsilon_i\) using ordinary least squares, where \(y_i\) is a dependent variable, \(X_i\) is a vector of covariates, and \(\epsilon_i\) is an error term. In order for \(b_1\) to estimate the true causal effect of an NCA, we need a conditional independence assumption to hold—that \(\text{cov}(NCA, \epsilon) = 0\).\(^2\)

This assumption is highly unlikely to hold. Based on where we see NCAs being deployed, our estimates of the NCA–wage differential will likely be seriously biased upward. For example, since NCAs are more common in technical jobs or for workers with more education, a worker bound by an NCA is highly likely to earn more than a worker not bound by an NCA—but this difference is perhaps mostly or entirely due to differences in their human capital, the type of job they are in, and the tasks they are asked to perform. We can control for some of these variables at a broad level, which should mitigate these concerns. However, because we cannot hold constant all the variables that determine both NCA use and wages, the positive bias will likely persist.

Nevertheless, inclusion of different covariates can be informative of the extent of selection into NCAs and thus the extent to which the NCA–wage differential is biased upward. Accordingly, we estimate two sets of models, one with “basic” controls, which are exogenous demographic characteristics. These are education, gender, race, AFQT score at or above 50th percentile, and whether the state enforces NCAs. We also estimate models that seek to compare workers who are in the same type of job and doing the same set of tasks. To do this, we add “advanced” controls in addition to the basic controls. These are the for-profit status of the firm, job tasks (as shown in table 2), and two-digit occupation and industry fixed effects. We note that some of the advanced controls may be bad controls in that they may be endogenous to agreeing to an NCA (that is, the tasks a worker does may depend on whether that worker agrees to an NCA).\(^2\)

Due caution is required when interpreting the NCA coefficient with these controls.

Wage bargaining and wage outcomes

We focus first on bargaining as an outcome of NCA use and later as a mediator and moderator of the NCA–wage relationship. Bargaining is relevant because NCAs give firms power only after an NCA is signed. As a result, NCAs put some pressure on the initial negotiations for workers to receive compensation for their postemployment concessions. Before we turn to the results, it is worth considering why bargaining may or may not arise in response to NCAs.

Different models of the labor market differ in how they consider bargaining. For example, wage-posting models assume employers simply post a take-it-or-leave-it offer, precluding the possibility of bargaining.\(^2\) In these models, as long as the NCA is sufficiently observable and perceived as costly to the worker, a compensating differential may be built into the posted wages, rendering bargaining unnecessary. Other wage bargaining models assume that workers bargain for some proportion of the surplus from the job, but these models are agnostic to the precise mechanics of how the bargaining occurs.\(^2\) Such a process may look as follows in the case of NCAs: the firm may initially...
offer an NCA paired with a wage offer that is at or slightly above the wages offered by firms that do not use NCAs. In this situation, the worker may either accept the contract as presented, turn it down, or ask for higher pay. In the third case, we might observe a positive relationship between bargaining and NCAs.

To set a baseline, prior research suggests that only approximately one-third of workers bargain over their wages at all and the only evidence on negotiation over NCAs suggests that only 10 percent of NCA signers report negotiating over the terms of their NCA or for other benefits in exchange for signing. In the NLSY97, 36 percent of workers report that their wage was bargained over, while the rest indicate that it was a take it or leave it offer. Chart 6 shows that the likelihood of wage bargaining rises effectively monotonically across the wage distribution, with 15 percent of the lowest earners bargaining over their wages, compared with 61 percent of the highest.

In light of this discussion, we begin by assessing whether NCAs are associated with a greater chance of wage bargaining. Table 4 panel A shows that while NCAs are associated with a 9.5-percentage-point increase in the likelihood of wage bargaining, controlling for basic controls and advanced controls reduces the differential to 2.1 percentage points and becomes statistically insignificant. Thus, the positive relationship between NCAs and wage bargaining seems largely driven by certain individual- or job-specific characteristics.
### Table 4. Interaction of NCAs, bargaining, and wages in NLSY97

| Variable | Incidence of bargaining over wages | Logarithm of hourly wages |
|----------|-----------------------------------|--------------------------|
|          | Model specification 1 | Model specification 2 | Model specification 3 | Model specification 4 | Model specification 5 | Model specification 6 |
| NCA      | 0.066[^1] | 0.069[^2] | 0.060 | 0.221[^1] | 0.120[^1] | 0.049[^1] |
|          | (0.027)   | (0.027)   | (0.026) | (0.024)   | (0.020)   | (0.018)   |
| Controls | None | Basic | Advanced | None | Basic | Advanced |
| Percent increase in wages associated with NCA | 24.7 | 12.7 | 5.0 |

#### Panel A: Baseline bargaining and wages

#### Panel B: Wages as a function of bargaining

| Variable | Logarithm of hourly wages |
|----------|--------------------------|
|          | Model specification 1 | Model specification 2 | Model specification 3 | Model specification 4 | Model specification 5 | Model specification 6 |
| NCA      | 0.192[^3] | 0.111[^4] | 0.047[^5] | 0.155[^1] | 0.074[^1] | 0.018 |
|          | (0.018)   | (0.015)   | (0.017)   | (0.028)   | (0.030)   | (0.022)   |
| Bargaining over wages | 0.287[^1] | 0.175[^1] | 0.101[^1] | 0.271[^1] | 0.171[^1] | 0.087[^1] |
|          | (0.024)   | (0.017)   | (0.019)   | (0.026)   | (0.020)   | (0.018)   |
| NCA interaction with bargaining over wages | 0.091[^1] | 0.079[^1] | 0.079[^1] |
|          | (0.052)   | (0.047)   | (0.036)   |
| Controls | None | Basic | Advanced | None | Basic | Advanced |
| Percent increase in wages associated with NCA | 21.2 | 11.7 | 4.8 | 16.8 | 7.7 | 1.8 |
| Percent increase in wages associated with bargaining | 33.2 | 19.1 | 10.6 | 31.1 | 18.6 | 9.1 |
| Percentage of NCA-wage differential explained by bargaining | 13.1 | 7.5 | 4.1 |
|          | (0.012)   | (0.12)   | (0.05)   |

Notes: Observations = 3,090. NCA = noncompete agreement. NLSY97 = National Longitudinal Survey of Youth 1997. Basic controls include three education categories (less than a college degree, a college degree, and more than a college degree), indicators for race and ethnicity, Armed Forces Qualification Test (AFQT) score at 50th percentile or more, gender, and an indicator for whether the state of residence does not enforce NCAs. Advanced controls add an indicator for for-profit or nonprofit status, occupation and industry fixed effects (two-digit Standard Occupational Classification and North American Industry Classification System codes), and indicators for job tasks including indicators for repetitive work, frequency of contact with others, the length of the longest document read on the job, solving problems, using math to solve problems, supervising others, and the extent of physical tasks. If the variable of interest is missing for some values, an indicator is included (but not reported) that equals 1 if the variable is missing. Results are available from the authors. Standard errors, in parentheses, are clustered by state of residence. Regressions are weighted with round 18 survey weights. The "Percentage of NCA-wage differential explained by bargaining" row takes the NCA coefficients from model specifications 1 to 6 from from panel B and divides them by the corresponding NCA coefficient in the top panel’s "Logarithm of hourly wages," model specifications 1 to 3.  
[^1]: p < 0.01.  
[^2]: p < 0.05.  
[^3]: p < 0.10.  
[^4]: Variable is not used in this model specification.  
[^5]: Not applicable.

Source: U.S. Bureau of Labor Statistics, NLSY97 (2017–18 interview). Authors’ calculation.

Columns 4 to 6 of table 4 panel A examine the baseline wage results. Unconditionally, those bound by NCAs earn about 25 percent more. However, as in the case of bargaining, the inclusion of basic controls reduces this coefficient to 12.7 percent, and the inclusion of advanced controls reduces it to just 5.0 percent. Given the precipitous drop in the coefficient on NCAs as controls are added, the correlation between NCAs and wages is highly susceptible to unobserved variables. That is, there are many other variables that we cannot observe (for instance, access to valuable trade secrets and clients) that might drive both NCA use and wage outcomes. Such omitted variables will positively bias the NCA–wage correlation, even with the granular controls we observe in the NLSY97.

There are two unanswered questions that follow with regards to NCAs, wages, and bargaining. First, how much of the NCA–wage differential can be explained by baseline differences in bargaining behavior? Second, do workers with NCAs who bargain actually end up with higher wages, perhaps because they asked for a greater compensating differential?

Columns 1 to 3 of panel B of table 4 address the first question. Column 1 shows that, without basic or advance controls, controlling for bargaining causes the NCA coefficient to fall by 13.1 percent (from 0.221 to 0.192). However, when we include controls, the NCA–wage differential explained by bargaining falls to 7.5 percent and 4.1 percent (columns 2 and 3), and the extent to which bargaining itself positively relates to wages falls. Thus, bargaining only modestly drives the NCA–wage relationship.

Columns 4 to 6 of panel B considers question two and allow for bargaining to have a different relationship to wages depending on if a worker signed an NCA or not. Column 4 shows that, without controls, the NCA–wage differential for workers who do not bargain over wages is 16.8 percent—a 29.9-percent decrease from the baseline—while the NCA–wage differential is 9.5 percent higher among those who do bargain. Moreover, while the controls reduce the NCA–wage differential for those who do not bargain—reducing it by 63.3 percent in the most saturated model relative to the main effect in panel A (0.018 vs. 0.049)—the NCA–wage differential for those who bargain remains 7 percent higher.

Taken together, this suite of results suggests that NCAs are positively associated with wages but that there is strong selection into NCA use. Our analysis does not show that NCAs cause higher wages; in fact, it may be that NCAs reduce wages but that we cannot account for all the variables that confound the NCA–wage relationship. Our results also show that wage bargaining can explain a substantial amount of the NCA–wage relationship; not because workers with NCAs are necessarily more likely to bargain over wages, but because those with NCAs who do bargain drive much of the positive baseline relationship.

### Heterogeneous wage effects

In this section we examine several potential heterogeneous effects discussed in the prior literature as well as novel heterogeneous effects made possible by the rich data in the NLSY97. The prior literature has emphasized the potential for historically disadvantaged populations to be especially harmed by NCAs. For example, Lipsitz and Starr found...
in 2021 that women particularly benefit when NCAs are banned, while Johnson, Lavetti, and Lipsitz found in 2020 that both women and Black workers are better off when NCA enforceability is weakened. Lastly, Starr found in 2019 evidence that those with less education are more likely to be harmed when NCAs are more likely to be enforced. Several rationales for these findings have been proposed, including that disadvantaged populations may be more likely to voluntarily abide by an NCA, that firms may selectively target such groups for enforcement, and that such workers are less likely to bargain over the NCA.

However, all of these studies examine state NCA policies, and none of the studies of NCA use have examined similar predictions. Accordingly, in table 5 we present analyses examining how, in the cross-section, the relationship of NCAs to wages is different for various groups. As before, we estimate models that include the same basic and advanced controls, clustering the standard errors by state.
Table 5. Heterogeneous wage effects of NCAs in the NLSY97

| Variable                                      | Logarithm of hourly wages |
|-----------------------------------------------|--------------------------|
|                                               | Model specification 1    | Model specification 2 | Model specification 3 | Model specification 4 |
|                                               |                           |                       |                      |                      |
| **Panel A: Education**                        |                           |                       |                      |                      |
| NCA                                           | 0.068[***]                | 0.024                  | 0.077[***]           | 0.022                |
|                                               | (0.022)                  | (0.019)                | (0.023)              | (0.019)              |
| Bachelor’s degree                             | 0.446[***]                | 0.274[***]             | 0.411[***]           | 0.252[***]           |
|                                               | (0.029)                  | (0.028)                | (0.036)              | (0.031)              |
| Education higher than a bachelor’s degree     | 0.703[***]                | 0.474[***]             | 0.708[***]           | 0.482[***]           |
|                                               | (0.041)                  | (0.036)                | (0.053)              | (0.053)              |
| Interaction of NCA and bachelor’s degree      | 0.008                    | 0.011                  | 0.010                | 0.012                |
|                                               | (0.051)                  | (0.048)                | (0.050)              | (0.049)              |
| Interaction of NCA and education higher than bachelor’s degree | 0.227[**]                | 0.175[**]              | 0.224[**]            | 0.176[**]            |
|                                               | (0.085)                  | (0.078)                | (0.085)              | (0.078)              |
| $R^2$                                         | 0.349                    | 0.527                  | 0.372                | 0.534                |
| **Panel B: Race and ethnicity**               |                           |                       |                      |                      |
| NCA                                           | 0.134[***]                | 0.053[***]             | 0.113[***]           | 0.046[***]           |
|                                               | (0.027)                  | (0.025)                | (0.026)              | (0.024)              |
| Black or Hispanic                             | -0.061[***]               | -0.066[***]            | -0.074[***]          | -0.052[***]          |
|                                               | (0.020)                  | (0.021)                | (0.025)              | (0.025)              |
| Interaction of NCA and Black or Hispanic      | -0.058                   | -0.017                 | -0.043              | -0.012               |
|                                               | (0.040)                  | (0.037)                | (0.042)              | (0.038)              |
| $R^2$                                         | 0.344                    | 0.525                  | 0.368                | 0.532                |
| Controls                                      | Basic                     | Advanced               | Basic                | Advanced             |
| Bargaining indicator                          | No                        | No                     | Yes                  | Yes                  |
| Interaction of bargaining indicator and group indicators | No                  | No                     | Yes                  | Yes                  |
| **Panel C: Gender**                           |                           |                       |                      |                      |
| NCA                                           | 0.155[***]                | 0.067[***]             | 0.144[***]           | 0.066[***]           |
|                                               | (0.026)                  | (0.025)                | (0.026)              | (0.025)              |
| Female                                        | -0.152[***]               | -0.112[***]            | -0.152[***]          | -0.117[***]          |
|                                               | (0.025)                  | (0.028)                | (0.033)              | (0.030)              |
| Interaction of NCA and Female                 | -0.102[***]               | -0.049                 | -0.099[***]          | -0.051               |
|                                               | (0.047)                  | (0.044)                | (0.049)              | (0.046)              |
| $R^2$                                         | 0.347                    | 0.526                  | 0.371                | 0.532                |
| **Panel D: AFQT**                             |                           |                       |                      |                      |
| NCA                                           | 0.062[***]                | -0.007                 | 0.074[***]           | -0.007               |
|                                               | (0.020)                  | (0.019)                | (0.020)              | (0.019)              |
| AFQT score 50 percent or higher               | 0.132[***]                | 0.036                  | 0.122[***]           | 0.029                |
|                                               | (0.023)                  | (0.024)                | (0.024)              | (0.029)              |
| Interaction of NCA and AFQT Score 50 percent or higher | 0.062[***]                | 0.113[***]             | 0.079[***]           | 0.108[***]           |
|                                               | (0.040)                  | (0.037)                | (0.041)              | (0.038)              |
| $R^2$                                         | 0.359                    | 0.527                  | 0.380                | 0.533                |
| **Panel E: State NCA enforceability**         |                           |                       |                      |                      |
| NCA                                           | 0.111[***]                | 0.042[***]             | 0.106[***]           | 0.042[***]           |
|                                               | (0.019)                  | (0.020)                | (0.016)              | (0.018)              |
| State does not enforce NCAs                    | 0.132[***]                | 0.131                  | 0.132[***]           | 0.130[***]           |
|                                               | (0.066)                  | (0.081)                | (0.055)              | (0.070)              |
| Interaction of NCA and whether a state does not enforce NCAs | 0.040                  | 0.065[***]             | 0.043[***]           | 0.065[***]           |

Notes: Observations = 3,090. AFQT = Armed Forces Qualification Test. NCA = noncompete agreement. NLSY97 = National Longitudinal Survey of Youth 1997. The dependent variable is log hourly wage. Basic controls include three education categories (less than a college degree, a college degree, and more than a college degree), indicators for race and ethnicity, AFQT score at 50th percentile or more, gender, and an indicator for whether the occupation and industry fixed effects (two digit Standard Occupational Classification and North American Industry Classification System codes), and indicators for job tasks including indicators for repetitive work, frequency of contact with others, the length of the longest document read on the job, solving problems, using math to solve problems, supervising others, and the extent of physical tasks. If the variable of interest is missing for some values, an indicator is included (but not reported) that equals 1 if the variable is missing. Results are available from the authors. Standard errors, clustered by state of residence, are in parentheses. Regressions are weighted with round 18 survey weights.

$[1] p < 0.10.$

$[2] p < 0.05.$

$[3] p < 0.01.$

Source: U.S. Bureau of Labor Statistics, NLSY97 (2017–18 interview). Authors’ calculation.
The results largely accord with what we saw in the case of wage bargaining: The main effects are highly sensitive to the inclusion of controls, while in most cases, the heterogeneous effects of NCAs are more stable (and often line up with the prior literature). For example, panel A shows that relative to the NCA–wage differential for those with less than a bachelor’s degree, the NCA–wage differential for those with a bachelor’s degree is practically no different, while for those with more than a bachelor’s degree it is 19 percent to 25 percent higher.

The heterogeneous effects of NCAs are more sensitive when it comes to race and gender. Panel B shows that the NCA–wage differential for minority (Black or Hispanic) workers is lower than the NCA–wage differential for non-Black non-Hispanic workers, but the estimates are noisy and close to zero in the most saturated model. Similarly, panel C shows that, at baseline, men bound by NCAs earn between 7 percent and 16 percent more than men without NCAs. The same differential for women, however, ranges from 5 to 10 percent lower than that of men, with the difference being statistically significant only in the model with basic controls.

Given the literature’s focus on disadvantaged workers, in panel D we consider whether higher ability workers, as measured by having an AFQT score at or above the 50th percentile, have higher NCA–wage differentials than lower ability workers. Indeed, the wage difference between those who signed NCAs and those who did not was larger for workers who had a high AFQT score than for those who had a low score.

Finally, we consider heterogeneous NCA–wage effects based on the extent of enforceability of the NCA. Under the efficient contracting theories, it is the actual law (i.e., whether a contract will be held up in court) that determines whether the firm can ultimately be protected from a holdup problem. Accordingly, under this theory, workers should be better off where NCAs are more enforceable—either because of being more likely to bargain or because access to valuable information makes them more productive. In contrast, if NCAs are value extraction tools for firms, then NCAs might more effectively extract value when firms can legitimately threaten a worker with a lawsuit for violating an NCA. Panel E shows that relative to states that enforce NCAs, the wage differential associated with NCAs when they are not enforceable is 4 to 7 percent higher.

Taken together, because the base rates are so sensitive to controls, our results suggest that it is not obvious whether the baseline positive NCA–wage relationship is driven by selection or treatment. However, the more consistent heterogeneous effects suggest that, whatever the baseline effect is, the wage differential associated with NCAs is lower for women, for those with less education, for those with low AFQT scores, and in states more able to enforce NCAs.

In columns 3 and 4 of table 5, we consider the plausible theory that the observed NCA–wage differentials are driven by group differences in bargaining. If, for example, women are less likely to bargain over wages or when they do bargain ask for smaller compensating differentials, then these baseline bargaining differences may explain why NCAs are more harmful to women than men. Accordingly, we rerun our heterogeneous effects models controlling for whether the individual bargain for their wages, and we allow for different groups (as defined for each panel) to have differential effects from bargaining. In each case, we observe that subgroup bargaining patterns do not explain the differences in pay, since the estimated NCA–wage differentials move little when including these controls.

### Discussion

This study is motivated by the recent and historical debates over the value of NCAs and by the relative lack of data on NCAs themselves, amidst a growing literature studying state NCA policies. Using new data collected on NCAs as part of the NLSY97, we examine who signs NCAs, how NCAs are related to wages and wage differentials between groups, and the role of bargaining in explaining these differentials. Our results both support the prior literature on NCAs and extend it in new, important ways.

Overall, we find that 18.1 percent of workers ages 32–38 in 2017 were bound by NCAs, very similar to prior estimates. We also document similar patterns to the prior literature—that the use of NCAs is more common for workers with more education and that NCAs are more common in technical occupations and industries. However, as the prior literature also suggests, NCAs are still used for a wide swath of workers at the low end of the wage distribution or even workers in states that would never enforce such an agreement. We extend these findings by showing that NCAs are also more common for workers with high ability and that even within a job-type, variation in job tasks (such as problem solving) are strongly associated with NCA use. Interestingly, our results suggest little selection into NCA use by ability after conditioning on broad demographics.

Examining wage outcomes, we find that NCAs are positively associated with wages but that this association is highly sensitive to demographic and job characteristics, as in prior work. As a result, we recommend interpreting the main correlations with due caution. Heterogeneous effects in the NCA–wage differential are more stable, however. For example, the wage increase associated with NCAs is lower for those with less education (relative to more education), lower for those with lower ability (relative to higher ability), and lower for women (relative to men) in some models. Although we also find that the NCA–wage differential is lower for those who do not bargain over wages (relative to the NCA–wage differential for those who do bargain), bargaining differentials across groups do not explain the NCA–wage differentials across groups. Finally, our results suggest that the enforceability of NCAs reduces NCA–wage differentials, as found by Starr, Prescott, and Bishara in 2021.

Taken together, our results are consistent with elements of the efficient contracting perspective, for example that NCAs are more common in high-skilled jobs and that NCAs are associated with higher wages on average. But our results also challenge that narrative because (1) the use of NCAs is widespread, (2) the NCA–wage effect is highly sensitive to demographic and job controls, and (3) the fact that the positive wage associations with NCAs dissipate where NCAs are more enforceable suggest that the baseline

| Variable | Logarithm of hourly wages |
|----------|--------------------------|
|          | Model specification 1   | Model specification 2 | Model specification 3 | Model specification 4 |
|          | (0.024)                  | (0.031)               | (0.020)               | (0.030)               |
| R²       | 0.538                    | 0.526                 | 0.380                 | 0.532                 |
| Controls | Basic                    | Advanced              | Basic                 | Advanced              |
| Bargaining indicator | No                  | No                    | Yes                   | Yes                   |
| Interaction of bargaining indicator and group indicators | No                  | No                    | Yes                   | Yes                   |

Notes: Observations = 3,090. AFQT = Armed Forces Qualification Test. NCA = noncompete agreement. NLSY97 = National Longitudinal Survey of Youth 1997. The dependent variable is log hourly wage. Basic controls include three education categories (less than a college degree, a college degree, and more than a college degree), indicators for race and ethnicity, AFQT score at 50th percentile or more, gender, and an indicator for whether the state of residence does not enforce NCAs. Advanced controls add an indicator for for-profit or nonprofit status, occupation and industry fixed effects (two digit Standard Occupational Classification and North American Industry Classification System codes), and indicators for job tasks including indicators for repetitive work, frequency of contact with others, the length of the longest document read on the job, solving problems, using math to solve problems, supervising others, and the extent of physical tasks. If the variable of interest is missing for some values, an indicator is included (but not reported) that equals 1 if the variable is missing. Results are available from the authors. Standard errors, clustered by state of residence, are in parentheses. Regressions are weighted with round 18 survey weights.

Source: U.S. Bureau of Labor Statistics, NLSY97 (2017–18 interview). Authors’ calculation.
positive wage estimates may be highly selected. Our results also suggest that since bargaining power differentials are unlikely to underlie the NCA–wage differentials for the groups we study, alternative theories may be considered, such as differential to access to legal services or acquiescence to legal threats.

Limitations and future directions

While these analyses advance our understanding of NCA adoption, wage setting, and wage bargaining, they have several important shortcomings. Notably, the data are from a single cross-section, making it difficult to extract anything but correlational relationships and precluding a study of longitudinal earnings or job mobility dynamics. However, as more data are collected, there are several clear opportunities to exploit the richness of the NLSY97. In this section, we lay out a broader research agenda that these data will allow researchers to fill.

First, of the major challenges in this literature is finding exogenous variation in the use of NCAs, given the existence of only cross-sectional data. However, as more states change their policies on NCAs, and as more data on NCAs are collected in the NLSY97, it seems natural that such policy variation could be used to instrument for NCA use. For example, between 2017 and 2021 several states banned NCAs for low-wage workers. These policy changes will likely exogenously reduce the use of NCAs among the low-wage population, especially those policies that impose penalties for using NCAs deemed illegal. As long as these policies leave unaffected the enforcement for those above the wage threshold (which some seem to do), then the exclusion restriction may plausibly hold (i.e., that these policies affect various outcomes only through their effect on NCA use). With this and perhaps Bartik-style approaches, we can hopefully begin to tease out the selection and treatment effects of NCAs.

Second, as longitudinal data are collected, the scope of variables one can analyze grows substantially, enabling analyses of within-individual wage profiles, job mobility choices, entrepreneurial behavior, and variation in nonwage benefits. NLSY97 data on moves and their timing also allow one to explore the relationship between NCAs and migration. Data on spouse and partner labor supply could be used to study the role job restrictions like NCAs play in dual labor market decisions. The NLSY97 also has unique data on several other dimensions that could be used to examine unique heterogeneous effects (such as job tasks, bargaining, AFQT, and more), which would not be possible with other data. Moreover, those interested in understanding the causal drivers of NCA use will be better positioned to use time-variant identification strategies. For example, one can examine how changes in minimum wages over time affect NCA use or how changes in subsidies or tax incentives for investment might drive firms into using NCAs.

As the NLSY97 data continue to accumulate, so too will the opportunities to learn more about how these contractual restrictions on employee mobility affect many important economic dynamics.

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Notes
1 See “Non-compete contracts: economic effects and policy implications,” U.S. Department of Treasury Office of Economic Policy, March 2016; and Non-Compete Agreements: Analysis of the Usage, Potential Issues, and State Responses. (Washington: DC: The White House, May 5, 2016).
2 See Steven Greenhouse, “Noncompete clauses increasingly pop up in array of jobs,” New York Times, June 8, 2014, https://www.nytimes.com/2014/06/09/business/noncompete-clauses-increasingly-pop-up-in-array-of-jobs.html; Dave Jamieson, “Jimmy John’s makes low-wage workers sign ‘oppressive’ noncompete agreements,” Huffington Post, October 13, 2014, https://www.huffpost.com/entry/jimmy-johns-non-compete-a_5973180; Evan Starr, J. J. Prescott, and Norman Bishara, “Noncompete agreements in the US labor force,” The Journal of Law and Economics, vol. 64, no. 1, 2021, pp. 63–84; and Matthew S. Johnson and Michael Lipitz, “Why are low-wage workers signing noncompete agreements?” Journal of Human Resources, vol. 57, May 12, 2020, pp. 0619-10274R2. For an example of potential state and federal actions, in 2021 the Uniform Law Commission promulgated the Uniform Restricive Employment Agreement Act for adoption by state legislatures. The proposed act bans noncompete agreements (NCAs) and related restrictive agreements for low-wage workers and mandates notice and other requirements for other workers (see “Restricptive employment agreement act,” Uniform Law Commission (2021), http://www.uniformlaws.org/committees/community-home/communitykey=870a839-27cd-4150-ad5f-51d821dfcd28&tab=roundupdetails). For other state and federal policies, see generally Russell Beck, “The Changing landscape of trade secrets laws and noncompete laws around the country,” Fair Competition Law, May 2021, http://faircompetitionlaw.com/changing-landscape-of-trade-secrets-laws-and-noncompete-laws/. In addition, state Attorneys General have investigated more than a dozen NCA cases (see Lisa Madigan, and Jane Flanagan, “Protecting competition on behalf of the people: the role of state Attorneys General in challenging noncompetes and other restraints on employee mobility,” in Sharon Block and Benjamin H. Harris, editors, Employee Mobility, and what role NCAs played in those dynamics. Note that care should be given to these estimates because estimates of the growth of NCAs will track the use of NCAs among a given age cohort and so may just reflect how NCA adoption changes as a cohort ages. Thus, it may be helpful to benchmark the results to other nationally representative cross-sections to separate out the trends from cohort-specific effects.
3 For example, between 2017 and 2021 several states banned NCAs for low-wage workers. These policy changes will likely exogenously reduce the use of NCAs among a given age cohort and so may just reflect how NCA adoption changes as a cohort ages. Thus, it may be helpful to benchmark the results to other nationally representative cross-sections to separate out the trends from cohort-specific effects.
4 See Norman Bishara and Evan Starr, “The incomplete noncompete picture,” Lewis and Clark Law Review, vol. 20, 2016, pp. 497–546. For a review of NCA use literature, see Evan Starr; “Consider this: training, wages, and the enforceability of covenants not to compete,” IJR Review, vol. 72, no. 4, August 2019, pp. 783–817, https://doi.org/10.1177/0022189419827660. Indeed, only a handful of studies possess data on the use of NCAs (see Alan B. Krueger and Eric A. Posner, “A proposal for protecting low-income workers from monopsony and collusion,” American Sociological Review, vol. 76, no. 5, August 24, 2011, pp. 695–712), physicians (see Kurt Lavetti, Carol Simon, and William D. White, “The impacts of restricting mobility of skilled service workers evidence from physicians,” Journal of Human Resources, vol. 55, no. 3, Summer 2020, pp. 1025–67), and hair stylists (see Johnson and Lipsitz, “Why are low-wage workers signing noncompete agreements?”).
For NCAs found in states where they are unenforceable, see Sarath Sanga, “Incomplete contracts: An empirical approach,” *Journal of Law, Economics, and Organization*, vol. 34, no. 4, November 2018, pp. 650–79, https://doi.org/10.1093/jleo/evy012; Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force,” and Alexander J.S. Colvin and Heidi Shierholz, “Noncompete agreements: ubiquitous, harmful to wages and to competition, and part of a growing trend of employers requiring workers to sign away their rights,” *Economic Policy Institute*, December 10, 2019. For workers’ perception of NCA enforceability, see J.J. Prescott and Evan Starr, “Subjective beliefs about contract enforceability,” *University of Michigan Law and Economics Research Paper*, 2022. For how NCAs limit mobility regardless actual law, see Evan Starr, J.J. Prescott, and Norman Bishara, “The behavioral effects of (unenforceable) contracts,” *Journal of Law, Economics, and Organization*, vol. 36, no. 3, November 2020, pp. 633–87.

For a concurrent work that also examines the incidence of NCAs using the longitudinal National Longitudinal Youth Study of 1997 (NLSY97) data, see Tyler Boesch, Katherine Lim, and Ryan Nunn, “Non-compete contracts sideline low-wage workers.” Federal Reserve Bank of Minneapolis, 2021, https://www.minneapolisfed.org/article/2021-non-compete-contracts-sideline-low-wage-workers.

Harlan M. Blake, “Employee agreements not to compete,” *Harvard Law Review*, 1960, pp. 625–91.

See Marx, “The firm strikes back: non-compete agreements and the mobility of technical professionals.” Matt Marx, Jasjit Singh, and Lee Fleming, “Regional disadvantage? Employee non-compete agreements and brain drain,” *Research Policy*, vol. 44, no. 2, November 11, 2014, pp. 394–404; and Natarajan Balasubramanian, Jin Woo Chang, Mariko Sakakibara, Jagadeesh Sivadasan, and Evan Starr, “Locked in? The enforceability of covenants not to compete and the careers of high-tech workers,” *Journal of Human Resources*, May 2020, pp. 1218–9391R1.

See Starr, “Consider this: training, wages, and the enforceability of covenants not to compete,” Michael Lipsitz and Evan Penniman Starr, “Low-wage workers and the enforceability of non-compete agreements,” *Management Science*, vol. 68, no. 1, January 2022, https://doi.org/10.1287/mnsc.2020.3918; and Matthew S. Johnson, Kurt Lavetti, and Michael Lipsitz, “The labor market effects of legal restrictions on worker mobility,” SSRN Electronic Journal, June 6, 2020, https://doi.org/10.2139/ssrn.3455381.

See David Friedman, “Non-competition agreements: some alternative explanations,” unpublished preliminary draft, April 2, 1991, http://davidfriedman.com/Academic/non-comp/Non-Competition.html; and Maureen B. Callahan, “Post-employment restraint agreements: A reassessment,” *The University of Chicago Law Review*, vol. 52, no.3, Summer 1985, pp. 703–28.

Rubin and Shedd, “Human capital and covenants not to compete.”

Jonathan M. Barnett, and Ted Sichelman, “The case for noncompetes,” *University of Chicago Law Review*, 87, 2020, pp. 953–1049.

In practice, unenforceable NCAs may resolve holdup problems to some degree if (1) workers are unaware of the law (as in Prescott and Starr, “Subjective beliefs about contract enforceability”), or (2) workers cannot access legal counsel or otherwise face costs of breaking an unenforceable contract (as in Starr, Prescott, and Bishara, “The behavioral effects of (unenforceable) contracts.”). Classic efficient contracting theories do not consider these possibilities.

David J. Balan, “Labor non-compete agreements: tool for economic efficiency, or means to extract value from workers?” *The Antitrust Bulletin*, vol. 66, no. 4, December 2021, pp. 583–608, https://doi.org/10.17717/0003603X21104544.

Arrow-Richman, Rachel S, “Cubework contracts and worker mobility: the dilution of employee bargaining power via standard form noncompetes,” *Michigan State Law Review*, vol. 2006, No. 963, December 2006.

See Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force,” and Natarajan Balasubramanian, Evan Starr, and Shotaro Yamaguchi, “Bundling employment restrictions and value capture from employees.” SSRN Electronic Journal, April 2021.

See also Stewart Schwab and Evan Starr, “Cornell National Social Survey,” unpublished data, 2019. Data from the Cornell National Social Survey (CNSS) derives from a random digit dial survey of 1,000 respondents. The noncompete question from the CNSS data is very similar to the one in the NLSY97. Note that, relative to the NLSY97, which is cohort-specific, these estimates. See also Stewart Schwab and Evan Starr, “Cornell National Social Survey,” unpublished data, 2019. Data from the Cornell National Social Survey (CNSS) derives from a random digit dial survey of 1,000 respondents. The noncompete question from the CNSS data is very similar to the one in the NLSY97. Note that, relative to the NLSY97, which is cohort-specific, these estimates.

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For NCAs found in states where they are unenforceable, see Sarath Sanga, “Incomplete contracts: An empirical approach,” *Journal of Law, Economics, and Organization*, vol. 34, no. 4, November 2018, pp. 650–79.

For a summary, see Evan Starr, “Are noncompetes holding down wages?” In Sharon Block and Benjamin H. Harris, editors, *Inequality and the Labor Market: The Case for Greater Competition* (Washington, DC: Brookings Institution Press, 2021), http://www.jstor.org/stable/10.7864/j.cty13vdw313. For studies on the negative effects of NCAs, see Natarajan Balasubramanian, Jin Woo Chang, Mariko Sakakibara, Jagadeesh Sivadasan, and Evan Starr, “Locked in? The enforceability of covenants not to compete and the careers of high-tech workers,” *Journal of Human Resources*, May 2020, pp. 1218–9391R1; Lipsitz and Starr, “Low-wage workers and the enforceability of non-compete agreements.”; Johnson and Lipsitz, “Why are low-wage workers signing noncompete agreements?”; and Starr, “Consider this: training, wages, and the enforceability of covenants not to compete.” For studies finding positive effects, see Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force”; Lavetti, Simon, and White, “The impacts of restricting mobility of skilled service workers evidence from physicians”; Omesh Kini, Ryan Williams, and David Yin, “CEO noncompete agreements, job risk, and compensation,” *Review of Financial Studies*, vol. 34, no. 10, October 2021, pp. 4701–44, https://doi.org/10.1093/rfs/hkaa103; Liyan Shi, “The macro impact of noncompete contracts,” *EIEF Working Papers Series*, 2103, revised 2021.

Balasubramanian, Starr, and Yamaguchi in 2021 used data on NCAs and three other restrictions and show that selection effects likely underlie the positive average NCA-wage differential, while the true effect is negative. See Balasubramanian, Starr, and Yamaguchi, “Bundling employment restrictions and value appropriation from employees.”

See Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force” and Balasubramanian, Starr, and Yamaguchi, “Bundling Employment Restrictions and Value Appropriation from Employees.”

See Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force.” Data from the 2014 Noncompete Survey Project is described in greater detail in J.J. Prescott, Norman Bishara, and Evan Starr, “Understanding noncompetition agreements: The 2014 Noncompete Survey Project,” *Michigan State Law Review*, vol. 2016, no. 2, 2016, pp. 369–464. The project covers in total 11,505 respondents. It derives from an online survey that the authors created and deployed via Qualtrics in 2014. Note that data from the 2014 Noncompete Survey Project includes both imputed and lower bound estimates, which differ in how they treat individuals who are unaware whether they have signed a noncompete; here we emphasize the lower-bound estimates. See also Stewart Schwab and Evan Starr, “Cornell National Social Survey,” unpublished data, 2019. Data from the Cornell National Social Survey (CNSS) derives from a random digit dial survey of 1,000 respondents. The noncompete question from the CNSS data is very similar to the one in the NLSY97. Note that, relative to the NLSY97, which is cohort-specific, these surveys cover all age categories. Accordingly, in the Noncompete Survey Project Data we limit to the same age range as the NLSY97, and in the CNSS, we limit to 25–50, in order to keep a large enough sample to say anything meaningful.

Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force.”

Values do not sum to 100 because of rounding. We also examined confidence levels by gender, education, wages, and NCA status. Across all these stratifications, at least 81.0 percent of workers are very confident in their NCA answer and at most 1.6 percent are not confident.

Legal jobs have the lowest use of NCAs (4 percent), which likely arises because they are the only occupation in which NCAs are unenforceable in all 50 states. See Russell C. Buffkin, “Locked in? The enforceability of (unenforceable) contracts,”). Classic efficient contracting theories do not consider these possibilities.

See Rachel Arnow-Richman, “The new enforcement regime: revisiting the law of employee mobility (and the scholarship of Charles Sullivan) with 2020 vision,” *Seton Hall Law Review*, vol. 34, no. 4, May 2021, pp. 1223–59. Other states have NCA bans for some sets of workers, though most of these bans started in 2017 or later. See Russell Beck, “The changing landscape of trade secrets laws and noncompete laws across the country,” *Fair Competition Law*, May 2021, https://faircompetitionlaw.com/changing-landscape-of-trade-secrets-laws-and-noncompete-laws/.

Rubin and Shedd, “Human capital and covenants not to compete.”

The Armed Forces Qualification Test (AFQT) covers four sections of the Armed Services Vocational Aptitude Battery (ASVAB) and measures math and verbal aptitude. This test was given to NLSY97 respondents in 1997–98.

For information on job tasks, see David H. Autor and Michael J. Handel, “Putting tasks to the test: human capital, job tasks, and wages,” *Journal of Labor Economics*, vol. 31, no. 2, June 2009, pp. S59-S96.

Theoretically, one may worry that workers sort into NCAs on the basis of unobserved ability; and since unobserved ability also drives wages, such sorting will cause upward bias in the NCA-wage effect. The results in table 3 suggest that workers are not sorting in NCAs by ability, conditional on demographic characteristics.
Practically, this condition means that anything else that affects wages must not also be related to NCAs. This condition will be violated if there are omitted variables that affect NCAs and wages, if there is reverse causality, etc.

See Robert E. Hall, and Alan B. Krueger, “Evidence on the incidence of wage posting, wage bargaining, and on-the-job search.” American Economic Journal: Macroeconomics, vol. 4, no. 4, October 2012, pp. 56–67; and Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force.”

Percent changes are calculated by raising the constant $e$ to the power of the coefficient in the table and then subtracting 1. In this case, $e^{0.22} - 1 = 0.246$, a 25-percent increase.

See Lipsitz and Starr, “Low-wage workers and the enforceability of non-compete agreements”; and Matthew S. Johnson, Kurt Lavetti, and Michael Lipsitz. “The labor market effects of legal restrictions on worker mobility.” SSRN Electronic Journal, June 6, 2020, https://dx.doi.org/10.2139/ssrn.3455381.

See Starr, “Consider this: training, wages, and the enforceability of covenants not to compete.”

See Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force”; and Schwab and Starr, “Cornell National Social Survey.”

See Johnson and Lipsitz. “Why are low-wage workers signing noncompete agreements?”

See Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force,” and Balasubramanian, Starr, and Yamaguchi, “Bundling Employment Restrictions and Value Appropriation from Employees.”

See Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force.”

See Michael Lipsitz and Mark Tremblay, “Noncompete agreements and the welfare of consumers.” SSRN Electronic Journal, January 25, 2022, https://dx.doi.org/10.2139/ssrn.3975664; and Naomi Hausman, and Kurt Lavetti. “Physician practice organization and negotiated prices: evidence from state law changes.” American Economic Journal: Applied Economics, vol. 13, no. 2, April 2021, pp. 258–96.

See Natarajan Balasubramanian, Evan Starr, and Shotaro Yamaguchi, “Bundling employment restrictions and value capture from employees,” SSRN Electronic Journal, April 2021; and Starr, Prescott, and Bishara, “Noncompete agreements in the US labor force.”

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Were wages converging during the 2010s expansion?

This article uses multiple surveys and data sourced from administrative records to examine trends in wage inequality from 2003 to 2019. Survey evidence shows that wages were growing more unequal from 2003 to 2013 as wages grew faster among high-wage workers than among low-wage workers. However, from 2013 to 2019, the same surveys show substantial wage gains for workers in the second and third deciles of the wage distribution, particularly among material moving workers and health aides. Administrative tax data also show substantial gains in annual wage and salary earnings income for earners in the lower portion of the earnings distribution in the same years. Wage growth among lower wage workers was large enough to reduce overall wage inequality from 2013 to 2019 in Occupational Employment and Wages Survey data. In tax data, wage growth among lower earning workers was large enough to reduce overall earnings inequality from 2010 to 2018. In data from the Current Population Survey, a plateau was found in overall wage inequality—rather than the clear decline found in the other two data sources—in the later years of the economic expansion.

Growing inequality of incomes is one of the most important economic issues of our time. When wages are not rising over time for a large fraction of American workers, these workers do not fully share in economic growth. Moreover, inequality of incomes becomes inequality in household resources. As household resources become more important in equipping new workers for jobs in which they can earn higher incomes (for example, funding from parents and other relatives to pay for postsecondary education), inequality today has the potential to further increase inequality in succeeding generations. Such ever-widening inequality will mean growing gaps in opportunities between Americans of different household income levels.

For more than four decades, inequality of incomes has been growing nearly continuously and has been the subject of a tremendous amount of empirical research. Lawrence F. Katz and David Autor provide a thorough survey of this literature as it stood 20 years ago. Since then, the works of David S. Lee and of David Card and John E. DiNardo have been particularly influential in emphasizing the potential role of declining real minimum wages and of unionization in explaining the growth of wage inequality. The work of David H. Autor, Lawrence F. Katz, and Melissa S. Kearney has also been particularly influential in emphasizing the importance of technological change in explaining wage inequality growth, because automation reduced demand for what had been routine work done by middle-income employees. A related literature using tax data to study income inequality has followed the work of Thomas Piketty and Emmanuel Saez, who used these tax data to show dramatic increases in incomes for people at the top of the income distribution.

All these studies focus on understanding details in the patterns of income inequality growth to better understand the underlying causes of inequality growth. However, recent research articles based on data from the Current Population Survey (CPS) show some evidence of a change from the trend of ever-increasing income and wage inequality in the years immediately preceding the 2020 recession. In their recent survey of the wage inequality literature, Florian Hoffmann, David S. Lee, and Thomas Lemieux include figures showing small declines in labor income inequality for men beginning around 2015. Jay C. Shambaugh and Michael R. Strain also present figures showing that wages at the lower percentiles of the wage distribution had greater growth than median wages from 2017 to 2019.

In this article, we examine recent trends in wage inequality using the confidential microdata collected from the Occupational Employment and Wage Statistics (OEWS) survey, which relies on a large representative sample of employers in the United States. We also examine the wage questions in the confidential version of the CPS data, collected from a large representative sample of households in the United States. The OEWS and CPS data are completely independent surveys that include wage information. James R. Spletzer and Elizabeth Weber Handwerker show very similar patterns of wage variances between the CPS and the OEWS survey from 1998 to 2010, overall, by sector, industry, and occupation, and in the fraction of wage variance explained by these factors. Here, we examine what happened to wage inequality in these two surveys from late 2002 or 2003 through 2019. We further corroborate our findings from these two surveys with annual wage and salary earnings data from income tax filings.

We find that wages were growing more unequal from 2003 to 2013 in both the CPS and OEWS data, because wages increased more among high-wage workers than among low-wage workers. However, from 2013 to 2019, both surveys show substantial wage gains for workers in the second and third deciles of the wage distribution. In the OEWS data, wage growth among lower wage workers was great enough to reduce overall wage inequality from 2013 to 2019, while in the CPS data, wage inequality plateaued. In tax data, we find substantial increases in annual earnings among workers with lower annual earnings, which were great enough to reduce overall earnings inequality from 2010 through 2018 (the most recent year available). Occupational information in the CPS and OEWS data allows us to identify the occupations most important for wage growth among lower wage workers, because of their wage gains and employment levels. These occupations included health aides and material moving workers. We also examine which characteristics of workers and their employers were particularly important for wage inequality in the CPS and OEWS data and highlight the importance of occupations in wage inequality.

Data

We begin by describing the wage or wage and salary data available from each of our sources and the differences between the data available from each one.

Wage data from the Occupational Employment and Wage Statistics program

In either May or November each year, the OEWS survey asks employers about their occupational and wage patterns, with approximately 200,000 establishments surveyed at each date. Administrative data on the occupations and wages of employees are also collected from state and federal governments. The OEWS data do not include much of the agricultural sector, the unincorporated self-employed, or private household employers. Employers are asked to report hourly wage rates for part-time or hourly workers and annual rates for salaried workers and for workers in occupations that are generally paid an annual salary but work less than full-time hours over the course of a year, such as...
pilots, flight attendants, and teachers. Wages in this survey include base pay, guaranteed pay, incentive pay, commissions, bonuses, and tips. They do not include overtime pay, severance pay, or employer costs for employee benefits. Before 2020, the OEWS survey collected wage information in 12 wage intervals, defined in terms of either hourly wages or annual wages equivalent to hourly wages multiplied by 2,080 hours.

The OEWS survey has a complex sample design. A full sample is selected over a 3-year period, with establishments generally not selected more than once every 3 years. All OEWS estimates rely on 3 years of data, as well as data from other U.S. Bureau of Labor Statistics (BLS) programs. Within each wage band, a mean hourly wage is estimated by using wage data collected by the BLS National Compensation Survey. To adjust wage estimates collected at different dates, the OEWS program uses the BLS Employment Cost Index for each occupational division. Employers that do not respond to the survey have occupational employment and wage values imputed on the basis of responses from employers that are similar in location, industry, and size (in Quarterly Census of Employment and Wages [QCEW] data). All OEWS estimates are benchmarked to employment totals from the BLS QCEW, by location, industry, and size, in the final year of data collection. More information about the OEWS survey can be found in the BLS Handbook of Methods.

We use the OEWS microdata beginning in November 2002, when that survey began sampling 200,000 establishments every November and May and had completed training all staff in using the Standard Occupational Classification (SOC) system. We convert the resulting nominal wage estimates into constant 2016 dollars using the CPI for All Urban Consumers (CPI-U). Because OEWS estimates are based on 3 years of data, OEWS estimates cannot be compared from one year to the next. We have calculated estimates for every 3-year aggregation of data (November 2002 to May 2005, November 2003 to May 2006, etc.) but present only estimates for the 3-year aggregations ending in May 2005, May 2010, May 2013, May 2016, and May 2019. The choice of years we have chosen for presentation does not substantially change our findings, although the overall log wage variance measured in the OEWS is highest for November 2011 to May 2014 (this period has a standard deviation of 0.616 for November 2010 to May 2013 shown in the charts discussed later in this article).

**Wage data from the Current Population Survey**

The CPS data are generally used in studies of wage and income inequality, because microdata from this survey have been publicly available to researchers for several decades. This survey uses a rotational sample design, in which each household in the sample is interviewed for 4 consecutive months and then, 8 months later, interviewed for another 4 consecutive months. For the best comparison to the OEWS, we focus on the CPS wage questions, which are asked in the fourth and eighth interviews. Since these are the months when respondents are rotating out of the sample, they are referred to as Outgoing Rotational Groups (ORGs). We use CPS data from the ORG beginning in 2003, when the CPS began using the same SOC system used in the OEWS as the basis for its occupational codes, allowing us to compare wage trends by occupation between the CPS and the OEWS. Authors who focus more on overall income inequality (rather than wages) use questions about income from the previous year, which the CPS asks only in the Annual Social and Economic Supplement.

The wage questions in the CPS are only asked of respondents about their main jobs and are not asked of self-employed people. We add overtime pay, tips, and commissions to hourly wages for those who report these types of income. We use hourly wages for jobs reported as such and otherwise convert annual, monthly, or weekly earnings to hourly wages using usual hours reports, following research by Anne E. Polivka and by John Schmitt. About 58 percent of respondents report hourly wages. Depending on the year, 2.5 percent to 3.8 percent of respondents report annual, monthly, or weekly earnings but not an hourly wage and report that their usual hours vary, making it difficult to calculate their hourly wages. For these people, we use a regression-based imputation method to model weekly hours separately for men and women working full- or part-time, based on age, race, education, marital status, and immigration status. All wage data in the CPS are reported in nominal terms and converted into constant 2016 dollars using the CPI-U. To avoid the top coding of incomes applied to the public-use version of the CPS data to protect the confidentiality of respondents, we use the confidential CPS microdata not available to researchers outside BLS or the U.S. Census Bureau. However, in the appendix (to this article), we show that the public-use version of these data yield very similar trends in wage inequality over time.

The greatest hourly wage reportable in the CPS data is $99.99, but this affects only 0.05 percent of hourly wage reports; most high earners report their earnings annually, monthly, or weekly, not hourly, and the CPS allows respondents to report weekly earnings up to $99,999.99 per week. Following Card and DiNardo, Thomas Lemieux, and Sarah A. Donovan and David H. Bradley, we remove observations with an hourly wage of less than $1 or more than $100 in 1979 dollars—less than $3.50 or more than $350 in 2016 dollars. This censoring of particularly high- and low-wage values means dropping 0.8 percent to 0.9 percent of observations in the confidential data, varying very slightly by year.

The most important differences in wage data collection between the OEWS and the CPS are that wage information is collected from employers in the OEWS and from workers in the CPS and that wage questions in the CPS ask respondents only about their main job.

**Earnings data from Form W-2 tax records**

We additionally examine annual person-level wage and salary income reported on Form W-2 Wage and Tax Statement to the Internal Revenue Service (IRS) by employers for each wage earner in each job in each year. The U.S. Census Bureau has received an extract of these data from tax years 2005 through 2018 and is authorized to use these data to improve measurements of income and produce new income statistics. Form W-2 data are annual, but they reflect earnings on each job, and so many W-2 observations have low values representing short duration jobs. We aggregate wage income across all W-2 forms for each person to capture total annual wage earnings in these data.

There are several ways this annual wage and salary earnings measure differs from the CPS and OEWS wage measures. The W-2 data include wage and salary income across all jobs over a calendar year, rather than the current “main jobs” for which we measure wages in the CPS. They do not include any measure of hours or weeks worked, rather than the hourly wage report in the CPS or the hourly wage or equivalent annual salary reported in the OEWS. This wage and salary earnings measure will be affected not only by wages but also by hours worked per week and by weeks worked per year. The W-2 data can also include overtime pay (like the CPS but unlike the OEWS), severance pay (unlike either the CPS or the OEWS), and potentially other forms of compensation, such as stock options and bonuses. Nonetheless, we include these annual earnings here to show how trends in the wage inequality measured with the OEWS and the CPS compare with trends in inequality in overall wage and salary incomes measured with income tax data.

**Overall wage variation results**

We begin by showing trends in the standard deviation of log wage income in the CPS-ORG, OEWS data, and W-2 data. We examine trends in the CPS-ORG data in two ways. First, to compare our results with authors in the economic literature, we examine trends in the CPS for full-time workers and weight these workers by the number of hours they work. (We cannot further restrict the data to full-year work, because these questions are only asked in the CPS-ORG data for workers who report wages on an annual basis.) Second, to better compare wage variation in the CPS with the OEWS and the W-2 data, we examine trends in the CPS for all workers, without weighting workers by the number of hours worked, since the OEWS and W-2 data include part-time and seasonal workers and cannot be weighted by the number of hours worked.

Chart 1 thus compares trends in the standard deviation of log hourly wage income in the OEWS with two versions of overall trends of the standard deviation of log hourly wage income in the CPS-ORG and with trends in the standard deviation of log annual wage and salary income in the W-2 data. Note that the standard deviation of log annual wage and salary income in the W-2 data is much greater than the standard deviation of hourly wages in the OEWS and CPS data, and so it is plotted on a different scale.
Comparing worker restrictions and weightings within versions of the CPS data, we find greater dispersion of wages among all workers than among full-time workers only. However, weighting full-time workers by the number of hours they work increases the dispersion in their wages, since higher earning full-time workers work more hours. Combining both worker restrictions and hours weighting, we find a greater dispersion of wages overall among all workers who are not weighted by hours worked (estimates more comparable to the OEWS) than among full-time workers only who are weighted by hours worked (estimates more comparable to the wage variation literature).

However, the two versions of the CPS wage inequality series show similar time trends in wage inequality. In both CPS series, wage inequality was clearly rising from 2003 to 2013 and then stopped rising, with perhaps some modest decline from 2016 through 2019. Versions of these series estimated using public-use CPS data are shown in the appendix.

Comparing the CPS data to the OEWS and W-2 data, we see that all three data sources show growing inequality from the beginning of the series through 2010. OEWS data show increased inequality of wages through 2013 and declining inequality of wages thereafter, particularly from 2016 to 2019. CPS data show a similar increase in wage inequality to the OEWS through 2016, but they do not show as much decline in inequality thereafter. The CPS series for all workers not weighted by hours is much more similar to the OEWS data in its measured level of wage inequality than the CPS series for full-time workers weighted by hours worked. The two CPS series, however, show similar time trends in wage inequality. The W-2 data show earnings inequality that peaked in 2010 and has been declining thereafter.

The rest of this article examines the distribution of wages further by using only the OEWS and the confidential version of the CPS from 2003 through 2019 that is more comparable to the OEWS (all workers, not weighted by hours) as well as the distribution of annual wage and salary income in the W-2 data.

Another common measure of overall wage inequality is the ratio of wages at the 90th percentile of the wage distribution to wages at the 10th percentile of the wage distribution. We show this measure for all three data sources in chart 2 and find broadly similar patterns to those shown in chart 1. In the OEWS data, this measure is increasing from 2005 to 2013, flat from 2013 to 2016, and decreasing from 2016 to 2019. In the CPS data, this measure is increasing from 2003 to 2010 and flat or declining from 2010 to 2013. In the W-2 data, this measure is increasing from 2003 to 2010 and declining afterward. We note that the OEWS is the last series to show a decline, perhaps because each OEWS estimate is based on 3 years of data; an OEWS estimate for May 2016 uses data collected in November 2013 through May 2016.
the CPS data, this measure is generally increasing from 2003 to 2016, with unclear trends from 2016 to 2019. In the W-2 data, this measure is increasing from 2005 to 2012, flat from 2012 to 2013, and declining afterward.

Chart 3. Ratio of 90th percentile to 50th percentile of hourly wages in CPS outgoing rotations and OEWS and of annual wage and salary income in W-2 data, 2003–19

Chart 4. Ratio of 50th percentile to 10th percentile of hourly wages in CPS outgoing rotations and OEWS and of annual wage and salary income in W-2 data, 2003–19

For a more complete understanding of how overall wage inequality has been declining in recent years in the OEWS and W-2 data (but not as clearly in the CPS data), we show the percentage changes in wages or annual earnings from 2013 to 2019 for selected percentiles of the wage/earnings distribution in all three data sources in table 1. This table shows an overall greater growth in hourly wages in the CPS than in the OEWS survey, particularly for wage earners at the 75th, 90th, and 95th percentiles of the wage distribution. The W-2 data have greater growth in annual earnings than either the OEWS or the CPS at the 10th, 25th, and 50th percentiles of the wage distribution. The earnings growth levels in the W-2 data are between those of the OEWS and the CPS at the 75th, 90th, and 95th percentiles of the wage/earnings distribution (estimates of earnings growth in the W-2 data for the 5th percentile are omitted for disclosure avoidance purposes).
This greater wage growth for high-wage workers in the CPS than in the OEWS explains why overall wage inequality declined in the OEWS but plateaued in the CPS from 2013 to 2019. Both surveys show particularly strong wage growth during this period for wages at the 10th and 25th percentiles of the wage distribution. The even stronger wage growth for low-wage and salary workers in the W-2 data drives the difference in overall wage inequality growth patterns between the W-2 and the OEWS. Perhaps the particularly strong annual earnings growth for low earners in the W-2 data reflects increases in their hours worked per week or weeks worked per year.

**Results by occupation**

The analysis just discussed shows that wage growth at the 10th and 25th percentiles of the log wage distribution was particularly strong during the 2013–19 period in both the OEWS survey and CPS data and in the W-2 data. We can say more about the occupations of the worker who saw this wage growth in the OEWS survey and CPS data, because both these surveys ask workers and employers about occupations. In each survey, these responses are then assigned detailed occupational codes by statistical agency staff or their state partner agencies. A similar analysis of the occupations experiencing strong earnings growth is not currently possible in the W-2 data, because although U.S. individual tax returns ask each tax filer to report an occupation, the U.S. Census Bureau does not currently receive occupational responses from tax filers.

We start by examining workers into 10 equally sized deciles of the wage distribution in each time in each dataset. For each decile \( d \) at time \( t \), overall wages \( w \) are the sum of wages earned by people working in each occupation \( j \), \( w_{jt}^d \), multiplied by the share \( s \) of people in that decile who work in each occupation \( j \), \( s_{jt}^d \). Thus, the overall wage level for each decile in each time is \( w_t^d = \sum_j w_{jt}^d \times s_{jt}^d \). The change in the average wage in decile \( d \) between time \( t_0 \) and time \( t_1 \) is the change in wages for each occupation within that decile, \( (w_{jt_1}^d - w_{jt_0}^d) \), multiplied by the share of decile employment for each occupation at time \( t_1 \), plus the change in the share of employment in the decile accounted for by each occupation, \( (s_{jt_1}^d - s_{jt_0}^d) \), multiplied by the initial wage level for each occupation:

\[
\Delta w^d = \sum_j \left[ (w_{jt_1}^d - w_{jt_0}^d) \times s_{jt_1}^d + (s_{jt_1}^d - s_{jt_0}^d) \times w_{jt_0}^d \right].
\]

We conduct this analysis at the minor occupational category (three-digit SOC code) level, slightly adjusting the SOC codes to make them consistent over time and consistent between the CPS and the OEWS. After codes are adjusted, there are 92 occupational categories.

During the 2005–19 period overall, both the CPS and the OEWS data show that the largest increases in wages were for the top three deciles of the wage distribution. Within each decile, changes in wages were overwhelmingly due to occupation-specific wage changes, rather than to changes in the distribution of occupations within the decile. However, the CPS shows larger increases in wages in the top three deciles of the wage distribution than the OEWS shows, and the CPS shows even less of this change was due to changes in the distribution of occupations within each decile than the OEWS.

From 2005 to 2013, wage inequality was increasing in both the CPS and OEWS data. In both surveys, increasing wage inequality was due to large increases in wages for the top decile of wage earners, accompanied by wage declines for most of the seven lowest deciles of wages. Again, in both surveys (but even more in the CPS than in the OEWS), these patterns were driven more by wage changes within occupations than by shifts in the occupational composition.

By contrast, from 2013 to 2019, wage inequality was declining in the OEWS and flat in the CPS data. Both surveys showed rising wages in every decile, with particularly substantial increases in wages for the second and third deciles of the wage distribution, in both the CPS and the OEWS. The decile-level decomposition of these wage changes, summed across all occupations, is shown in table 2. This table shows that in both the OEWS and the CPS, these wage increases were due almost entirely to within-occupation wage increases rather than to changes in the shares of each occupation. It also shows that the difference in overall wage inequality trends in the CPS and the OEWS from 2013 to 2019 comes from greater increases in wages for the top deciles of the wage distribution in the CPS than in the OEWS. These greater increases in wages at the top in the CPS meant that overall wage inequality in the CPS held steady, while smaller increases in wages at the top in the OEWS meant that overall wage inequality in the OEWS declined during this period.
Table 2. Wage growth (in dollars) in each wage decile from 2013 to 2019 and its decomposition into occupation shares and occupation wages for all occupations in the OEWS survey and the CPS

| Decile | OEWS survey | | | | CPS | | | | | |
|--------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|        | 2013 real hourly wage | 2019 real hourly wage | Difference | Change due to occupation-specific wages | Change due to occupation shares | 2013 real hourly wage | 2019 real hourly wage | Difference | Change due to occupation-specific wages | Change due to occupation shares |
| 1      | $8.34        | $8.67       | $0.33       | $0.33       | $0.00       | $7.75        | $8.36       | $0.61       | $0.64       | -$0.03      |
| 2      | 9.31         | 10.59       | 1.29        | 1.23        | 0.06        | 9.67         | 10.95       | 1.28        | 1.27        | 0.00        |
| 3      | 10.98        | 12.41       | 1.43        | 1.43        | 0.00        | 11.36        | 12.98       | 1.63        | 1.62        | 0.00        |
| 4      | 13.57        | 14.23       | 0.66        | 0.66        | 0.00        | 13.56        | 14.91       | 1.35        | 1.35        | 0.00        |
| 5      | 16.05        | 16.26       | 0.21        | 0.14        | 0.06        | 16.03        | 17.42       | 1.39        | 1.39        | 0.00        |
| 6      | 18.72        | 19.87       | 1.15        | 1.08        | 0.07        | 19.00        | 20.36       | 1.36        | 1.36        | 0.01        |
| 7      | 22.59        | 23.70       | 1.12        | 1.13        | 0.01        | 22.67        | 24.42       | 1.74        | 1.74        | 0.01        |
| 8      | 27.94        | 28.97       | 1.03        | 1.01        | 0.02        | 27.79        | 30.01       | 2.22        | 2.21        | 0.02        |
| 9      | 36.62        | 37.61       | 0.99        | 0.94        | 0.05        | 36.05        | 39.19       | 3.14        | 3.11        | 0.03        |
| 10     | 66.01        | 68.79       | 2.78        | 3.05        | 0.26        | 64.41        | 70.94       | 6.53        | 6.64        | -0.10       |

Note: CPS = Current Population Survey, and OEWS = Occupational Employment and Wage Statistics. CPS estimates are based on the confidential version of the CPS microdata available to U.S. Bureau of Labor Statistics employees, not the public-use version of the microdata.

Source: U.S. Bureau of Labor Statistics.

We delve into the individual occupations aggregated in table 2 to answer two questions about the 2013–19 period:

1. Both the OEWS and the CPS show remarkable wage growth in the second and third deciles of the wage distribution during this period. Which occupations benefited from this wage growth?

2. The CPS showed much greater wage increases than the OEWS in the top deciles of the wage distribution during this period. Which occupations drove this difference in measured wage growth?

Occupations driving wage growth in the second and third deciles of the wage distribution

What occupations accrued these wage increases in the second and third deciles of the wage distribution during this period? The answers differ somewhat between the OEWS and the CPS; the correlation of occupation-specific contributions to these wage increases between the two surveys is 0.28 in the second decile and 0.22 in the third decile.

Table 3 presents the 10 minor occupational groups that contributed most to wage growth in OEWS data in the second and third deciles of the wage distribution. In the OEWS data, health aides (SOC code 31-1) were the most important minor occupational category in explaining wage growth within the second decile from 2013 to 2019, with large increases in both employment and wages in this decile of the wage distribution. This occupational group includes such occupations as home health and personal care aides (SOC code 31-1120) and nursing assistants (SOC code 31-1131). Much of the employment growth in this occupational category was the result of including about half a million additional workers in the OEWS beginning in 2017 who were providing nonmedical home care for the elderly or people with disabilities. These additional workers were added to the OEWS as the result of an effort in some states to more consistently classify such work as part of North American Industry Classification System (NAICS) code 624120, services for the elderly and disabled (covered by the OEWS) instead of NAICS code 814110, private households (not covered by the OEWS). The same occupational group had a smaller contribution to wage growth in the third decile of the OEWS, because it had wage growth but did not increase its share of employment in this decile of the wage distribution.
Table 3. Occupational groups contributing most to wage growth from 2013 to 2019 in the second and third deciles of the wage distribution in OEWS survey data

| Decile | SOC Code | Title | Share of employment | Average wage | Contribution to wage growth |
|--------|----------|-------|---------------------|--------------|-----------------------------|
| 2      | 31-1000  | Health aides | 0.040 | 0.087 | $9.92 | $10.64 | $0.53 |
|        | 37-2000  | Building cleaning and pest control workers | 0.044 | 0.054 | 9.46 | 10.58 | 0.15 |
|        | 43-4000  | Information and record clerks | 0.032 | 0.042 | 9.41 | 10.54 | 0.15 |
|        | 43-5000  | Material recording, scheduling, dispatching, and distributing workers | 0.036 | 0.042 | 9.21 | 10.57 | 0.11 |
|        | 35-2000  | Cooks and food preparation workers | 0.051 | 0.055 | 9.45 | 10.61 | 0.09 |
|        | 39-9000  | Other personal care and service workers | 0.018 | 0.021 | 9.44 | 10.61 | 0.06 |
|        | 33-9000  | Other protective service workers | 0.016 | 0.020 | 9.60 | 10.59 | 0.05 |
|        | 35-1000  | Supervisors of food preparation and serving workers | 0.005 | 0.010 | 10.08 | 10.55 | 0.05 |
|        | 51-9000  | Other production occupations | 0.018 | 0.019 | 9.38 | 10.54 | 0.03 |
|        | 51-2000  | Assemblers and fabricators | 0.013 | 0.014 | 9.35 | 10.52 | 0.03 |

| Decile | SOC Code | Title | Share of employment | Average wage | Contribution to wage growth |
|--------|----------|-------|---------------------|--------------|-----------------------------|
| 3      | 35-3000  | Food and beverage serving workers | 0.057 | 0.073 | 10.90 | 12.16 | 0.26 |
|        | 53-7000  | Material moving workers | 0.048 | 0.059 | 11.04 | 12.39 | 0.21 |
|        | 29-2000  | Health technologists and technicians | 0.014 | 0.022 | 11.03 | 12.58 | 0.12 |
|        | 47-2000  | Construction trades workers | 0.015 | 0.022 | 10.98 | 12.56 | 0.11 |
|        | 49-9000  | Other installation, maintenance, and repair occupations | 0.015 | 0.022 | 11.01 | 12.57 | 0.11 |
|        | 31-1000  | Health aides | 0.073 | 0.073 | 10.91 | 12.31 | 0.10 |
|        | 25-9000  | Other educational instruction and library occupations | 0.021 | 0.024 | 10.99 | 12.52 | 0.07 |
|        | 13-1000  | Business operations specialists | 0.004 | 0.009 | 11.14 | 12.60 | 0.07 |
|        | 21-1000  | Counselors, social workers, and other community and social service specialists | 0.009 | 0.014 | 11.01 | 12.56 | 0.07 |
|        | 43-5000  | Material recording, scheduling, dispatching, and distributing workers | 0.043 | 0.043 | 11.02 | 12.45 | 0.06 |

Note: OEWS = Occupational Employment and Wage Statistics, and SOC = Standard Occupational Classification. Source: U.S. Bureau of Labor Statistics.

In the third decile of the OEWS wage distribution, food and beverage serving workers contributed most to wage growth, with a rising share of employment and rising wages. This occupational group consists of workers in occupations such as bartenders (SOC code 35-3011), fast food and counter workers (SOC code 35-3023), and waiters and waitresses (SOC code 35-3031). However, this occupational group did not contribute to wage growth in the second decile of the wage distribution because its employment fell sharply in this wage group. Overall, this occupational group saw little change in total employment across all wage deciles from 2013 to 2019, but strong wage growth meant that its employment shifted from the first two deciles to higher deciles of the overall wage distribution.

Similarly, material moving workers were the second most important occupational group contributing to wage growth in the third decile of the OEWS wage distribution, with rising employment and rising wages, but this occupational group also had a negative impact on wage growth in the second decile of the wage distribution because its employment fell in this decile of the wage distribution. Although the material moving occupational group grew overall from 2013 to 2019, wage growth for this occupational group meant that it made up an increasing share of employment in the third, fourth, and fifth deciles of the overall wage distribution and a decreasing share of employment in the first and second deciles.

Table 4 presents the 10 minor occupational groups that contributed most to wage growth in CPS data in the second and third deciles of the wage distribution. In both deciles, the minor occupational group that contributed most is material moving workers, which grew in employment in both deciles and had large increases in average wages. This group includes such occupations as crane and tower operators (SOC code 53-7021), industrial truck and tractor operators (SOC code 53-7050), and stockers and order fillers (SOC code 53-7065), an occupation that would include many e-commerce order fulfillment workers. The second most important contributing occupational group in the second decile of the wage distribution is retail sales workers, who had declining employment but sharply rising wages during 2013 to 2019. Another important contributing occupational group in both the second and third deciles of the wage distribution is health technologists and technicians, such as lab technicians (SOC code 29-2010), paramedics (SOC code 29-2040), and licensed practical nurses (SOC code 29-2061), who had growing employment and rising wages. Yet another such group is information and record clerks, such as customer service representatives (SOC code 43-4050), file clerks (SOC code 43-4071), and order clerks (SOC code 43-4150), who also had growing employment and rising wages.
One possible reason we might find different occupational groups contributing the most to this wage growth in the OEWS and the CPS could be that the CPS measures wages only in workers’ main jobs, whereas the OEWS survey measures wages in all jobs. However, this reason does not appear to explain the difference in which occupations have particularly strong wage growth. Although the CPS does not record wages for workers’ second jobs, it does record the occupations worked in these jobs. The most common second jobs in the CPS are in construction trades and teaching, and these are not the jobs with particularly strong wage growth in the OEWS survey. One possible reason we might find different occupational groups contributing the most to this wage growth in the OEWS and the CPS could be that the CPS measures wages only in workers’ main jobs, whereas the OEWS survey measures wages in all jobs. However, this reason does not appear to explain the difference in which occupations have particularly strong wage growth. Although the CPS does not record wages for workers’ second jobs, it does record the occupations worked in these jobs. The most common second jobs in the CPS are in construction trades and teaching, and these are not the jobs with particularly strong wage growth in the OEWS survey.

### Occupations driving higher wage growth in the CPS than the OEWS for top deciles of the wage distribution

While both the CPS and OEWS data show strong wage growth in the second and third deciles of the wage distribution from 2013 to 2019, the CPS data show much greater wage growth in the top deciles than the OEWS data during this same period. Using the same methodology as just previously described, we can identify the occupational groups that contribute most to this difference in wage growth between the surveys. We find that the pattern of which occupations contributed most to decile-level wage increases is remarkably similar between the two surveys. The correlation of occupation-specific contributions to wage increases between surveys is 0.51 in the eighth decile, 0.71 in the ninth decile, and 0.51 in the tenth decile.

Table 5 lists the occupation-wage-decile combinations for which the difference in contributions to wage growth in the OEWS and the CPS during this period is greater than or equal to 50 cents. “Other management occupations” appears in this table in all three of the uppermost wage deciles. This occupational group includes such occupations as farm managers, construction managers, education administrators, engineering managers, food service managers, medical managers, postmasters, funeral home managers, and others. Both surveys show an increasing share of employment in the top deciles between 2013 and 2019, as well as increasing wages in both surveys but somewhat greater share growth and substantially greater wage growth in the CPS than in the OEWS. “Computer occupations” appears in this table in the top two wage deciles. This occupational category includes such occupations as computer systems analysts, computer and information research scientists, computer network support specialists, network administrators, computer programmers, and others. Again, both surveys show an increasing share of employment for this occupational category in the top deciles between 2013 and 2019, as well as increasing wages in both surveys, but somewhat greater share growth and substantially greater wage growth in the CPS than in the OEWS. The last two occupational groups in table 5 are “Health diagnosing or treating practitioners” and “Sales representatives, wholesale and manufacturing,” which appear only in the top decile. The occupational group of health diagnosing or treating practitioners includes such occupations as dentists, dieticians, optometrists, pharmacists, physician assistants, nurses, physicians, surgeons, and others. This group made up a growing share of employment in the top decile in the CPS but a falling share of employment in the OEWS during this period, and it showed greater wage growth in the CPS than in the OEWS (overall and within the top decile). Sales representatives, wholesale and manufacturing, made up a falling share of employment in the top decile in both surveys and saw an increase in wages of more than $13.00 an hour in the CPS but a decrease in wages in the OEWS of $0.23 during this period.
Table 5. Occupation-wage-decile combinations contributing 50 cents or more to the divergence between OEWS survey and CPS wage growth from 2013 to 2019

| Decile | SOC | Contribution to the change in wages in OEWS survey data | Contribution to the change in wages in CPS data | Difference in contributions |
|--------|-----|------------------------------------------------------|------------------------------------------------|----------------------------|
| 8      | 11-9000 Other management occupations | $0.08 | $0.58 | $0.50 |
| 9      | 15-1000 Computer occupations | 0.26 | 0.94 | 0.67 |
| 10     | 11-9000 Other management occupations | 0.48 | 1.69 | 1.22 |
|        | 15-1000 Computer occupations | 0.79 | 1.88 | 1.09 |
|        | 29-1000 Healthcare diagnosing or treating practitioners | –0.00 | 1.05 | 1.06 |
|        | 41-4000 Sales representative, wholesale and manufacturing | –0.36 | 0.17 | 0.53 |

Note: CPS = Current Population Survey, OEWS = Occupational Employment and Wage Statistics, and SOC = Standard Occupational Classification. CPS estimates are based on the confidential version of the CPS microdata available to U.S. Bureau of Labor Statistics employees, not the public-use version of the microdata. Source: U.S. Bureau of Labor Statistics.

Further decomposition results
The richness of the survey data from the OEWS and the CPS allow us to show how much wage inequality can be explained by various characteristics of workers and their employers and how this explanatory power has been changing over time. In the previous section, we emphasized the role of occupations in identifying which workers have seen notable changes in wages, because occupations are collected in both the OEWS and the CPS. In contrast, Hoffman and coauthors emphasize the important role of education in driving wage inequality growth in the United States in recent decades by showing that after accounting for education, occupations explain very little more of wage variation among workers. However, education and occupation are closely related; one mechanism for the strong relationship between education and wage inequality is the way that education determines occupations of workers. For example, Daron Acemoglu and Pascual Restrepo find that much of the divergence in wage growth from 1980 to 2016 for people of different education levels can be explained by the different exposure of people with different education levels to automation technologies.

In this section, we closely follow Hoffman and coauthors, regressing wages on categorical dummy variables and showing how much variation in wages can be explained by each variable individually or how much additional variation can be explained in regressions that include multiple variables. These figures plot $R^2$ values (and increases in $R^2$ values from wage regressions including additional variables), multiplied by the wage variance in each period. The categorical variables used here are broad age, education, occupation, industry, and metropolitan statistical area (MSA) groups. Categories are eight 5-year age groups, five broad education categories, ten broad occupational groups using the current CPS broad occupational recoding, thirteen broad industry groups using the current CPS broad industry recoding, and three geographic area groups (the largest 15 metropolitan areas, all other metropolitan areas, and the balance of the United States).

In chart 5, we reproduce results from Hoffman, Lee, and Lemieux (their figure 4) using the confidential CPS-ORG data, combining data on men and women. Chart 5 replicates the result in Hoffman and coauthors that most of the impact of growing wage inequality comes through their “baseline,” which includes the impact only of the interaction between age/experience and schooling levels, with smaller additional amounts explained by occupation, industry, and interactions with geographic areas. However, when we reverse the order of this decomposition to show the impact of the interaction between age/experience and occupation first and then add education later, in chart 6, this pattern is reversed, showing an increasing amount of wage variation explained by occupation (with a smaller additional amount explained by education).
We cannot observe either the education or age of workers in the OEWS data, but we can observe their occupations and the industries and locations of their employers. Chart 7 shows the amount of growing wage inequality in the confidential CPS wage data that can be explained by only these three variable categories, while chart 8 shows the same results in the OEWS data.

Chart 6. Effect of additional covariates on the between-group variance of Current Population Survey hourly wage, with age × occupation as baseline, 2000–19

Chart 7. Effect of additional covariates on the between-group variance of Current Population Survey hourly wages, using only covariates available in the Occupational Employment and Wage Statistics survey, 2000–19

Chart 8. Effect of additional covariates on the between-group variance of Occupational Employment and Wage Statistics survey hourly wages, 2002–19
Three notable differences are apparent between charts 7 and 8. First, as shown earlier in this article, the total amount of wage variation in the OEWS data (but not in the CPS data) is declining from the 2010–13 period to the 2016–19 period. Second, the amount of wage variation because of occupation—even the extremely broad occupational groups used in Hoffman and colleagues—is much greater in the OEWS than in the CPS. Third, the amount of wage variance that can be explained by broad occupational groups continues to increase in the CPS throughout this period, but the amount of wage variance that can be explained by occupation in the OEWS declines from the 2010–13 period to the 2016–19 period.

This article is not the first to show that more wage variation can be explained by occupation in the OEWS data than in the CPS data. Spletzer and Handwerker found a very similar result for major occupational groups in the 1998–2010 period. Following Sandra Hoffman, Lee, and Lemieux, have emphasized the role of education in wage inequality. Following Thomas Lemieux, we apply a uniform factor of 1.4 multiplied by the top-coded value to all these observations.

The declining amount of wage variation that can be explained by occupation in the OEWS (but not in the CPS) is consistent with the evidence shown earlier in this article. As table 4 shows, in the OEWS, several lower wage occupations had substantial wage gains from 2013 to 2019, while table 5 gives examples of high-wage occupations with much more substantial wage growth in the CPS than in the OEWS. This combination of increasing wages for lower wage occupations and relatively less wage growth for higher wage occupations in the OEWS generates this pattern of a declining amount of wage variation explained by occupation.

The explanatory power of industry or MSA groups on wage inequality in the OEWS is much less than the impact of occupational groups, even when we do not first condition on occupation. While occupational groups alone explain more than one-third of log wage variation in each OEWS period, industry groups alone can explain less than one-seventh, and MSA status alone can explain only one-forieth.

**Discussion and conclusion**

This article documents the expansion and compression of wage and earnings inequality using three data sources: wage data collected in the OEWS employer survey, wage data collected in the CPS household survey, and W-2 earnings reports to the IRS. All three show expanded inequality of wages or earnings from 2005 to 2010. However, in the CPS, we find that wage inequality has been flat since 2013 (for all workers) or 2015 (for full-time workers), and in the OEWS, we find that wage inequality was basically flat from 2013 to 2016 and decreased from 2016 to 2019. This finding—that wage inequality did not continue rising through the 2010s—is consistent with evidence that workers’ annual wage and salary earnings in the W-2 tax data are compressing from 2010 to 2018.

All three of these very different data sources show that wages/earnings were becoming more equal among workers in the bottom half of the wage/earnings distribution from about 2013 to 2018 or 2019, because of particularly strong wage/earnings growth for workers near the 10th and 25th percentiles of the wage distribution. In the CPS and OEWS data, we show particularly strong wage growth in the second and third deciles among workers who worked in occupational groups such as material moving workers, health technologists and technicians, and information and record clerks (in the CPS) and health aides, food and beverage serving workers, and material moving workers (in the OEWS).

The results are consistent with those of Jay C. Shambaugh and Michael R. Strain, who show particularly strong wage growth at the lower percentiles of the wage distribution from 2017 to 2019. They are also consistent with other research suggesting a change in the trend of ever-increasing income and wage inequality in recent years. Using data from millions of households with checking accounts, Fiona Gregg, Chris Wheat, George Eckerd, Melissa O’Brien, and Shantamu Banerjee examine income growth over 2-year periods, grouping households into quartiles by average incomes in their ZIP Code of residence. They find income growth rates for households in the lowest income quartile that exceeded the income growth rates for households in the highest income quartile beginning with the 2-year period from 2016 to 2018. Ellora Derenoncourt, Clemens Noelke, and David Weil use online job postings to study wage spillovers for low-wage workers in the same labor markets as the workers of Walmart, Target, Costco, and Amazon/Whole Foods. These large employers announced company policies of paying all U.S. workers wages of no less than $9–$15 per hour between 2014 and 2019. Derenoncourt and coauthors find that the wage policies of these employers not only affected wages for their own workers but also raised wage offers for lower wage workers hired by other employers in the same geographic areas.

Our examination of which occupations have played substantial roles in wage convergence during this period is accompanied by evidence that occupations play a large and growing role in wage inequality in CPS data—and even more so in wage inequality in OEWS data. However, the role of occupations in wage inequality in OEWS data was lessened from 2013 to 2019, while low-wage occupations saw large wage gains and high-wage occupations saw small wage gains in this data. Other authors, such as Hoffman, Lee, and Lemieux, have emphasized the role of education in wage inequality. We suggest that readers looking to reconcile these findings consider that occupation is often a mechanism by which education affects wages.

We also caution our readers that wage inequality—despite its importance—is only one piece of overall inequality in labor markets. The Organisation for Economic Cooperation and Development suggests indicators of job quality that include not only earnings but also working time arrangements (such as the share of workers with “unsocial” hours of work), job security, workplace relationships, work-related access to programs for health insurance, pensions, unemployment insurance, and family-related paid leave, as well as workplace safety. As an example of how workplace safety may affect the overall “quality” of an occupation, we note that despite the increasing wages we have found in multiple datasets for material moving workers, the BLS Injuries, Illnesses, and Fatalities program found that workers in the broader category of transportation and material moving occupations have among the highest rates of workplace injuries and illnesses of any broad occupational group in 2018.

Nonetheless, wage inequality is a very important part of overall inequality in labor markets. Thus, it is important that wage inequality either plateaued or began to reverse because of high wage growth for lower wage workers in the later years of the last economic expansion.

ACKNOWLEDGMENT: Any opinions and conclusions expressed herein are those of the authors and not the U.S. Census Bureau or the U.S. Bureau of Labor Statistics. The U.S. Census Bureau reviewed the results derived from Title 13 protected data for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to this release (approval ID: CBDRB-FY21-CES014-040). The U.S. Bureau of Labor Statistics reviewed results derived from OEWS and CPS data for unauthorized disclosure.

**Appendix: Wage inequality trends in public-use versions of the CPS data**

In our main results, we use the confidential CPS microdata not available to researchers outside BLS or the U.S. Census Bureau. The difference between the public-use and confidential versions of the CPS data is whether actual wages are reported for people earning more than $2,884.61 a week. The CPS public-use data are top coded at $2,884.61 a week to protect the confidentiality of the respondents. This top coding affects a growing share of respondents. In 2003, it affected 0.9 percent of respondents; in 2019, it affected 4.1 percent of respondents. Researchers working with public-use data have approached the problem of modeling earnings above this top-coding threshold in two different ways: assuming a Pareto distribution and assuming wages of 1.4 multiplied by $2,884.61 ($4,038.45). We follow two approaches to these top-coded public-use data in the published literature. Following Thomas Lemieux, we apply a uniform factor of 1.4 multiplied by the top-coded value to all these observations. Following Sandra A. West, Anne E. Polivka, and Barry T. Hirsch and David A. Macpherson, we fit a Pareto distribution to the non-top-coded observations to impute values for the top-coded
The use of the Pareto distribution to model wages above $2,884.61 ($2,884.61 multiplied by 1.4). We also find that the assumption that all these top-coded earners earn $4,038.45 a week better fits the trend in the confidential CPS data than modeling the top-coded data using a Pareto distribution each period. The use of the Pareto distribution to model wages above the top code

Comparing the various versions of the CPS data (comparing 1 with 3 and 5 and 2 with 4 and 6), we find much greater variation in overall wages when wages above $2,884.61 are modeled using a Pareto distribution fit to the shape of the earning distribution below $2,884.61 a week than if all wages above $2,885.00 are assumed to be $4,038.45 ($2,884.61 multiplied by 1.4). We also find that the assumption that all these top-coded earners earn $4,038.45 a week better fits the trend in the confidential version of these data than modeling the top-coded data using a Pareto distribution each period. The use of the Pareto distribution to model wages above the top code introduces more variation in wages in recent years than exists in the confidential data. Both the public-use version of the CPS wage data—using the assumption that top-coded wages are $4,038.45 a week—and the confidential version of the CPS data show that wage inequality plateaued after 2012.

In appendix chart 1, we compare six variations of overall trends of the standard deviation of log hourly wage income in the CPS-ORG. Trends in

1. the confidential CPS data for all workers (the main specification shown in the article);
2. the confidential CPS data for full-time workers only, weighted by their weekly hours;
3. the public-use data for all workers, assuming a Pareto distribution of wages for those who earn more than $2,884.61 a week;
4. the public-use CPS data for full-time workers only, weighted by their weekly hours, and assuming a Pareto distribution of wages for those who earn more than $2,884.61 a week,
5. the public-use CPS data for all workers, assuming weekly earnings of $4,038.45 for those who earn more than $2,884.61 a week; and
6. the public-use CPS data for full-time workers only, weighted by their weekly hours, and assuming weekly earnings of $4,038.45 for those who earn more than $2,884.61 a week.

Appendix chart 1. Standard deviation of log hourly wages for all workers and full-time workers in CPS outgoing rotations, public-use (with two different corrections for the censoring of high-wage observations) and confidential internal versions, 2003–19

View Chart Data

Comparing worker restrictions and weightings within each version of the CPS data (comparing 1 with 2, 3 with 4, and 5 with 6), we find that without weighting by the number of hours worked, a greater dispersion of wages is found among all workers than among full-time workers. Weighting full-time workers by the number of hours they work increases the dispersion in their wages, since higher earning full-time workers work more hours. In all versions of the CPS data, a greater dispersion of wages is found overall among all workers, not weighted by hours worked (estimate more comparable to the OEWS) than among full-time workers only, weighted by hours worked (estimates more comparable to the wage variation literature).

Comparing the various versions of the CPS data (comparing 1 with 3 and 5 and 2 with 4 and 6), we find much greater variation in overall wages when wages above $2,884.61 ($2,884.61 multiplied by 1.4). This adjustment is not done in the confidential internal versions, 2003–19 corrections for the censoring of high-wage observations) and confidential internal versions, 2003–19

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The within-decile employment and wage trends hold for these occupations as a whole in the CPS data, not just within the second and third deciles of the wage distribution. During this period, material moving workers, grew in employment and had large increases in average wages overall; retail sales workers, had declining employment but rising wages overall, and health technologists and technicians as well as information and record clerks had growing employment and wages overall.

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JUNE 2022

The legalities of the uniquely American employee benefits system

Understanding Employee Benefits Law, 2nd ed. By Kathryn L. Moore. Durham, NC: Carolina Academic Press, 2020, 531 pp., $51.00 paperback.

In a nation where welfare and pension benefits largely come from employers, the rules and laws governing how employers distribute those benefits hold outsized importance. According to a recent survey from Principal Financial Group, less than half of Americans are confident they will have enough saved to ensure a secure retirement. And a recent study from the Pew Research Center suggests that most Americans are unhappy with the employer-based healthcare system they currently have, with a clear majority (63 percent) favoring a single, national government program to provide healthcare coverage. With ever-evolving rules on pensions and various legal challenges to the most significant healthcare legislation, the Affordable Care Act (ACA), keeping up with where the law stands at any given time could be troublesome. A recent text on the subject could make it a lot simpler.

In Understanding Employee Benefits Law (2nd edition), author Kathryn L. Moore provides a comprehensive overview of what is a broad and complex area of law. She addresses employer pension and healthcare plans, detailing the unique features of the U.S. employer-based benefits system. The book provides in-depth discussion of the impact of the ACA on employer-provided healthcare plans, as well as the effect of the Employee Retirement Income Security Act (ERISA) on employer-provided pension plans. What Moore offers is an end product that would satisfy students, practitioners, and the intellectually curious alike.

The book begins with an overview of pension plans, distinguishing between defined benefit (DB) and defined contribution (DC) plans. DB plans are what many would consider traditional pension plans, with beneficiaries receiving a fixed amount during retirement. DC plans, which are more prevalent today, are individual retirement accounts into which money is contributed, with benefits resulting from accumulated savings. The author offers detailed examples of how specific plan terms and varying benefit formulas would affect a participant’s total benefit for different types of DB and DC plans.

Next is an introduction to employment-based healthcare plans. The author puts forth a brief history of the U.S. employment-based healthcare system, reporting that this system is unique among advanced nations and attributing its rise to wage and price controls dating back to World War II, when employee benefits became an increasingly important recruitment tool. The book reveals several problems with the system—including its inability to insure people, its high cost, and its poorly functioning individual and small-group markets—and then moves on to discuss the ACA, the 2010 legislation designed to address these problems.

Moore’s discussion of the ACA is centered around the act’s three key components: market reforms, individual and employer mandates, and health insurance exchanges. Among the market reforms discussed are prohibiting health insurance companies from denying coverage on the basis of preexisting conditions, allowing young adults to retain their parents’ coverage until age 26, and prohibiting lifetime and annual caps on benefits. The author devotes considerable time to discussing the evolution of the individual mandate, which originally carried a monetary penalty for individuals who failed to purchase health insurance coverage. After the penalty was eliminated by Congress in 2017, the mandate survived legal challenges to its constitutionality and remains in effect today. With respect to the health insurance marketplaces established by the ACA, the book describes the individual and small business marketplaces, including covered benefits, cost-sharing limits, and actuarial-value requirements. The author is careful to point out what the legislation does not do—create a single coherent system; eliminate the employer-based system; or change the large-group, small-group, and individual-market segmentation of the current system.

The book next turns to the ERISA regulatory requirements that govern the day-to-day operation of employee benefit plans, including items such as the written plan documents describing the operation and provisions of those plans, reporting and disclosure requirements, and procedures for amending plans. In addition, Moore offers a detailed review of the four ERISA section 510 prohibitions (exercise clause, interference clause, whistleblower provision, and multiemployer plan provision) protecting employees from adverse employment action for exercising their rights in relation to the plan, and she also provides several practical examples of violations of those protections.

Later chapters discuss the intricacies of regulating pension plans, ERISA fiduciary standards, civil enforcement, ERISA preemption, nondiscrimination rules for qualified plans, the tax rules governing pension plans, and plan termination. In the hands of a less capable writer, this weighty material might have been presented in a way that is muddled and tedious to read. But here, the substantive information is well arranged and easy to comprehend.

A major strength of the book is its presentation style. Moore offers practical examples showing how the technical concepts she discusses might operate in the real world. The examples found in the chapter on tax rules, for instance, are particularly helpful in showing the tax implications that different Internal Revenue Service regulations would have on DB and DC plan participants of various incomes. The author also provides flow charts that illustrate how some of the more complex processes would work in practical terms. For example, the chapter on nondiscrimination rules for qualified plans, which contains some of the thorniest material in the text, effectively uses flow charts to break the information down and make it easy to follow.

Understanding Employee Benefits Law is a legal text that is broadly accessible and not restricted to the legal community. It uses clear examples and strong visual aids to make complicated material digestible. I would recommend this book as a reference for legal practitioners or an introduction for people looking to expand their knowledge of the legal aspects of employee benefit programs.
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