

## Business employment dynamics by wage class

*Currently available data on gross job gains and losses do not capture the wage component of employment dynamics. This article partly fills this gap by examining the distribution of job gains and losses among establishments that pay high, medium, and low wages.*

Statistics on gross job gains and losses, which show the dynamics of job creation and destruction, are now often used by economists and policymakers in understanding the labor market. Available longitudinal microrecord data on employers and employees have allowed researchers to observe, in detail, how employment growth is generated by a continuous stream of job gains and losses across all industries, geographies, and firms of different sizes and ages. Since its first publication in 2003, the Business Employment Dynamics (BED) program at the U.S. Bureau of Labor Statistics (BLS) has expanded greatly, publishing valuable data series in response to policy and research needs for data on employment growth and labor turnover. Currently available data series on employment dynamics and some entrepreneurship indicators allow economists and policymakers to gain a better understanding of the overall labor market and the specific nature and magnitude of job creation and destruction.<sup>1</sup>

Missing from current series on job flows are data on the wage component of employment dynamics. Efforts to fill this gap are important because of a growing desire among economists to measure job creation and employment growth in terms of wage quality. In a working paper on the effect of minimum-wage increases on employment in Seattle, WA, Ekaterina Jardim et al. used state employment and wage data to examine the impact of minimum-wage increases across categories of low-wage employment. The authors reached a “markedly different conclusion” from that reported in previous studies, stating that “employment losses associated with Seattle’s mandated wage increases are in fact large enough to have resulted in net reductions in payroll expenses—and total employee earnings—in the low-wage job market.”<sup>2</sup> The paper attributed this contrasting finding to the data sources used in the analysis.



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Jardim et al. focused on low-wage employment by using data compiled by Washington State's Employment Security Department in the administration of unemployment insurance (UI) law. The BLS Quarterly Census of Employment and Wages (QCEW) program gathers such data from every state, compiling them into a single longitudinal database used in developing the BED data series. Expanding the BED scope by adding wage data elements and tabulating job gains and losses by a quality-of-wage measure will increase the value and utility of the BED series. In this article, we analyze BED data by wage class, showing gross job gains and losses, as well as employment growth, by metrics that distinguish among establishments that pay high, medium, and low wages.

## What are BED data?

The BED program has published quarterly statistics on gross job gains and losses since 2003.<sup>3</sup> These statistics are derived from QCEW establishment-level microrecords. The data gathered by the QCEW program provide a virtual census of employees on nonfarm payrolls, covering 98 percent of such employees. In the first quarter of 2020, the QCEW program reported 147.0 million employees working across 10.4 million establishments.<sup>4</sup>

The QCEW estimates are based on mandatory quarterly reports on employment and wages submitted by all employers subject to UI laws. The process of reviewing and editing these reports turns raw, unedited, administrative data into high-quality, reliable, and consistent economic statistics. These QCEW statistics are the most accurate, timely, comprehensive, and frequent employment and wage census data in the federal statistical system at the local level. In addition to being a high-quality source of employment statistics, the QCEW serves as the sampling frame for many BLS surveys, as a benchmark for the BLS Current Employment Statistics and Occupational Employment and Wage Statistics surveys, and as an input to the U.S. Bureau of Economic Analysis National Income and Product Accounts.

The QCEW records are matched across quarters to create a longitudinal history for each establishment. Records are linked by their unique identifiers, including state codes, UI numbers, and reporting-unit numbers. This method creates a history for continuous records and identifies establishment entries and exits, while avoiding spurious business births and deaths that could be reported in the event of ownership changes, mergers, acquisitions, spinoffs, or other corporate restructuring. The longitudinal database created from the linked records is used to construct the BED data.<sup>5</sup>

The BED program tracks employment levels and establishment counts by the direction of employment changes. The employment reported in the third month of each consecutive quarter is used to measure the over-the-quarter employment change. Depending on the nature of this change, records correspond to four distinct groups of establishments: opening, expanding, closing, and contracting. Expanding and contracting establishments have continuous records with, respectively, increasing and decreasing employment over the quarter. Opening establishments are those whose employment shifts from zero to positive, whereas closing establishments are those whose employment shifts from positive to zero.<sup>6</sup>

The sum of employment at opening establishments and the change in employment at expanding establishments represents gross job gains. Similarly, the sum of the prior-quarter employment at establishments that closed in the current quarter and the change in employment of contracting establishments represents gross job losses. The net employment growth for all firms can be measured in one of two ways: as the difference between total employment in the current and previous quarters or as the difference between gross job gains and losses in the current quarter.

## Differentiating among high-, medium-, and low-paying establishments

In this article, we measure, by level of wages paid, gross job gains at opening or expanding establishments and gross job losses at contracting or closing establishments. We show how much net employment growth comes from establishments that pay high, medium, and low wages. Because there are no commonly accepted definitions of these wage categories, we use the distribution of average weekly wages paid across all private sector establishments and select certain wage ranges as high, medium, and low. We use the lower and upper quartiles as boundaries for differentiating among high, medium, and low wages. Establishments paying average weekly wages lower than the bottom quartile are defined as low-paying establishments, and those paying average weekly wages higher than the top quartile are defined as high-paying establishments. Establishments paying average weekly wages in the interquartile range are defined as medium-paying establishments.

We apply this wage classification to every establishment in the QCEW database, for every quarter. The wage class into which a record falls is based on the distribution of average wages paid across all active records in the reference quarter. The establishment wage group is reevaluated every quarter and may change from quarter to quarter. For closing establishments, we use the wages paid in the last quarter in which the establishments were active. The values for the upper and lower quartile wages vary across quarters as the ranks of establishments on the wage scale move over time because of business growth and the phases of business cycles.

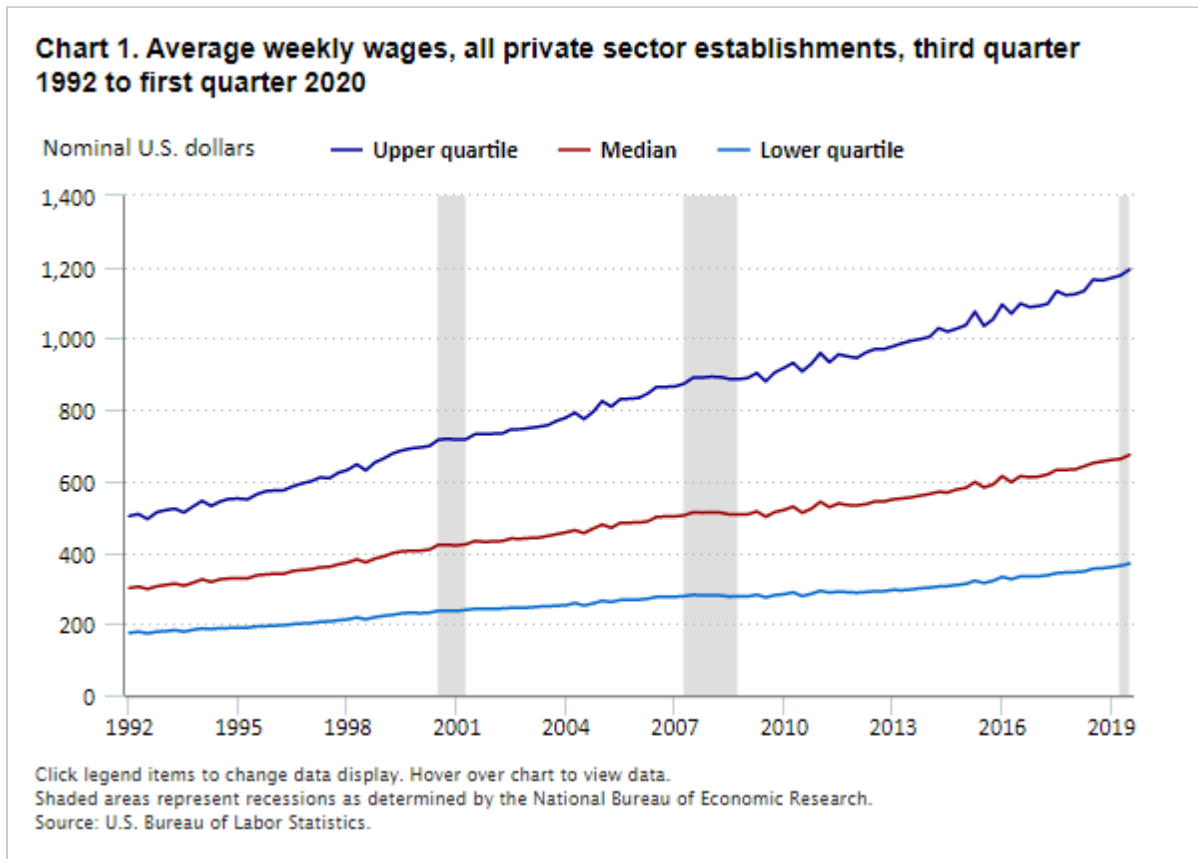
To show the dynamics of employment by wage class, we follow a methodology for measuring gross job gains and losses (and their components) that is the same as that used routinely in measuring other data elements of the BED series. We compare employment at the establishment level in two consecutive quarters and calculate net changes in employment. On the basis of the direction of employment change, records are labeled as opening, closing, expanding, or contracting. The gains and losses at the establishment level are then aggregated by wage class. We seasonally adjust the four components of employment dynamics and use them to calculate the seasonally adjusted values for gross job gains and losses, as well as the rate of gains and losses and the net change in employment.<sup>7</sup>

In the following sections, we summarize findings from the tabulation of BED data by establishment wage class. The latest available data at the time of writing this article were for the quarter ended in March 2020. The full impact of the coronavirus disease 2019 (COVID-19) pandemic will not be reflected in the BED data elements until the pandemic subsides. However, data for the first quarter of 2020 partially reflect the impact of the pandemic-induced recession that started in February 2020.<sup>8</sup> For that reason, in discussing a trend for a given data element, we mainly compare data up to the fourth quarter of 2019 and, if warranted, refer to data for the first quarter of 2020.

## Rising wage gap between high- and low-paying establishments

In the first quarter of 2020, average weekly wages in the U.S. private sector were, on a seasonally adjusted basis, \$369 or less at low-paying establishments and \$1,193 or more at high-paying establishments. (See chart 1.) The mean and median wages of all establishments in that quarter were \$1,133 and \$673, respectively. The difference between mean and median wages indicates the skewness of the wage dispersion across payrolls of all private sector establishments compiled in the QCEW database. The mean and median wages, as well as the upper and lower quartile wage levels, increased over the quarter and from the same period in 2019. Average private sector

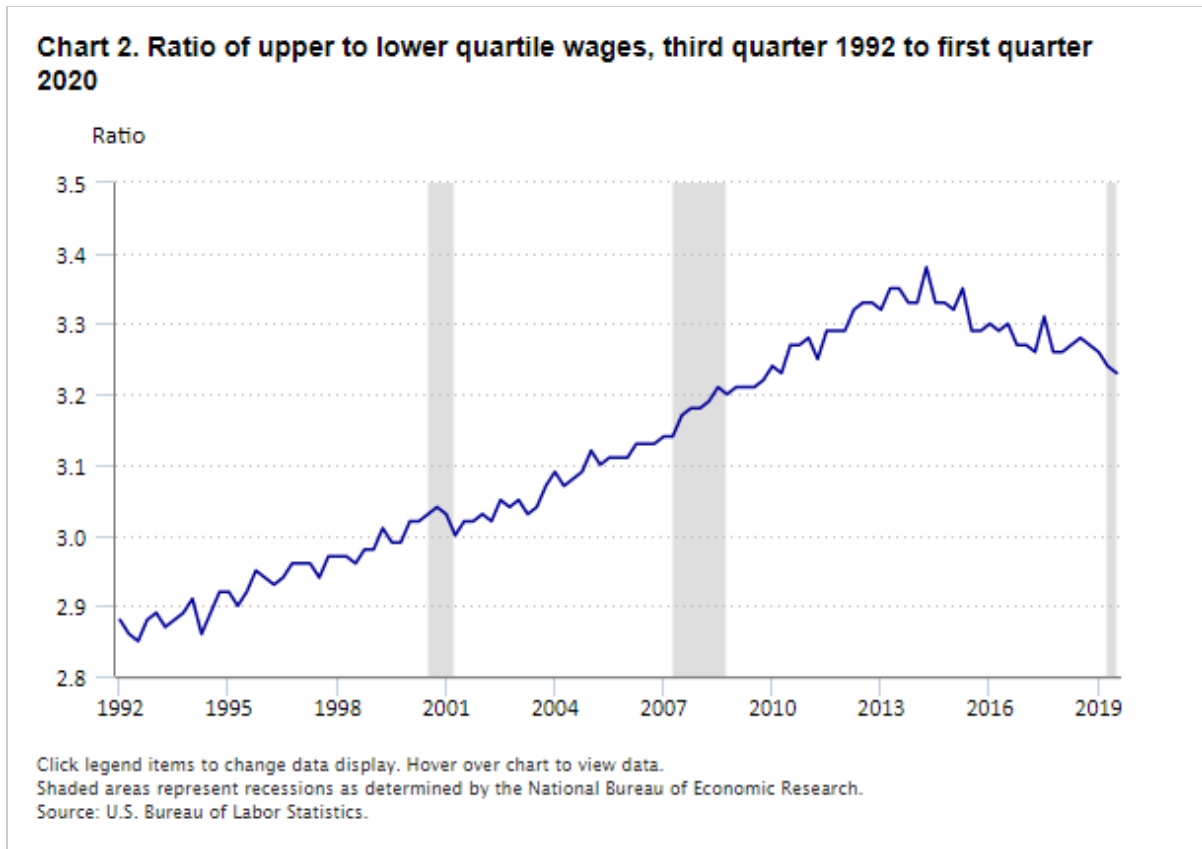
wages, which were partly affected by the COVID-19 economic slowdown, did not change considerably in the first quarter of 2020. (See appendix table A-1.)



Low-paying establishments across the nation paid an average weekly wage of \$175 or less in the third quarter of 1992, and this figure rose to \$369 in the first quarter of 2020, a steady, 2.1-fold increase over the period. In high-paying establishments, the average weekly wage was \$502 in the third quarter of 1992 and \$1,193 in the first quarter of 2020, a 2.4-fold increase that was faster than that at low-paying establishments. The gap between upper and lower quartiles widened over this period, with the average weekly wage differential between top and bottom quartiles rising from \$328 in the third quarter of 1992 to \$824 in the first quarter of 2020. The gap between the three wage classes described previously is based on nominal wages, and the real gap, deflated for inflation, will be smaller. However, the finding that wages rose more in establishments with higher wages stands.

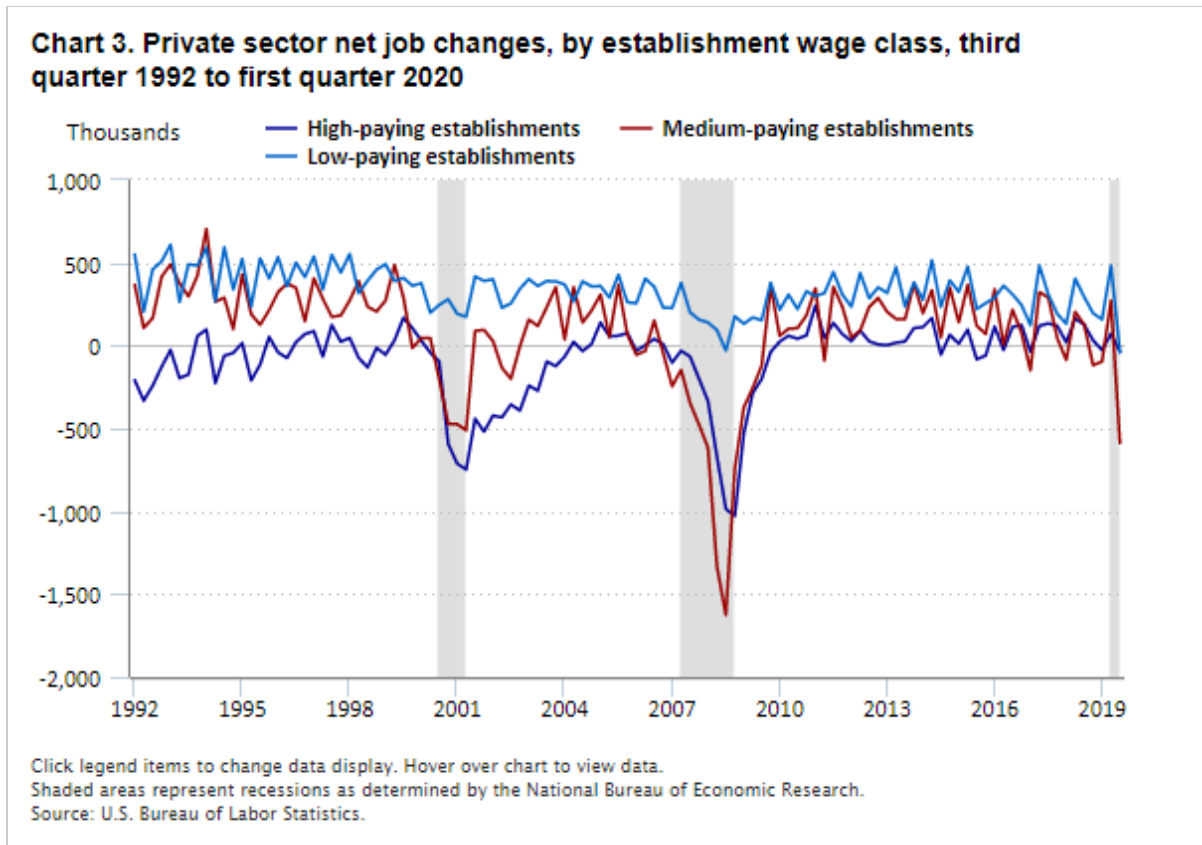
## Recent fall in wage dispersion

Chart 2 shows that wage dispersion, measured by the ratio of upper to lower quartile wages, has been declining in recent years, despite previously trending up since the beginning of the series. In 1992, establishments in the top quartile of the wage distribution paid average wages that were 2.89 times higher than those paid by establishments in the lower quartile. In the fourth quarter of 2014, this ratio, which indicates a widening wage inequality, reached 3.38, and since then, it has been on a declining trend, falling to 3.23 in the first quarter of 2020.



## Low-wage establishments account for most job gains

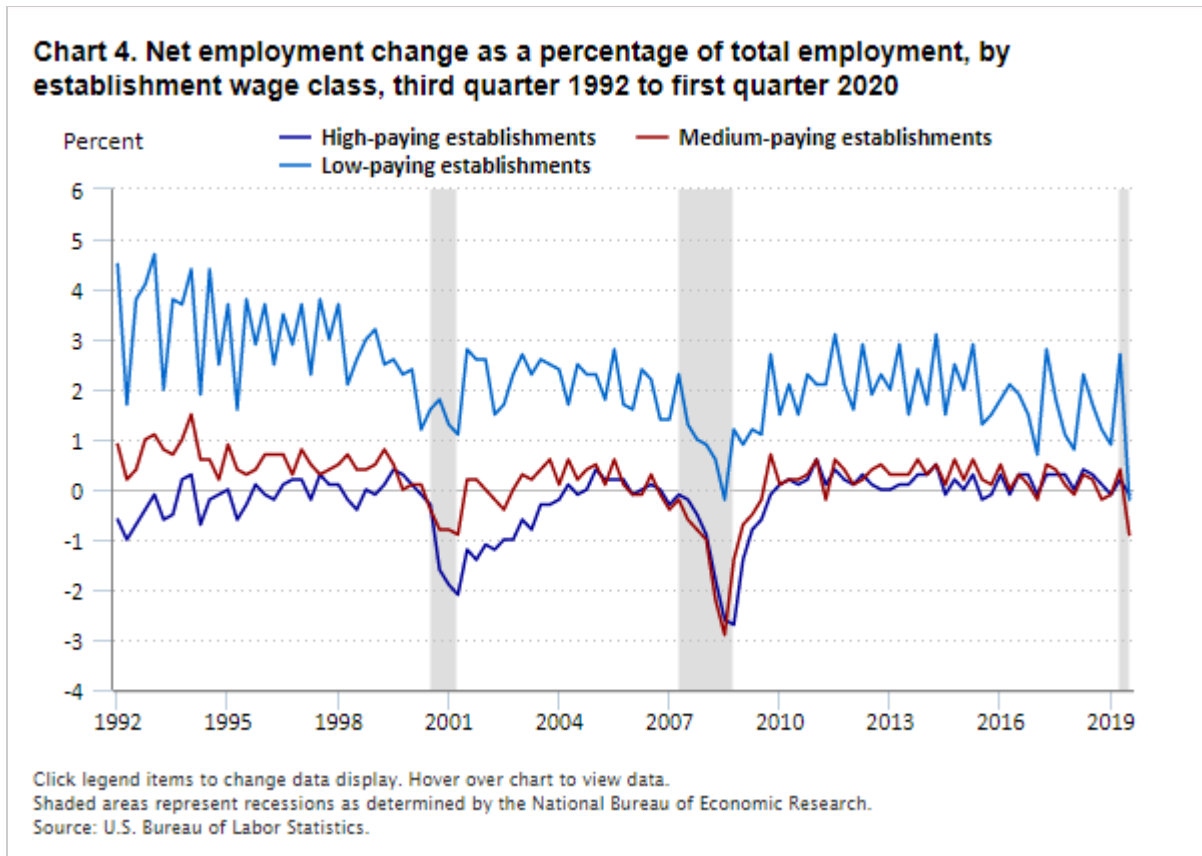
In the first quarter of 2019, the U.S. private sector created 547,000 jobs, on net. Of these jobs, 294,000 (53.7 percent) were added by low-paying establishments (those paying an average weekly wage of \$346 or less), 127,000 (23.2 percent) were added by high-paying establishments (those paying an average weekly wage of \$1,138 or more), and 126,000 (23.0 percent) were added by medium-paying establishments (those paying between \$346 and \$1,138 per week, on average). (See chart 3 and appendix table A-2.)



In the first quarter of 2020, the private sector lost a net total of 663,000 jobs,<sup>9</sup> a drop partly reflecting the effect of the COVID-19 recession. Low-paying establishments lost a net of 40,000 jobs and high-paying establishments lost a net of 47,000 jobs. Most net job losses occurred at medium-paying establishments, which lost 587,000 jobs during the quarter.

The historical values of gross job gains and losses by wage class since 1992 reveal that, except for a slight decline in a single quarter during the 2007–09 Great Recession and in the early days of the COVID-19 recession, gross job gains at low-paying establishments have consistently exceeded gross job losses. For this reason, low-paying establishments have had the highest share of employment growth in almost every quarter, compensating for the frequent employment losses in other wage groups, especially high-paying establishments. (See chart 4.) For example, between the 2001 and 2007–09 recessions—a period of recovery from the big job losses of the 2001 recession—high-paying establishments had only a few quarters of positive employment growth, whereas low-paying establishments contributed substantially to employment growth and had the largest share of net job gains.



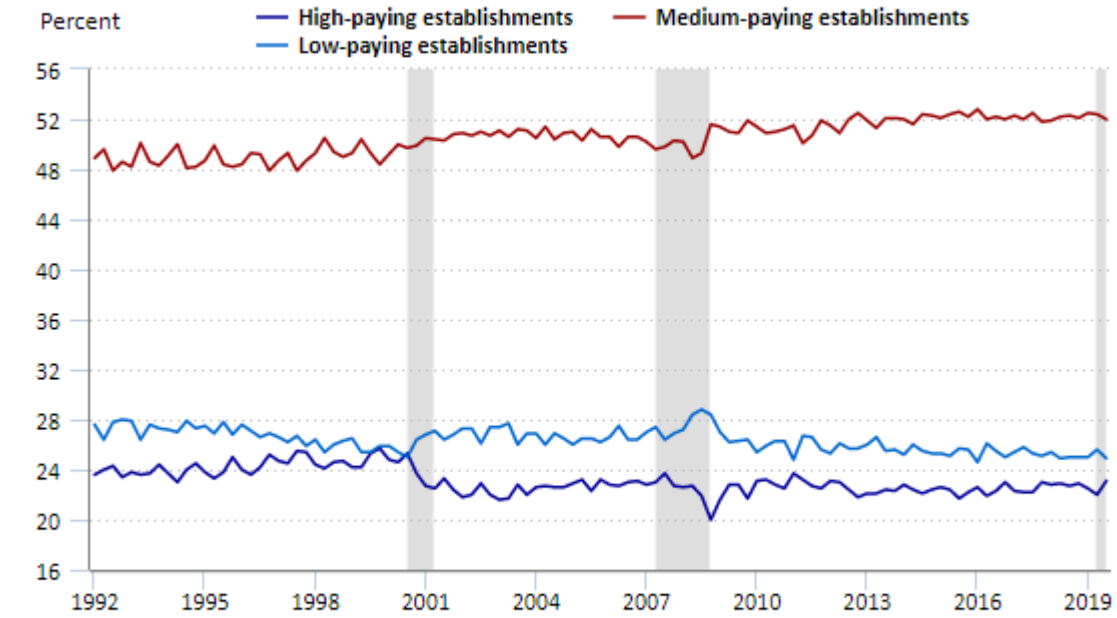


The cumulative effect of net job gains by wage class shows that, since the third quarter of 1992, the U.S. private sector has created a net total of 37 million jobs. Over this period, low-paying establishments gained 36 million jobs, medium-paying establishments gained 10 million jobs, and high-paying establishments lost 9 million jobs.

## High-paying establishments have been affected most by the last two recessions

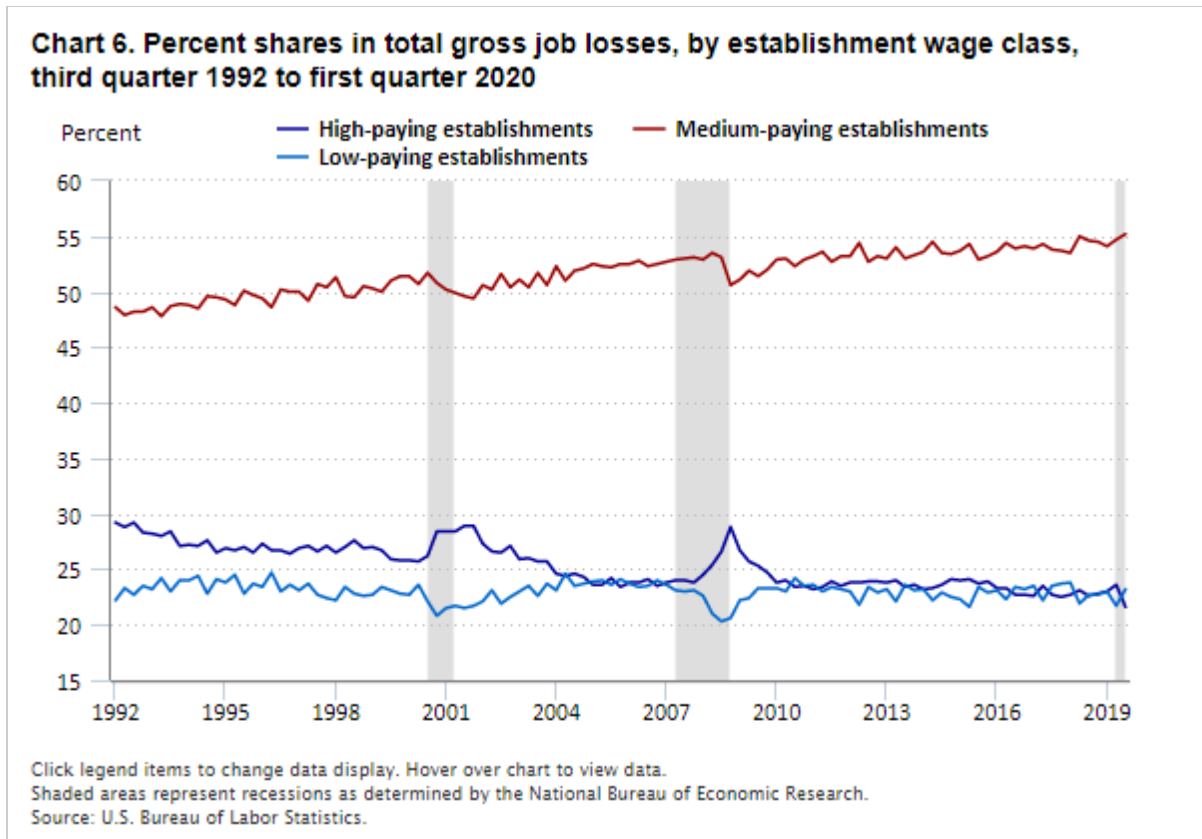
During the 2001 and 2007–09 recessions, the share of high-paying establishments in total gross job gains fell, whereas the shares of low- and medium-paying establishments increased. (See chart 5.) At the same time, the share of job losses rose in high-paying establishments and fell in low- and medium-paying establishments. (See chart 6.) In the immediate aftermath of the 2007–09 recession, establishments of all three wage classes saw their shares in gross job gains recover and return to prerecession levels. However, in subsequent years, the job-gains share changed little in high-paying establishments, increased in medium-paying establishments, and slightly decreased in low-paying establishments. (See appendix table A-2.)

**Chart 5. Percent shares in total gross job gains, by establishment wage class, third quarter 1992 to first quarter 2020**



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





In the 2001 recession, more jobs were lost in high-paying establishments than in establishments of other wage classes. Net job losses in low-paying establishments started to decline earlier than did job losses in high- and medium-paying establishments, but they remained positive throughout the recession. The 2001 recession occurred after the burst of the dot-com bubble of the late 1990s, with many high-paying technology companies seeing large job losses and pay declines. In the 2007–09 recession, both high- and medium-paying establishments experienced fast and similar rates of net job losses, but the net number of jobs lost was the largest in medium-paying establishments. In low-paying establishments, net job losses began to decline before the onset of the recession, but they only fell to negligible negative values in the first quarter of 2009 and reversed course immediately after that quarter. Because of the breadth of recession impacts across all sectors and establishment size classes, medium-paying establishments suffered the largest number of net job losses in that recession. (See charts 3 and 4.)

## Continuing establishments have much higher wages than opening and closing establishments

Wages paid at the establishment level correlate with the type of job flow. Median wages are considerably higher in expanding and contracting establishments than in opening and closing establishments. (See chart 7.) For opening and closing establishments, the BED data by wage class reveal that, until 2011, wages at opening establishments were consistently higher than wages at closing establishments. In most years since 2011, wages at closing establishments have been either equal to or slightly higher than wages at opening establishments. Median wages at expanding establishments have been slightly lower than wages at contracting establishments, but the difference

is not significant. However, the data show that this difference has widened during economic downturns. (See appendix table A-1.)

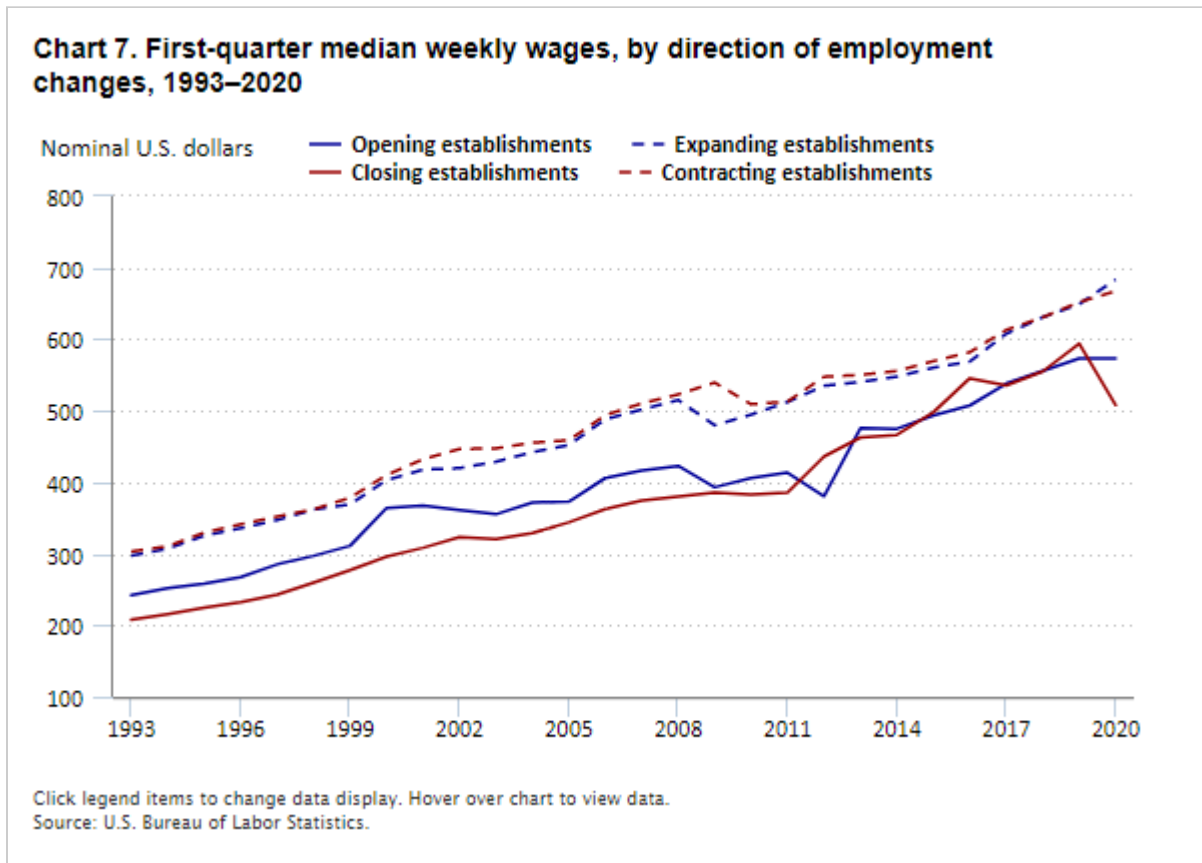
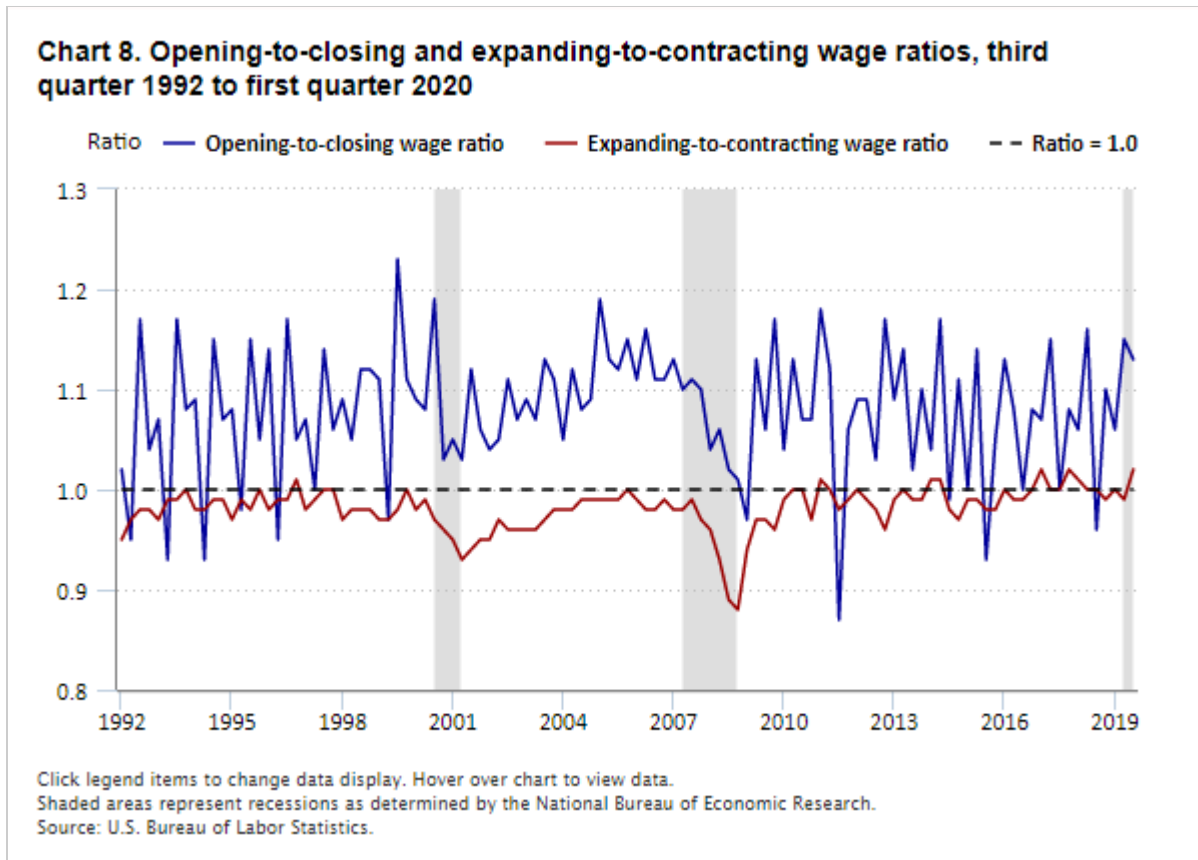


Chart 8 compares the ratio of median wages at opening establishments to median wages at closing establishments (hereafter referred to as “opening-to-closing wage ratio”) with the ratio of median wages at expanding establishments to median wages at contracting establishments (hereafter referred to as “expanding-to-contracting wage ratio”). These ratios hover around 1, a value indicating wage parity for the data elements compared. In the chart, this value is represented by a dashed line, allowing readers to visually determine at which points and to what extent wage ratios are higher or lower than 1 for a pair of data elements. The data show that the expanding-to-contracting wage ratios are mostly below the dashed line, suggesting that, on average, expanding firms may pay less to their new hires, which would bring the median wage down, and/or that contracting establishments may lay off more of their low-wage workers, which would cause the median wage to rise. In contrast, the data show that the opening-to-closing wage ratios are mostly above the dashed line, indicating that workers hired by opening establishments are generally paid higher wages than workers who lost their jobs in closing establishments.

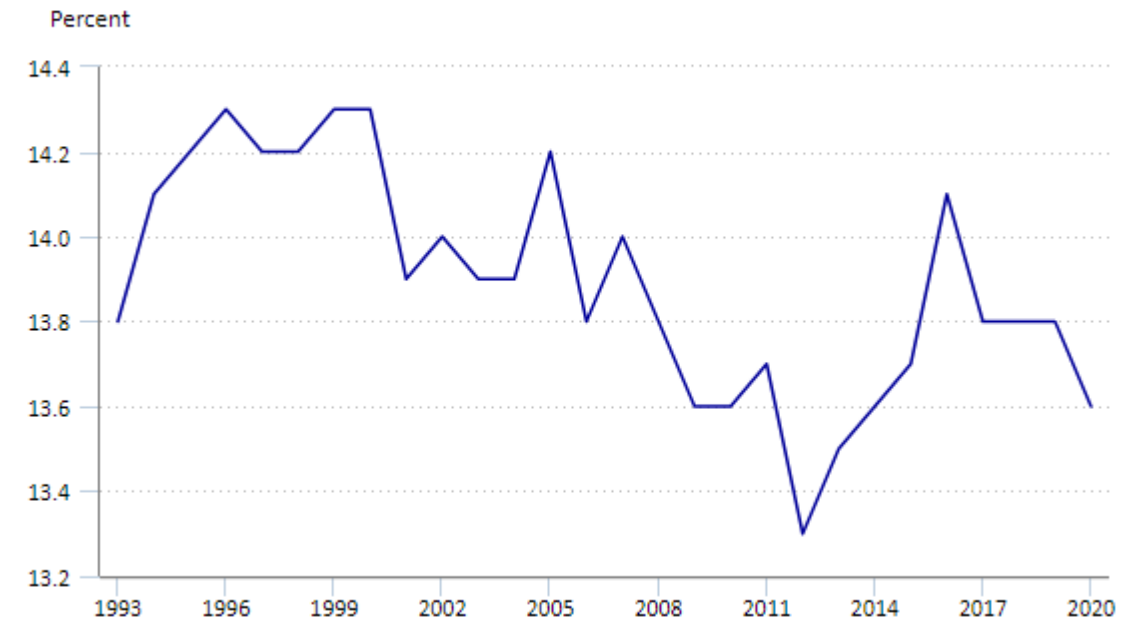


As shown in chart 8, the pattern of wage ratios among the components of gross job gains and losses exhibits some business cycle properties. This is especially evident for the expanding-to-contracting wage ratio, which dipped more during economic downturns than during other phases of the business cycle. This ratio, which was close to 1 in most years, fell to 0.93 at the height of the 2001 recession and to 0.88 at the height of the 2007–09 recession. The fall of wage ratios during economic downturns may result from a lower median wage paid at expanding establishments, a higher median wage paid at contracting establishments, or a combination of both factors.

## Employment is shifting from high-paying to medium-paying establishments

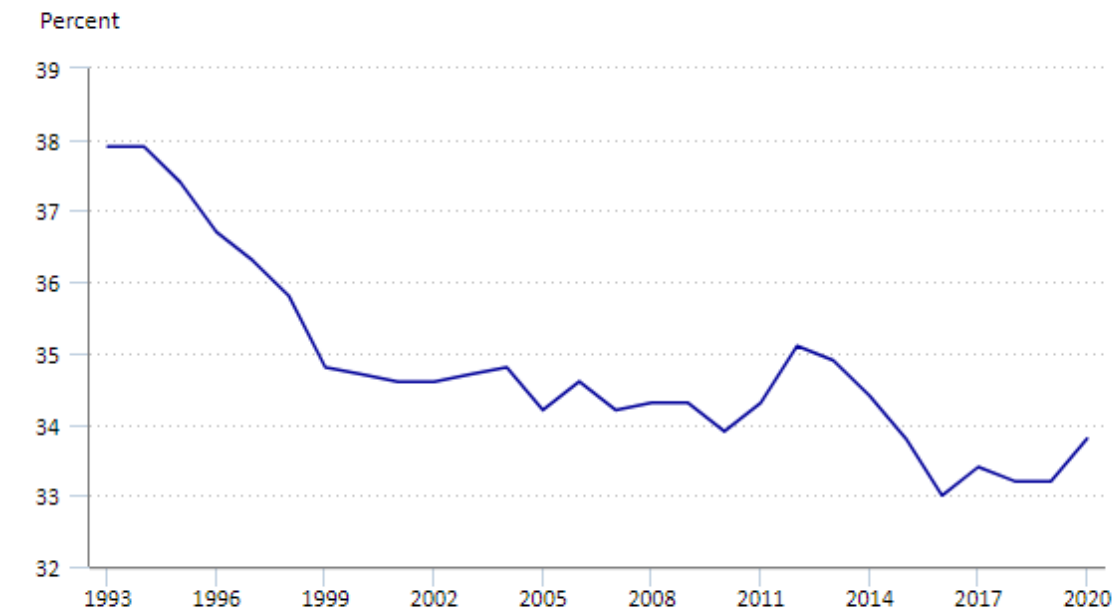
Charts 9a to 9c show employment for each establishment wage class as a percentage of total employment from March 1993 to March 2019. Over this period, the employment share of low-paying establishments fluctuated in a narrow range of 1 percent, from a high of 14.3 percent in 1999 to a low of 13.3 percent in 2012. In 2019, this share was the same as it was in 1993. In contrast, the employment share of high-paying establishments has been trending down, falling from 37.9 percent in 1993 to 33.8 percent in 2019. Over the same period, the distribution of employment by wage class has shifted from high-paying to medium-paying establishments, with the 4.1-percent drop in the employment share of high-paying establishments leading to a rise of a similar magnitude (from 48.3 to 52.5 percent) in the employment share of medium-paying establishments.

**Chart 9a. First-quarter private sector employment in low-paying establishments, as a percentage of total employment, 1993–2020**

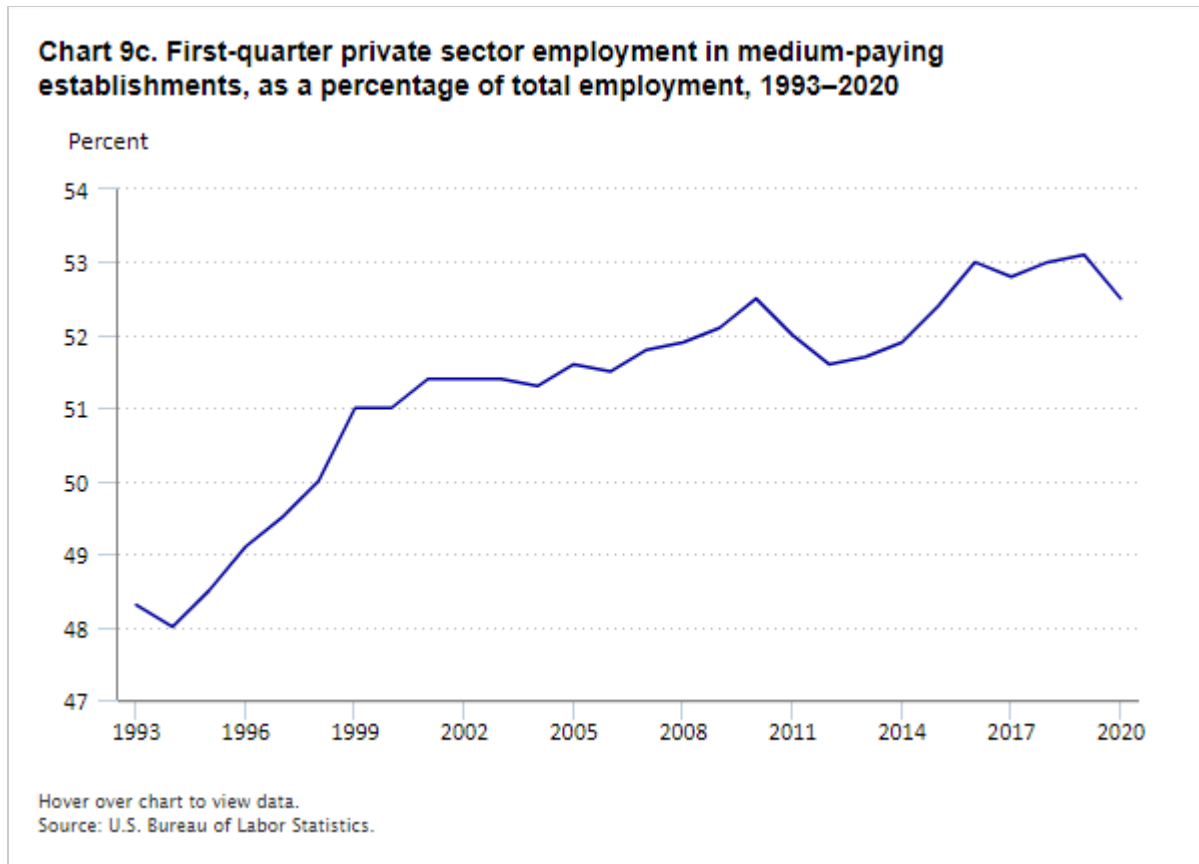


Hover over chart to view data.  
Source: U.S. Bureau of Labor Statistics.

**Chart 9b. First-quarter private sector employment in high-paying establishments, as a percentage of total employment, 1993–2020**



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



## Summary

In this article, we presented research data on gross job gains and losses by wage class, quantifying the magnitude of job creation and destruction in terms of three classes of wages. Using the distribution of average weekly wages paid across all private sector establishments in the longitudinal QCEW, we distinguished among high-paying establishments, whose wages are in the top quartile; low-paying establishments, whose wages are in the lower quartile; and medium-paying establishments, whose wages are in the interquartile range.

For each of these establishment categories, we measured the BED data elements over time and during the phases of business cycles, finding that the wage ratio—that is, wages paid at high-paying establishments to wages paid at low-paying establishments—climbed over the two decades following the start of the series. Although this trend indicates a rising wage inequality, more recent data show a sign of improvement, with wage dispersion declining since 2014.

We also showed that a substantial share of employment growth (reflected in the gap between gross job gains and losses) came from low-paying establishments. These establishments experienced employment growth even during economic downturns.

Further, we analyzed wages by the direction of employment changes, comparing the opening-to-closing and expanding-to-contracting wage ratios. We found that, during the period for which BED data are available, the opening-to-closing wage ratios were consistently higher than 1, whereas the expanding-to-contracting wage ratios were mostly less than 1. This result suggests that, on average, wages at opening establishments are higher than

wages at closing establishments, and wages at contracting establishments are higher than wages at expanding establishments.

BED data by wage class show labor and wage dynamics, adding a tremendous value to the utility of the BED data series. We highly recommend publishing these data periodically as a research or production series. The three wage classes we introduced here are arbitrary and can be substituted or complemented either by more wage classes or by specific wage levels or income targets. Whatever the wage grouping, the BED series by wage class will provide a means to monitor whether employment growth is consistent with defined wage and income policy objectives.

## Appendix: Data

**Table A-1. First-quarter average weekly wages, by direction of employment changes, seasonally adjusted, 1993–2000**

Year	All establishments				Opening establishments	Expanding establishments	Closing establishments	Contracting establishments
	Mean	Lower quartile	Median	Upper quartile	Median	Median	Median	Median
1993	\$454.1	\$173.6	\$297.6	\$493.8	\$242.0	\$297.3	\$207.6	\$303.1
1994	466.8	178.1	307.1	512.1	252.0	307.2	215.8	310.5
1995	493.6	188.0	325.2	543.3	258.2	325.3	224.5	329.6
1996	519.1	192.6	336.1	563.1	267.3	335.7	232.5	341.2
1997	543.1	199.3	348.4	585.7	285.2	347.1	242.8	352.0
1998	581.7	206.8	359.7	608.1	297.0	361.8	259.7	362.1
1999	594.4	212.8	372.3	630.3	311.0	369.1	277.0	378.4
2000	648.3	229.6	403.2	686.2	364.1	402.9	296.0	410.0
2001	677.3	236.5	421.7	716.2	367.6	417.6	308.3	432.2
2002	754.7	242.1	432.1	731.5	361.0	419.8	323.5	446.5
2003	694.3	244.7	439.1	745.4	355.2	428.7	320.7	447.4
2004	712.0	249.0	446.2	756.7	371.7	442.1	329.0	455.3
2005	743.7	251.3	454.3	773.9	372.9	452.0	343.9	458.7
2006	797.2	267.0	483.3	829.8	405.9	488.0	362.5	493.8
2007	834.0	275.8	500.1	864.4	416.7	501.7	374.2	510.3
2008	853.2	281.1	512.7	890.0	422.8	515.0	379.9	522.8
2009	837.8	276.4	506.8	886.3	393.0	479.7	385.9	539.4
2010	835.6	274.2	500.3	879.7	405.9	494.5	382.7	509.1
2011	872.9	277.9	511.4	907.8	413.3	512.3	385.6	512.9
2012	899.2	290.2	537.6	955.3	380.6	534.9	436.0	547.5
2013	911.8	291.3	543.1	970.4	475.7	540.3	462.5	550.2
2014	934.9	296.3	554.6	993.7	474.8	547.7	466.4	555.6
2015	969.7	305.8	568.1	1,019.1	493.6	560.2	498.0	569.4
2016	982.6	314.4	582.3	1,035.2	507.4	568.8	545.5	581.9
2017	1,034.3	333.0	614.1	1,097.7	538.1	607.7	535.6	613.0
2018	1,079.8	342.2	632.0	1,132.7	555.8	630.7	555.0	630.7
2019	1,097.8	354.7	650.9	1,164.9	573.0	649.1	594.0	651.8
2020	1,132.8	369.0	673.4	1,193.2	572.9	683.5	507.9	667.4

See footnotes at end of table.



Source: U.S. Bureau of Labor Statistics.

**Table A-2. Private sector gross job gains and losses by wage class, seasonally adjusted, first quarter 2019 to first quarter 2020 (in thousands)**

Three months ended	Wage class	Net change	Gross job gains			Gross job losses		
			Total	Expanding establishments	Opening establishments	Total	Contracting establishments	Closing establishments
Mar 2019	Low	294	1,864	1,339	525	1,570	1,153	417
	Medium	126	3,898	3,312	586	3,772	3,235	536
	High	127	1,690	1,448	242	1,563	1,295	268
	All	547	7,452	6,099	1,353	6,905	5,683	1,222
Jun 2019	Low	196	1,907	1,399	508	1,711	1,237	474
	Medium	-118	3,985	3,382	602	4,103	3,490	612
	High	32	1,750	1,489	261	1,718	1,442	276
	All	110	7,642	6,271	1,371	7,532	6,170	1,362
Sep 2019	Low	158	1,852	1,347	505	1,694	1,259	434
	Medium	-96	3,893	3,296	597	3,989	3,417	572
	High	-27	1,667	1,395	272	1,694	1,425	269
	All	35	7,412	6,038	1,374	7,377	6,101	1,276
Dec 2019	Low	483	2,009	1,479	530	1,526	1,094	432
	Medium	271	4,120	3,478	642	3,849	3,250	599
	High	72	1,734	1,405	329	1,662	1,376	286
	All	826	7,863	6,362	1,501	7,037	5,720	1,317
Mar 2020	Low	-40	1,726	1,215	511	1,766	1,276	490
	Medium	-587	3,610	3,061	549	4,196	3,546	650
	High	-37	1,607	1,379	228	1,644	1,367	277
	All	-663	6,943	5,655	1,288	7,606	6,189	1,417

Source: U.S. Bureau of Labor Statistics.

#### SUGGESTED CITATION

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#### NOTES

<sup>1</sup> For discussions on the importance of job-flow analyses and employment dynamics, see Steven J. Davis and John Haltiwanger, "Measuring gross worker and job flows," Working Paper 5133 (Cambridge, MA: National Bureau of Economic Research, May 1995); and Steven J. Davis, John C. Haltiwanger, and Scott Schuh, *Job creation and destruction* (Cambridge, MA: The MIT Press, 1996).

<sup>2</sup> Ekaterina Jardim, Mark C. Long, Robert Plotnick, Emma van Inwegen, Jacob Vigdor, and Hilary Wething, "Minimum wage increases, wages, and low-wage employment: evidence from Seattle," Working Paper 23532 (Cambridge, MA: National Bureau of Economic Research, June 2017).

<sup>3</sup> For the Business Employment Dynamics (BED) program's first release, see *New quarterly data on business employment dynamics from BLS*, USDL 03-521 (U.S. Department of Labor, September 30, 2003), [https://www.bls.gov/news.release/archives/cewbd\\_09302003.pdf](https://www.bls.gov/news.release/archives/cewbd_09302003.pdf).

<sup>4</sup> For data and technical notes concerning the Quarterly Census of Employment and Wages, see *County employment and wages—first quarter 2021*, USDL-21-1514 (U.S. Department of Labor, August 18, 2021), <https://www.bls.gov/news.release/pdf/cewqtr.pdf>.

<sup>5</sup> James R. Spletzer, R. Jason Faberman, Akbar Sadeghi, David M. Talan, and Richard L. Clayton, “Business employment dynamics: new data on gross job gains and losses,” *Monthly Labor Review*, April 2014, <https://www.bls.gov/opub/mlr/2004/04/art3full.pdf>.

<sup>6</sup> For information on the definitions of the BED data elements, see “Business employment dynamics technical note” (U.S. Bureau of Labor Statistics, last modified October 21, 2021), <https://www.bls.gov/news.release/cewbd.tn.htm>.

<sup>7</sup> The seasonally adjusted data for total private employment in this article may not exactly equal official published BED data, mainly because of our independent seasonal adjustment.

<sup>8</sup> According to the National Bureau of Economic Research, the official arbiter of recessions in the United States, the recession lasted from February to April 2020. See “U.S. business cycle expansions and contractions” (Cambridge, MA: National Bureau of Economic Research, last updated July 19, 2021), <https://www.nber.org/research/data/us-business-cycle-expansions-and-contractions>.

<sup>9</sup> The seasonally adjusted net change in employment for the BED series by wage class slightly differs from published BED data. This difference is the net result of seasonal adjustment processes applied to the main BED data elements by wage class. Data that are not seasonally adjusted match exactly the published values.

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