

Demographics, earnings, and family characteristics of workers in sectors initially affected by COVID-19 shutdowns

In the initial weeks of the coronavirus disease 2019 (COVID-19) pandemic, employment in several industries was especially vulnerable because of shutdown policies imposed by states, as well as a drop in demand as people engaged in social distancing. This article looks at the demographic characteristics of workers in the initially highly exposed industries, as well as the characteristics and earnings of families with workers in these industries. The article also uses recent Current Population Survey data to look at how various demographic groups have fared in the early weeks of the COVID-19 pandemic between February and April.

In the initial weeks of the COVID-19 pandemic, employment in several industries was especially vulnerable because of shutdown policies imposed by states, as well as a drop in demand as people engaged in social distancing. As a general rule, these were industries that were not deemed essential and that provide goods and services requiring considerable interaction between workers and customers. A recent article by Matthew Dey and Mark A. Loewenstein, published in the April 2020 *Monthly Labor Review*,^[1] using a taxonomy developed by Joseph Vavra to identify vulnerable industries, provides estimates of the number of jobs and the wages paid in these vulnerable industries of the economy.^[2] A key finding of that article is that, in 2019, about 20 percent of all employees worked in these highly exposed industries. Furthermore, occupations with lower wages are more common in the highly exposed sector than elsewhere in the economy. (Throughout this article, we



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characterize the economy as being made up of two sectors, the highly exposed sector and the not highly exposed sector.)

The effects of the pandemic have now become widespread, and employment losses have not been confined to businesses in industries that were forced to shut down.

Furthermore, some localities and states have now begun to lift stay-at-home orders and businesses in vulnerable

industries have begun to reopen. However, a number of unknowns exist: Will customers return when industries that have been shut down are reopened? Will workers return? Will further breakouts occur that result in industries again being shut down? In the state of these uncertainties, industries initially identified as vulnerable may continue to face difficulties.

This article expands on the earlier analysis by looking at the demographic characteristics of workers in the highly exposed industries. We also look at family earnings and other family characteristics. In the final section of this article, we briefly examine Current Population Survey (CPS) April 2020 estimates to gauge how employment in the highly exposed sector and elsewhere was affected at the start of the pandemic. The estimates indicate that, between February and April, employment losses have been especially severe in the highly exposed industries.

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Note: Analysis on more recent CPS estimates is available at <https://www.bls.gov/ers/update-on-demographics-earnings-and-family-characteristics-of-workers-in-sectors-initially-affected-by-covid-19-shutdowns.htm>.

Data

The Dey and Loewenstein's April 2020 article uses establishment data from the U.S. Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages and Occupational Employment Statistics (OES) programs. In this current article, we use household data from the CPS. Conducted by the U.S. Census Bureau for the BLS, the CPS is a monthly survey of approximately 60,000 households. The CPS provides a comprehensive body of data on the labor force status of individuals (employed, unemployed, or not in the labor force), hours of work, and other demographic and labor force characteristics. In addition, for one-fourth of the monthly sample, information about the earnings of wage and salary workers is collected.^[3] The estimates in this article are obtained by averaging the data across months in 2019, with use of only a quarter of the sample for which earnings information was collected.

The current article uses the same industry classification scheme as that used in the initial article.^[4] (The list of census industries used for this analysis can be found in the appendix, table A-1.) Industries in the highly exposed sector include "Restaurants and Bars, Travel and Transportation, Entertainment (e.g., casinos and amusement parks), Personal Services (e.g., dentists, daycare providers, barbers), other sensitive Retail (e.g., department stores and car dealers), and sensitive Manufacturing (e.g., aircraft and car manufacturing)."^[5] Using CPS data, we

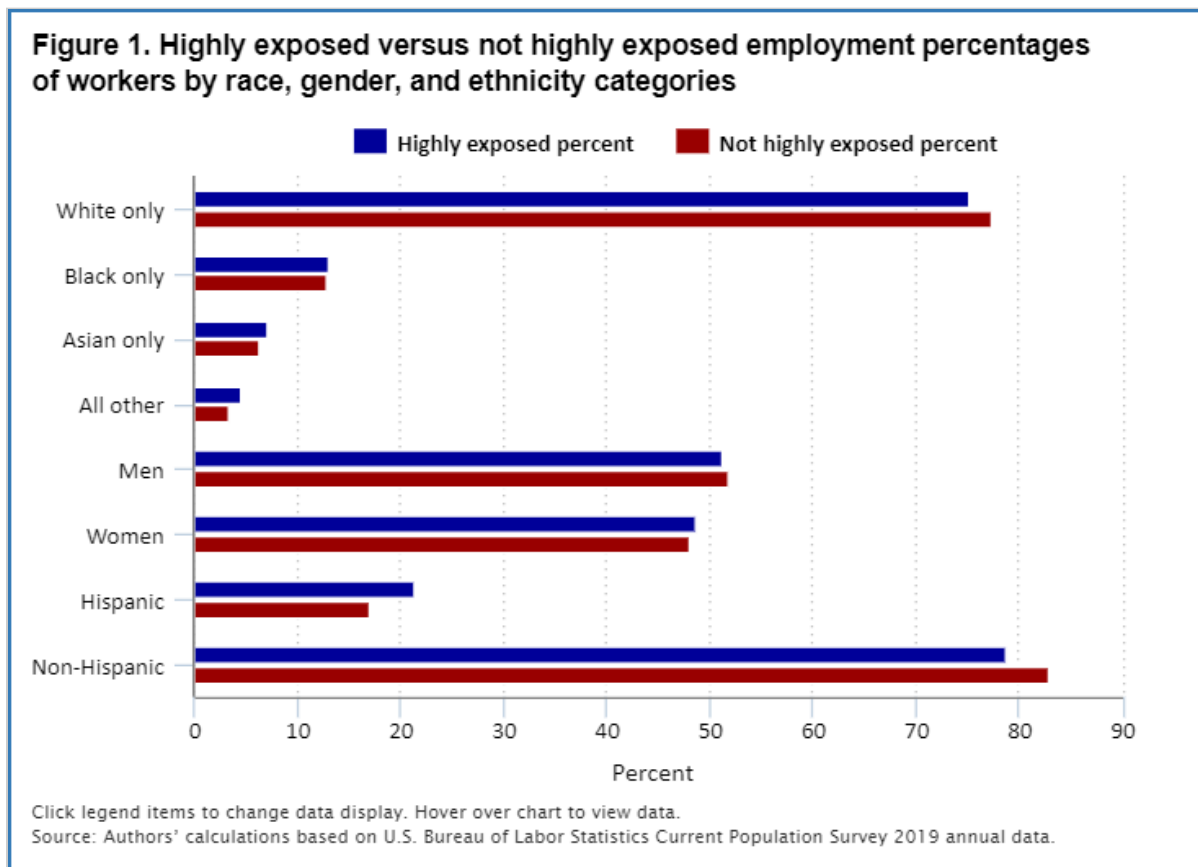
find 27.5 million workers, or 19.4 percent of U.S. employment in 2019 (similar to the OES estimates), were in these highly exposed industries.

Demographic characteristics and wages of workers in the highly exposed sector

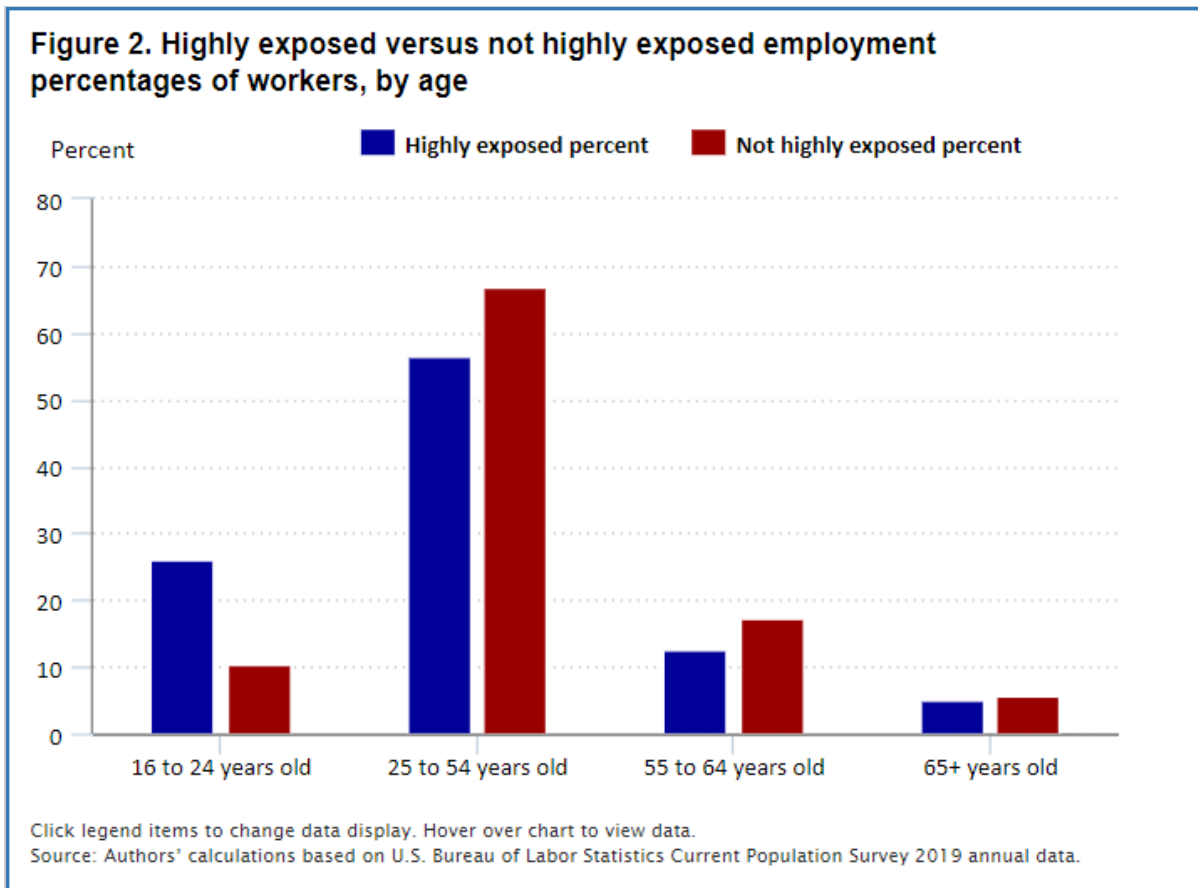
Employment estimates for various demographic groups are presented in table 1 and in tables A-2 and A-3 of the appendix. The figures and the ensuing discussion in this section are based on the estimates in these tables.

Table 1. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of all workers

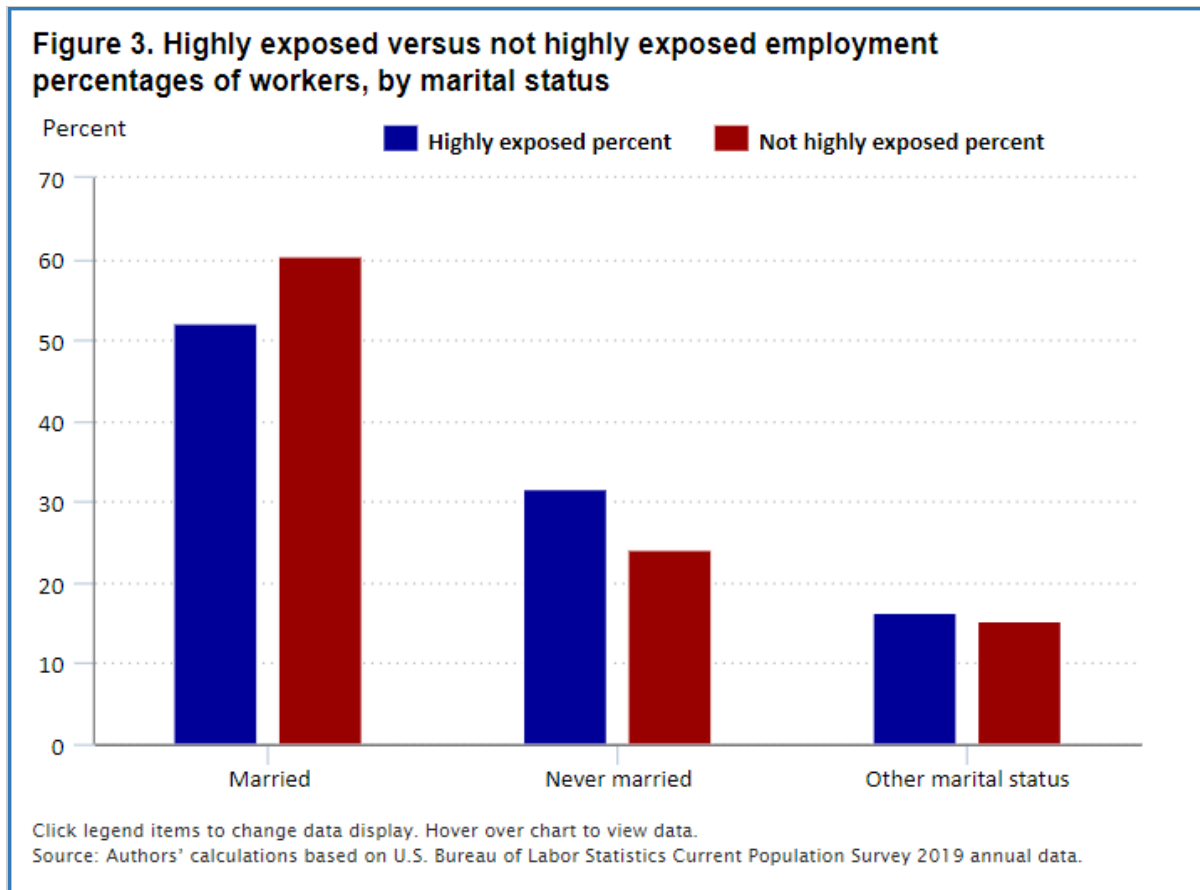
Figure 1 depicts the fraction of workers by race, gender, and Hispanic ethnicity in the highly exposed industries and in the rest of the economy. One sees that the racial composition of the two sectors is quite similar, with a slight overrepresentation of minorities in the highly exposed sector. One also sees that the gender composition between the two sectors is similar, with a slight overrepresentation of women. (However, tables A-2 and A-3 show a gender imbalance among younger workers. In the highly exposed sector, 40 percent of those ages 16 to 24 are women and only 35 percent are men.) Other demographic differences are more pronounced. As figure 1 shows, Hispanics are overrepresented in the highly exposed sector. Twenty-three percent of Hispanic workers are employed in the highly exposed sector. The corresponding estimate for non-Hispanics is 18.6 percent.



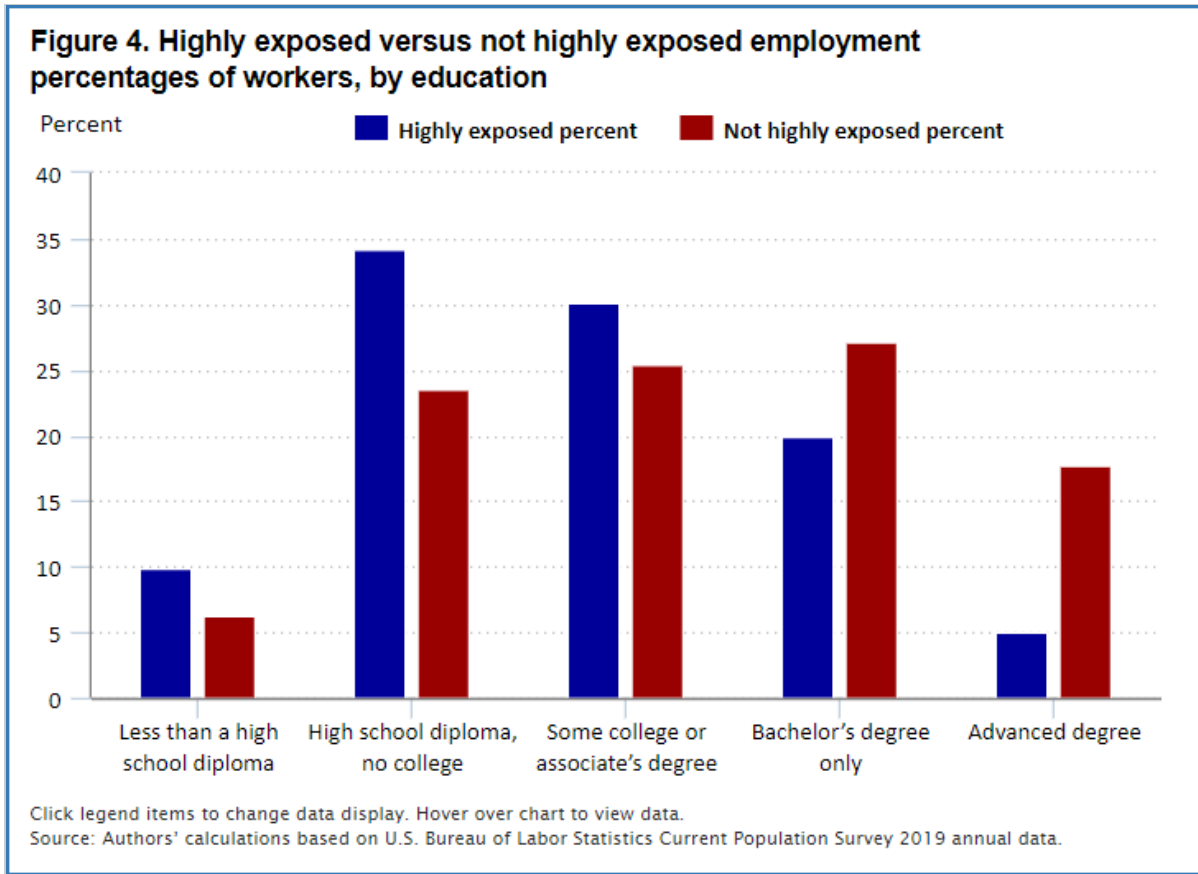
Age, marital status, and education attainment differences of workers between the two sectors are even starker. Figure 2 shows the age composition of workers in the highly exposed industries and the rest of the economy. Note that workers under the age of 25 make up 25.9 percent of employment in the highly exposed industries and only 10.3 percent of employment in the remaining industries. This, in turn, implies that 37.9 percent of workers under age 25 are in the highly exposed sector even though this sector accounts for a little less than 20 percent of overall employment.



Marital status estimates for workers age 25 and older appear in figure 3. A disproportionate share of workers in the highly exposed sector is never married. Workers age 25 and older make up 20.7 percent of never-married workers employed in the highly exposed sector, while the estimate for married workers is 14.6 percent.^[6]

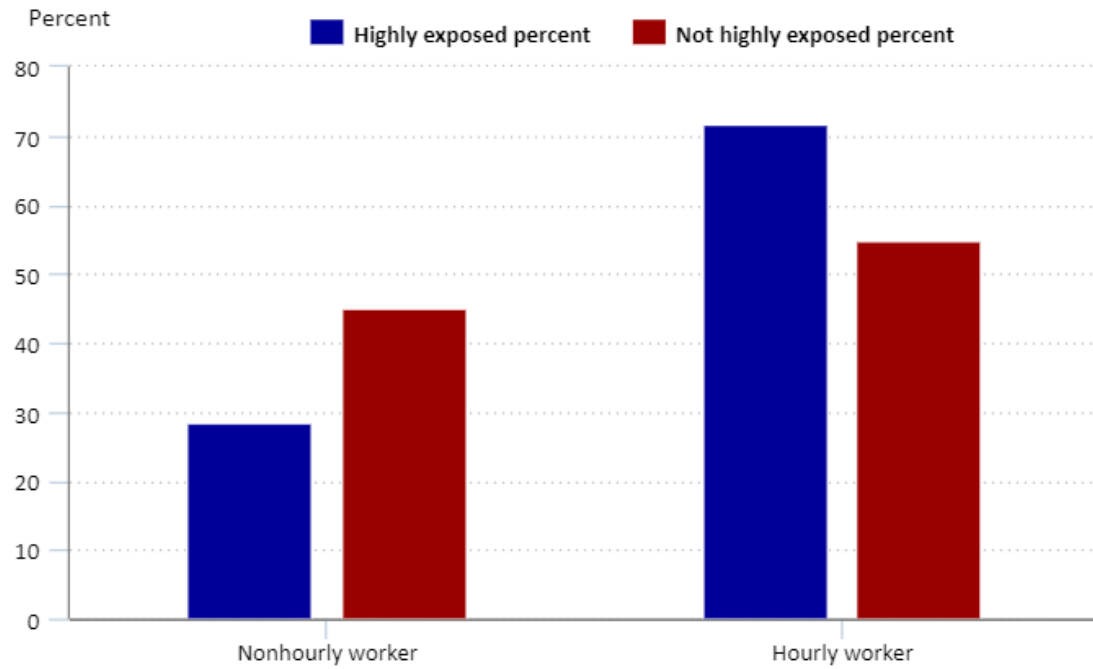


The highly exposed sector is also disproportionately composed of workers with lower educational attainment. As shown in figure 4, at lower levels of education, the share of workers age 25 and older in the highly exposed sector exceeds the share in the other sector, whereas the pattern is reversed at higher levels of education. Thus, as can be seen from table A-3, the higher the level of education, the lower the share of workers in the highly exposed sector. This share is 24.3 percent for workers age 25 and older without a high school degree and 22.4 percent for workers age 25 and older with just a high school degree. The share drops to 19.1 percent for workers with some college or an associate’s degree, 12.7 percent for workers with a bachelor’s degree, and 6.2 percent for workers with an advanced degree.



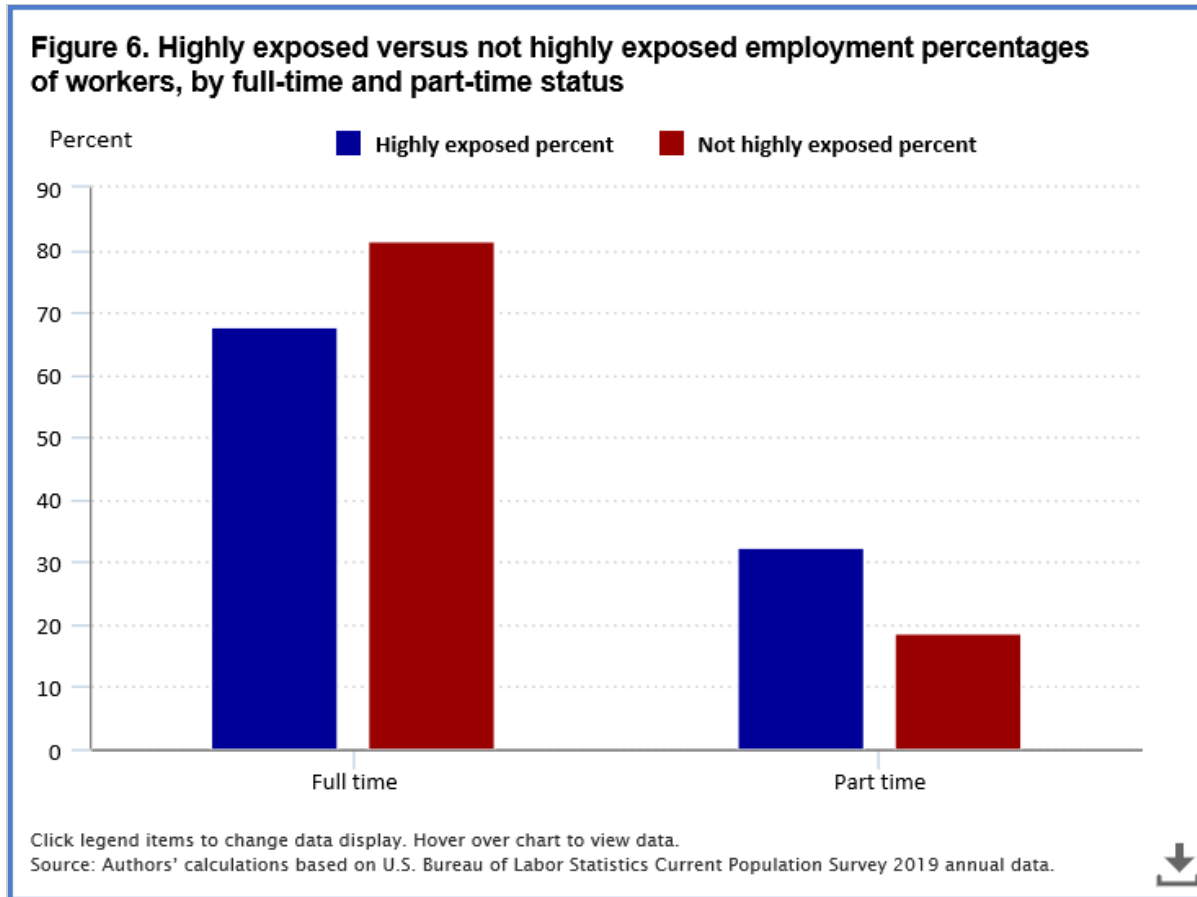
As illustrated in figures 5 and 6, the highly exposed industries have more hourly workers and part-time workers. While 71.7 percent of workers are paid hourly in the highly exposed industries, 54.9 percent of workers are paid hourly in the remaining industries. Approximately one-third of workers in the highly exposed sector usually worked part-time hours—less than 35 hours per week. In the rest of the economy, this estimate is 18.5 percent.

Figure 5. Highly exposed versus not highly exposed employment percentages of workers, by hourly worker status

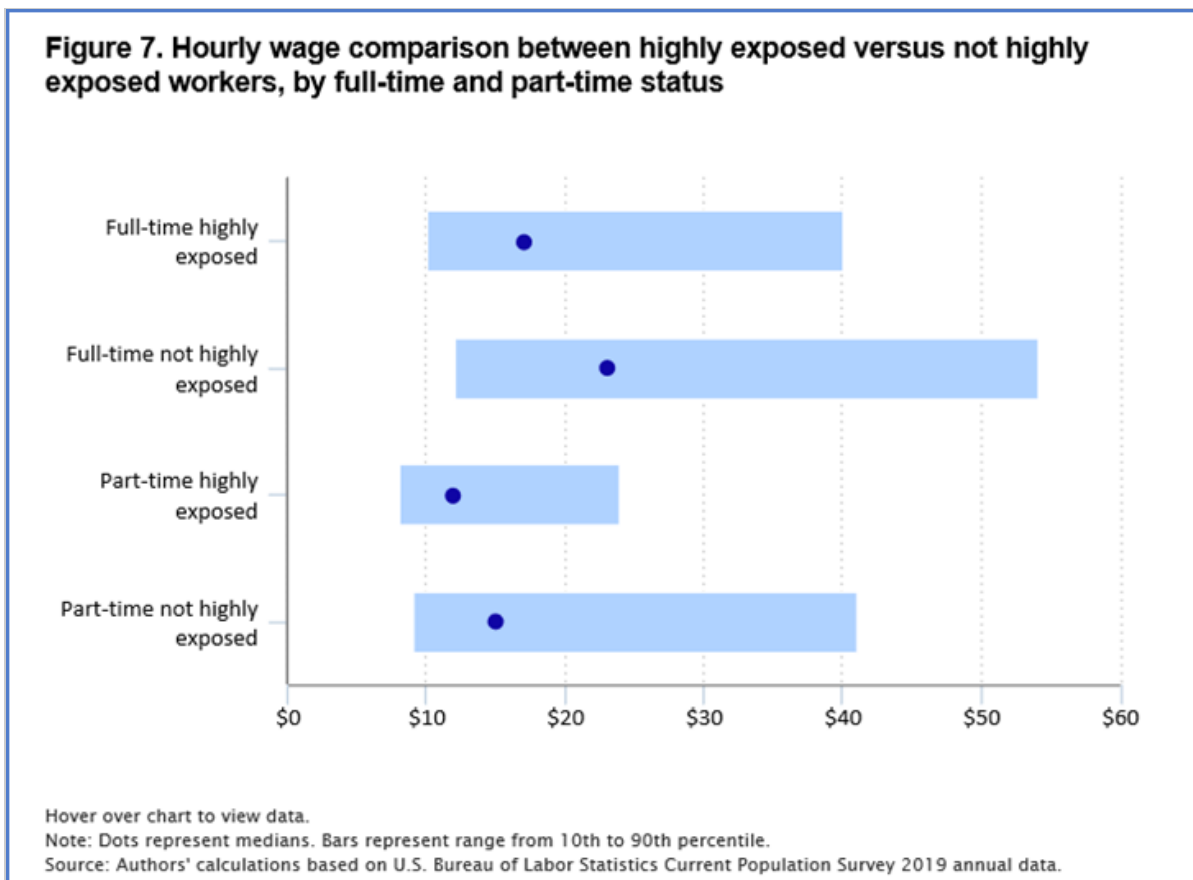


Click legend items to change data display. Hover over chart to view data.

Source: Authors' calculations based on U.S. Bureau of Labor Statistics Current Population Survey 2019 annual data.



Wages are considerably lower in the highly exposed sector than elsewhere.^[7] As noted earlier, the highly exposed sector has more part-time workers than the other sector, and as can be seen in table 1, part-time workers earn less than full-time workers do.^[8] In addition, as shown in figure 7, the wages of part-time and full-time workers in the highly exposed sector are both lower than the wages of workers with similar working arrangements elsewhere. The median hourly wage of part-time workers in the highly exposed sector is \$11.80, compared with \$15.00 elsewhere. The median wage of full-time workers is \$17.00 in the highly exposed sector, compared with \$23.00 for the other sector.



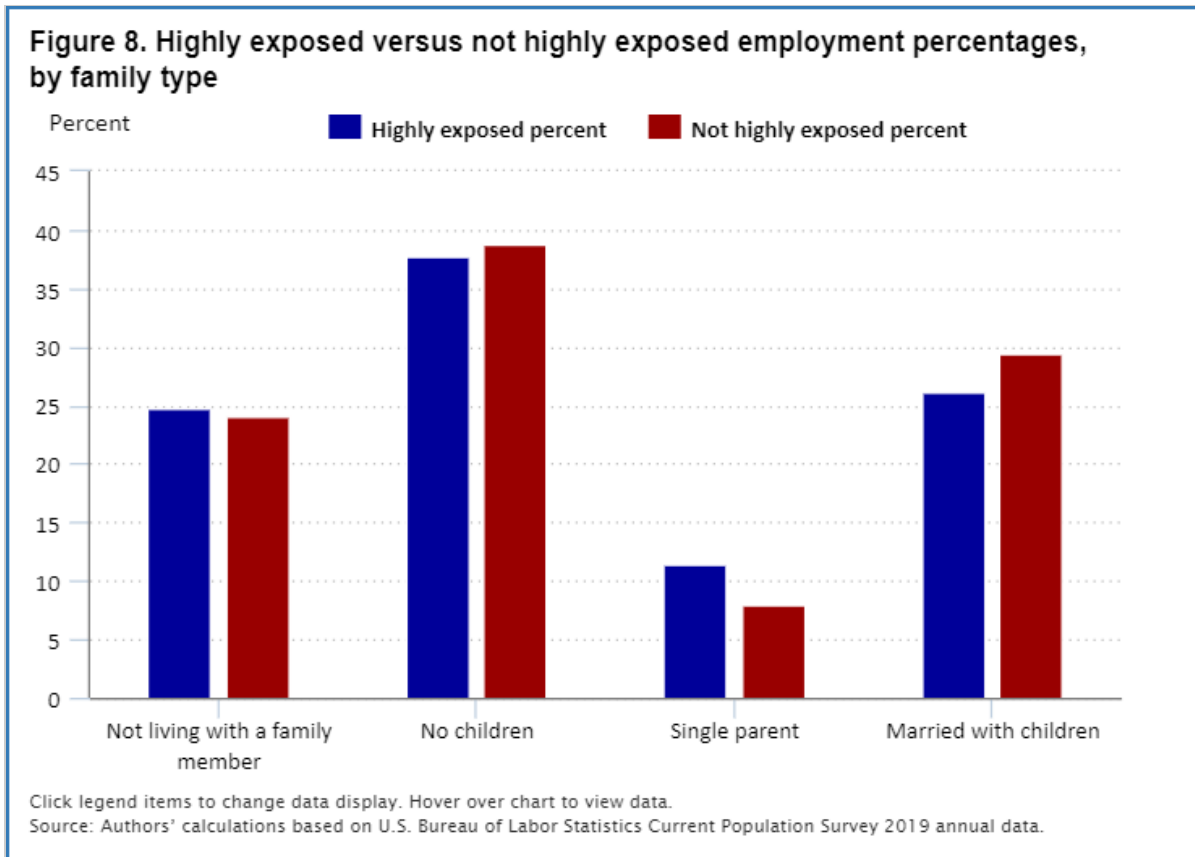
The lower wages in the highly exposed sector translate into lower earnings. Median usual weekly earnings of part-time workers in the highly exposed sector are \$260.00, compared with \$386.00 elsewhere. Median usual weekly earnings of full-time workers are \$700.00 in the highly exposed sector and \$961.53 in the rest of the economy. Of course, averaged over all workers, earnings in the highly exposed sector are also lower because of the much higher proportion of part-time workers.

Family characteristics of workers in the highly exposed sector

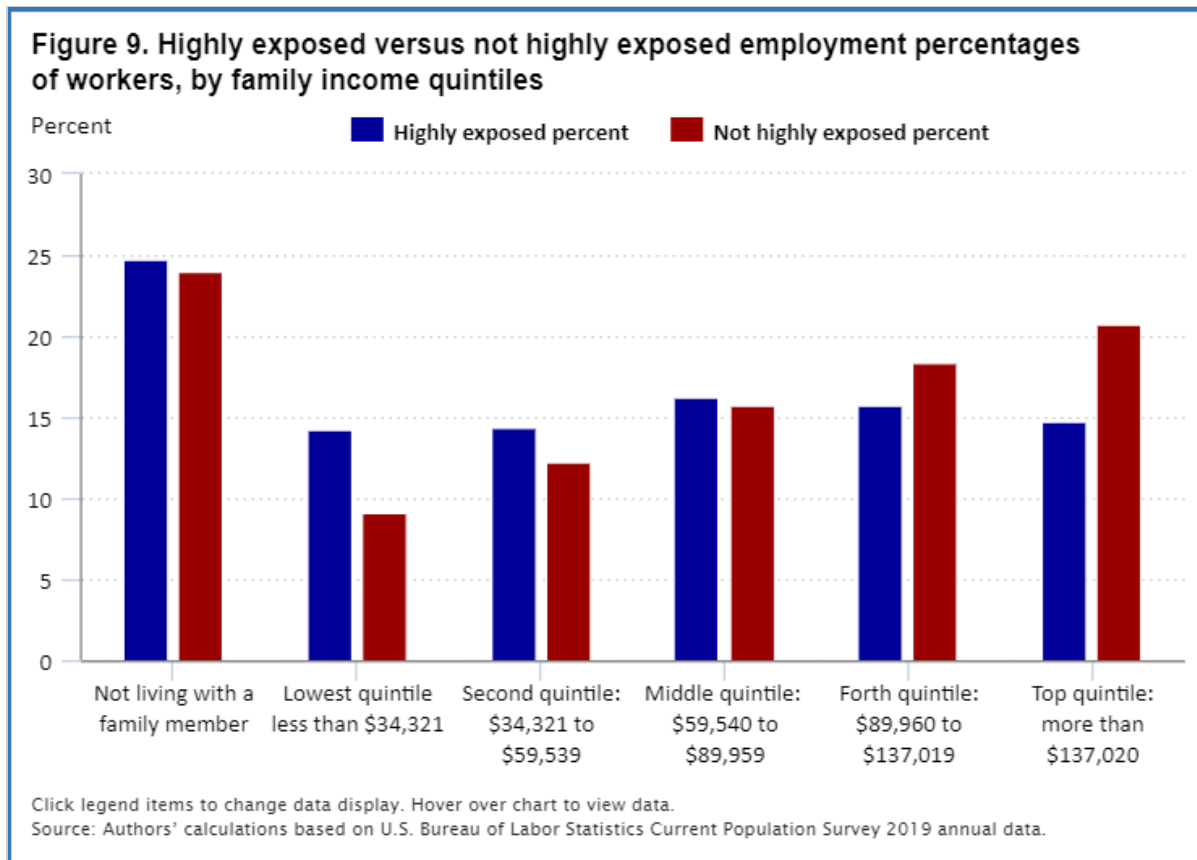
From table 1, one sees that approximately three-fourths of workers in the highly exposed sector live with other family members.^[9] (The proportion is the same for workers in the other sector.) Within these families, workers both contribute to overall family earnings and are able to receive support from other family members who also work. Looking at the composition of these families and the proportions of family earnings that come from the highly exposed sector yields insights into how vulnerable workers may be to possible shutdowns in response to the COVID-19 pandemic.

Workers in the highly exposed sector disproportionately come from single-parent families. From table 1, one sees that approximately 26.0 percent of workers from single-parent families are employed in the highly exposed sector. In contrast, about 18.0 percent of workers from married families with children, 19.0 percent of workers in families with no children, and 20.0 percent of workers living alone or with nonrelatives are employed in the highly exposed sector. Figure 8 shows the percentage of workers in the highly exposed and not highly exposed sectors who are living alone or with nonrelatives and the type of family they live in if they are in a family. Note that approximately 25.0 percent of workers in the highly exposed sector do not live in a family and another 11.4 percent live in a

single-parent family. Taken together, these percentages suggest that if workers were unable to work in the highly exposed sector, as many as 36.0 percent of them would be unable to draw on earnings from other family members in the household.



For workers who do live in families, the highly exposed sector disproportionately employs workers from families with low earnings.[10] Figure 9 shows in each family earnings quintile the proportion of workers who are employed in the highly exposed and not highly exposed sectors. From the numbers in table 1, one sees that 27.6 percent of workers whose family earnings (not adjusted for the size of a person’s family) are in the bottom quintile are employed in the highly exposed sector. For workers whose family earnings are in the second quintile, this estimate is 22.2 percent, and it is 19.9 percent for workers whose family income is in the third quintile. The percentage falls to 17.1 percent and 14.7 percent for workers whose family earnings are in the fourth and top quintiles. The finding that the highly exposed sector disproportionately employs workers from families with low earnings further illustrates that even workers in the highly exposed sector who live in families may only be able to obtain minimal financial support from other family members should they lose their jobs.



Characteristics of families with workers in the highly exposed sector

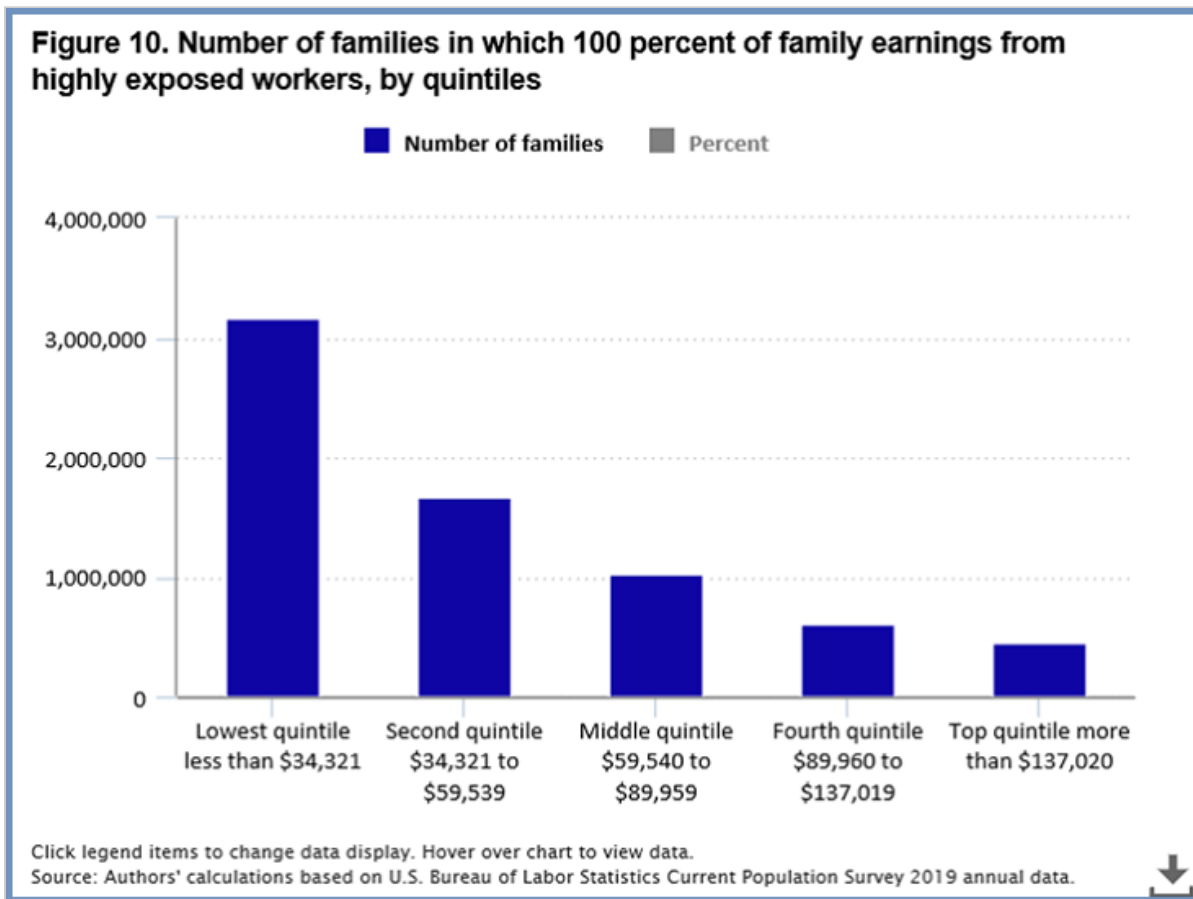
The analysis in the previous section has been conducted from the perspective of the worker and of how much support workers who lose their jobs may expect to receive from other family members in their household. A related question concerns the financial support that workers employed in the highly exposed sector provide to their families. For families with at least one employed family member, the estimates in table 2 show that a little more than 26 percent have at least one worker who is employed in the highly exposed sector and about half of these families have children. For one to assess the vulnerability of these families for each quintile of the family earnings distribution, table 3 shows the percentage of family earnings that stem from employment in the highly exposed sector.

[Table 2. 2019 annual Current Population Survey family estimates, by percent of family earnings from workers in highly exposed sectors and type of family](#)

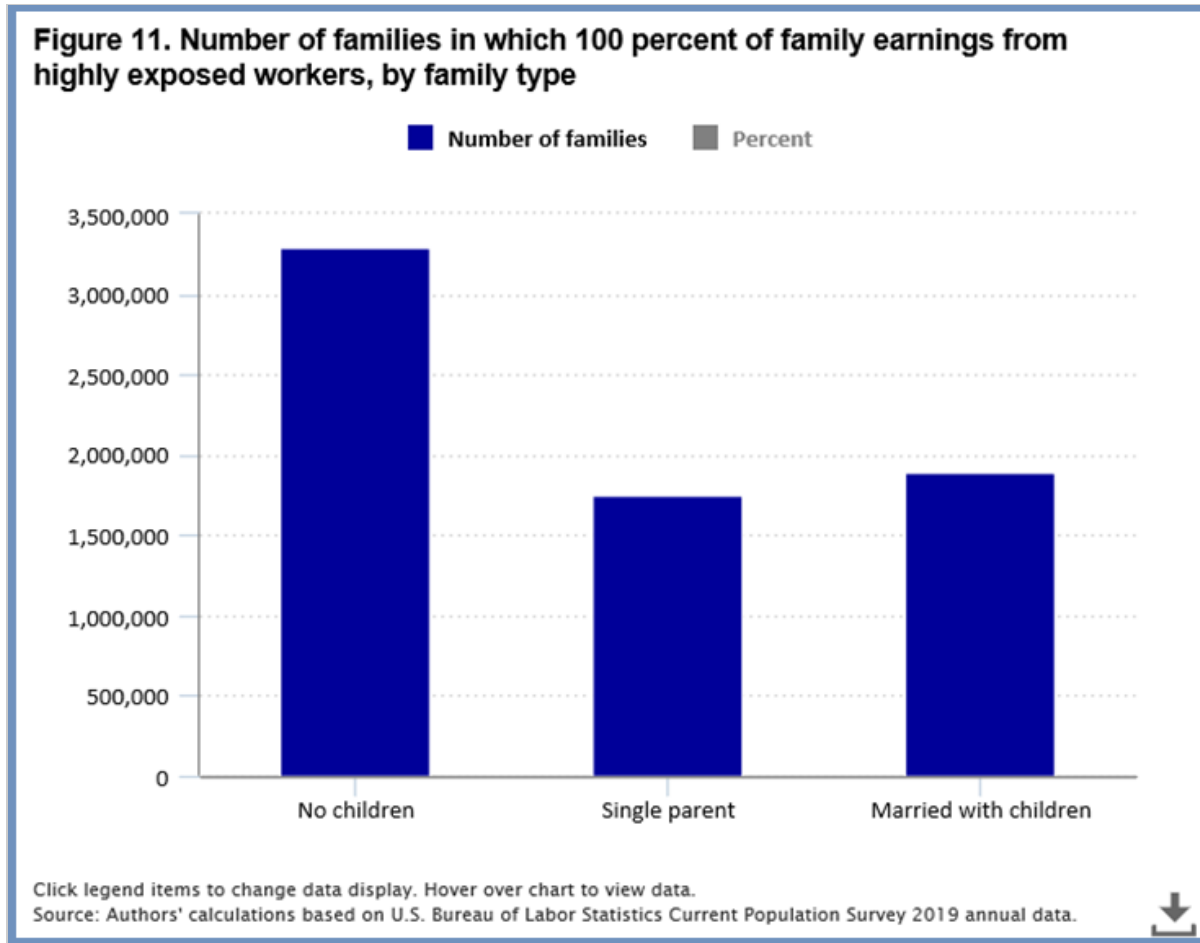
[Table 3. 2019 annual Current Population Survey family counts, by percent of family earnings from workers in highly exposed sectors and family earnings quintiles](#)

Overall, the estimates in table 3 indicate that 10.9 percent of families receive 100.0 percent of their earnings from workers in the highly exposed sector. The estimates also suggest that families with the lowest earnings depend heavily on employment in the highly exposed sector. To illustrate, figure 10 shows the percentage of families in each earnings quintile that receive all of their earnings from the highly exposed sector. Almost 46.0 percent of families in the bottom quintile receive all of their earnings from the highly exposed sector. For families in the

second quintile, this percentage is 24.2 percent. The percentage of families in the middle quintile is 14.7 percent. This percentage drops to 8.8 percent and 6.5 percent for families in the fourth and top quintiles, respectively.



Families with children are similarly vulnerable as families overall. Of families with children, 11.4 percent had 100.0 percent of their earnings coming from workers in the highly exposed sector.^[11] In many instances, children in families in which 100.0 percent of the earnings are from the highly exposed sector live in single-parent households. For each family type (married families with children, single-parent families with children, and families with no children), table 2 shows the percentage of family earnings that stem from employment in the highly exposed sector. The data in the table show that single-parent families are especially vulnerable to shutdowns in the highly exposed sector. Of these families, 19.0 percent obtain 100.0 percent of their family's earnings from workers in the highly exposed sector. In contrast, 8.3 percent of married families with children and 10.5 percent of married families with no children receive all of their earnings from the highly exposed sector.^[12] Figure 11 shows the breakdown of full-exposure cases by family type—47.5 percent are families with no children, 25.3 percent are single-parent families, and 27.3 percent are married families with children.



Early effects of the pandemic

The recently released CPS April 2020 estimates, which are summarized in table 4, confirm the vulnerability of workers in the highly exposed sector.^[13] In April, the economic shocks due to the pandemic were clearly not confined to the highly exposed sector but were felt throughout the entire economy. Employment disruptions were widespread throughout the entire labor market. Between February and April, overall employment (not seasonally adjusted) fell by 15.6 percent. However, the reduction in employment was especially severe in what we have identified as the initially highly exposed sector. The CPS estimates indicate that, between February and April, employment in the highly exposed sector fell by 38.2 percent, compared with 10.5 percent elsewhere. The same is true of the unemployment rate. Overall, the unemployment rate (not seasonally adjusted) increased from 3.8 percent to 14.4 percent between February and April. However, the unemployment rate in the highly exposed sector increased from 4.5 percent to 34.1 percent. Elsewhere, the unemployment rate increased from 3.6 percent to 10.3 percent.

Table 4. February 2020 to April 2020 CPS worker counts for key demographics for all workers, highly exposed workers and not highly exposed workers

The employment disruptions during the first few months of the pandemic have been spread unevenly among the demographic groups. A thorough analysis of how the pandemic affected all the various demographic groups is

beyond the scope of this article. Here, we simply highlight how several groups have fared. To this point in time, women have been more affected than men have. Throughout the economy as a whole, female employment has fallen by 17.9 percent, whereas male employment has dropped by 13.5 percent (see table 4). Female employment in the highly exposed sector fell by a whopping 43.3 percent. Hispanics also suffered severe losses in employment. Hispanic employment fell by 20.1 percent overall and by 42.2 percent in the highly exposed sector. Young workers are another group that experienced a large fall in employment. Employment of workers ages 16–24 fell by 31.3 percent overall and by 48.1 percent in the more highly exposed sector. Less educated workers are another group suffering a larger-than-average fall in employment. Employment of individuals 25 and older with less than a high school diploma fell by 20.7 percent and those with a high school diploma, but no college, declined by 20.8 percent overall and by 35.1 percent and 40.4 percent, respectively, in the highly exposed sector.

Finally, looking at the experience of the various family types, one sees from table 4 that employment of workers in single-parent families fell by 24.3 percent in the economy as a whole. In the highly exposed sector, employment declined by 47.4 percent. Employment of individuals who are not living with a family member fell by 19.3 percent in the economy as a whole and by 42.8 percent in the highly exposed sector.

Conclusion

To combat the COVID-19 pandemic, industries that are most prone to being shut down are disproportionately composed of workers who are younger, are unmarried, and have less education. Workers in the highly exposed sector are more likely to be in part-time jobs and generally have lower wages and total earnings than do workers in other parts of the economy.

Workers in the highly exposed sector disproportionately belong to single-parent families or do not live in a family. When workers in the highly exposed sector do live with other family members, family earnings are often toward the bottom of the earnings distribution.

Families with workers in the highly exposed sector are particularly vulnerable to industry shutdowns. A substantial percentage of families receive all of their earnings from family members working in the highly exposed sector. This percentage is particularly high for families whose earnings are at the bottom end of the earnings distribution. Almost 46 percent of families in the bottom quintile of the earnings distribution receive all of their earnings from the highly exposed sector. For families in the second quintile, this number is 24.2 percent. Families with children are similarly vulnerable to shutdowns as are families overall, but single-parent families with children are especially vulnerable—about 19 percent of single-parent families obtain 100 percent of their family's earnings from workers in the highly exposed sector.

The recently released CPS April 2020 estimates confirm the vulnerability of workers in the highly exposed sector. Employment losses were widespread but were especially severe in the highly exposed sector. Furthermore, the reductions in employment were spread unevenly among various demographic groups. In some demographic groups, employment decreased substantially overall and especially sharply in the more highly exposed sector. Particularly hard-hit groups include, Hispanics, younger workers, and workers with less education level. Workers who are not family members and workers in single-parent families also experienced a large fall in employment and an increase in unemployment.

Appendix: Lists of highly exposed industries and Current Population Survey employment and wage estimates by demographic categories and sector

Table A-1. List of highly exposed census industries

Table A-2. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of workers 16 to 24 years old

Table A-3. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of workers 25 years old and older

Tables

Table 1. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of all workers

Demographic	Category	Workers in highly exposed sectors				Workers not in highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
None	All workers	27,512,307	100.0	\$15.00	\$560.00	114,039,962	100.0	\$21.50	\$865.38	19.4
Gender	Men	14,108,189	51.3	16.17	650.00	59,172,580	51.9	23.56	1,000.00	19.3
	Women	13,404,118	48.7	13.50	480.00	54,867,382	48.1	19.65	769.00	19.6
Race	White only	20,672,218	75.1	15.00	570.00	88,317,777	77.4	22.00	900.00	19.0
	Black only	3,600,997	13.1	13.86	500.00	14,605,046	12.8	17.67	711.53	19.8
	Asian only	1,980,547	7.2	15.38	600.00	7,300,556	6.4	28.85	1,154.00	21.3
	All other	1,258,546	4.6	14.00	500.00	3,816,583	3.3	18.75	738.46	24.8
Age	16 to 24 years old	7,134,436	25.9	11.35	315.00	11,711,911	10.3	13.50	480.00	37.9
	25 to 54 years old	15,564,728	56.6	16.88	668.00	76,144,803	66.8	23.00	953.84	17.0
	55 to 64 years old	3,475,087	12.6	18.00	709.00	19,690,633	17.3	24.00	961.53	15.0
	65+ years old	1,338,056	4.9	15.00	480.00	6,492,615	5.7	20.00	720.00	17.1
Hispanic ethnicity	Hispanic	5,861,321	21.3	13.70	500.00	19,533,372	17.1	17.00	680.00	23.1
	Non-Hispanic	21,650,986	78.7	15.00	576.92	94,506,590	82.9	22.59	923.07	18.6
Marital status	Married	10,910,070	39.7	18.00	720.00	62,882,158	55.1	24.59	1,000.00	14.8
	Never married	13,184,014	47.9	13.00	440.00	35,274,848	30.9	17.31	680.00	27.2
	Other marital status	3,418,224	12.4	16.00	615.38	15,882,956	13.9	20.48	840.00	17.7
Educational attainment	Less than a high school diploma	3,741,271	13.6	11.00	326.92	7,603,357	6.7	13.50	520.00	33.0

See footnotes at end of table.

Table 1. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of all workers

Demographic	Category	Workers in highly exposed sectors				Workers not in highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
	High school diploma, no college	9,192,224	33.4	14.06	534.00	27,707,986	24.3	17.00	680.00	24.9
	Some college or associate's degree	8,854,747	32.2	15.00	540.00	30,399,521	26.7	18.75	750.00	22.6
	Bachelor's degree only	4,498,094	16.3	22.01	923.00	29,934,233	26.2	28.27	1,153.00	13.1
	Advanced degree	1,225,971	4.5	33.65	1,346.15	18,394,866	16.1	36.05	1,461.53	6.2
Hourly worker status	Nonhourly worker	7,795,148	28.3	24.04	1,000.00	51,448,807	45.1	29.91	1,250.00	13.2
	Hourly worker	19,717,159	71.7	13.25	480.00	62,591,155	54.9	17.00	664.61	24.0
Full- or part-time status	Worked full-time hours	18,619,643	67.7	17.00	700.00	92,903,573	81.5	23.00	961.53	16.7
	Worked part-time hours	8,892,664	32.3	11.80	260.00	21,136,389	18.5	15.00	387.00	29.6
Family status	Not living with a family member	6,789,356	24.7	15.63	600.00	27,349,806	24.0	21.15	865.38	19.9
	Family member	20,722,951	75.3	15.00	540.00	86,690,156	76.0	21.63	865.38	19.3
Family earnings quintile	Not living with a family member	6,789,356	24.7	15.63	600.00	27,349,806	24.0	21.15	865.38	19.9
	Lowest quintile: less than 34,321	3,931,100	14.3	11.50	350.00	10,328,297	9.1	12.50	420.00	27.6
	Second quintile: 34,321 to 59,539	3,967,332	14.4	13.83	500.00	13,882,507	12.2	17.78	715.00	22.2
	Middle quintile: 59,540 to 89,959	4,464,770	16.2	15.00	600.00	17,971,413	15.8	19.75	800.00	19.9
	Forth quintile: 89,960 to 137,019	4,308,153	15.7	17.81	702.69	20,940,813	18.4	25.00	1,045.00	17.1
	Top quintile: more than 137,020	4,051,597	14.7	21.67	920.00	23,567,126	20.7	38.46	1,682.69	14.7

See footnotes at end of table.

Table 1. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of all workers

Demographic	Category	Workers in highly exposed sectors				Workers not in highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
Family type	Not living with a family member	6,789,356	24.7	15.63	600.00	27,349,806	24.0	21.15	865.38	19.9
	No children family	10,392,597	37.8	15.00	560.00	44,109,378	38.7	21.00	850.00	19.1
	Single-parent family	3,122,716	11.4	12.50	442.30	8,978,055	7.9	17.00	670.00	25.8
	Married with children family	7,207,638	26.2	15.00	560.00	33,602,724	29.5	24.00	976.00	17.7

Source: Authors' calculations based on U.S. Bureau of Labor Statistics Current Population Survey 2019 annual data.

Table 2. 2019 annual Current Population Survey family estimates, by percent of family earnings from workers in highly exposed sectors and type of family

Percent of family earnings from workers in highly exposed sectors	No children family			Single-parent family			Married with children family			Overall		
	Number of families	Column percent	Row percent	Number of families	Column percent	Row percent	Number of families	Column percent	Row percent	Number of families	Column percent	Row percent
0	23,118,971	73.6	49.6	6,579,595	71.4	14.1	16,907,323	74.6	36.3	46,605,889	73.6	100.0
>0 and <25	1,443,308	4.6	46.9	328,655	3.6	10.7	1,302,945	5.8	42.4	3,074,908	4.9	100.0
>25 and <50	1,872,857	6.0	53.6	335,906	3.6	9.6	1,282,344	5.7	36.7	3,491,107	5.5	100.0
>50 and <75	1,348,542	4.3	54.6	164,603	1.8	6.7	957,731	4.2	38.8	2,470,876	3.9	100.0
>75 and <100	345,547	1.1	48.4	53,864	0.6	7.5	314,841	1.4	44.1	714,252	1.1	100.0
100	3,286,454	10.5	47.5	1,750,179	19.0	25.3	1,888,419	8.3	27.3	6,925,052	10.9	100.0
Total	31,415,679	100.0	49.6	9,212,801	100.0	14.6	22,653,604	100.0	35.8	63,282,084	100.0	100.0

Note: Children are under 18 years old.

Source: Authors' calculations based on U.S. Bureau of Labor Statistics Current Population Survey 2019 annual data.

Table 3. 2019 annual Current Population Survey family counts, by percent of family earnings from workers in highly exposed sectors

Percent of family earnings from workers in highly exposed sectors	Lowest quintile less than \$34,321			Second quintile \$34,321 to \$59,539			Middle quintile \$59,540 to \$89,959			Fourth quintile \$89,960 to \$137,019			Top
	Number of families	Col percent	Row percent	Number of families	Col percent	Row percent	Number of families	Col percent	Row percent	Number of families	Col percent	Row percent	Number of families
0	9,148,927	72.0	19.6	9,390,697	74.5	20.1	9,230,531	72.3	19.8	9,225,686	73.5	19.8	9,610,000
>0 and <25	78,697	0.6	2.6	346,443	2.7	11.3	621,945	4.9	20.2	847,635	6.8	27.6	1,180,000
>25 and <50	162,783	1.3	4.7	653,132	5.2	18.7	1,062,718	8.3	30.4	969,227	7.7	27.8	643,000
>50 and <75	114,679	0.9	4.6	465,719	3.7	18.8	688,196	5.4	27.9	723,279	5.8	29.3	479,000
>75 and <100	39,367	0.3	5.5	77,323	0.6	10.8	142,506	1.1	20.0	169,978	1.4	23.8	285,000
100	3,165,526	24.9	45.7	1,676,345	13.3	24.2	1,020,890	8.0	14.7	611,147	4.9	8.8	451,000
Total	12,709,979	100.0	20.1	12,609,658	100.0	19.9	12,766,787	100.00	20.2	12,546,953	100.0	19.8	12,648,000

Note: Col = column.

Source: Authors' calculations based on U.S. Bureau of Labor Statistics Current Population Survey 2019 annual data.

Table 4. February 2020 to April 2020 CPS worker counts for key demographics for all workers, highly exposed workers and not highly exposed workers

Worker type	Demographic	Category	Employment				Unemployment rate		
			February employment	March employment	April employment	February to April percent difference	February unemployment rate	March unemployment rate	April unemployment rate
All workers	None	All workers	158,017,404	155,167,192	133,325,808	-15.6	3.8	4.5	14.8
	Gender	Men	83,047,264	81,793,960	71,810,038	-13.5	4.1	4.8	13.5
		Women	74,970,140	73,373,232	61,515,770	-17.9	3.4	4.2	15.3
	Race	White only	122,668,581	120,660,190	104,082,574	-15.2	3.4	4.1	13.3
		Black only	19,529,751	19,017,683	16,248,270	-16.8	6.3	7.0	16.1
		Asian only	10,327,393	10,058,336	8,475,618	-17.9	2.5	4.1	14.4
		All other	5,491,680	5,430,982	4,519,345	-17.7	6.2	6.9	20.1
	Age	16 to 24 years old	19,081,546	18,059,739	13,112,044	-31.3	8.0	10.0	26.1
		25 to 54 years old	101,151,803	100,141,056	87,909,549	-13.1	3.3	3.9	12.1
		55 to 64 years old	26,939,383	26,706,244	23,609,245	-12.4	2.6	3.4	12.1
65+ years old		10,844,671	10,260,153	8,694,971	-19.8	3.2	3.7	15.1	
Hispanic ethnicity	Hispanic	28,311,217	27,531,184	22,625,491	-20.1	4.8	6.3	18.1	
	Non-Hispanic	129,706,187	127,636,009	110,700,317	-14.7	3.6	4.2	13.1	

See footnotes at end of table.

Table 4. February 2020 to April 2020 CPS worker counts for key demographics for all workers, highly exposed workers and not highly exposed workers

Worker type	Demographic	Category	Employment				Unemployment rate		
			February employment	March employment	April employment	February to April percent difference	February unemployment rate	March unemployment rate	April unemployment rate
	Marital status (25+ years old)	Married	83,815,233	83,628,130	74,819,947	-10.7	2.2	2.7	10.0
		Never married	33,986,850	33,024,188	27,839,427	-18.1	4.8	5.5	16.0
		Other marital status	21,133,775	20,455,135	17,554,390	-16.9	4.1	5.1	14.0
	Educational attainment (25+ years old)	Less than a high school diploma	8,670,067	8,439,022	6,872,495	-20.7	7.2	8.1	20.0
		High school diploma, no college	34,793,442	33,460,473	27,556,750	-20.8	4.1	4.8	17.0
		Some college or associate's degree	36,061,032	35,803,359	30,633,663	-15.1	3.3	3.9	14.0
		Bachelor's degree only	36,792,009	36,686,256	33,549,993	-8.8	2.2	2.5	9.0
		Advanced degree	22,619,308	22,718,343	21,600,863	-4.5	1.6	2.3	6.0
	Family type	Not living with a family member	37,390,088	35,715,717	30,179,966	-19.3	3.8	4.8	14.0
		No children family	62,524,760	61,588,954	53,220,784	-14.9	3.8	4.3	15.0
		Single-parent family	12,676,955	12,298,149	9,591,655	-24.3	6.4	7.3	19.0
		Married with children family	45,425,601	45,564,372	40,333,402	-11.2	3.0	3.8	12.0
	Highly exposed workers	None	All highly exposed workers	29,113,690	28,660,646	17,982,024	-38.2	4.5	6.5
Gender		Men	14,927,838	15,130,943	9,942,024	-33.4	4.2	6.0	30.0
		Women	14,185,851	13,529,703	8,040,000	-43.3	4.9	7.1	38.0
Race		White only	22,154,774	21,781,872	14,010,204	-36.8	3.9	5.7	32.0
		Black only	3,568,795	3,528,243	2,094,194	-41.3	8.9	11.3	38.0
		Asian only	2,121,172	2,108,080	1,231,265	-42.0	1.8	6.6	35.0
		All other	1,268,949	1,242,451	646,361	-49.1	6.4	6.3	45.0
Age	16 to 24 years old	6,821,739	6,557,727	3,537,243	-48.1	7.2	11.3	41.0	

See footnotes at end of table.

Table 4. February 2020 to April 2020 CPS worker counts for key demographics for all workers, highly exposed workers and not highly exposed workers

Worker type	Demographic	Category	Employment				Unemployment rate		
			February employment	March employment	April employment	February to April percent difference	February unemployment rate	March unemployment rate	April unemployment rate
		25 to 54 years old	16,630,771	16,275,118	10,637,505	-36.0	4.0	5.2	32
		55 to 64 years old	4,016,878	4,117,047	2,613,718	-34.9	2.9	4.6	32
		65+ years old	1,644,301	1,710,753	1,193,558	-27.4	2.6	3.7	27
	Hispanic ethnicity	Hispanic	6,210,105	6,103,419	3,588,418	-42.2	4.8	8.4	38
		Non-Hispanic	22,903,584	22,557,227	14,393,605	-37.2	4.5	6.0	33
	Marital status (25+ years old)	Married	12,119,940	11,881,614	8,193,025	-32.4	2.4	4.0	28
		Never married	6,694,549	6,637,646	4,011,576	-40.1	5.7	6.0	36
		Other marital status	3,477,462	3,583,659	2,240,180	-35.6	4.3	6.3	34
	Educational attainment (25+ years old)	Less than a high school diploma	1,716,042	1,852,118	1,113,106	-35.1	4.8	6.7	36
		High school diploma, no college	7,331,270	7,042,372	4,371,212	-40.4	4.2	4.9	35
		Some college or associate's degree	6,794,829	6,796,208	4,365,846	-35.7	3.5	5.2	33
		Bachelor's degree only	4,916,510	4,858,730	3,401,036	-30.8	3.0	4.5	27
		Advanced degree	1,533,299	1,553,491	1,193,581	-22.2	2.8	4.0	20
	Family type	Not living with a family member	7,238,650	6,967,738	4,140,208	-42.8	4.1	5.9	34
		No children family	11,285,791	11,293,478	7,360,872	-34.8	4.8	6.2	34
		Single-parent family	2,954,695	2,864,840	1,554,376	-47.4	7.2	9.2	39
Married with children family		7,634,554	7,534,589	4,926,567	-35.5	3.6	6.4	31	

See footnotes at end of table.

Table 4. February 2020 to April 2020 CPS worker counts for key demographics for all workers, highly exposed workers and not highly exposed workers

Worker type	Demographic	Category	Employment				Unemployment rate		
			February employment	March employment	April employment	February to April percent difference	February unemployment rate	March unemployment rate	April unemployment rate
Not highly exposed workers	None	All not highly exposed workers	128,903,714	126,506,547	115,343,785	-10.5	3.6	4.1	10.0
	Gender	Men	68,119,426	66,663,017	61,868,015	-9.2	4.1	4.5	9.9
		Women	60,784,288	59,843,529	53,475,770	-12.0	3.1	3.6	10.0
	Race	White only	100,513,807	98,878,318	90,072,371	-10.4	3.3	3.7	9.9
		Black only	15,960,955	15,489,441	14,154,076	-11.3	5.6	6.0	11.1
		Asian only	8,206,221	7,950,256	7,244,354	-11.7	2.7	3.4	9.9
		All other	4,222,731	4,188,531	3,872,984	-8.3	6.1	7.1	14.4
	Age	16 to 24 years old	12,259,806	11,502,012	9,574,801	-21.9	8.4	9.2	19.9
		25 to 54 years old	84,521,032	83,865,938	77,272,043	-8.6	3.2	3.6	9.9
		55 to 64 years old	22,922,506	22,589,196	20,995,527	-8.4	2.6	3.2	9.9
		65+ years old	9,200,370	8,549,400	7,501,413	-18.5	3.3	3.7	13.3
	Hispanic ethnicity	Hispanic	22,101,112	21,427,765	19,037,073	-13.9	4.9	5.7	13.3
		Non-Hispanic	106,802,603	105,078,782	96,306,712	-9.8	3.4	3.8	9.9
	Marital status (25+ years old)	Married	71,695,294	71,746,516	66,626,922	-7.1	2.2	2.5	8.8
		Never married	27,292,301	26,386,542	23,827,851	-12.7	4.6	5.3	11.1
		Other marital status	17,656,313	16,871,476	15,314,210	-13.3	4.1	4.8	11.1
	Educational attainment (25+ years old)	Less than a high school diploma	6,954,025	6,586,904	5,759,389	-17.2	7.7	8.5	16.6
		High school diploma, no college	27,462,172	26,418,101	23,185,538	-15.6	4.1	4.8	12.2
		Some college or associate's degree	29,266,203	29,007,151	26,267,817	-10.2	3.2	3.6	10.0
		Bachelor's degree only	31,875,499	31,827,526	30,148,957	-5.4	2.0	2.2	6.6
		Advanced degree	21,086,009	21,164,853	20,407,282	-3.2	1.5	2.2	5.5
Family type	Not living with a family member	30,151,439	28,747,979	26,039,758	-13.6	3.8	4.6	9.9	

See footnotes at end of table.

Table 4. February 2020 to April 2020 CPS worker counts for key demographics for all workers, highly exposed workers and not highly exposed workers

Worker type	Demographic	Category	Employment				Unemployment rate		
			February employment	March employment	April employment	February to April percent difference	February unemployment rate	March unemployment rate	April unemployment rate
		No children family	51,238,969	50,295,476	45,859,912	-10.5	3.6	3.9	10
		Single-parent family	9,722,260	9,433,309	8,037,279	-17.3	6.1	6.8	14
		Married with children family	37,791,047	38,029,783	35,406,835	-6.3	2.9	3.3	8

Source: Authors' calculations based on U.S. Bureau of Labor Statistics Current Population Survey February 2020, March 2020, and April 2020 basic monthly data.

Table A-1. List of highly exposed census industries

Highly exposed sector	Census industrial classification system codes	Census industry
Restaurants and bars	8680	Restaurants and other food services
	8690	Drinking places, alcoholic beverages
Travel and transportation	6070	Air transportation
	6190	Taxi and limousine service
	8660	Traveler accommodation
	7980	Offices of dentists
Personal services	8970	Barber shops
	8980	Beauty salons
	8990	Nail salons and other personal care services
	9090	Other personal services
	Entertainment	8560
8580		Bowling centers
8590		Other amusement, gambling, and recreation industries
Other sensitive retail	4670	Automobile dealers
	4680	Other motor vehicle dealers
	4770	Furniture and home furnishings stores
	5170	Clothing stores
	5180	Shoe stores
	5190	Jewelry, luggage, and leather goods stores
	5275	Sporting goods, and hobby and toy stores
	5280	Sewing, needlework, and piece goods stores
	5295	Musical instrument and supplies stores
5370	Book stores and news dealers	

See footnotes at end of table.

Table A-1. List of highly exposed census industries

Highly exposed sector	Census industrial classification system codes	Census industry
	5380	Department stores and discount stores
	5470	Retail florists
	5480	Office supplies and stationery stores
	5570	Gift, novelty, and souvenir shops
	5580	Miscellaneous retail stores
	5690	Other direct selling establishments
	7170	Video tape and disk rental
	7180	Other consumer goods rental
	4390	Apparel, piece goods, and notions merchant wholesalers
	4690	Automotive parts, accessories, and tire stores
	5680	Fuel dealers
Sensitive manufacturing	3470	Household appliance manufacturing
	3570	Motor vehicles and motor vehicle equipment manufacturing
	3580	Aircraft and parts manufacturing
	3590	Aerospace product and parts manufacturing
	3680	Ship and boat building
	3895	Furniture and related product manufacturing
	3970	Sporting and athletic goods; and doll, toy, and game manufacturing
	3980	Miscellaneous manufacturing, n.e.c.
	4070	Motor vehicle and motor vehicle parts and supplies merchant wholesalers
	4080	Furniture and home furnishing merchant wholesalers
	4280	Recyclable material merchant wholesalers
	4290	Miscellaneous durable goods merchant wholesalers
	1480	Fabric mills, except knitting mills
	1670	Knitting fabric mills and apparel knitting mills
	1570	Carpet and rug mills
	1590	Textile product mills, except carpet and rug
	1680	Cut and sew apparel manufacturing

Note: n.e.c. = not elsewhere classified.

Source: Authors' calculations based on U.S. Bureau of Labor Statistics Current Population Survey 2019 annual data.

Table A-2. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of workers 16 to 24 years old

Demographic	Category	Workers in highly exposed sectors				Workers not in highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
None	All workers 16 to 24 years old	7,134,436	100.0	\$11.35	\$315.00	11,711,911	100.0	\$13.50	\$480.00	37.9

See footnotes at end of table.

Table A-2. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of workers 16 to 24 years old

Demographic	Category	Workers in highly exposed sectors				Workers not in highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
Gender	Men	3,323,717	46.6	11.93	341.25	6,115,444	52.2	14.25	520.00	35.2
	Women	3,810,719	53.4	11.00	300.00	5,596,467	47.8	12.90	420.00	40.5
Race	White only	5,443,063	76.3	11.50	312.50	8,999,044	76.8	13.75	480.00	37.7
	Black only	933,669	13.1	11.00	315.00	1,542,351	13.2	12.12	440.00	37.7
	Asian only	296,171	4.2	12.00	300.00	582,502	5.0	15.00	480.00	33.7
	All other	461,533	6.5	11.25	322.50	588,014	5.0	13.50	480.00	44.0
Hispanic ethnicity	Hispanic	1,650,645	23.1	12.00	336.00	2,528,419	21.6	13.50	480.00	39.5
	Non-Hispanic	5,483,791	76.9	11.00	300.00	9,183,493	78.4	13.50	480.00	37.4
Marital status	Married	322,787	4.5	12.50	480.00	1,027,860	8.8	15.00	600.00	23.9
	Never married	6,738,401	94.4	11.25	300.00	10,509,777	89.7	13.25	461.53	39.1
	Other marital status	73,248	1.0	11.00	360.00	174,275	1.5	12.71	500.00	29.6
Educational attainment	Less than a high school diploma	1,721,972	24.1	10.00	175.00	1,306,296	11.2	10.25	225.00	56.9
	High school diploma, no college	2,222,071	31.1	12.00	400.00	3,629,245	31.0	13.00	480.00	38.0
	Some college or associate's degree	2,717,944	38.1	12.00	325.00	4,410,433	37.7	13.00	401.20	38.1
	Bachelor's degree only	452,339	6.3	15.00	556.00	2,169,400	18.5	19.23	769.00	17.3
	Advanced degree	20,110	0.3	16.50	660.00	196,539	1.7	24.23	980.76	9.3
Hourly worker status	Nonhourly worker	563,316	7.9	15.00	560.00	2,255,884	19.3	19.23	761.53	20.0
	Hourly worker	6,571,120	92.1	11.00	300.00	9,456,027	80.7	13.00	440.00	41.0
Full- or part-time status	Worked full-time hours	2,976,745	41.7	13.00	500.00	7,338,709	62.7	15.00	600.00	28.9
	Worked part-time hours	4,157,691	58.3	10.50	200.00	4,373,203	37.3	11.50	230.76	48.7
Family status	Not living with a family member	1,518,315	21.3	12.90	450.00	3,338,566	28.5	15.00	600.00	31.3
	Family member	5,616,121	78.7	11.00	285.00	8,373,345	71.5	13.00	438.00	40.1
Family earnings quintile	Not living with a family member	1,518,315	21.3	12.90	450.00	3,338,566	28.5	15.00	600.00	31.3
	Lowest quintile: less than 34,321	1,022,135	14.3	10.38	240.00	1,291,445	11.0	11.26	310.00	44.2

See footnotes at end of table.

Table A-2. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of workers 16 to 24 years old

Demographic	Category	Workers in highly exposed sectors				Workers not in highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
	Second quintile: 34,321 to 59,539	1,005,098	14.1	11.00	300.00	1,399,368	11.9	12.00	400.00	41.8
	Middle quintile: 59,540 to 89,959	1,123,970	15.8	11.00	303.00	1,808,978	15.4	13.00	480.00	38.3
	Fourth quintile: 89,960 to 137,019	1,184,837	16.6	11.50	300.00	1,875,480	16.0	13.13	460.00	38.7
	Top quintile: more than 137,020	1,280,081	17.9	11.52	290.00	1,998,075	17.1	14.90	500.00	39.0
Family type	Not living with a family member	1,518,315	21.3	12.90	450.00	3,338,566	28.5	15.00	600.00	31.3
	No children family	2,590,592	36.3	11.76	336.00	4,634,972	39.6	13.50	480.00	35.9
	Single-parent family	1,100,037	15.4	10.60	275.00	1,298,240	11.1	12.00	415.38	45.9
	Married with children family	1,925,492	27.0	10.50	220.00	2,440,133	20.8	12.00	378.00	44.1

Source: Authors' calculations based on U.S. Bureau of Labor Statistics Current Population Survey 2019 annual data.

Table A-3. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of workers 25 years old and older

Demographic	Category	Workers in highly exposed sectors				Workers not in the highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
None	All workers 25+ years old	20,377,871	100.0	\$17.00	\$666.00	102,328,051	100.0	\$23.00	\$942.30	16.6
Gender	Men	10,784,472	52.9	18.89	776.15	53,057,136	51.9	25.00	1,057.69	16.9
	Women	9,593,399	47.1	15.00	560.00	49,270,915	48.1	20.50	804.80	16.3
Race	White only	15,229,155	74.7	17.31	680.00	79,318,733	77.5	23.40	961.00	16.1
	Black only	2,667,328	13.1	15.00	600.00	13,062,695	12.8	18.45	760.00	17.0
	Asian only	1,684,375	8.3	17.00	673.00	6,718,054	6.6	31.00	1,250.00	20.0
	All other	797,013	3.9	15.86	600.00	3,228,569	3.2	20.00	800.00	19.8

See footnotes at end of table.

Table A-3. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of workers 25 years old and older

Demographic	Category	Workers in highly exposed sectors				Workers not in the highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
Hispanic ethnicity	Hispanic	4,210,676	20.7	15.00	570.00	17,004,953	16.6	18.00	720.00	19.8
	Non-Hispanic	16,167,195	79.3	17.75	700.00	85,323,098	83.4	24.04	992.30	15.9
Marital status	Married	10,587,282	52.0	18.10	722.40	61,854,299	60.4	25.00	1,000.00	14.6
	Never married	6,445,613	31.6	15.15	600.00	24,765,071	24.2	20.00	800.00	20.7
	Other marital Status	3,344,976	16.4	16.12	620.00	15,708,681	15.4	20.73	841.50	17.6
Educational attainment	Less than a high school diploma	2,019,298	9.9	13.00	480.00	6,297,062	6.2	14.42	560.00	24.3
	High school diploma, no college	6,970,154	34.2	15.00	600.00	24,078,742	23.5	18.00	720.00	22.4
	Some college or associate's degree	6,136,804	30.1	17.00	660.00	25,989,088	25.4	20.00	800.00	19.1
	Bachelor's degree only	4,045,755	19.9	23.79	961.53	27,764,833	27.1	28.85	1,180.00	12.7
	Advanced degree	1,205,861	5.9	34.00	1,384.00	18,198,327	17.8	36.06	1,480.00	6.2
Hourly worker status	Nonhourly worker	7,231,832	35.5	25.00	1,057.00	49,192,923	48.1	30.77	1,269.23	12.8
	Hourly worker	13,146,040	64.5	15.00	560.00	53,135,128	51.9	18.00	716.00	19.8
Full- or part-time status	Worked full-time hours	15,642,898	76.8	18.00	760.00	85,564,864	83.6	24.03	1,000.00	15.5
	Worked part-time hours	4,734,974	23.2	13.00	337.50	16,763,187	16.4	17.00	467.07	22.0
Family status	Not living with a family member	5,271,041	25.9	17.00	673.00	24,011,240	23.5	22.22	923.07	18.0
	Family member	15,106,831	74.1	16.96	660.00	78,316,811	76.5	23.00	950.00	16.2
Family earnings quintile	Not living with a family member	5,271,041	25.9	17.00	673.00	24,011,240	23.5	22.22	923.07	18.0
	Lowest quintile: less than 34,321	2,908,966	14.3	12.00	384.61	9,036,852	8.8	13.00	437.00	24.4
	Second quintile: 34,321 to 59,539	2,962,233	14.5	15.00	600.00	12,483,139	12.2	18.00	730.76	19.2

See footnotes at end of table.

Table A-3. 2019 annual Current Population Survey worker counts and wage estimates for key demographics of workers 25 years old and older

Demographic	Category	Workers in highly exposed sectors				Workers not in the highly exposed sectors				Percent of category in highly exposed sectors
		Number of workers	Percent	Median hourly wage	Median weekly earnings	Number of workers	Percent	Median hourly wage	Median weekly earnings	
	Middle quintile: 59,540 to 89,959	3,340,799	16.4	17.00	682.50	16,162,436	15.8	20.36	840.00	17.1
	Fourth quintile: 89,960 to 137,019	3,123,316	15.3	22.00	923.07	19,065,334	18.6	26.43	1,111.00	14.1
	Top quintile: more than 137,020	2,771,516	13.6	33.65	1,461.00	21,569,051	21.1	41.67	1,800.00	11.4
Family type	Not living with a family member	5,271,041	25.9	17.00	673.00	24,011,240	23.5	22.22	923.07	18.0
	No children family	7,802,005	38.3	16.83	670.00	39,474,406	38.6	22.50	920.00	16.5
	Single-parent family	2,022,679	9.9	14.42	538.46	7,679,815	7.5	18.00	720.00	20.8
	Married with children family	5,282,147	25.9	18.25	720.00	31,162,591	30.5	25.00	1,038.46	14.5

Source: Authors' calculations based on U.S. Bureau of Labor Statistics Current Population Survey 2019 annual data.

SUGGESTED CITATION

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NOTES

¹ Matthew Dey and Mark A. Loewenstein, "How many workers are employed in sectors directly affected by COVID-19 shutdowns, where do they work, and how much do they earn?" *Monthly Labor Review*, April 2020, <https://www.bls.gov/opub/mlr/2020/article/covid-19-shutdowns.htm>.

² Joseph S. Vavra, "Shutdown sectors represent large share of all U.S. employment" (Chicago, IL: Becker Friedman Institute for Economics at the University of Chicago, March 31, 2020), <https://bfi.uchicago.edu/insight/blog/key-economic-facts-about-covid-19/>.

³ Earnings information is not collected for the self-employed.

⁴ While the Quarterly Census of Employment and Wages and Occupational Employment Statistics (OES) surveys use the North American Industry Classification System (NAICS) industry classification, the Current Population Survey (CPS) uses census industry codes. A few situations exist in which differences between the NAICS and census industry definitions made it necessary to add or

subtract industries identified as exposed in our initial article. As noted in the text, the list of Census industries used for this analysis can be found in the appendix, table A-1.

[5](#) Vavra, “Shutdown sectors represent large share of all U.S. employment.” As noted in the initial article, one could quibble about certain industries, but we are convinced that reasonable modifications to the list are likely to have relatively minor effects on our overall findings.

[6](#) These particular numbers do not appear in figure 3. Figure 3 depicts the demographic composition of the highly exposed and not highly exposed sectors. The numbers in the text refer to the sectoral composition of workers in a particular demographic category.

[7](#) In our earlier article, we looked at occupational wages by using the OES and showed that lower paying occupations are more heavily represented in the exposed sector. In this article, using the CPS data, we look at the wages of individual workers by using the CPS data.

[8](#) To obtain a more comprehensive picture, we have constructed an hourly wage for all workers (BLS only does this for hourly workers). We also have chosen to calculate usual median weekly earnings for part-time workers and full-time workers. BLS press releases report usual weekly earnings for only full-time workers.

[9](#) For this analysis, families are defined as two or more individuals living together who are related by birth, marriage, or adoption. All related individuals in a household are considered one family, even if several generations of a family are living together (for example, a divorced mother living with her adult son and his infant daughter would be one family). The estimates for families with children refer to children under the age of 18. Individuals who are living alone or in a household with completely unrelated people (for example, a group of unrelated people sharing a house) are classified as not living with a family member. Unmarried partners and same-sex spouses also are not classified as living with a family member.

[10](#) Earnings are what individuals receive from being employed. Although typically the largest component, earnings are just one component of family income. Other potential sources of family income include payments from government programs such as social security and public assistance programs, rental income, and dividend payments.

[11](#) Children are those age 18 and under who are sons, daughters, stepchildren, or adopted children living in the household. Nieces, nephews, grandchildren, other related and unrelated children, and children not living in the household are not included as children.

[12](#) However, the exposure of single-parent families does not vary much by the number of children in the household. For single-parent households with one child, 19.5 percent of families obtain all the family’s earnings from workers in the highly exposed sector, while 18.5 percent of single-parent families with two or more children do.

[13](#) The definition of the exposed sector is admittedly subjective. With current CPS data, we can identify industries that are potentially misclassified. To this end, we deem an industry in the exposed sector as potentially misclassified if employment grew or decreased less than 15 percent from February to April. In addition, we deem an industry in the not highly exposed sector as potentially misclassified if employment decreased by 30 or more percent from February to April. Given these definitions, we find that only 6.2 percent of highly exposed sector employment and 5.5 percent of not highly exposed sector employment are potentially in misclassified industries.

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JUNE 2020

Income “Crow”?

[Maya B. Brandon](#)

Income segregation is often considered a result of the rising marks of income inequality shown racially and economically within and between social classes. In “[Income segregation: up or down, and for whom?](#)” (National Bureau of Economic Research, Working Paper 27045, April 2020), authors John R. Logan, Andrew Foster, Hongwei Xu, and Wenquan Zhang report that “rising income segregation has been brought into question by the observation that post-2000 estimates are upwardly biased due to a reduction in the sample sizes on which they are based.”

Fueled by job loss, foreclosure, heightened mortgage requirements, and declining asset values, income segregation, or the separating of people into different communities and neighborhoods based on income level, is on the rise in the United States. The segregation can be seen in the composition of neighborhoods, social groups, and class. Although attempts have been made to measure the effects of income inequality in residential communities across the United States, they lacked consistency. Methods of measuring income inequality and segregation are topics gaining more traction and attention in the statistical community.

As incomes and opportunities of people and families increase, particularly those of minorities, they are expected to “seek more advantaged neighborhoods.” This expectation does not apply clearly to Black families but more readily applies to Hispanic families. More factors affect the residential and social mobility of families than only increases in income. Higher income can influence neighborhood composition, both racially and economically; however, it is not the sole factor of composition.

Logan et al. point out that studies have shown that most of the “socioeconomic residential sorting seen in the last forty years occurred in the 1980s and 2000s.” The authors, while recognizing that income segregation of some families rose in the 1980s 1990s, conclude that the segregation of Black and Hispanic families was not generally higher than that of White families. They further conclude that income segregation is mostly proven by the separation seen in Hispanic families between the bottom 90 percent and top 10 percent.

Sources of data and income segregation indicators, modifications in the collection methods of public data, bias inherent to smaller sample sizes, and changes in income distribution across racial and familial lines have all contributed to inflated estimates of income segregation. Logan, Foster, Xu, and Zhang pose that “rather than focusing on why income segregation seems to be rising in parallel with growing income inequality, scholars need to give more attention to why it may not.”

Census data have long been used to measure changes among and between demography, geography, and economics. Although the base premises are partly true, further techniques for researching the data, collecting the data, and using the collected data are necessary to quantify social factors into measurable units for calculation. The quantifying of social, typically considered immeasurable, factors is needed to develop more accurate and effective measures of income inequality and subsequent segregation. Scholars are now tasked to effectively use available data sources to reflect the nature of reality, remove the bias included in smaller samples, and more accurately calculate multivariate studies to explore the nuances between race, geography, class, and income.

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Ability to work from home: evidence from two surveys and implications for the labor market in the COVID-19 pandemic

This article examines the relationship between workers' ability to work at home, as captured in job characteristics measured by the Occupational Information Network, and the actual incidence of working at home, as measured by the American Time Use Survey and the National Longitudinal Survey of Youth 1979. For occupations in which telework is feasible, the article also estimates the proportion of workers who actually teleworked for a substantial amount of time prior to the coronavirus disease 2019 (COVID-19) pandemic. The article concludes by examining recent (April 2020) employment estimates from the Current Population Survey, aiming to gauge how the initial employment effects of the pandemic differed between occupations in which telework is feasible and occupations in which it is not.

In an attempt to contain the coronavirus disease 2019 (COVID-19) pandemic, states and localities across the country have adopted “social distancing” measures, closing businesses and enacting stay-at-home orders. Many workers are now working remotely. Although teleworking had been on the rise even before the pandemic,¹ it has now increased substantially, with more people working at home whenever possible. A recent article by Erik Brynjolfsson et al. estimates that 31 percent of workers who were employed in early March had switched to working at home by the first week of April.² Even when stay-at-home orders are relaxed, many workers may continue working at home until the pandemic is fully contained.

Of course, many jobs cannot be performed remotely and require that workers be physically present at their worksites. Data on job characteristics provided by the Occupational Information Network (O*NET), together with



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occupational employment estimates from the Occupational Employment Statistics (OES) survey, make it possible to estimate the number of jobs that can and cannot be performed remotely.³ O*NET contains occupation-level measures not only of the knowledge and skills required by an occupation, but also on how and where the work associated with that occupation is carried out. Information captured in the O*NET categories “work context” and “general work activities” is especially helpful for determining whether a job cannot be done at home. Examples of jobs that one would expect to be unsuitable for telework are jobs that involve operating equipment or interacting face to face with the public. Using O*NET and OES data, for instance, Jonathan I. Dingel and Brent Neiman estimate that 63 percent of U.S. jobs require significant onsite presence and that the remaining 37 percent can be performed entirely at home.⁴

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Simon Mongey, Laura Pilossoph, and Alex Weinberg provide evidence that information on working at home in the American Time Use Survey (ATUS) is consistent with the type of O*NET measures constructed by Dingel and Neiman.⁵ In a supplement to the 2017–18 ATUS, workers were asked whether they could work at home.⁶ Averaging the responses to this question across individuals, Mongey, Pilossoph, and Weinberg estimate the proportion of workers in broad (two-digit census) occupations who can work at home. In addition, averaging O*NET-based estimates for more detailed occupations, they obtain an O*NET-based measure of the inability to work at home across two-digit occupations. Comparing the two measures, the authors find that, as predicted, the measures are inversely correlated.

In this article, we take a closer look at the relationship between the ability to work at home, as captured in job characteristics measured by O*NET, and the actual incidence of working at home, as measured by two U.S. Bureau of Labor Statistics surveys—the ATUS and the National Longitudinal Survey of Youth 1979 (NLSY79). Rather than comparing broader occupational averages of the incidence of working at home and the ability to work at home, we analyze behavior at the individual level. This approach allows us to (1) determine the incidence of classification errors (that is, the incidence of working at home in detailed occupations that would otherwise seem to preclude working at home) and (2) examine takeup rates (that is, the proportions of workers in detailed occupations who can work from home and actually spend a significant amount of time doing so). Working at home in response to the pandemic is more likely to increase in occupations in which teleworking is feasible and the takeup rate is relatively low. In the final section of the article, we examine recent (April 2020) employment estimates from the Current Population Survey (CPS), aiming to gauge how the initial employment effects of the pandemic differed between occupations in which telework is feasible and occupations in which it is not.

Is the O*NET-based telework feasibility measure consistent with observed telework behavior in the ATUS and the NLSY79?

Because the questions in the ATUS and the NLSY79 differ, it is difficult to construct perfectly comparable definitions of teleworkers in the two surveys. To avoid this difficulty, we formulate a plausible definition for each survey and then examine the degree to which the survey results conforming to that definition are consistent with the O*NET measure. For the ATUS, our definition is based on whether workers who worked entirely at home on

some days received pay for some of their time. For the NLSY79, our definition is based on the number of hours that respondents worked at home.

The ATUS is a single-day time-diary survey administered to a sample of individuals in households that have recently completed their participation in the CPS, the main labor force survey for the United States. The information on working at home used here is from the 2017–18 Leave and Job Flexibilities Module of the ATUS. Administered to every respondent who was a wage or salary worker, this module has a sample size of 10,071. We classify workers as telecommuters if, in response to questions about working at home, they replied that they (1) were able to and did work at home, (2) worked entirely at home on some days, and (3) were paid for at least some of the hours they worked at home. The ATUS also provides information on other variables that may be related to working at home. These variables include a worker's education level, age, gender, race, ethnicity, and marital status; the presence of children in the household; the worker's job status (full or part time); and the size of the metropolitan area in which the worker resides.⁷

Following the methodology of Dingel and Neiman, we classify occupations on the basis of their telework feasibility and then merge this information with data from the ATUS.⁸ The results are summarized in table A-1 of the appendix. As indicated in the first data column of the table, approximately 54 percent of workers in the ATUS sample (1) are in occupations in which working at home is not feasible (according to the O*NET-based telework feasibility measure) and (2) did not telework. As shown in the second data column, about 2 percent of workers in the sample worked at home despite being in occupations in which telework is not feasible. Dividing the latter percentage by the percentage of workers for which working at home is predicted to be infeasible yields a relatively low classification error rate of about 4 percent. This result provides strong support for the O*NET-based measure, whose ruling out of telework for occupations in which working at home is deemed infeasible is correct about 96 percent of the time.

As shown in the third data column of table A-1, about 33 percent of workers in the ATUS sample (1) are in occupations in which working at home is feasible (according to the O*NET-based telework feasibility measure) and (2) did not telework. As seen in the fourth data column, the percentage of those who are in occupations in which telework is feasible and who did telework is about 11 percent. Dividing this percentage by the percentage of workers for which working at home is predicted to be feasible yields an estimated takeup rate of about 25 percent.

Table 1 shows estimates for the ability-to-telework rate, the classification error rate, and the takeup rate. The entries in the table's first data column provide ability-to-telework rates by various worker characteristics. One sees that workers with less education tend to be in jobs in which working at home is not feasible, as is the case for workers who are younger than 25, not married, or Hispanic. Teleworking is also less feasible in part-time jobs and in jobs found in nonmetropolitan areas. Working at home is generally feasible in management, professional, and administrative support jobs, but not in most service, construction, transportation, and production jobs. Similarly, while telework feasibility is high in the information, financial activities, professional and business services, and public administration industries, it is low in the leisure and hospitality, agriculture, and construction industries.

Table 1. Telework statistics, by demographic, occupational, industry, and job-task characteristics, ATUS and NLSY79 (in percent)

Category	ATUS			NLSY79		
	Ability-to-telework rate	Classification error rate	Takeup rate	Ability-to-telework rate	Classification error rate	Takeup rate
All	43.6	3.9	24.7	44.8	5.6	21.6
Educational attainment						
Less than a high school diploma	10.7	0.4	7.7	17.0	4.4	3.7
High school diploma, no college	24.5	1.4	11.3	30.3	4.0	12.8
Some college or associate's degree	36.4	3.0	16.3	42.5	5.0	18.2
Bachelor's degree and higher	67.5	10.8	31.4	70.5	11.3	28.7
Age						
15 to 24 years	23.7	0.0	11.5	—	—	—
25 to 54 years	46.7	5.0	27.8	—	—	—
55 years and older	48.1	4.7	20.1	—	—	—
Comparable NLS age range (51–59)	46.6	5.1	22.2	—	—	—
Presence of children						
No children	44.7	3.9	23.5	44.0	4.8	20.5
Children	42.0	4.0	26.6	50.1	11.4	28.4
Job status						
Full time	47.2	4.6	25.8	46.8	5.9	22.0
Part time	28.7	1.9	17.1	32.2	4.0	18.3
Gender						
Men	40.0	3.5	27.8	38.8	5.7	25.5
Women	47.6	4.4	21.9	51.5	5.5	18.4
Marital status						
Not married	34.4	2.3	21.1	39.3	5.0	18.7
Married	50.2	5.4	26.5	47.7	5.9	22.9
Race or ethnicity						
Non-Hispanic White	48.7	5.2	26.4	46.9	6.0	22.8
Black	39.5	2.8	24.2	33.5	3.9	16.0
Hispanic	28.9	1.5	14.4	39.0	4.9	12.8
Occupations						
Management, business, and financial occupations	86.6	13.6	29.7	86.5	22.0	23.4
Professional and related occupations	64.4	8.2	28.1	64.3	7.7	28.5
Service occupations	7.9	2.0	7.0	13.4	4.2	6.3
Sales and related occupations	31.9	4.3	29.2	30.1	8.4	36.4
Office and administrative support occupations	59.2	5.9	10.4	61.5	4.6	7.7
Farming, fishing, and forestry occupations	0.0	0.9	—	0.0	0.0	—
Construction and extraction occupations	0.0	2.6	—	0.0	4.0	—
Installation, maintenance, and repair occupations	1.0	1.2	0.0	3.9	3.0	0.0
Production occupations	0.4	1.7	0.0	3.9	3.9	0.0
Transportation and material moving occupations	0.3	1.1	0.0	1.3	2.0	0.0

See footnotes at end of table.

Table 1. Telework statistics, by demographic, occupational, industry, and job-task characteristics, ATUS and NLSY79 (in percent)

Category	ATUS			NLSY79		
	Ability-to-telework rate	Classification error rate	Takeup rate	Ability-to-telework rate	Classification error rate	Takeup rate
Industries						
Agriculture, forestry, fishing, and hunting	8.3	3.0	20.4	16.0	29.7	25.3
Mining, quarrying, and oil and gas extraction	55.9	28.0	26.3	15.0	0.0	52.6
Construction	17.3	2.6	13.0	21.8	6.3	10.5
Manufacturing	36.4	4.6	31.6	36.6	2.7	16.5
Wholesale and retail trade	26.9	2.1	19.3	29.3	2.4	22.8
Transportation and utilities	25.4	1.8	22.2	26.4	2.3	13.8
Information	71.2	4.2	36.9	77.3	16.8	37.3
Financial activities	77.9	17.2	29.6	75.3	11.2	27.3
Professional and business services	69.9	9.0	40.8	68.5	10.1	30.1
Education and health services	48.9	3.7	15.8	49.7	6.1	19.2
Leisure and hospitality	13.0	0.9	12.7	20.5	5.3	19.9
Other services	31.0	7.1	14.0	55.5	13.7	19.0
Public administration	65.2	7.3	16.5	54.9	3.5	13.7
Industry missing	—	—	—	50.2	12.3	30.4
Area						
Nonmetropolitan area	31.8	1.5	10.8	—	—	—
Metropolitan area, unknown size	39.6	4.5	17.2	—	—	—
Metropolitan area, 100,000–250,000	40.4	2.5	28.1	—	—	—
Metropolitan area, 250,000–500,000	40.1	3.8	13.7	—	—	—
Metropolitan area, 500,000–1,000,000	42.4	4.8	21.6	—	—	—
Metropolitan area, 1,000,000–2,500,000	44.8	4.5	25.4	—	—	—
Metropolitan area, 2,500,000–5,000,000	49.5	6.0	31.0	—	—	—
Metropolitan area, 5,000,000+	48.8	4.0	29.5	—	—	—
PDII task measures						
Time on physical tasks						
Almost all	—	—	—	16.6	3.1	9.8
More than half	—	—	—	31.3	5.6	13.2
Less than half	—	—	—	54.1	7.0	20.3
Almost none	—	—	—	74.3	12.7	26.0
Time on repetitive tasks						
Almost all	—	—	—	27.1	4.2	13.1
More than half	—	—	—	36.4	3.8	13.0
Less than half	—	—	—	51.6	6.3	20.0
Almost none	—	—	—	59.4	8.6	28.9
Time on managing or supervising						
Almost all	—	—	—	53.1	6.7	19.8
Half or more	—	—	—	52.2	7.3	24.1
Less than half	—	—	—	44.0	5.8	21.3

See footnotes at end of table.

Table 1. Telework statistics, by demographic, occupational, industry, and job-task characteristics, ATUS and NLSY79 (in percent)

Category	ATUS			NLSY79		
	Ability-to-telework rate	Classification error rate	Takeup rate	Ability-to-telework rate	Classification error rate	Takeup rate
Almost none	—	—	—	40.7	4.9	21.9
Solve problems of 30+ minutes						
1+/day	—	—	—	55.5	7.7	26.8
1+/week	—	—	—	44.5	5.7	18.4
1+/month	—	—	—	36.1	5.1	12.7
Never	—	—	—	24.3	2.5	12.6
Use high school+ math						
1+/day	—	—	—	46.7	4.3	26.2
1+/week	—	—	—	46.8	9.6	24.9
1+/month	—	—	—	52.3	10.6	22.6
Never	—	—	—	42.9	4.5	20.1
Longest document typically read at job						
< 1 page	—	—	—	27.4	3.2	12.6
2–5 pages	—	—	—	50.1	6.1	19.9
6–10 pages	—	—	—	55.9	4.1	25.0
11–25 pages	—	—	—	60.3	11.9	29.5
25+ pages	—	—	—	68.6	11.7	26.0
Never	—	—	—	14.8	5.9	15.7
Frequency of personal contact with people other than coworkers or supervisors						
A lot	—	—	—	40.7	5.3	21.3
A moderate amount	—	—	—	51.8	7.1	20.7
A little	—	—	—	49.4	6.2	19.1
None at all	—	—	—	42.8	4.2	28.8
Frequency of personal contact with customers or clients						
A lot	—	—	—	36.8	5.7	18.7
Some	—	—	—	54.3	6.7	20.8
None at all	—	—	—	47.9	4.4	25.9
Frequency of personal contact with suppliers or contractors						
A lot	—	—	—	44.8	6.7	17.4
Some	—	—	—	47.0	6.7	20.8
None at all	—	—	—	42.7	4.3	23.6
Frequency of personal contact with students or trainees						
A lot	—	—	—	54.6	5.7	22.3
Some	—	—	—	42.7	3.9	20.2
None at all	—	—	—	42.8	6.7	22.3
Frequency of personal contact with patients						
A lot	—	—	—	24.3	5.0	10.6
Some	—	—	—	49.2	4.6	27.9
None at all	—	—	—	47.2	5.7	22.0

See footnotes at end of table.

Note: ATUS = American Time Use Survey, NLSY79 = National Longitudinal Survey of Youth 1979, NLS = National Longitudinal Surveys, PDII = Princeton Data Improvement Initiative, O*NET = Occupational Information Network.

Source: Authors' calculations using the 2017–18 Leave and Job Flexibilities Module of the ATUS, the most recent interview (2016–17) of the 1979 cohort of the NLSY79, and job-content data provided by O*NET.

The NLSY79 is a second source of data on hours worked at home. It is a survey of 12,686 individuals who were ages 14 to 21 in 1979. These individuals were interviewed annually from 1979 to 1994, and every 2 years after that. We use information from the most recent NLSY79 interview (round 27), which was conducted from October 2016 through November 2017, when respondents were ages 51 to 59. The sample used here is restricted to respondents who provided full information on their education, gender, race, wages, hours worked at home, occupation, and job tasks. The resultant sample size is 4,293.

For the NLSY79, our telework measure is derived from individual responses to a question about the number of hours per week respondents usually worked at home while at their current or most recent employer. Some workers in the NLSY79 work at home just a few hours a week, and, for our present purposes, it is not useful to designate them as teleworkers. During a pandemic, teleworking is a realistic alternative to working onsite only if individuals can work at home on a nearly full-time basis or at least for a considerable number of hours. In the ATUS, we address this issue by classifying workers as teleworkers only if they worked entirely at home on some days. In the NLSY79, we classify workers as teleworkers only if they usually worked at home at least 8 hours a week, which roughly corresponds to working at home for a full day.⁹ As shown below, with this restriction, the NLSY79 data look very similar to the ATUS data. Like the ATUS, the NLSY79 has information on a worker's age, gender, race, ethnicity, and marital status; the presence of children in the household; and the worker's job status (full or part time).

As with the ATUS, we merge the O*NET-based telework feasibility measure with data from the NLSY79.¹⁰ The results are summarized in table A-2 of the appendix. The estimates for the ability-to-telework rate, the classification error rate, and the takeup rate are presented in table 1. As shown in the table's fourth data column, approximately 45 percent of workers in the NLSY79 sample are in occupations in which working at home is feasible. The classification error rate, shown in the fifth data column, is about 6 percent, just a tad higher than the rate for workers of comparable age in the ATUS.

Looking at other entries in the fourth data column of table 1, one sees estimates that are quite similar to those obtained from the ATUS. Workers with less education are concentrated in jobs in which working from home is generally not feasible. Black, Hispanic, male, unmarried, and part-time workers also are more likely to be in jobs in which teleworking is not feasible. Working at home is generally feasible in management, professional, and administrative support jobs, but not in most service, sales, farming, construction, and transportation jobs. Similar to the occupation results, the industry results obtained from the NLSY79 largely mirror those obtained from the ATUS.

Round 27 of the NLSY79 also added variables based on individual responses to questions about the nature of a worker's job duties. Looking at these variables, which are similar to those in O*NET, suggests that lower skilled jobs with repetitive tasks are typically jobs in which telework is not feasible (according to the O*NET criteria). The same is true for jobs that require physical tasks or contact with patients and, to a lesser extent, for jobs that involve personal contact with customers.¹¹

Takeup rates in the ATUS and the NLSY79

As shown in appendix table A-1, about 44 percent of workers in the ATUS sample are in jobs in which telework is feasible. However, because only about 11 percent of workers in the sample (1) are in jobs in which telework is feasible and (2) did work at home, the takeup rate is only about 25 percent.

As seen in the third data column of table 1, the takeup rate is higher for more educated workers, workers in full-time jobs, and men, and it is lower for Hispanics. Examined by age group, the takeup rate is the highest for workers ages 25 to 54 and the lowest for workers younger than 25. Workers in larger metropolitan areas have a higher takeup rate, as do workers in management, professional, and sales occupations. Similarly, the industry estimates indicate higher takeup rates in the information industry and the professional and business services industry. The takeup rate is quite low in service occupations and office and administrative support occupations.

Turning to the NLSY79 and looking at the sixth data column in table 1, one sees that the overall takeup rate is a little less than 22 percent, comparable to the rate for workers of similar age in the ATUS. The other entries in the column show basic patterns similar to those in the ATUS. The takeup rate is lower for Hispanics and workers with less education. It is higher for men and people with children in the household. The takeup rate is very low in service occupations and office and administrative support occupations, and it is higher in jobs that involve more complex cognitive tasks such as frequent problem solving and reading long documents.

The most striking feature of the takeup rate estimates is that they are so low. As noted earlier, the overall takeup rate is 25 percent in the ATUS sample and 22 percent in the NLSY79 sample, whose respondents are older, on average. Even for the groups with the highest takeup rates, these rates generally top out at around 30 percent. However, both anecdotal reports and the evidence provided by Brynjolfsson et al. indicate that, in response to the COVID-19 pandemic, takeup rates are much higher than this percentage.¹²

Two factors determine the takeup rate: the employers' willingness to let workers telework and the workers' desire to work at home when they are offered the opportunity.¹³ There are several possible reasons why employers might be reluctant to let their workers telework. Working from home may require costly investments in computers or improved internet access. Alternatively, employers might see telework as a job perk given only to the most deserving workers. Likewise, employers might be concerned about difficulties in monitoring the behavior of employees working at home. (There are reports that employers are now increasing their use of surveillance software to monitor the work habits of their teleworking employees.¹⁴)

As mentioned earlier, the ATUS asks workers not only whether they work at home, but also whether they can work at home. Workers may interpret the latter question as being primarily about the employer's telework policies. An affirmative response would then indicate that a formal agreement or an informal understanding with the employer allows workers to work at home.¹⁵ Across the entire ATUS sample, 45 percent of workers who can telework actually do so under our definition. Although this percentage is almost double the takeup rate (as we have measured it), it still indicates that, for whatever reason, a majority of workers choose not to telework when given the opportunity. It is possible that many workers miss the social interactions at the workplace, forfeiting the time-saving benefits of telework.¹⁶

Implications for the labor market in the COVID-19 pandemic

The COVID-19 pandemic has led to widespread employment losses as businesses have closed, stay-at-home orders have been enacted, and workers and customers have made efforts to avoid close interactions with others. Teleworking has enabled some workers to continue working while maintaining social distancing. Table 2 presents CPS estimates of the change in employment and unemployment between February and April 2020. Separate estimates are presented for workers in occupations in which the O*NET-based telework feasibility measure predicts that working at home is feasible. All estimates shown are not seasonally adjusted.¹⁷

The CPS estimates indicate that, overall, employment fell by 16 percent from February to April, and the unemployment rate increased by 11 percentage points. However, employment fell by 21 percent in occupations in which telework is not feasible, compared with 8 percent in occupations in which telework is feasible. Over the same period, the unemployment rate increased by 14 percentage points in occupations in which telework is not feasible, but only by 6 percentage points in occupations in which telework is feasible.

In a recent article published in the June 2020 *Monthly Labor Review*, Matthew Dey et al. use a taxonomy developed by Joseph S. Vavra to identify vulnerable industries at the beginning of the COVID-19 pandemic.¹⁸ The authors show that while job losses were widespread throughout the economy from February to March, they were especially severe in these initially vulnerable, or highly exposed, industries. Table 2 breaks down employment and unemployment estimates for the highly exposed industries and for the remainder of the economy. In the highly exposed industries, workers in occupations in which working at home is not feasible were especially hard hit by the pandemic. For these occupations, employment fell by 42 percent between February and April, and the unemployment rate rose by 32 percentage points. By comparison, in occupations also located in the highly exposed industries but in which working at home is feasible, employment fell by a still substantial but smaller 22 percent, and the unemployment rate increased by 18 percentage points. In February, only 15 percent of employment in the highly exposed industries was in occupations in which telework is feasible. As a result, the overall fall in employment in these industries was very large (39 percent) and not far off from the reduction in employment in jobs in which working at home is not feasible.

Table 2. Changes in CPS employment and unemployment statistics, by ability to telework and industry exposure, February–April 2020

Telework status	Percent change in employment			Percentage-point change in unemployment rate		
	Total	Exposed industries	Nonexposed industries	Total	Exposed industries	Nonexposed industries
Unable to telework	-21.2	-41.5	-14.6	14.3	32.3	8.7
Able to telework	-7.7	-22.1	-6.7	6.2	18.1	5.4
Total	-15.9	-38.6	-11.1	11.0	30.1	7.2

Source: Authors' calculations based on February–April 2020 Current Population Survey (CPS) data and O*NET job-content data.

The percent reduction in employment in the remaining industries was substantial, but not nearly as large as that in the highly exposed industries. However, the same pattern holds here as in the highly exposed industries: the percent reduction in employment and the increase in the unemployment rate were substantially smaller in occupations in which it is possible to work at home. Specifically, in occupations in which telework is not feasible, employment fell by 15 percent between February and April, and the unemployment rate rose by 9 percentage points. By comparison, in occupations in which telework is feasible, employment fell by 7 percent over the same

period, and the unemployment rate increased by 5 percentage points. In February, 44 percent of employment in the less highly exposed industries was in occupations in which telework is feasible, which moderated both the overall reduction in employment and the increase in unemployment in those industries.

Table 3 presents CPS estimates of employment and unemployment, by major industry.¹⁹ As indicated by the final entries in the table's second and third data columns, across the entire economy, employment fell by 16 percent from February to April, and the unemployment rate increased by 11 percentage points. Examining the entries in the first three data columns, one sees that, for the most part, industries in which a higher proportion of workers can telework have a smaller reduction in employment and a smaller increase in unemployment. An even stronger relationship between employment loss and the ability to telework is evident in the remaining columns of the table. The fourth and fifth data columns show that, in every industry except agriculture, workers in occupations in which telework is feasible have a smaller percent decline in employment. In some industries, this difference is very large. For example, in information, employment fell by 37 percent in occupations in which telework is not feasible, but only by 2 percent in occupations in which telework is feasible. In the category of other services, the corresponding numbers are 36 percent and 8 percent. The table's seventh and eighth data columns, which break down the change in industry unemployment rates by the ability to work at home, tell the same story. In every industry, unemployment increased by a smaller amount for workers who are in occupations in which telework is feasible.

Table 3. Industry statistics

Industry	Percent share of employed able to telework (April 2020)	Labor market outcomes		Percent change in employment (February–April 2020)			Percentage-point change in unemployment rate (February–April 2020)		
		Percent change in employment (February–April 2020)	Percentage-point change in unemployment rate (February–April 2020)	Able to telework	Not able to telework	Difference	Able to telework	Not able to telework	Difference
Financial activities	81.1	-6.1	3.7	-5.8	-7.2	1.4	2.8	7.2	-4.4
Information	80.4	-11.8	9.3	-2.1	-37.3	35.2	5.8	21.1	-15.3
Professional and business services	71.6	-9.6	5.5	-6.4	-16.8	10.4	3.5	10.0	-6.5
Public administration	57.0	-3.8	3.4	-1.5	-6.7	5.1	3.2	3.8	-0.6
Education and health services	47.9	-13.9	9.4	-12.5	-15.2	2.8	8.8	9.9	-1.1
Manufacturing	41.0	-13.7	9.2	-3.9	-19.5	15.5	4.3	12.3	-8.0
Mining, quarrying, and oil and gas extraction	40.3	-14.9	4.2	5.5	-24.8	30.3	4.2	5.1	-0.8
Other services	39.9	-27.2	19.4	-8.4	-35.9	27.5	10.6	24.3	-13.6
Transportation and utilities	32.7	-10.9	8.7	4.7	-16.9	21.6	4.9	10.4	-5.5

See footnotes at end of table.

Table 3. Industry statistics

Industry	Percent share of employed able to telework (April 2020)	Labor market outcomes		Percent change in employment (February–April 2020)			Percentage-point change in unemployment rate (February–April 2020)		
		Percent change in employment (February–April 2020)	Percentage-point change in unemployment rate (February–April 2020)	Able to telework	Not able to telework	Difference	Able to telework	Not able to telework	Difference
Wholesale and retail trade	26.5	-16.4	12.6	-9.4	-18.6	9.2	7.6	14.2	-6.6
Construction	20.7	-16.6	10.2	-11.9	-17.8	5.8	5.1	11.3	-6.2
Leisure and hospitality	20.3	-42.0	32.1	-25.5	-45.1	19.6	22.9	34.1	-11.2
Agriculture, forestry, fishing, and hunting	8.1	-1.2	-1.7	-4.3	-1.0	-3.3	-5.9	-1.3	-4.5
Total	45.8	-15.6	10.8	-7.9	-21.2	13.3	6.2	14.3	-8.1

Source: Authors' calculations based on February–April 2020 Current Population Survey data and O*NET job-content data.

Conclusion

Our analysis of merged O*NET–ATUS data and merged O*NET–NLSY79 data indicates that about 45 percent of U.S. employment is in occupations in which telework is feasible. However, a much lower percentage of workers actually worked at home prior to the COVID-19 pandemic. Specifically, only a little more than 10 percent of workers in the ATUS spent any paid workday working only at home, and a similar percentage in the NLSY79 usually spent more than 8 hours a week working at home. Thus, according to both surveys, the implied takeup rate—that is, the percentage of workers who were in occupations in which telework is technologically feasible and who actually worked at home—was quite low prior to the pandemic. According to the ATUS, the takeup rate was about 25 percent. In the NLSY79, with its sample of older workers, the takeup rate was about 22 percent.

Many workers have begun working at home in response to the pandemic. CPS estimates indicate that, from February to April, the drop in employment in occupations in which telework is feasible was considerably smaller than the drop in employment in occupations in which telework is not feasible. This differential effect exists both within and across major industries, and it is likely to persist throughout the pandemic. The extent to which working patterns will be permanently affected by the pandemic is an open question. One might speculate that the takeup rate will increase permanently as workers and employers become more comfortable with telework arrangements.

Appendix

Table A-1. Percentage of workers in telework status categories in the ATUS, by demographic, occupational, and industry characteristics

Category	Telework status category			
	Unable to telework and did not telework	Unable to telework and did telework	Able to telework and did not telework	Able to telework and did telework
All	54.2	2.2	32.8	10.8
Educational attainment				
Less than a high school diploma	88.9	0.4	9.9	0.8
High school diploma, no college	74.4	1.1	21.8	2.8
Some college or associate's degree	61.7	1.9	30.5	5.9
Bachelor's degree and higher	29.0	3.5	46.3	21.2
Age				
15 to 24 years	76.3	0.0	21.0	2.7
25 to 54 years	50.6	2.6	33.8	13.0
55 years and older	49.4	2.5	38.5	9.7
Comparable NLS age range (51–59)	50.7	2.7	36.3	10.3
Presence of children				
No children	53.2	2.2	34.2	10.5
Children	55.7	2.3	30.8	11.2
Job status				
Full time	50.4	2.4	35.0	12.2
Part time	70.0	1.4	23.8	4.9
Gender				
Men	57.9	2.1	28.9	11.1
Women	50.1	2.3	37.1	10.4
Marital status				
Not married	64.0	1.5	27.2	7.3
Married	47.1	2.7	36.9	13.3
Area				
Nonmetropolitan area	67.1	1.0	28.4	3.4
Metropolitan area, unknown size	57.6	2.7	32.8	6.8
Metropolitan area, 100,000–250,000	58.1	1.5	29.0	11.3
Metropolitan area, 250,000–500,000	57.6	2.3	34.7	5.5
Metropolitan area, 500,000–1,000,000	54.9	2.8	33.2	9.2
Metropolitan area, 1,000,000–2,500,000	52.7	2.5	33.4	11.4
Metropolitan area, 2,500,000–5,000,000	47.5	3.0	34.2	15.4
Metropolitan area, 5,000,000+	49.2	2.0	34.4	14.4
Race or ethnicity				
Non-Hispanic White	48.6	2.7	35.8	12.9
Black	58.8	1.7	29.9	9.6
Hispanic	70.0	1.1	24.8	4.2
Occupations				

See footnotes at end of table.

Table A-1. Percentage of workers in telework status categories in the ATUS, by demographic, occupational, and industry characteristics

Category	Telework status category			
	Unable to telework and did not telework	Unable to telework and did telework	Able to telework and did not telework	Able to telework and did telework
Management, business, and financial	11.6	1.8	60.9	25.7
Professional and related	32.7	2.9	46.3	18.1
Service	90.2	1.9	7.3	0.6
Sales and related	65.2	2.9	22.6	9.3
Office and administrative support	38.4	2.4	53.1	6.1
Farming, fishing, and forestry	99.1	0.9	0.0	0.0
Construction and extraction	97.4	2.6	0.0	0.0
Installation, maintenance, and repair	97.9	1.2	1.0	0.0
Production	97.9	1.7	0.4	0.0
Transportation and material moving	98.6	1.1	0.3	0.0
Industries				
Agriculture, forestry, fishing, and hunting	89.0	2.8	6.6	1.7
Mining, quarrying, and oil and gas extraction	31.8	12.4	41.2	14.7
Construction	80.5	2.2	15.1	2.3
Manufacturing	60.7	2.9	24.9	11.5
Wholesale and retail trade	71.6	1.6	21.7	5.2
Transportation and utilities	73.3	1.4	19.7	5.6
Information	27.6	1.2	45.0	26.3
Financial activities	18.3	3.8	54.8	23.0
Professional and business services	27.4	2.7	41.4	28.5
Education and health services	49.2	1.9	41.2	7.7
Leisure and hospitality	86.2	0.7	11.4	1.7
Other services	64.1	4.9	26.6	4.4
Public administration	32.3	2.5	54.5	10.8

Note: NLS = National Longitudinal Surveys.

Source: Authors' calculations using the 2017–18 Leave and Job Flexibilities Module of the American Time Use Survey (ATUS).

Table A-2. Percentage of workers in telework status categories in the NLSY79, by demographic, occupational, industry, and job-task characteristics

Category	Telework status category			
	Unable to telework and did not telework	Unable to telework and did telework	Able to telework and did not telework	Able to telework and did telework
All	52.2	3.1	35.1	9.7

See footnotes at end of table.

Table A-2. Percentage of workers in telework status categories in the NLSY79, by demographic, occupational, industry, and job-task characteristics

Category	Telework status category			
	Unable to telework and did not telework	Unable to telework and did telework	Able to telework and did not telework	Able to telework and did telework
Educational attainment				
Less than a high school diploma	79.3	3.6	16.4	0.6
High school diploma, no college	66.9	2.8	26.4	3.9
Some college or associate's degree	54.6	2.9	34.8	7.7
Bachelor's degree and higher	26.2	3.4	50.3	20.2
Gender				
Men	57.8	3.5	28.9	9.9
Women	45.9	2.7	42.0	9.5
Race or ethnicity				
Non-Hispanic White	49.9	3.2	36.2	10.7
Black	64.0	2.6	28.1	5.4
Hispanic	58.1	3.0	34.0	5.0
Marital status				
Not married	57.7	3.0	32.0	7.3
Married	49.2	3.1	36.8	10.9
Presence of children				
No children	53.4	2.7	35.0	9.0
Children	44.2	5.7	35.9	14.3
Job status				
Full time	50.1	3.1	36.5	10.3
Part time	65.1	2.7	26.3	5.9
Occupations				
Management, business, and financial	10.5	3.0	66.3	20.2
Professional and related	32.9	2.7	46.0	18.3
Service	83.0	3.6	12.5	0.9
Sales and related	64.0	5.9	19.2	11.0
Office and administrative support	36.8	1.8	56.8	4.7
Farming, fishing, and forestry	100.0	0.0	0.0	0.0
Construction and extraction	96.0	4.0	0.0	0.0
Installation, maintenance, and repair	93.2	2.9	3.9	0.0
Production	92.4	3.7	3.9	0.0
Transportation and material moving	98.7	2.0	1.3	0.0
Industries				
No industry reported	43.7	6.1	34.9	15.3

See footnotes at end of table.

Table A-2. Percentage of workers in telework status categories in the NLSY79, by demographic, occupational, industry, and job-task characteristics

Category	Telework status category			
	Unable to telework and did not telework	Unable to telework and did telework	Able to telework and did not telework	Able to telework and did telework
Agriculture, forestry, fishing, and hunting	59.1	24.9	12.0	4.1
Mining, quarrying, and oil and gas extraction	85.0	0.0	7.1	7.9
Construction	73.3	5.0	19.5	2.3
Manufacturing	61.7	1.7	30.6	6.0
Wholesale and retail trade	69.0	1.7	22.6	6.7
Transportation and utilities	71.9	1.7	22.8	3.7
Information	18.9	3.8	48.5	28.8
Financial activities	22.0	2.8	54.7	20.5
Professional and business services	28.3	3.2	47.8	20.6
Education and health services	47.3	3.1	40.2	9.5
Leisure and hospitality	75.3	4.2	16.4	4.1
Other services	38.4	6.1	45.0	10.5
Public administration	43.5	1.6	47.4	7.5
PDII task measures				
Time on physical tasks				
Almost all	80.9	2.6	15.0	1.6
More than half	64.8	3.9	27.2	4.1
Less than half	42.7	3.2	43.1	11.0
Almost none	22.4	3.3	55.0	19.3
Time on repetitive tasks				
Almost all	69.9	3.0	23.6	3.5
More than half	61.1	2.4	31.7	4.8
Less than half	45.4	3.1	41.2	10.3
Almost none	37.1	3.5	42.2	17.2
Time on managing or supervising				
Almost all	43.7	3.1	42.6	10.5
Half or more	44.3	3.5	39.6	12.6
Less than half	52.8	3.2	34.6	9.4
Almost none	56.4	2.9	31.7	8.9
Solve problems of 30+ minutes				
1+/day	41.0	3.4	40.6	14.9
1+/week	52.3	3.2	36.3	8.2
1+/month	60.7	3.3	31.5	4.6
Never	73.9	1.9	21.2	3.1
Use high school+ math				
1+/day	51.0	2.3	34.5	12.3
1+/week	48.1	5.1	35.2	11.7
1+/month	42.7	5.0	40.5	11.8
Never	54.5	2.6	34.3	8.6

See footnotes at end of table.

Table A-2. Percentage of workers in telework status categories in the NLSY79, by demographic, occupational, industry, and job-task characteristics

Category	Telework status category			
	Unable to telework and did not telework	Unable to telework and did telework	Able to telework and did not telework	Able to telework and did telework
Longest document typically read at job				
< 1 page	70.3	2.3	23.9	3.5
2–5 pages	46.9	3.1	40.1	10.0
6–10 pages	42.3	1.8	42.0	14.0
11–25 pages	35.0	4.7	42.5	17.8
25+ pages	27.7	3.7	50.7	17.9
Never	80.2	5.0	12.5	2.3
Frequency of personal contact with people other than coworkers or supervisors				
A lot	56.2	3.1	32.0	8.7
A moderate amount	44.7	3.4	41.1	10.7
A little	47.5	3.1	40.0	9.4
None at all	54.8	2.4	30.5	12.3
Frequency of personal contact with customers or clients				
A lot	59.7	3.6	29.9	6.9
Some	42.6	3.1	43.0	11.3
None at all	49.8	2.3	35.5	12.4
Frequency of personal contact with suppliers or contractors				
A lot	51.5	3.7	37.0	7.8
Some	49.4	3.6	37.2	9.8
None at all	54.8	2.5	32.6	10.1
Frequency of personal contact with students or trainees				
A lot	42.8	2.6	42.5	12.2
Some	55.0	2.2	34.1	8.6
None at all	53.4	3.9	33.3	9.6
Frequency of personal contact with patients				
A lot	71.9	3.8	21.7	2.6
Some	48.5	2.3	35.4	13.7
None at all	49.7	3.0	36.9	10.4

Note: NLSY79 = National Longitudinal Survey of Youth 1979, PDII = Princeton Data Improvement Initiative.

Source: Authors' calculations using the most recent interview (2016–17) of the 1979 cohort of the NLSY79.

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NOTES

¹ Analyzing diary information in the American Time Use Survey (ATUS), Rachel Krantz-Kent finds that, from 2003–07 to 2013–17, workers in management, professional, and related occupations increased their time working at home. (See Krantz-Kent, "Where did workers perform their jobs in the early 21st century?" *Monthly Labor Review*, July 2019, <https://doi.org/10.21916/mlr.2019.16>.) The increased work at home documented by Krantz-Kent could possibly involve tasks done at home during a workday spent primarily at the workplace. However, as reported by Global Workforce Analytics and Flexjobs, the American Community Survey shows that the number of workers who worked at home at least half the time increased by 115 percent from 2005 to 2017. (See *2017 state of telecommuting in the U.S. employee workforce* (Global Workforce Analytics and Flexjobs, 2017).) According to Lexico.com, teleworking is defined as "the action or practice of working from home, making use of the Internet, email, and the telephone" (<https://www.lexico.com/en/definition/teleworking>). Most of the increase in work at home presumably involves teleworking. In this article, the terms teleworking and working at home are used interchangeably.

² Erik Brynjolfsson, John J. Horton, Adam Ozimek, Daniel Rock, Garima Sharma, and Hong Yi Tu Ye, "COVID-19 and remote work: an early look at US data," Working Paper 27344 (Cambridge, MA: National Bureau of Economic Research, April 2020), <https://www.nber.org/papers/w27344>.

³ O*NET data are produced under the sponsorship of the U.S. Department of Labor's Employment and Training Administration. Initially, the information in the O*NET database was collected by occupational analysts. Over time, this information has been updated through surveys of both occupational experts and each occupation's worker population. The OES survey is a U.S. Bureau of Labor Statistics survey that measures, by geography and industry, occupational employment and wages in the United States.

⁴ Jonathan I. Dingel and Brent Neiman, "How many jobs can be done at home?" white paper (Chicago, IL: Becker Friedman Institute for Economics at the University of Chicago, April 2020), https://bfi.uchicago.edu/wp-content/uploads/BFI_White-Paper_Dingel_Neiman_3.2020.pdf.

⁵ Simon Mongey, Laura Pilossoph, and Alex Weinberg, "Which workers bear the burden of social distancing policies?" Working Paper 27085 (Cambridge, MA: National Bureau of Economic Research, May 2020), <https://www.nber.org/papers/w27085>.

⁶ An examination of the ATUS data suggests that the percentage of workers who indicate they can work at home is somewhat higher than the percentage of workers who work at home, but the former appears to be significantly lower than the percentage of workers who are working at home in response to the pandemic. We suspect that workers in the ATUS indicate they can work at home if a formal agreement or an informal understanding with their employer allows them to work at home, rather than whether or not teleworking is technologically feasible given the nature of the job.

⁷ In a recent article, Harley Frazis analyzes the relationship between teleworking and the ATUS variables. (See Frazis, "Who telecommutes? Where is the time saved spent?" Working Paper 523 (U.S. Bureau of Labor Statistics, April 2020), <https://www.bls.gov/osmr/research-papers/2020/pdf/ec200050.pdf>.) Our current analysis differs from that of Frazis in that we use O*NET information to determine whether working at home is technologically feasible. A recent article by Rose Woods pictorially depicts some of the relationships between teleworking and the ATUS variables. (See Woods, "Job flexibilities and work schedules in 2017–18," *Spotlight on Statistics* (U.S. Bureau of Labor Statistics, April 2020), <https://www.bls.gov/spotlight/2020/job-flexibilities-and-work-schedules/home.htm>.)

⁸ Occupations in O*NET are based on an extended version of the Standard Occupational Classification (SOC) system structure. The ATUS uses a slightly aggregated version of the SOC-based 2010 occupation codes. There are many cases in which multiple O*NET occupations map to a single ATUS occupation. In these cases, we first average the O*NET estimates at the ATUS occupation level and then apply Dingel and Neiman's ("How many jobs can be done at home?") definition for telework feasibility.

[9](#) As noted earlier, our NLSY79 and ATUS definitions of teleworkers do not fully correspond to each other. In the NLSY79, some individuals who usually work at home 8 hours a week may never work full days at home, in which case they would not be counted as teleworkers under the ATUS definition. And there are workers we classify as teleworkers in the ATUS who report teleworking less than once a week in response to a question about the frequency of teleworking. These workers would likely not be counted as teleworkers under the NLSY79 definition.

[10](#) The NLSY79 uses 2002 census occupation codes. There are many cases in which multiple O*NET occupations map to a single NLSY79 occupation. In these cases, we first average the O*NET responses and then apply the Dingel and Neiman's ("How many jobs can be done at home?") definition for telework feasibility.

[11](#) In the NLSY79 questionnaire, "physical tasks" are defined broadly as "standing, handling objects, operating machinery or vehicles, or making or fixing things with your hands." Since occupations with a high O*NET value for any of these characteristics are classified as jobs in which teleworking is not feasible, it is not surprising that jobs that NLSY79 respondents identify as physical fall into this category. The same observation applies to jobs that workers in the NLSY79 identify as requiring extensive personal contact, because occupations with a high O*NET value for dealing with the public are classified as jobs in which teleworking is not feasible. We had hoped that the NLSY79 variables on the time spent on physical tasks and on the frequency of personal contacts would be helpful in ascertaining whether or not teleworking in an occupation is feasible, but these variables did not improve the predictive performance of the O*NET measure.

[12](#) Brynjolfsson et al., "COVID-19 and remote work."

[13](#) Another possible explanation for the low estimated takeup rates is that job variations within an occupation result in some error in our measure of whether a worker is in a job in which working at home is technically feasible.

[14](#) See Drew Harwell, "Managers turn to surveillance software, always-on webcams to ensure employees are (really) working from home," *The Washington Post*, April 30, 2020, <https://www.washingtonpost.com/technology/2020/04/30/work-from-home-surveillance/>.

[15](#) Formal telework agreements are common in the federal government, but rare in the private sector. According to National Compensation Survey estimates, flexible workplace agreements covered only 7 percent of private sector workers in 2019.

[16](#) See Alana Semuels, "The coronavirus is making us see that it's hard to make remote work actually work," *Time*, March 13, 2020, <https://time.com/5801882/coronavirus-spatial-remote-work/>.

[17](#) After our article was written, Dimitris Papanikolaou and Lawrence D. W. Schmidt published a working paper that uses ATUS information on whether workers work from home, measuring the extent to which workers in an industry can telework. Similarly to us, the authors find that, during the early stage of the COVID-19 pandemic, employment fell by a greater amount in industries in which fewer workers were working from home prior to the pandemic. See Papanikolaou and Schmidt, "Working remotely and the supply-side impact of Covid-19," Working Paper 27330 (Cambridge, MA: National Bureau of Economic Research, June 2020), <https://www.nber.org/papers/w27330>.

[18](#) See Matthew Dey, Mark A. Loewenstein, David S. Piccone Jr, and Anne E. Polivka, "Demographics, earnings, and family characteristics of workers in sectors initially affected by COVID-19 shutdowns," *Monthly Labor Review*, June 2020, <https://doi.org/10.21916/mlr.2020.11>; and Joseph S. Vavra, "Shutdown sectors represent large share of all U.S. employment" (Chicago, IL: Becker Friedman Institute for Economics at the University of Chicago, March 31, 2020), <https://bfi.uchicago.edu/insight/blog/key-economic-facts-about-covid-19/>. The highly exposed industries identified by Vavra are "Restaurants and Bars, Travel and Transportation, Entertainment (e.g., casinos and amusement parks), Personal Services (e.g., dentists, daycare providers, barbers), other sensitive Retail (e.g., department stores and car dealers), and sensitive Manufacturing (e.g., aircraft and car manufacturing)."

[19](#) Our estimates differ slightly from published CPS estimates because of such things as the treatment of missing industry codes.

Related Articles

[Demographics, earnings, and family characteristics of workers in sectors initially affected by COVID-19 shutdowns](#), *Monthly Labor Review*, June 2020.

[How many workers are employed in sectors directly affected by COVID-19 shutdowns, where do they work, and how much do they earn?](#) *Monthly Labor Review*, April 2020.

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Job openings, hires, and quits set record highs in 2019

Data from the Job Openings and Labor Turnover Survey show that the labor market continued to be strong throughout most of 2019, with job openings, hires, total separations, and quits reaching their highest monthly levels since these data series began in December 2000. The job openings level reached 7.5 million in January 2019; the hires level reached 6.0 million in April 2019; the separations level reached 5.8 million in April, July, and December 2019; and the quits level reached 3.6 million in July 2019. The annual hires level increased from 68.6 million in 2018 to 70.0 million in 2019, which is a series high since 2001, the first full year of data. The annual total separations level increased from 66.2 million in 2018 to 67.9 million in 2019, another series high since 2001. Within total separations, annual quits rose from 40.3 million in 2018 to 42.1 million in 2019, which also was a series high. The number of layoffs and discharges—another component of total separations—edged down from 21.8 million in 2018 to 21.7 million in 2019. The annual number of other separations declined slightly over the year, from 4.1 million in 2018 to 4.0 million in 2019.

The Job Openings and Labor Turnover Survey (JOLTS) data continued to show signs of a strong labor market in 2019, as job openings, hires, and total separations generally trended upward for total nonfarm and total private throughout the year.^[1] This article reviews the JOLTS data for 2019 at the total nonfarm, industry, and region levels.^[2] (For definitions of JOLTS terms, see the box that follows.)



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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 the employees have 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.

* From U.S. Bureau of Labor Statistics, *Handbook of Methods*, “Job Openings and Labor Turnover Survey,” p. 2, <https://www.bls.gov/opub/hom/pdf/homch18.pdf>.

Job openings

The job openings level is a procyclical measure of demand; the number of job openings tends to increase during economic expansions and decrease during economic contractions.[3] A larger number of job openings generally indicates that employers need additional workers, which is a sign of a demand for labor and confidence in the economy. Job openings and employment are closely linked and tend to rise and fall together. Also notable in this context is that the number of employees on nonfarm payrolls is considered a Principal Federal Economic Indicator; more particularly, payroll employment has frequently been cited as a coincident economic indicator.[4]

Monthly data show that job openings reached a data series high of 7.5 million in January 2019, indicating that the demand side of the labor force continued to show signs of strength. However, since the 2019 series high, job openings have trended downward, returning to early 2018 levels. Over the year, job openings fell from a December 2018 level of 6.7 million to a December 2019 level of 6.0 million, a 10.8-percent decrease.[5] (See table 1.) However, even with this decrease, job openings were still robust, compared with historical levels.

Table 1. Change in level and percentage of job openings, by industry and region, not seasonally adjusted, December 2018–December 2019 (levels in thousands)

Industry and region	Level by month and year			Change, December 2017 to December 2018		Change, December 2018 to December 2019	
	December 2017	December 2018	December 2019	Level	Percent	Level	Percent
Industry							
Total nonfarm	5,638	6,699	5,974	1,061	18.8	-725	-10.8
Total private	5,108	6,106	5,282	998	19.5	-824	-13.5
Mining and logging	20	23	13	3	15.0	-10	-43.5
Construction	180	291	216	111	61.7	-75	-25.8
Manufacturing	381	441	360	60	15.7	-81	-18.4
Durable goods	233	297	222	64	27.5	-75	-25.3
Nondurable goods	148	144	138	-4	-2.7	-6	-4.2
Trade, transportation, and utilities	1,260	1,265	1,045	5	0.4	-220	-17.4
Wholesale trade	208	164	168	-44	-21.2	4	2.4
Retail trade	834	791	633	-43	-5.2	-158	-20.0
Transportation, warehousing, and utilities	218	310	244	92	42.2	-66	-21.3
Information	118	129	146	11	9.3	17	13.2
Financial activities	353	340	306	-13	-3.7	-34	-10.0
Finance and insurance	269	279	222	10	3.7	-57	-20.4
Real estate and rental and leasing	84	61	84	-23	-27.4	23	37.7
Professional and business services	806	1,198	1,069	392	48.6	-129	-10.8
Education and health services	1,087	1,238	1,147	151	13.9	-91	-7.4
Educational services	86	92	106	6	7.0	14	15.2
Healthcare and social assistance	1,000	1,146	1,041	146	14.6	-105	-9.2
Leisure and hospitality	711	907	744	196	27.6	-163	-18.0

See footnotes at end of table.

Table 1. Change in level and percentage of job openings, by industry and region, not seasonally adjusted, December 2018–December 2019 (levels in thousands)

Industry and region	Level by month and year			Change, December 2017 to December 2018		Change, December 2018 to December 2019	
	December 2017	December 2018	December 2019	Level	Percent	Level	Percent
Arts, entertainment, and recreation	62	96	98	34	54.8	2	2.1
Accommodation and food services	649	810	646	161	24.8	-164	-20.2
Other services	191	275	236	84	44.0	-39	-14.2
Government	530	593	691	63	11.9	98	16.5
Federal	89	98	88	9	10.1	-10	-10.2
State and local	442	495	603	53	12.0	108	21.8
State and local education	139	202	211	63	45.3	9	4.5
State and local, excluding education	302	293	393	-9	-3.0	100	34.1
Region							
Northeast	1,024	1,114	1,055	90	8.8	-59	-5.3
South	1,994	2,525	2,245	531	26.6	-280	-11.1
Midwest	1,325	1,586	1,255	261	19.7	-331	-20.9
West	1,295	1,473	1,418	178	13.7	-55	-3.7

Note: Details may not sum to totals because of rounding.

Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

Job openings by industry

During 2019, the monthly job openings level for eight industries reached series highs. The top three industries with the most job openings were healthcare and social assistance, at 1.3 million in March; accommodation and food services, at 1.0 million in January; and construction, at 430,000 in April. (See table 2.)

Table 2. Monthly data series highs, by industry and region, seasonally adjusted, 2019

Industry and region	Industry and region data element	Month	Level
Industry			
Mining and logging	Job openings	July	40,000
Construction	Job openings	April	430,000
Wholesale trade	Job openings	January	279,000
Educational services	Job openings	November	146,000
Healthcare and social assistance	Job openings	March	1,300,000
Accommodation and food services	Job openings	January	1,000,000
State and local government education	Job openings	October	234,000
State and local government, excluding education	Job openings	August	409,000
Healthcare and social assistance	Hires	July	655,000
Accommodation and food services	Hires	June	992,000

See footnotes at end of table.

Table 2. Monthly data series highs, by industry and region, seasonally adjusted, 2019

Industry and region	Industry and region data element	Month	Level
Retail trade	Quits	November	577,000
Transportation, warehousing, and utilities	Quits	December	150,000
Professional and business services	Quits	March	697,000
Educational services	Quits	December	66,000
Arts, entertainment, and recreation	Quits	November	86,000
Accommodation and food services	Quits	February	714,000
Other services	Quits	October	183,000
State and local government education	Quits	January	100,000
Region			
Northeast	Job openings	August	1,300,000
South	Job openings	October	2,800,000
West	Job openings	January	1,800,000
South	Hires	July	2,400,000
Northeast	Quits	August	535,000
South	Quits	February	1,500,000
West	Quits	December	854,000

Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

Monthly job openings were up over the year from December 2018 to December 2019 in 7 of the 19 groups of industries for which data are published.^[6] The largest over-the-year increases in job openings occurred in real estate and rental and leasing (+37.7 percent), state and local government, excluding education (+34.1 percent), and educational services (+15.2 percent). Industries with the largest declines over the year include mining and logging (-43.5 percent), construction (-25.8 percent), and durable goods manufacturing (-25.3 percent). (See table 1.)

Job openings by region

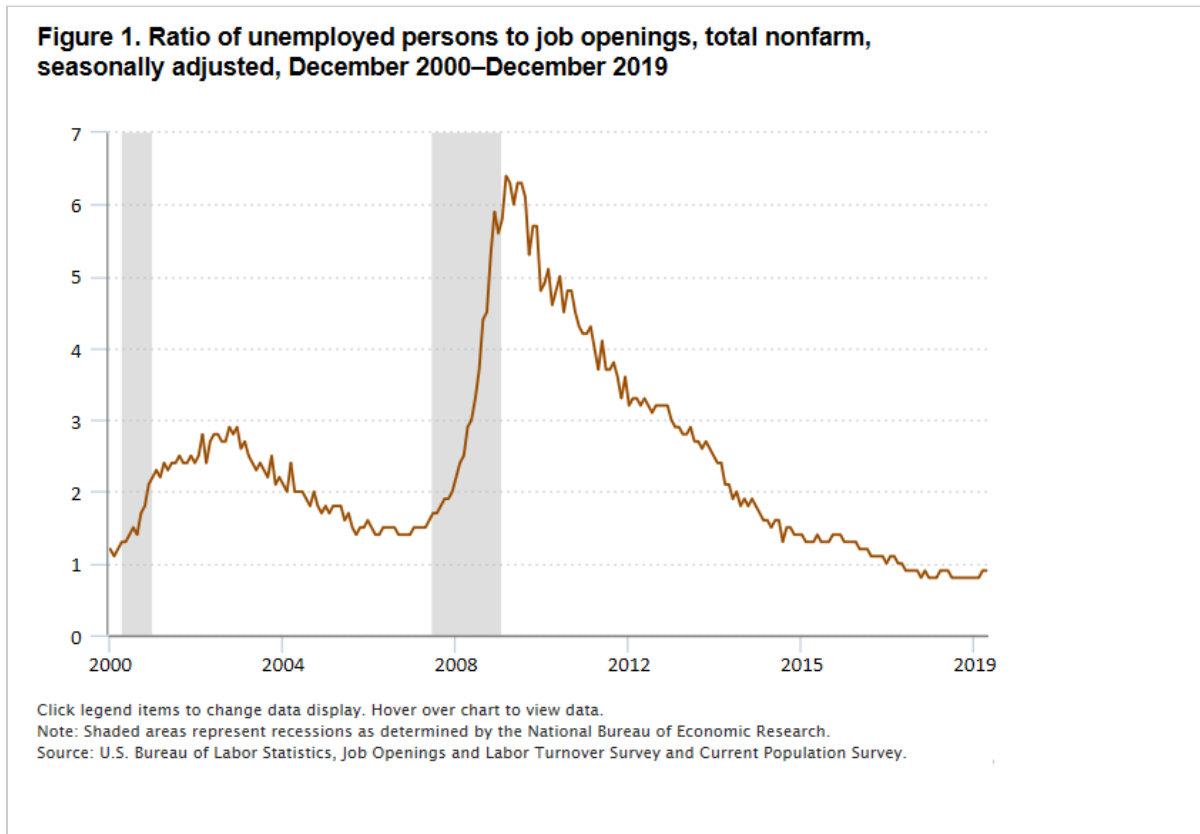
Three out of the four regions reached monthly series highs for job openings in 2019. In the South, the number of job openings reached a high of 2.8 million in October 2019. In the West, job openings reached a high of 1.8 million in January 2019; and in the Northeast, there were a record number of job openings, at 1.3 million in August 2019. (See table 2.) All four census regions experienced over-the-year declines in job openings from December 2018 to December 2019. The largest regional downward trend was in the Midwest, at 20.9 percent. Job openings fell in the South by 11.1 percent, followed by the Northeast (-5.3 percent) and the West (-3.7 percent). (See table 1.)

Job openings and unemployment

One way to analyze job openings and unemployment is to consider the number of unemployed persons per job opening. The number of unemployed persons per job opening is the ratio of unemployed persons, as published by the Current Population Survey (CPS), to the number of job openings. To calculate this ratio, divide the number of unemployed by the number of job openings. Unemployment and job openings levels generally move in opposite directions. That is, when the economy is strong, the number of unemployed is low and the number of job openings is high, causing the ratio to decrease. The opposite occurs when the economy weakens—unemployment increases and job openings decrease, leading to a higher ratio. Because of this countercyclical behavior, the ratio

of the number of unemployed persons per job opening provides a metric that helps describe the slack or tightness in the labor market.^[7]

When the “Great Recession” began in December 2007, the number of unemployed persons per job opening was 1.7.^[8] The ratio peaked at 6.4 unemployed persons per job opening in July 2009, the month after the recession ended. In 2018, the ratio of unemployed persons per job opening went below 1.0 for the first time. For 22 consecutive months—from March 2018 to December 2019—the ratio of unemployed persons per job opening was below 1.0. Within the year (2019), the ratio fell to a series low of 0.8 from March through October. (See figure 1.)



Hires

Like job openings, hires are a procyclical measure. The hires level has increased each year since the end of the 2007–09 recession, in June 2009. The 2019 monthly level for hires rose to a series high of 6.0 million in April. The total annual hires level has risen for 10 consecutive years; it increased from 68.6 million in 2018 to 69.9 million in 2019, or 2.0 percent. (See table 3.)

Table 3. Change in level and percentage of annual hires, by industry and region, not seasonally adjusted, 2017–19 (levels in thousands)

Industry and region	Level by year			Change, 2017 to 2018		Change, 2018 to 2019	
	2017	2018	2019	Level	Percent	Level	Percent
Total	65,638	68,594	69,943	2,956	4.5	1,349	2.0
Industry							
Total private	61,502	64,286	65,567	2,784	4.5	1,281	2.0
Mining and logging	374	449	319	75	20.1	-130	-29.0
Construction	4,585	4,524	4,981	-61	-1.3	457	10.1
Manufacturing	3,985	4,390	4,081	405	10.2	-309	-7.0
Durable goods	2,238	2,512	2,297	274	12.2	-215	-8.6
Nondurable goods	1,748	1,879	1,783	131	7.5	-96	-5.1
Trade, transportation, and utilities	12,642	13,682	13,870	1,040	8.2	188	1.4
Wholesale trade	1,656	1,756	1,806	100	6.0	50	2.8
Retail trade	8,479	9,032	9,088	553	6.5	56	0.6
Transportation, warehousing, and utilities	2,507	2,895	2,976	388	15.5	81	2.8
Information	1,018	1,088	1,123	70	6.9	35	3.2
Financial activities	2,530	2,501	2,649	-29	-1.1	148	5.9
Finance and insurance	1,657	1,636	1,672	-21	-1.3	36	2.2
Real estate and rental and leasing	874	864	977	-10	-1.1	113	13.1
Professional and business services	13,430	13,747	13,860	317	2.4	113	0.8
Education and health services	8,007	8,509	8,689	502	6.3	180	2.1
Educational services	1,141	1,159	1,209	18	1.6	50	4.3
Healthcare and social assistance	6,867	7,350	7,480	483	7.0	130	1.8
Leisure and hospitality	12,236	12,797	13,388	561	4.6	591	4.6
Arts, entertainment, and recreation	2,048	2,211	1,979	163	8.0	-232	-10.5
Accommodation and food services	10,188	10,587	11,408	399	3.9	821	7.8
Other services	2,687	2,598	2,603	-89	-3.3	5	0.2
Government	4,138	4,310	4,376	172	4.2	66	1.5
Federal	380	420	506	40	10.5	86	20.5
State and local	3,757	3,889	3,868	132	3.5	-21	-0.5
State and local education	1,820	2,013	1,993	193	10.6	-20	-1.0
State and local, excluding education	1,936	1,874	1,877	-62	-3.2	3	0.2
Region							
Northeast	10,486	10,496	11,000	10	0.1	504	4.8
South	25,898	27,315	28,094	1,417	5.5	779	2.9
Midwest	14,340	15,192	14,972	852	5.9	-220	-1.4
West	14,909	15,592	15,876	683	4.6	284	1.8

Note: Details may not sum to totals because of rounding.

Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

Hires by industry

Annual hires rose in 14 of 19 industries in 2019 and fell in 5 industries. The largest percentage increases in annual hires levels in 2019 were in federal government (+20.5 percent), real estate and rental and leasing (+13.1 percent), and construction (+10.1 percent).^[9] The largest percentage declines in hires occurred in mining and logging

(-29.0 percent); arts, entertainment, and recreation (-10.5 percent); and durable goods manufacturing (-8.6 percent). (See table 3.) There were 5 industries that had annual series highs for the number of hires in 2019. The top 3 industries in terms of hires are professional and business services, accommodation and food services, and healthcare and social assistance. (See table 4.)

Table 4. Annual data series highs, by industry and region, not seasonally adjusted, 2019 (levels in thousands)

Industry and region	Industry and region data element	Level
Industry		
Transportation, warehousing, and utilities	Hires	2,976
Professional and business services	Hires	13,860
Educational services	Hires	1,209
Healthcare and social assistance	Hires	7,480
Accommodation and food services	Hires	11,408
Retail trade	Quits	6,238
Transportation, warehousing, and utilities	Quits	1,639
Professional and business services	Quits	7,782
Educational services	Quits	640
Healthcare and social assistance	Quits	4,901
Arts, entertainment, and recreation	Quits	942
Accommodation and food services	Quits	8,239
Other services	Quits	1,621
State and local government education	Quits	1,103
Region		
Northeast	Hires	11,000
South	Hires	28,094
West	Hires	15,876
Northeast	Quits	5,778
South	Quits	17,158
Midwest	Quits	9,245
West	Quits	9,931

Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

Monthly seasonally adjusted hires reached series highs in two industries during 2019: accommodation and food services, at 992,000 in June, and healthcare and social assistance, at 655,000 in July. (See table 2.)

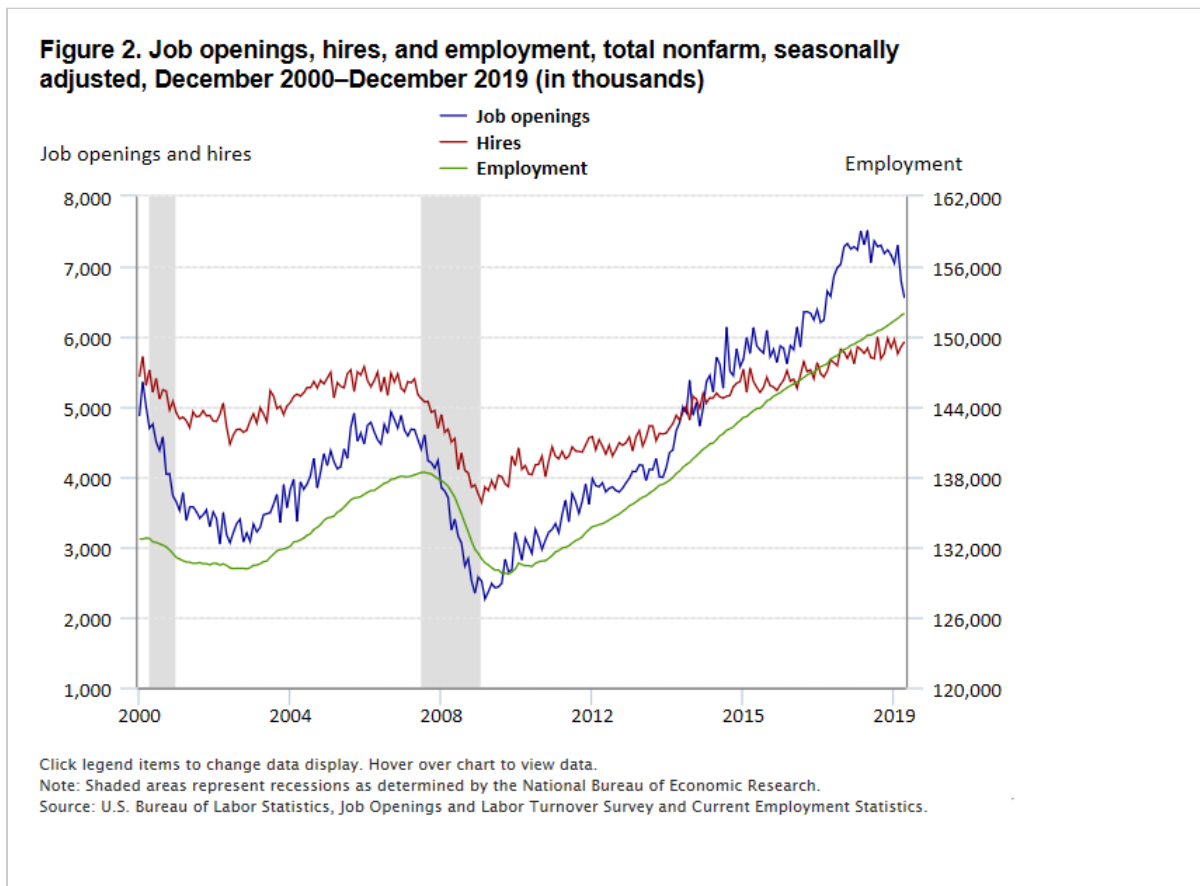
Hires by region

The Northeast region had the highest percentage increase in annual hires in 2019, rising 4.8 percent. Annual hires also increased in the South (+2.9 percent) and West (+1.8 percent), while they declined in the Midwest (-1.4 percent). In 2018, the Midwest had the highest percentage increase in annual hires, at 5.9 percent, while the Northeast had the lowest percentage increase in annual hires, at 0.1 percent. (See table 3.)

The South, Northeast, and West regions had series highs in the number of annual hires in 2019. In July 2019, the South experienced a series high of 2.4 million hires based on its monthly seasonally adjusted level. (See table 2.)

Hires and job openings

Following steady growth in the number of job openings after the end of the 2007–09 recession in June 2009, job openings started to increase rapidly in early 2014. Hires also increased after the recession, but at a slower pace than job openings. The monthly number of total nonfarm hires has exceeded the number of job openings for most of the history of the JOLTS series. In January 2015, however, job openings began to exceed hires, which was not expected, because hires is a full-month (or flow) measure whereas job openings is a 1-day, end-of-month snapshot (or stock) measure. When job openings exceed hires, it may suggest that employers have unmet demand for workers. For 60 consecutive months—from January 2015 to December 2019—job openings exceeded hires. The last time that the number of hires exceeded the number of job openings was in December 2014. (See figure 2.)



Total separations

The annual number of total separations increased 2.5 percent from 2018 to 2019, rising from 66.2 million to 67.9 million. (See table 5.) Total separations—also known as turnover—has risen annually for 9 consecutive years.

Table 5. Change in level and percentage of annual total separations, by industry and region, not seasonally adjusted, 2017–19 (levels in thousands)

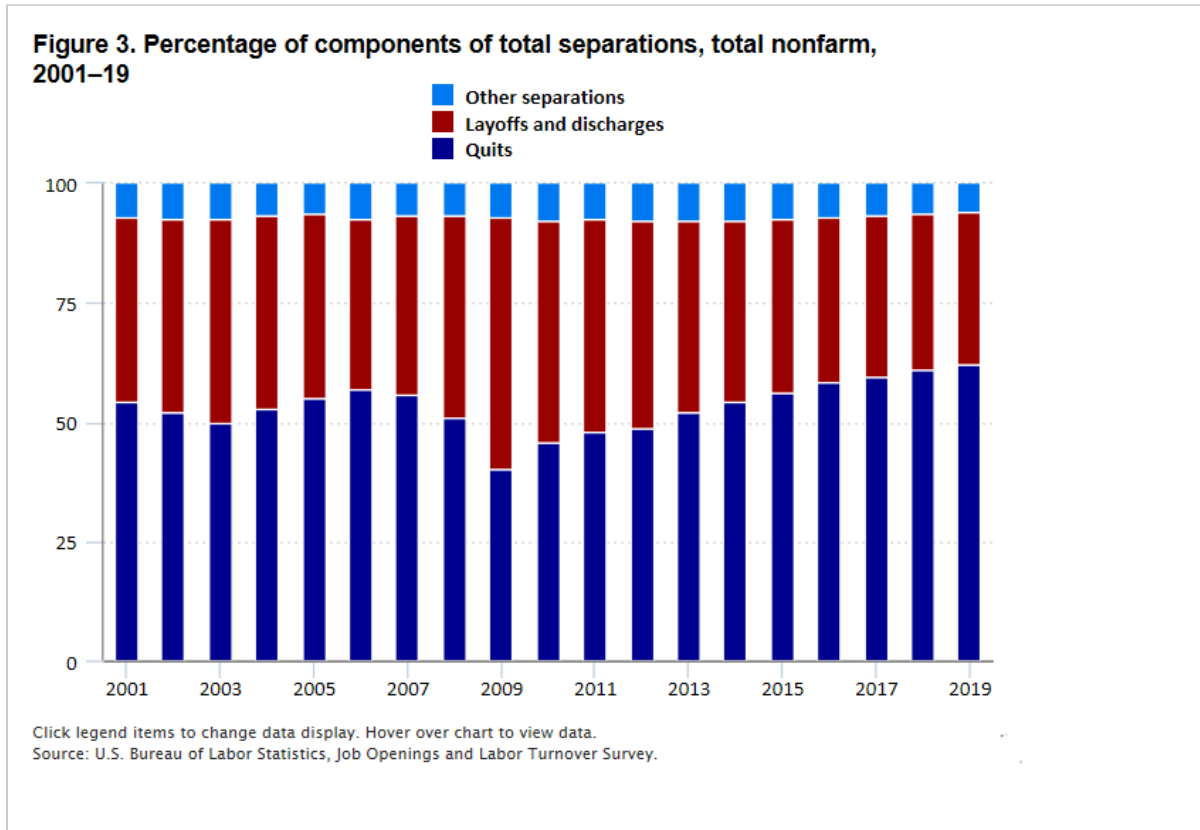
Industry and region	Level by year			Change, 2017 to 2018		Change, 2018 to 2019	
	2017	2018	2019	Level	Percent	Level	Percent
Total	63,497	66,199	67,856	2,702	4.3	1,657	2.5
Industry							
Total private	59,429	62,058	63,640	2,629	4.4	1,582	2.5
Mining and logging	327	393	346	66	20.2	-47	-12.0
Construction	4,278	4,215	4,855	-63	-1.5	640	15.2
Manufacturing	3,813	4,123	4,021	310	8.1	-102	-2.5
Durable goods	2,116	2,291	2,277	175	8.3	-14	-0.6
Nondurable goods	1,695	1,830	1,744	135	8.0	-86	-4.7
Trade, transportation, and utilities	12,512	13,501	13,685	989	7.9	184	1.4
Wholesale trade	1,625	1,714	1,741	89	5.5	27	1.6
Retail trade	8,540	9,154	9,106	614	7.2	-48	-0.5
Transportation, warehousing, and utilities	2,352	2,630	2,840	278	11.8	210	8.0
Information	1,014	1,057	1,100	43	4.2	43	4.1
Financial activities	2,381	2,334	2,508	-47	-2.0	174	7.5
Finance and insurance	1,576	1,530	1,597	-46	-2.9	67	4.4
Real estate and rental and leasing	806	804	912	-2	-0.2	108	13.4
Professional and business services	13,024	13,294	13,488	270	2.1	194	1.5
Education and health services	7,558	8,034	8,046	476	6.3	12	0.1
Educational services	1,068	1,129	1,101	61	5.7	-28	-2.5
Healthcare and social assistance	6,487	6,906	6,945	419	6.5	39	0.6
Leisure and hospitality	11,910	12,547	13,064	637	5.3	517	4.1
Arts, entertainment, and recreation	1,969	2,108	1,943	139	7.1	-165	-7.8
Accommodation and food services	9,941	10,438	11,120	497	5.0	682	6.5
Other services	2,609	2,561	2,525	-48	-1.8	-36	-1.4
Government	4,068	4,138	4,216	70	1.7	78	1.9
Federal	401	400	465	-1	-0.2	65	16.3
State and local	3,666	3,739	3,748	73	2.0	9	0.2
State and local education	1,782	1,928	1,937	146	8.2	9	0.5
State and local, excluding education	1,885	1,810	1,811	-75	-4.0	1	0.1
Region							
Northeast	10,303	10,086	10,511	-217	-2.1	425	4.2
South	25,125	26,299	26,781	1,174	4.7	482	1.8
Midwest	13,832	14,621	14,493	789	5.7	-128	-0.9
West	14,233	15,191	16,072	958	6.7	881	5.8

Note: Details may not sum to totals because of rounding.

Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

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 falls when the economy contracts. Layoffs and discharges are countercyclical, which means that their numbers typically rise during economic contractions and fall during economic expansions. The other separations data element remains relatively constant over time. Figure 3 shows this relationship by displaying the percentage of total separations attributed to each type of separation. Quits as a

percentage of total separations have been increasing since 2009, whereas layoffs and discharges as a percentage of total separations have been decreasing since 2009.



The number of annual quits rose over the year, from 40.3 million to 42.1 million. (See table 6.)

Table 6. Change in level and percentage of annual quits, by industry and region, not seasonally adjusted, 2017–19 (levels in thousands)

Industry and region	Level by year			Change, 2017 to 2018		Change, 2018 to 2019	
	2017	2018	2019	Level	Percent	Level	Percent
Total	37,708	40,331	42,113	2,623	7.0	1,782	4.4
Industry							
Total private	35,682	38,174	39,878	2,492	7.0	1,704	4.5
Mining and logging	172	247	177	75	43.6	-70	-28.3
Construction	1,852	2,058	2,082	206	11.1	24	1.2
Manufacturing	2,292	2,506	2,475	214	9.3	-31	-1.2
Durable goods	1,261	1,378	1,380	117	9.3	2	0.1
Nondurable goods	1,033	1,127	1,093	94	9.1	-34	-3.0
Trade, transportation, and utilities	7,882	8,497	8,897	615	7.8	400	4.7
Wholesale trade	1,020	1,067	1,022	47	4.6	-45	-4.2
Retail trade	5,616	5,958	6,238	342	6.1	280	4.7
Transportation, warehousing, and utilities	1,244	1,473	1,639	229	18.4	166	11.3

See footnotes at end of table.

Table 6. Change in level and percentage of annual quits, by industry and region, not seasonally adjusted, 2017–19 (levels in thousands)

Industry and region	Level by year			Change, 2017 to 2018		Change, 2018 to 2019	
	2017	2018	2019	Level	Percent	Level	Percent
Information	521	568	563	47	9.0	-5	-0.9
Financial activities	1,365	1,407	1,560	42	3.1	153	10.9
Finance and insurance	909	857	1,014	-52	-5.7	157	18.3
Real estate and rental and leasing	457	549	546	92	20.1	-3	-0.5
Professional and business services	7,458	7,561	7,782	103	1.4	221	2.9
Education and health services	4,920	5,379	5,543	459	9.3	164	3.0
Educational services	576	580	640	4	0.7	60	10.3
Healthcare and social assistance	4,345	4,797	4,901	452	10.4	104	2.2
Leisure and hospitality	7,749	8,444	9,181	695	9.0	737	8.7
Arts, entertainment, and recreation	779	919	942	140	18.0	23	2.5
Accommodation and food services	6,972	7,524	8,239	552	7.9	715	9.5
Other services	1,470	1,511	1,621	41	2.8	110	7.3
Government	2,026	2,159	2,236	133	6.6	77	3.6
Federal	177	184	206	7	4.0	22	12.0
State and local	1,847	1,975	2,028	128	6.9	53	2.7
State and local education	926	1,043	1,103	117	12.6	60	5.8
State and local, excluding education	923	933	925	10	1.1	-8	-0.9
Region							
Northeast	5,424	5,388	5,778	-36	-0.7	390	7.2
South	15,317	16,467	17,158	1,150	7.5	691	4.2
Midwest	8,116	8,988	9,245	872	10.7	257	2.9
West	8,853	9,488	9,931	635	7.2	443	4.7

Note: Details may not sum to totals because of rounding.

Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

The annual quits level has risen for 10 consecutive years. Annual layoffs and discharges decreased slightly over the year, from 21.8 million in 2018 to 21.7 million in 2019. (See table 7.)

Table 7. Change in level and percentage of annual layoffs and discharges, by industry and region, not seasonally adjusted, 2017–19 (levels in thousands)

Industry and region	Level by year			Change, 2017 to 2018		Change, 2018 to 2019	
	2017	2018	2019	Level	Percent	Level	Percent
Total	21,608	21,803	21,739	195	0.9	-64	-0.3
Industry							
Total private	20,263	20,544	20,492	281	1.4	-52	-0.3
Mining and logging	128	129	152	1	0.8	23	17.8
Construction	2,245	2,002	2,571	-243	-10.8	569	28.4

See footnotes at end of table.

Table 7. Change in level and percentage of annual layoffs and discharges, by industry and region, not seasonally adjusted, 2017–19 (levels in thousands)

Industry and region	Level by year			Change, 2017 to 2018		Change, 2018 to 2019	
	2017	2018	2019	Level	Percent	Level	Percent
Manufacturing	1,253	1,371	1,305	118	9.4	-66	-4.8
Durable goods	702	753	747	51	7.3	-6	-0.8
Nondurable goods	549	620	559	71	12.9	-61	-9.8
Trade, transportation, and utilities	3,741	4,171	4,022	430	11.5	-149	-3.6
Wholesale trade	490	502	604	12	2.4	102	20.3
Retail trade	2,302	2,658	2,400	356	15.5	-258	-9.7
Transportation, warehousing, and utilities	951	1,012	1,019	61	6.4	7	0.7
Information	396	409	449	13	3.3	40	9.8
Financial activities	683	634	644	-49	-7.2	10	1.6
Finance and insurance	383	417	323	34	8.9	-94	-22.5
Real estate and rental and leasing	303	218	319	-85	-28.1	101	46.3
Professional and business services	4,891	4,989	5,012	98	2.0	23	0.5
Education and health services	2,064	2,101	2,008	37	1.8	-93	-4.4
Educational services	427	480	399	53	12.4	-81	-16.9
Healthcare and social assistance	1,638	1,622	1,611	-16	-1.0	-11	-0.7
Leisure and hospitality	3,847	3,800	3,560	-47	-1.2	-240	-6.3
Arts, entertainment, and recreation	1,153	1,146	965	-7	-0.6	-181	-15.8
Accommodation and food services	2,695	2,654	2,594	-41	-1.5	-60	-2.3
Other services	1,012	938	763	-74	-7.3	-175	-18.7
Government	1,342	1,257	1,248	-85	-6.3	-9	-0.7
Federal	120	89	120	-31	-25.8	31	34.8
State and local	1,223	1,168	1,127	-55	-4.5	-41	-3.5
State and local education	562	601	548	39	6.9	-53	-8.8
State and local, excluding education	663	567	580	-96	-14.5	13	2.3
Region							
Northeast	4,130	3,928	3,989	-202	-4.9	61	1.6
South	8,190	8,352	8,124	162	2.0	-228	-2.7
Midwest	4,869	4,787	4,459	-82	-1.7	-328	-6.9
West	4,417	4,733	5,171	316	7.2	438	9.3

Note: Details may not sum to totals because of rounding.
Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

The annual level of other separations declined slightly, from 4.1 million in 2018 to 4.0 million in 2019. (See table 8.)

Table 8. Change in level and percentage of annual other separations, by industry and region, not seasonally adjusted, 2017–19 (levels in thousands)

Industry and region	Level by year			Change, 2017 to 2018		Change, 2018 to 2019	
	2017	2018	2019	Level	Percent	Level	Percent
Total	4,182	4,065	4,002	-117	-2.8	-63	-1.5
Industry							
Total private	3,483	3,342	3,269	-141	-4.0	-73	-2.2
Mining and logging	25	21	17	-4	-16.0	-4	-19.0
Construction	181	156	202	-25	-13.8	46	29.5
Manufacturing	270	248	240	-22	-8.1	-8	-3.2
Durable goods	155	161	151	6	3.9	-10	-6.2
Nondurable goods	114	88	89	-26	-22.8	1	1.1
Trade, transportation, and utilities	892	836	765	-56	-6.3	-71	-8.5
Wholesale trade	115	145	113	30	26.1	-32	-22.1
Retail trade	622	542	470	-80	-12.9	-72	-13.3
Transportation, warehousing, and utilities	155	147	182	-8	-5.2	35	23.8
Information	95	80	91	-15	-15.8	11	13.8
Financial activities	333	294	304	-39	-11.7	10	3.4
Finance and insurance	283	255	260	-28	-9.9	5	2.0
Real estate and rental and leasing	48	37	44	-11	-22.9	7	18.9
Professional and business services	677	743	692	66	9.7	-51	-6.9
Education and health services	570	553	497	-17	-3.0	-56	-10.1
Educational services	66	68	64	2	3.0	-4	-5.9
Healthcare and social assistance	505	485	432	-20	-4.0	-53	-10.9
Leisure and hospitality	312	304	323	-8	-2.6	19	6.3
Arts, entertainment, and recreation	42	42	37	0	0.0	-5	-11.9
Accommodation and food services	271	260	284	-11	-4.1	24	9.2
Other services	127	114	142	-13	-10.2	28	24.6
Government	698	724	735	26	3.7	11	1.5
Federal	104	128	140	24	23.1	12	9.4
State and local	593	595	593	2	0.3	-2	-0.3
State and local education	294	285	287	-9	-3.1	2	0.7
State and local, excluding education	300	309	310	9	3.0	1	0.3
Region							
Northeast	747	769	746	22	2.9	-23	-3.0
South	1,621	1,479	1,496	-142	-8.8	17	1.1
Midwest	848	844	790	-4	-0.5	-54	-6.4
West	964	973	972	9	0.9	-1	-0.1

Note: Details may not sum to totals because of rounding.

Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

Components of separations by industry

As mentioned previously, 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 2019 with the components of separations.

Quits

Quits include employees who left their job voluntarily, excluding retirements or transfers to other locations, which are counted as other separations. In 2019, the number of annual quits grew in 13 of 19 industries, while 6 industries had fewer quits. The largest percentage increases in annual quits levels in 2019 were in finance and insurance (+18.3 percent), federal government (+12.0 percent), and transportation, warehousing, and utilities (+11.3 percent). After having the largest percentage increase in annual quits in 2018, mining and logging had the largest 2019 annual percentage decrease (−28.3 percent), followed by wholesale trade (−4.2 percent), and nondurable goods manufacturing (−3.0 percent).

Nine of 19 industries reached a series high for the annual level of quits. The top 3 of these industries are accommodation and food services, at 8.2 million; professional and business services, at 7.8 million; and retail trade, at 6.2 million. (See table 6.) Eight industries reached monthly seasonally adjusted series highs for quits in 2019: accommodation and food services, at 714,000 in February; professional and business services, at 697,000 in March; and retail trade at 577,000 in November. (See table 2.)

Layoffs and discharges

In general, layoffs and discharges include involuntary separations initiated by the employer, including layoffs with no intent to rehire. Annual layoffs and discharges dropped in 2019 in 10 of 19 industries, whereas 9 industries had higher layoffs and discharges. The largest percentage declines in annual layoffs and discharges were in finance and insurance (−22.5 percent), other services (−18.7 percent), and educational services (−16.9 percent). After having the largest percentage decrease in annual layoffs and discharges in 2018, real estate and rental and leasing had the largest 2019 annual percentage increase (+46.3 percent), followed by federal government (+34.8 percent),^[10] and construction (+28.4 percent).

For annual layoffs and discharges, only one industry reached a series low—finance and insurance, at 323,000. (See table 7.) For monthly layoffs and discharges, no industry reached a series high. State and local government, excluding education, was the only industry to reach a series low for the monthly layoffs and discharges level, at 29,000 in December. (See table 4.)

Other separations

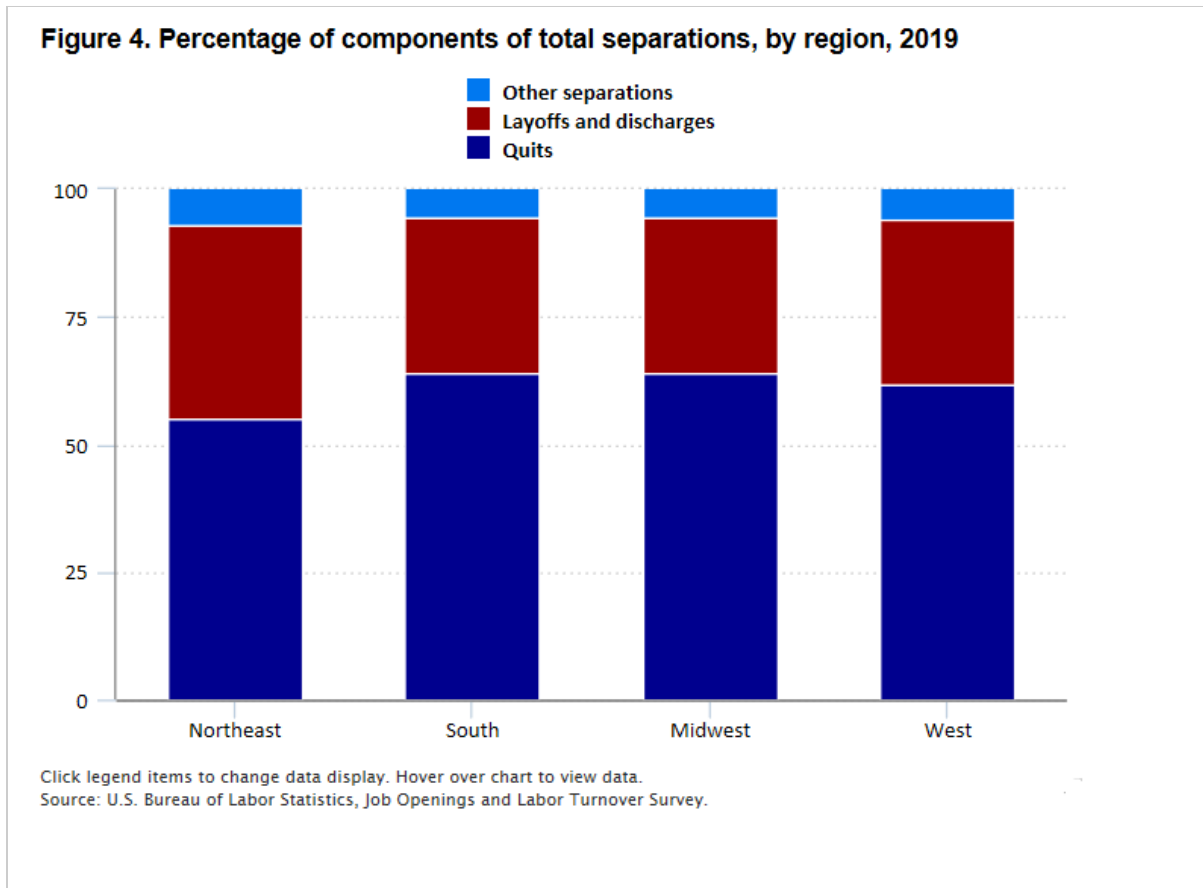
In 2019, annual other separations increased in 11 of 19 industries, with 8 industries having fewer annual other separations than in the previous year. The largest percentage increases in annual other separations include construction (+29.5 percent), other services (+24.6 percent), and transportation, warehousing, and utilities (+23.8 percent). The industries with the largest percentage declines in annual other separations were wholesale trade (−22.1 percent), mining and logging (−19.0 percent), and retail trade (−13.3 percent). No industry reached a series high for the annual level of other separations. Retail trade dropped to an annual series low of 470,000, as did durable goods manufacturing, at 151,000, and mining and logging, at 17,000. (See table 8.) There were no monthly seasonally adjusted series highs in other separations for 2019. (See table 2.)

Components of separations by region

In 2019, the Northeast region had an annual level of 10.5 million total separations. Within total separations, the Northeast had 5.8 million quits, 4.0 million layoffs and discharges, and 746,000 other separations. In the South region, the annual level of total separations for 2019 was 26.8 million. Within total separations, the quits level was 17.2 million for the South region, the layoffs and discharges level was 8.1 million, and the other separations level was 1.5 million. In the Midwest region, the annual total separations level was 14.5 million. Within total separations, there were 9.2 million quits in the Midwest region, 4.5 million layoffs and discharges, and 790,000 other separations. In 2019, the West region annual total separations level was 16.1 million. Within total separations in the West region, the quits level was 9.9 million, the layoffs and discharges level was 5.2 million, and the other separations level was 972,000. (See tables 5, 6, 7, and 8.)

Three out of the four regions reached monthly series highs for quits in 2019. The South quits level reached a series high of 1.5 million, in February; the West quits level reached a series high of 854,000, in December; and the Northeast quits level reached a series high of 535,000, in August. (See table 2.) No region reached a monthly series high for layoffs and discharges and other separations in 2019.

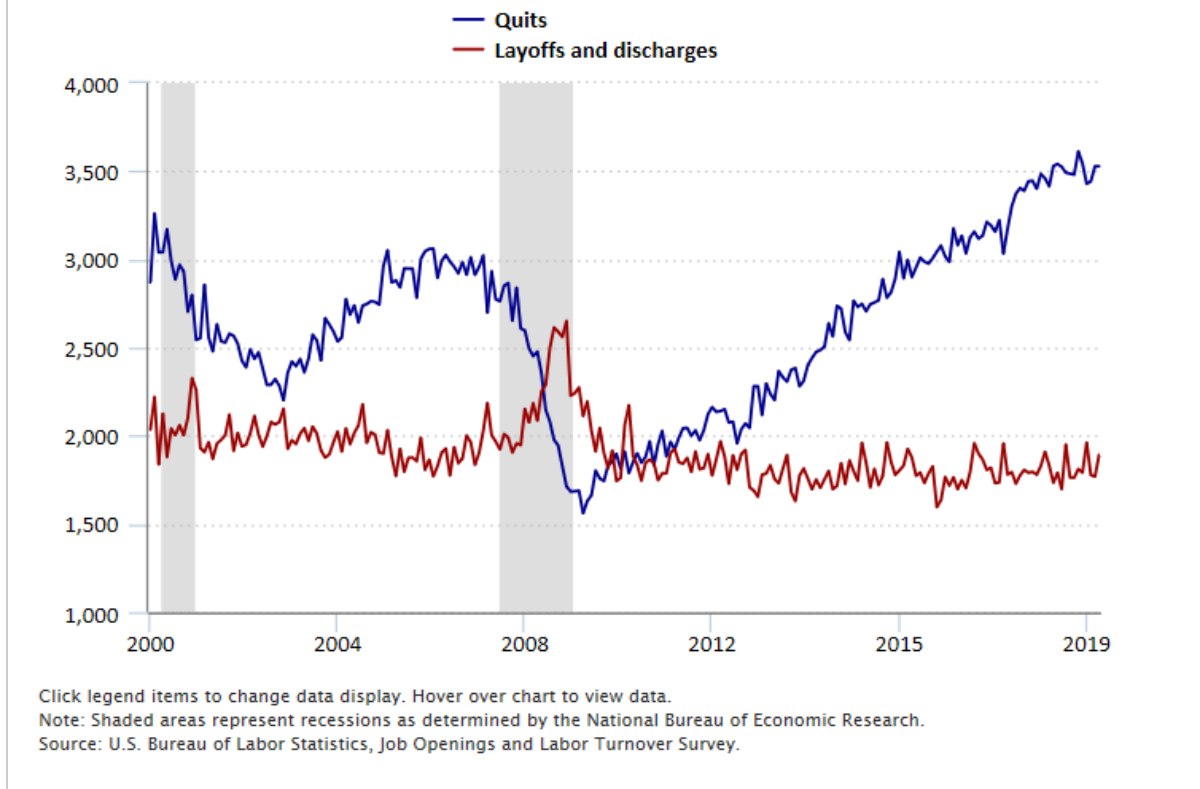
An analysis of each region by the components as a percentage of total separations illustrates the different characteristics of the JOLTS data at the region level. The Northeast region had the smallest percentage of quits within total separations, at 55.1 percent in 2019. The South experienced the highest percentage of quits, at 64.1 percent. In 2019, the Northeast region had the largest percentage of layoff and discharges within total separations, at 37.8 percent. The South region had the lowest percentage of layoffs and discharges, at 30.3 percent. The Northeast had the highest percentage of other separations, at 7.1 percent, while the Midwest region had the lowest percentage, at 5.5 percent. (See figure 4.)



Quits compared with layoffs and discharges

Over the period from July 2011 to December 2019, there were 102 consecutive months in which the monthly quits level exceeded the monthly layoffs and discharges level. During this period, the gap between the level of quits and the level of layoffs and discharges continued to widen. This growing gap is attributable to the number of quits increasing and the number of layoffs and discharges remaining flat. (See figure 5.)

Figure 5. Quits and layoffs and discharges, total nonfarm, seasonally adjusted, December 2000–December 2019 (in thousands)



Summary

JOLTS data show that the level of job openings, hires, total separations, and quits in the U.S. labor market rose throughout 2019. The job openings level began the year at its highest level since the data series began in December 2000. Although job openings declined throughout the year, ending at a lower level than in December 2018, the average job openings level in 2019 was higher than the average job openings level in 2018. In 2019, the number of hires continued its strong growth rate throughout the year and reached its highest level since the series began in December 2000. The number of total separations also maintained strong growth in 2019 and reached its highest level since December 2000. Much of the growth in total separations can be attributed to the increase in the number of quits, which also rose to a new high since the series began in December 2000.

SUGGESTED CITATION

Montgomery McCarthy and Larry Akinyooye, "Job openings, hires, and quits set record highs in 2019," *Monthly Labor Review*, U.S. Bureau of Labor Statistics, June 2020, <https://doi.org/10.21916/mlr.2020.12>.

NOTES

¹ The Job Openings and Labor Turnover Survey (JOLTS) produces monthly data on job openings, hires, quits, layoffs and discharges, and other separations from a sample of approximately 16,000 establishments. This sample consists of establishments from all 50 states, the District of Columbia, and all nonfarm industries as classified by the North American Industry Classification System (NAICS). The JOLTS sample allows publication of data by four census regions and by select NAICS two-digit sectors. All

annual data are not seasonally adjusted, and all monthly data are 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, 2015), <https://www.bls.gov/opub/hom/pdf/jlt-20130314.pdf>. See also the JOLTS page on the BLS website, at <https://www.bls.gov/jlt/>.

2 JOLTS estimates are produced by region for the Northeast, the South, the Midwest, and the West.

3 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*, September 9, 2019, <http://www.investopedia.com/terms/p/procyclical.asp>.

4 For more information, see "What Principal Federal Economic Indicators (PFEIs) are published by the U.S. Bureau of Labor Statistics?" *News Room—Frequently Asked Questions* (U.S. Bureau of Labor Statistics, December 29, 2016), <https://www.bls.gov/newsroom/faqs.htm>. For more on payroll employment being a "coincident" economic indicator, see Geoffrey H. Moore, "An introduction to international economic indicators," in *Business Cycles, Inflation, and Forecasting*, 2nd ed. (Pensacola, FL: Ballinger Publishing, 1983), pp. 65–92, <https://www.nber.org/chapters/c0692.pdf>; see p. 70.

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

6 The JOLTS program publishes estimates by seven NAICS supersectors (manufacturing; trade, transportation, and utilities; financial activities; education and health services; leisure and hospitality; government; and state and local government) and for 19 other groups of industries that are within the scope of the JOLTS program; excluded are agriculture and private households. Publicly owned establishments are classified in government. For a complete list of the 19 groups of industries (henceforth referred to as "industries"), see the JOLTS NAICS page at <https://www.bls.gov/jlt/jltnaics.htm>.

7 Countercyclical is a condition of negative correlation in which the value of the good, service, or indicator moves "in the opposite direction of the overall economic cycle: rising when the economy is weakening, and falling when the economy is strengthening." For more information, see the definition of "countercyclical" in *InvestorWords*, at <http://www.investorwords.com/1166/countercyclical.html>.

8 The National Bureau of Economic Research (NBER) is the official arbiter of the beginning and ending dates of U.S. business cycle expansions and contractions. The NBER Business Cycle Dating Committee recently determined that a peak in monthly economic activity occurred in the U.S. economy in February 2020, marking an end to the most recent economic expansion and the beginning of a recession. See "Determination of the February 2020 peak in U.S. economic activity" (National Bureau of Economic Research, June 8, 2020), <http://www.nber.org/cycles/june2020.html>. See also, "U.S. business cycle expansions and contractions" (National Bureau of Economic Research, June 8, 2020), <http://www.nber.org/cycles/>.

9 The large increase in annual hires for the federal government was largely the result of the hiring of temporary Census 2020 workers in the late summer of 2019.

10 The large increase in annual layoffs and discharges for the federal government was heavily affected by the temporary Census 2020 workers having their positions ended in October 2019.

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The number of people who can telework is higher than was estimated

Maureen Soyars Hicks

March 2020 marked the beginning of a new experiment in the American workplace. Millions of people began working from home in an effort to inhibit the spread of the COVID-19 virus, also known as the novel coronavirus. As more people than ever are skipping daily commutes and holding virtual meetings, a fundamental question arises: how many people can actually perform all of their work duties from home? In their working paper “[How many jobs can be done at home?](#)” economists Jonathan I. Dingel and Brent Neiman (National Bureau of Economic Research, Working Paper 26948, April 2020) use data from the Occupational Information Network (O*Net) and U.S. Bureau of Labor Statistics (BLS) to estimate how many jobs in the United States can be performed entirely at home.

The authors find that 37 percent of U.S. jobs can be performed entirely at home—a number that greatly exceeds any recent estimate of how many workers telecommute on an average day. According to the 2018 American Time Use Survey, “less than a quarter of all full-time workers work from home on an average day, and even those workers typically spend well less than half of their working hours at home.”

Dingel and Neiman determine whether a job should be classified as “feasible for telework” using responses from two O*Net surveys covering “work context” and “generalized work activities.” If a job requires daily “outdoor work,” for example, they determine that it cannot be performed at home. Then, the authors merge their classifications with data from BLS “on the prevalence of each occupation in the aggregate U.S. economy as well as in particular metropolitan statistical areas and 2-digit NAICS industries.”

According to Dingel and Neiman, workers in telework-capable occupations typically earn more: the 37 percent of U.S. jobs that can plausibly be performed at home account for 46 percent of all wages.

The authors note that findings varied across cities and industries. For example, more than 45 percent of jobs in San Francisco, San Jose, and Washington, DC, can be performed at home, while only 30 percent or less of the jobs in Fort Myers, Grand Rapids, and Las Vegas can be performed at home. The findings also indicate that most jobs in finance, corporate management, and professional and scientific services can plausibly be performed at home, while very few jobs in agriculture, hotels and restaurants, or retail can be.

The authors then analyze countries other than the United States and find “a clear positive relationship between income levels and the shares of jobs that can be done from home.” They find that fewer than 25 percent of jobs in Mexico and Turkey can be performed at home, whereas more than 40 percent of jobs in Sweden and the United Kingdom can be. These results suggest that developing economies may face challenges in continuing to work during periods of social distancing during the spread of the COVID-19 virus.