2021 LABOR MARKET AND ECONOMIC REPORT

U.S. economy
Washington's economy
Seasonal employment
Unemployment
Employment projections
Wages
Economic comparisons

Employment Security Department
WASHINGTON STATE

Data Architecture, Transformation and Analytics
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2021 Labor Market and Economic Report

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Labor market fast facts

Fast facts 1. Labor force and unemployment, not seasonally adjusted
Washington state, annual data from January 2005 to September 2021
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Year	Labor force	Employed	Unemployed	Unemployment rate
2005	3,263,703	3,082,399	181,304	5.6%
2006	3,323,938	3,156,626	167,312	5.0%
2007	3,403,163	3,243,308	159,855	4.7%
2008	3,478,577	3,291,309	187,268	5.4%
2009	3,535,200	3,211,649	323,551	9.2%
2010	3,511,326	3,160,544	350,782	10.0%
2011	3,461,428	3,140,190	321,238	9.3%
2012	3,471,282	3,189,271	282,011	8.1%
2013	3,463,869	3,219,842	244,027	7.0%
2014	3,489,666	3,275,753	213,913	6.1%
2015	3,545,904	3,345,496	200,408	5.7%
2016	3,635,200	3,444,126	191,074	5.3%
2017	3,724,722	3,547,430	177,292	4.8%
2018	3,793,095	3,622,299	170,796	4.5%
2019	3,914,154	3,747,713	166,441	4.3%
2020	3,914,869	3,585,782	329,087	8.4%
2021 January to September*	**3,914,501**	**3,700,239**	**214,262**	**5.5%**

*2021 data is averaged for nine months.

Fast facts 2. Labor force and unemployment, not seasonally adjusted
Washington state metropolitan areas, January to September 2021
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Metropolitan area	Labor force	Employed	Unemployed	Unemployment rate
Washington state	**3,914,501**	**3,700,239**	**214,262**	**5.5%**
Bellingham	113,198	106,721	6,477	5.7%
Bremerton	125,169	119,035	6,134	4.9%
Kennewick-Pasco-Richland	148,224	140,052	8,172	5.5%
Longview-Kelso	47,768	44,857	2,911	6.1%
Mount Vernon-Anacortes	61,655	57,981	3,674	6.0%
Olympia	143,077	135,970	7,107	5.0%
Seattle-Bellevue-Everett MD*	1,755,485	1,662,158	93,327	5.3%
Spokane	279,890	265,045	14,845	5.3%
Tacoma MD* (Pierce)	437,925	412,309	25,616	5.8%
Wenatchee	65,705	62,318	3,387	5.2%
Yakima	132,584	124,013	8,571	6.5%

*Metropolitan Division

Fast facts 3. Projected industry average annual employment growth rates
Washington state, 2019 to 2029
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics

NAICS	Industry sector	2020 Q2 to 2022 Q2	2019 to 2024	2024 to 2029
-	**Total nonfarm**	**2.00%**	**-0.54%**	**1.36%**
22, 48, 49	Transportation, warehousing and utilities	0.88%	-0.36%	1.08%
23	Construction	2.35%	-1.30%	0.01%
31-33	Manufacturing	0.41%	-1.25%	-0.08%
42	Wholesale trade	0.51%	-0.86%	0.60%
44-45	Retail trade	2.39%	0.18%	1.78%
51	Information	5.15%	3.81%	3.39%
52	Financial activities	0.90%	0.14%	0.95%
54-56	Professional and business services	1.81%	0.24%	1.66%
61-62	Education and health services	2.17%	0.49%	1.71%
71-72	Leisure and hospitality	4.70%	-6.77%	1.35%
GOV	Government	1.04%	0.17%	0.82%

Fast facts 4. Wages and employment by industry; annual averages (revised)
Washington state, 2020
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry subsector	Average number of firms	Total wages paid	Average annual employment	Average weekly wage
	Total	**233,080**	**$250,062,147,696**	**3,255,985**	**$1,477**
11	Agriculture, forestry, fishing and hunting	6,717	$3,590,991,842	99,281	$696
21	Mining	137	$151,295,987	2,059	$1,413
22	Utilities	228	$568,505,399	5,224	$2,093
23	Construction	27,023	$13,951,786,091	199,845	$1,343
31 - 33	Manufacturing	7,602	$22,025,363,086	268,654	$1,577
42	Wholesale trade	12,334	$11,246,816,984	128,791	$1,679
44 - 45	Retail trade	14,057	$27,127,494,166	379,946	$1,373
48 - 49	Transportation and warehousing	4,800	$6,660,752,620	101,215	$1,266
51	Information	4,786	$35,859,937,523	148,235	$4,652
52	Finance and insurance	6,051	$10,792,738,281	95,043	$2,184
53	Real estate, rental and leasing	7,037	$3,331,600,816	52,642	$1,217
54	Professional, scientific and technical services	28,164	$23,580,987,822	210,649	$2,153
55	Management of companies and enterprises	653	$5,615,435,122	43,516	$2,482
56	Administrative and waste management services	12,650	$9,185,058,032	160,913	$1,098
61	Educational services	3,575	$1,823,818,298	40,898	$858
62	Health care and social assistance	57,811	$24,187,244,732	426,047	$1,092
71	Arts, entertainment and recreation	3,001	$1,359,369,751	34,968	$748
72	Accommodation and food services	14,948	$5,459,454,041	220,795	$476
81	Other services (except public administration)	19,380	$4,156,983,829	89,077	$897
GOV	Government	2,127	$39,386,513,274	548,188	$1,382

Fast facts 5. Measuring the wage gap, 2020 dollars
Washington state, 2001 through 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse

Wages	2001	2007	2017	2018	2019	2020	Percent change 2019-2020
Median hourly wage	$23.05	$23.53	$26.10	$26.72	$27.46	$29.28	6.6%
Average hourly wage for:							
All jobs	**$31.18**	**$31.84**	**$38.01**	**$39.74**	**$41.13**	**$44.99**	**9.4%**
Lowest-paid 10 percent of jobs	$9.97	$10.19	$11.84	$12.31	$12.76	$13.85	8.6%
Second-lowest 10 percent of jobs	$12.68	$12.70	$14.63	$15.12	$15.71	$16.67	6.1%
Third-lowest-paid 10 percent of jobs	$15.39	$15.47	$17.16	$17.62	$18.17	$19.35	6.5%
Fourth-lowest-paid 10 percent of jobs	$18.26	$18.48	$20.20	$20.67	$21.25	$22.66	6.6%
Fifth-lowest-paid 10 percent of jobs	$21.38	$21.75	$23.93	$24.52	$25.19	$26.82	6.5%
Fifth-highest 10 percent of jobs	$24.92	$25.59	$28.57	$29.35	$30.20	$32.16	6.5%
Fourth-highest 10 percent of jobs	$29.36	$30.64	$34.86	$35.85	$36.97	$39.29	6.3%
Third-highest 10 percent of jobs	$35.46	$37.74	$43.65	$44.91	$46.38	$49.27	6.2%
Second-highest 10 percent of jobs	$44.22	$48.23	$57.06	$58.98	$61.20	$65.23	6.6%
Highest-paid 10 percent of jobs	$100.58*	$97.88	$128.51	$138.17	$143.22	$165.91	15.8%
Ratio of highest 10 to lowest 10	10.1	9.6	10.9	11.2	11.2	12.0	NA
Ratio of highest 10 to median	4.4	4.2	4.9	5.2	5.2	5.7	NA
Ratio of median to lowest 10	2.3	2.3	2.2	2.2	2.2	2.1	NA

*Boosted by stock options. Without stock options, the average would have been about $85.00.

Fast facts 6. GDP by industry contribution
Washington state, 2020
Source: U.S. Bureau of Economic Analysis, Gross Domestic Product

Washington state GDP (in millions)	2020 GDP	Percent of 2020 GDP	Rank
All industry total	**$604,253.8**		
Finance, insurance, real estate, rental and leasing	$101,877.1	16.9%	1
Information	$98,344.4	16.3%	2
Government and government enterprises	$76,219.6	12.6%	3
Professional and business services	$63,952.6	10.6%	4
Retail trade	$58,599.6	9.7%	5
Manufacturing	$57,043.3	9.4%	6
Educational services, health care and social assistance	$38,537.3	6.4%	7
Wholesale trade	$30,564.9	5.1%	8
Construction	$25,528.9	4.2%	9
Arts, entertainment, recreation, accommodation and food services	$15,889.4	2.6%	10
Transportation and warehousing	$12,940.5	2.1%	11
Other services (except government and government enterprises)	$10,795.6	1.8%	12
Agriculture, forestry, fishing and hunting	$8,807.3	1.5%	13
Utilities	$4,778.4	0.8%	14
Mining, quarrying, and oil and gas extraction	$374.8	0.1%	15

Fast facts 7. Highest and lowest state unemployment rates, not seasonally adjusted, based on 2020 ranking
United States and Washington state, 2010, 2015 and 2020
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

	State	2010	2015	2020
	United States	**9.6%**	**5.3%**	**8.1%**
1	Nebraska	4.6%	3.0%	4.2%
2	South Dakota	5.0%	3.1%	4.6%
3	Utah	7.8%	3.6%	4.7%
4	North Dakota	3.8%	2.8%	5.1%
5	Iowa	6.0%	3.8%	5.3%
6	Idaho	9.0%	4.2%	5.4%
7	Maine	8.1%	4.4%	5.4%
8	Vermont	6.1%	3.6%	5.6%
9	Wyoming	6.4%	4.3%	5.8%
10	Alabama	10.5%	6.1%	5.9%
11	Kansas	7.1%	4.2%	5.9%
12	Montana	7.3%	4.2%	5.9%
40	New Mexico	8.1%	6.5%	8.4%
41	**Washington**	**10.0%**	**5.6%**	**8.4%**
42	Massachusetts	8.3%	4.8%	8.9%
43	Pennsylvania	8.5%	5.3%	9.1%
44	Rhode Island	11.2%	6.0%	9.4%
45	Illinois	10.4%	6.0%	9.5%
46	New Jersey	9.5%	5.8%	9.8%
47	Michigan	12.6%	5.4%	9.9%
48	New York	8.6%	5.3%	10.0%
49	California	12.2%	6.2%	10.1%
50	Hawaii	6.9%	3.6%	11.6%
51	Nevada	13.5%	6.8%	12.8%

Executive summary

U.S. economy and labor market

The U.S. economy went into a short, steep recession in March 2020. By November 2021, the nation was well on its way to recovery. Key indicators like gross domestic product, industrial production, personal income and retail and food service sales were above their pre-COVID-19 levels. Corporate profits recovered quickly, and reached record highs in the second and third quarters of 2021.

The labor market was slower to recover. By November 2021, nonfarm employment was still 3.9 million jobs (-2.6 percent) below its pre-COVID-19 level. At the same time, the labor market shifted from a labor surplus to a labor shortage, as job openings surged, and hiring did not keep pace. Beginning in August 2021, the number of people quitting their job reached record highs, with quit rates higher in low-wage industries, and lower at large businesses. A number of factors influenced both trends.

COVID-19 exacerbated inequities in the labor market. Through most of the pandemic, job losses have been heavier for a number of demographic groups, including African American women, Latino/Hispanic women, African American men, those without a bachelor's degree, and young adults aged 20 to 24. Annual data for 2020 indicate that losses were also heavier for Pacific Islanders and Asian Americans of Vietnamese, Filipino, Japanese and Chinese heritage. Many of these groups had higher than average unemployment before the pandemic.

Beginning in January 2021, inflation picked up. The November year-over-year inflation rate for the CPI-U was 6.9 percent, the highest increase since June, 1982. A number of factors contributed to higher prices, including COVID-19, supply chain issues, record-high corporate profits, low interest rates, and federal stimulus.

Median household incomes declined in 2020 for most demographic groups. The distribution of income worsened slightly, and large disparities by race and education continued. The portion of wealth held by the top 1 percent of households increased to a record high (with the series starting in 1989).

As the recovery continues, the nation faces a number of major economic challenges, with climate change being the most serious, along with persistent racial inequities.

Washington's economy and labor market

Similar to the nation, Washington state plunged into a deep and short recession in early 2020. From February to May 2020, Washington payroll dropped by more than 420,000 or 12 percent, bringing total employment down to levels last observed in 2014.

By historic standards, the swift drop in employment was followed by a swift recovery. As of September 2021, total nonfarm employment in Washington had recovered nearly 328,000 jobs, leaving a deficit of less than 94,000 jobs compared to February 2020.

Throughout 2020 and 2021, employment trends varied significantly by industry. Notably, industries that were well poised to shift to telecommuting practices were able to avoid steep initial losses and recovered relatively quickly. Washington's information sector provides an example of a sector that not only benefitted from the flexibility of telework, but also made telework possible for other industries. Employment dipped by less than 2 percent during the recession, and as of September 2021, expanded by 6.6 percent compared to the pre-recession peak.

By comparison, industries that rely on face-to-face tasks were more likely to suffer deep and sustained employment losses. Leisure and hospitality suffered the deepest losses of any sector, shedding an estimated 142,500 jobs (40.4 percent) from February to May 2020. Despite a strong growth rate, industry employment remains well below pre-recession levels.

While the ability to work from home played a significant role in industry employment trends, a number of industry-specific factors came into play, as well as environmental factors. Virtual school, constrained child care resources, and health concerns affected workers' ability to engage with the labor market.

Most industries fell somewhere between the extremes of information and leisure and hospitality, each influenced by a unique set of challenges. Construction losses at the start of the pandemic were steep, but a robust housing market and continued demand buoyed the sector, which recovered quickly. Manufacturing losses occurred after the short-lived recession, affected by reduced demand for aircraft. Retail trade dipped by 10.8 percent in spring 2020, but recovered relatively quickly as a whole, due in large part to the availability of online shopping and a general shift from dining out to eating home prepared meals.

In short, the pandemic affected industries and workers differently, for a number of reasons including, but not limited to, the ability to work from home.

Seasonal, structural and cyclical industry employment

Employment patterns are shaped by a number of different factors. Employment projections produced by ESD take seasonal, structural and cyclical factors into account in order to understand what drives employment in certain industries.

Seasonality refers to predictable patterns of employment that occur within a calendar year. Natural factors such as weather, administrative factors such as school or budget calendars, and social or cultural factors such as holidays affect the seasonal trends in some industries. This year's analysis identified 18 industries that have a high level of seasonality. The five industries that are most influenced by seasonality from 2002 to 2020 were crop production, scenic and sightseeing transportation, support activities for agriculture and forestry, funds, trusts, and other financial vehicles, and support activities for mining.

Structural (trend) components refer to shifts in long term employment growth as a result of fundamental structural changes. Innovation and the adoption of new technology, policy changes, shifting access to resources, and societal changes can affect and be reflected in structural employment changes. From 2002 to 2020, 14 industries were identified for which structural changes accounted for at least 2/3 of total employment change. The five industries that were influenced to the greatest extent by structural factors were ambulatory health care services, other information services (a diverse collection of industries that includes personal care services, religious and grantmaking organizations and other services), wholesale electronic markets and agents and brokers, nonstore retailers, and publishing industries (except internet).

Cyclical factors refer to changes that are attributable to the business cycle or specific events such as the housing bubble bursting in 2007, cyclical variation in aerospace employment, or the COVID-19 pandemic. For 25 industries, the cyclical component accounted for more than half of the change in employment over time. The top five cyclical industries in Washington were support activities for mining, transportation equipment manufacturing, oil and gas extraction, pipeline transportation and postal service.

Understanding the difference between seasonal, structural and cyclical employment trends is critical for reading the economy and for making informed decisions in workforce investment.

Unemployment

Disruptions caused by the COVID-19 pandemic recession led to unprecedented demand for unemployment insurance. The number of paid claims peaked at a high of 711,945 in May 2020. Over the course of the pandemic, the number of claims has returned to normal. As of September 2021, the level of unemployment beneficiaries was 242,000. The drop in beneficiaries reflects factors including workers finding employment, losing benefits, and reduced layoff activity.

The CARES Act (March 27, 2020 to September 6, 2021) created temporary federal emergency unemployment insurance programs that expanded access to unemployment insurance to workers who are traditionally ineligible to receive benefits, extended the number of weeks that a beneficiary can receive payments, and temporarily increased weekly payment amounts.

The spike in benefits paid during the recession dropped quickly at first, as temporary layoffs resolved. The number of exhausted benefits (workers who used the maximum weeks of benefits available to them) provides an indication of the workers that suffered lasting impacts by industry and occupation. Workers in the arts, entertainment and recreation industries and within food preparation and serving related occupations were found to be the most likely to exhaust benefits in 2021.

The unemployment rate describes how well workers who are actively seeking work are connecting with jobs. The unemployment rate in Washington peaked at 16.3 percent in April 2020. In September 2021, the unemployment rate was down to 5.1 percent.

Employment projections

Employment projections provide a general outlook for industry and occupational employment so that decision-makers can adjust training and education decisions to meet future demand. The Employment Security Department publishes projections on an annual basis, with 2-year, 5-year and 10-year horizons from a base year.

The 10-year average annual growth rate for total nonfarm employment for the 2019 to 2029 period is projected to be 0.40 percent. This is a decrease from the 1.37 average annual report predicted last year, as it incorporates data from the pandemic recession.

The largest increases by share of employment (industry) are expected in the information and education and health services sectors, and the largest increases by share of employment (occupation) are expected in computer and mathematical occupations.

The largest decreases by share of employment (industry) are expected for the manufacturing and construction sectors, and the largest decreases (occupation) are expected for food preparation and serving.

Wages

Across the nation, job losses during the COVID recession were predominantly in lower-wage jobs. The same was true for the state of Washington. While full-time equivalent (FTE) employment fell by 3.7 percent, the number of FTE jobs paying below $20.00 declined by 16.4 percent. The loss of lower-wage jobs meant that the average wage for jobs that were left was higher than in 2019. Both the average hourly wage and the median hourly wage had their largest increases on record (going back to 1990). Job loss was concentrated in lower-wage industries, but also in lower-wage jobs within industries.

The distribution of wages by industry continued to vary widely. In 2020, for example, the median wage for child care services was $16.47 per hour, while the median for pre-packaged software was $105.51. In accommodations (hotels, motels etc.), 67.3 percent of the jobs paid below $20.00 per hour, while in computer systems design, only 4.3 percent paid that low.

Workers that did keep their job did well. The median increase in the hourly wage – unadjusted for inflation – was over 5 percent in 2020, higher than a comparable national figure of 3.5 percent.

Wage inequality increased substantially in 2020. The gap between the average wage for the lowest-paid and highest-paid 10 percent of jobs widened considerably, even though the minimum wage increased by $1.50 per hour to $13.50, because of the growth of higher-wage jobs (those paying more than $56.00 per hour, which annualized would be $117,000 per year).

Wage inequities among different demographic groups have persisted for decades and continued in 2020. The average monthly wage for African American workers was 76.9 percent of the average for all workers, lower than it was in 1992 and 2005. Earnings for Indigenous workers were 67.0 percent below average, while Pacific Islanders earned 69.2 percent of the average and Latino/Hispanic worker were at 68.3 percent. The average for women was 78.8 percent of the all-job average, and 65.7 percent of the average for men, not substantially different from 1992.

Economic comparisons with other states

When compared against other states, Washington stands out on several metrics. In 2020, Washington had the second-highest minimum wage in the country and ranked among the top 10 states for rate of job growth, value of exports, per capita personal income, and building permits. The Seattle-Tacoma-Bellevue MSA ranked eighth among U.S. Metropolitan Statistical Areas for median single family house prices.

Chapter 1: U.S. economy and labor market

Summary

- The U.S. economy went into a short, steep recession in March 2020. By November 2021, the nation was well on its way to recovery. Key indicators like gross domestic product, industrial production, personal income and retail and food service sales were above their pre-COVID-19 levels. Corporate profits recovered quickly, and reached record highs in the second and third quarters of 2021.
- Beginning in January 2021, inflation picked up. The November year-over-year inflation rate for the CPI-U was 6.9 percent, the highest increase since June, 1982.
- The labor market was one area that was recovering at a slower pace. By November 2021, nonfarm employment was 3.9 million jobs (-2.6 percent) below its pre-COVID-19 level. Job losses remained heavy in the film and recording industry (-20.9 percent), accommodations (-14.9 percent), nursing homes (-12.0 percent), arts, entertainment and recreation (-11.4 percent), clothing stores (-16.2 percent), child care (-10.1 percent), air transportation (-9.7 percent), public universities and colleges (-7.9 percent), and food services (-6.4 percent).
- COVID-19 exacerbated inequities in the labor market. Through most of the pandemic, job losses have been heavier for a number of demographic groups, including African American women, Latino/Hispanic women, African American men, those without a bachelor's degree, and young adults aged 20 to 24. Annual data for 2020 indicate that losses were also heavier for Pacific Islanders and Asian Americans of Vietnamese, Filipino, Japanese and Chinese heritage. Many of these groups had higher than average unemployment before the pandemic.
- COVID-19 initially led to a massive shift towards working from home. While those numbers have abated over the last year and a half, it appears that there will be a permanent increase in those working at home at least part of the time.
- Early in 2021, the labor market shifted from a labor surplus to a labor shortage, as job openings surged, and hiring did not keep pace. Beginning in August 2021, the number of people quitting their job reached record highs, with quit rates higher in low-wage industries, and lower at large businesses. A number of factors influenced both trends.

- Supply chain issues have also hampered the recovery, and have contributed to the highest inflation rate since the early 1990s. Weaknesses in the supply chain have been decades in the making, and would require substantial changes in policy and practice to address.
- Federal policy also contributed to higher inflation. Monetary policy, as implemented by the Federal Reserve Bank, has been accommodative. The Federal Funds rate, which crept up to 2.1 percent in 2019, has been at 0.1 percent since the pandemic began. Mortgage rates have been close to 3.0 percent throughout 2021. Fiscal policy provided important support to households and businesses in both 2020 and 2021. Income supports led to higher demand, which pushed retail sales well above their pre-COVID trend.
- Median household incomes declined in 2020 for most demographic groups. The distribution of income worsened slightly, and large disparities by race and education continued. The portion of wealth held by the top 1 percent of households increased to a record high (with the series starting in 1989).
- As the recovery continues, the nation faces a number of major economic challenges, with climate change being the most serious. Persistent racial disparities, a broken housing market, the power of monopolies and oligopolies (industries dominated by a small number of companies), the growing concentration of income and wealth and high inflation are just a few of the outstanding issues.

Prelude: On the inadequacy of economic indicators

There has been growing criticism of the disconnect between common economic indicators – gross domestic product (GDP) in particular, but others as well – and the general welfare of society.[1] Many of these indicators were developed during the Great Depression of the 1930s, when policymakers needed to get a better read on production and employment, and they also proved to be useful during World War II when the federal government essentially ran the economy. They incorporate several common prejudices of economists, including the devaluation of household production (the vast majority of which is done by women) and the reduction of the environment to inputs into the production process. Some examples:

[1] For a recent example, see *Doughnut Economics* by Kate Raworth.

- Climate change is widely recognized as the biggest existential threat to humanity. The latest Intergovernmental Panel on Climate Change (IPCC) report[2] makes it abundantly clear that we are headed for an ecological disaster unless steep reductions in carbon emissions are rapidly implemented. Some climatic changes, such as higher ocean temperatures that lead to increased tidal flooding, are already at the point where it will take more than a century to undo.[3]
    - Given the scale of current and future impacts of climate change, ranging from droughts to flooding to forest fires to the increasing power and frequency of all types of storms, we need to consider the adequacy of our array of measurement tools. For example, traditionally, an increase in GDP has been viewed as a positive development. But given the current global economy and the widespread lack of serious action to reduce emissions, GDP growth means more carbon in the atmosphere and moves us one step closer towards severe, costly disruptions in our way of life.
- COVID-19 has brought home the chronically underappreciated role of caregivers, both informal (at home) and paid. Before COVID-19 hit, there was a labor shortage at nursing homes and child care centers, due in part to low wages and poor working conditions. The latest data show those shortages have reached crisis conditions, and are impeding the recovery as workers stay out of the labor market to care for children and parents.
    - GDP and other economic measures do not include care giving and other unpaid work in the household unless it is monetized into a job.
    - Since the 1970s, income and wealth have grown increasingly concentrated in the U.S. Studies have shown that inequality acts as a drag on economic growth, and has negative impacts on health.[4] The link between extreme

[2] IPCC report can be located at: https://www.ipcc.ch

[3] When reviewing the IPCC findings, three factors should be noted. First, the modeling is conservative. Every IPCC updated has concluded that climate change and its impacts are happening faster than previously believed. Two, the latest report was the first one where panel members sought to break down silos between different areas of research and take a more systemic approach. Third, if it hasn't been modeled yet, it isn't in the report, and there are plenty of developments that have yet to be modeled—for example, recent developments like the sinkholes in the Siberian permafrost, which may foretell massive methane releases in the coming years, or the newly-discovered weakness in the Thwaites Glacier in Antarctica.

[4] See, for example, "Causes and Consequences of Income Inequality: A Global Perspective and Trends in Income Inequality and its Impact on Economic Growth by Federico Cingano.

wealth and political influence has also raised questions. The U.S. has yet to develop a measurement system that adequately tracks either of these key indicators.

- One would think that economic growth would (barring pandemics) translate in to longer lives. Life expectancy in the U.S. peaked in 2014 before declining in 2015 and 2016. The cause was an increase in suicides and drug overdoses. This was extremely unusual (it hadn't happened since World War I/the Great Influenza, and hasn't happen in other industrialized countries). Life expectancy hadn't fully recovered by 2019 and dropped in 2020 due to COVID.
- Until more robust indicators are available, we will have to make do with the standard measures, keeping in mind their inadequacies.

Downturn and recovery through the lens of key national economic indicators

The COVID-19 recession officially began in March 2020. By September 2021, of the five key economic measures used to determine the state of the business cycle, four had completely recovered. The fifth indicator, nonfarm employment, is covered in the next section.

Gross domestic product[5] (GDP) had a large, 5.1 percent decline in first quarter 2020, and then collapsed in second quarter, falling by 31.2 percent. Most of that was made up in the third quarter of the year, and by the third quarter of 2021, GDP was 1.4 percent higher than the pre-COVID-19 peak.

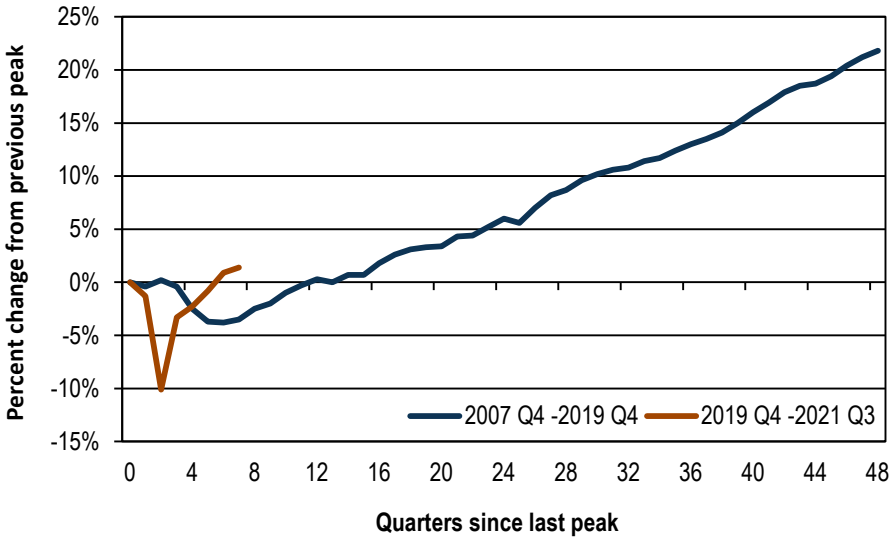
The strongest component of GDP has been housing, with spending up 13.4 percent over the business cycle. There has been little investment in affordable housing, however, and the pandemic has exacerbated houselessness. Before the recession, almost half (48.4 percent) of all renters were considered to be income distressed, with rent eating up over 30 percent or more of their income, and almost a quarter (23.7 percent) spent over half of their income on rent. Pandemic rental assistance programs across the country have been slow to get aid to tenants, leading to fears of high numbers of evictions when moratoria end.

The biggest drag on GDP has been exports, which have fallen by 11.0 percent.

[5] GDP is defined as the value of all goods produced and services provided within the U.S. It's estimated on a quarterly basis, adjusted for inflation and for seasonal fluctuations. It's the best single indicator of business activity, but not a good measure of general welfare, equity, or long-term health of the economy.

Figure 1-1 compares the path of GDP in the current and previous business cycle. Each line starts the previous peak – the last quarter before the recession began. In the current cycle, GDP bottomed out in second quarter 2021, when it was 10.1 percent below fourth quarter 2019. By the third quarter, GDP was 1.4 percent above that previous peak. At this point in the 2008 to 2009 recession, GDP was just starting to recover, and was 3.5 percent below its previous peak in second quarter 2008.

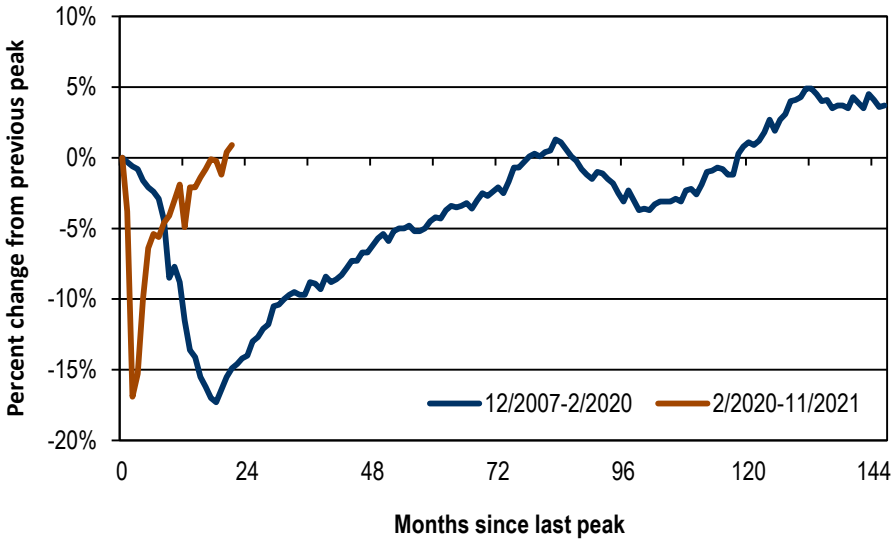
Figure 1-1. Gross domestic product compared with its previous peak
United States, fourth quarter 2007 through third quarter 2021
Source: U.S. Bureau of Economic Analysis



GDP fell much more steeply, and recovered more quickly, than in 2008 to 2009.

The **industrial production** index measures manufacturing output, mining output (which is mostly related to petroleum) and energy production. The index plummeted by 16.9 percent from February to April 2020, recovered by two-thirds over the next three months, and finally topped its previous high in July 2021. The index has declined slightly since then, fluctuating along normal lines. Of the three components of industrial production, two of them, manufacturing and energy production, have both fully recovered, while mining activity has lagged, chiefly due to lower oil and gas production, especially from fracking. At this point in the 2008 to 2009 recession, industrial production was 16.3 percent below its previous peak, and was only two months into a long, slow recovery.

Figure 1-2. Industrial production compared with its previous peak
United States, December 2007 through November 2021
Source: Federal Reserve Bank

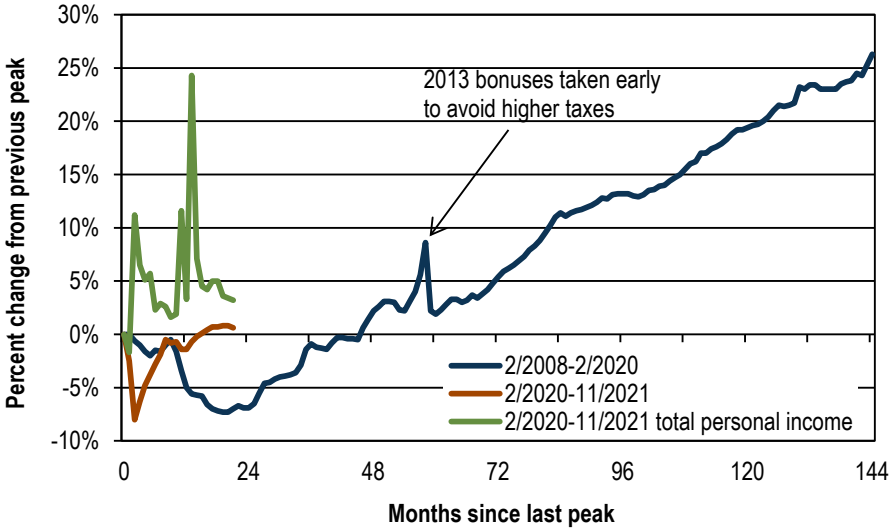


Industrial production fully recovered in 2021, despite supply chain issues.

Nowhere was the impact of COVID-19 – and the policy response – more evident than in **personal income** data. Economists usually focus on income excluding "transfer payments" – payments like Social Security, Medicare, and unemployment benefits that effectively shift money from one pocket to another, as opposed to income generated by economic activity, like a job, owning a business, or financial activities. Personal income less transfers (as it is usually referred to) plummeted by 8.0 percent in the first two months of the recession, rebounded over the next four months, and then slowly recovered over the past year, finally exceeding its pre-COVID-19 peak in April 2021 (*Figure 1.3*).

Personal income with transfers included followed a completely different path. A small downturn in March 2020, was followed by a huge jump in April due to stimulus payments, with incomes 10.0 percent higher than in February. Income continued to run a few percentage points higher than before the recession, with more stimulus-related spikes in January and March 2021. Over the last half of 2021, transfer payments were still somewhat elevated (about 13 percent above pre-pandemic levels). In November 2021, total income was 3.2 percent above pre-COVID-19 levels.

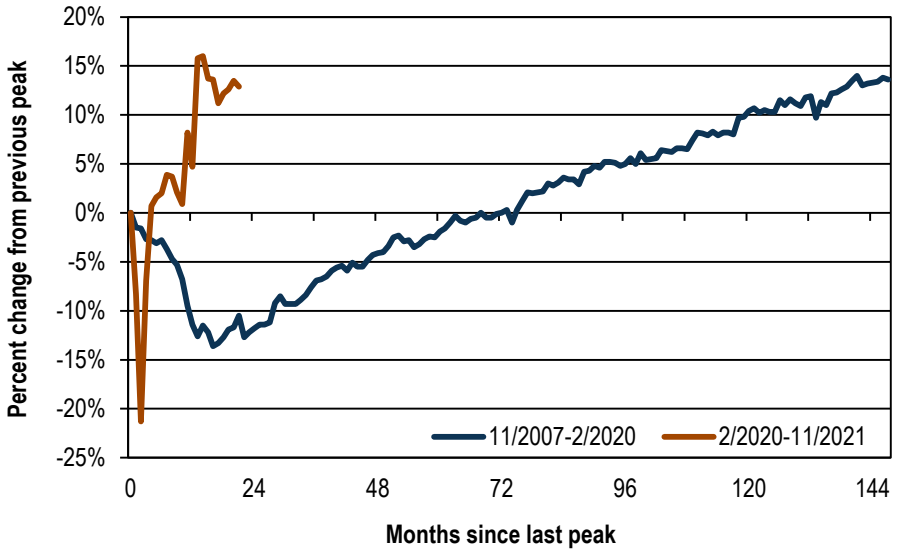
Figure 1-3. Personal income excluding transfer payments, and total personal income, percent change from previous peak
United States, February 2008 through February 2020 (blue line), and February 2020 through November 2021 (orange line), along with total personal income, February 2020 through November 2021
Source: Bureau of Economic Analysis



Personal income excluding transfer payments – income which is generated by economic activity – recovered early in 2021. Total personal income was supported through transfer payments like stimulus checks and unemployment insurance.

Retail and food service (e.g., restaurants) sales dropped by 21.3 percent in the first two months of the recession, but had fully recovered by June 2020. More federal stimuli kicked in, and as of November 2021, sales were 12.9 percent higher than pre-COVID-19; a huge gain in such a short period. In contrast, following the Great Recession of 2008 to 2009, it took until May 2019 – over 11 years – before sales had increased by 12.0 percent over their pre-recession level. Even with all the challenges that restaurants have been facing, food service sales in November were 4.7 percent above February 2020.

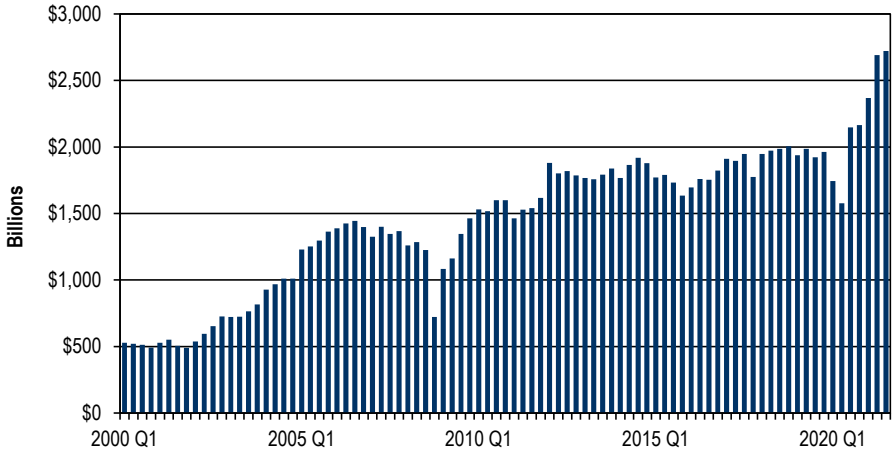
Figure 1-4. Retail and food service sales compared with its previous peak
United States, November 2007 through November 2021
Source: U.S. Department of Commerce



Economic stimulus pushed retail and food service sales sharply above pre-pandemic levels.

Before moving on to an analysis of the labor market, there is one other indicator that deserves attention: corporate profits. As *Figure 1-5* shows, after-tax corporate profits dropped sharply in the first two quarters of 2020, but then fully recovered (and then some) in third quarter. In the first two quarters of 2021, profits grew wildly, by 9.4 percent in the first quarter and 13.6 percent in the second quarter, reaching unprecedented levels.

Figure 1-5. Corporate profits after tax (without IVA and CCAdj), billions of dollars, not adjusted for inflation
United States, first quarter 2000 through third quarter 2021
Source: U.S. Bureau of Economic Analysis/FRED



Corporate profits rose to unprecedented levels in 2021.

The fifth indicator: nonfarm employment

While the four major indicators reviewed above (almost) returned to their pre-COVID-19 levels, the nonfarm employment has continued to lag. This has been a regular feature of recoveries going back to 1992 (the first "jobless" recovery), as employers have used recessions as a time to invest in labor-saving technologies and restructure their workforce. The COVID-19 recovery has had additional, unique challenges, not the least of which has been the virus itself.

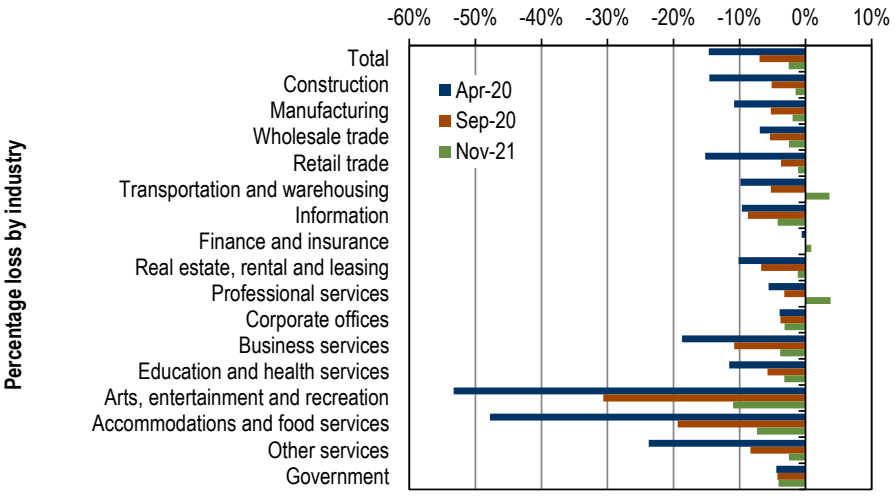
First, a review. With the onset of the COVID-19 recession, the national labor market has gone through three stages: a precipitous downturn in March and especially April 2020, an adjustment period from May to September, and an ongoing recovery that continues as we go to press.

Stage 1: From February 2020 to April 2020, the nation lost over 22 million jobs, almost 15 percent of its employment. As shown in *Figure 1.6*, every major sector shed workers, with leisure and hospitality staffing

lopped in half (a loss of more than eight million jobs), as performing arts and sports venues shut down, museums and casinos closed, hotel occupancy rates plunged to 22 percent, and restaurants struggled to survive. In contrast, finance and insurance employment declined by only 0.6 percent.

Stage 2: As the nation learned how to better cope with COVID-19 (still very much a work in progress), over half of the jobs lost in March and April 2020 returned over the next five months. By September 2020, the nation was just shy of 11 million jobs – 7.0 percent – below pre-COVID-19 levels.

Figure 1-6. Nonfarm employment, percentage loss by industry, seasonally adjusted United States, February 2020 to April 2020, September 2020 and November 2021, respectively
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics



Nonfarm employment fell sharply in April 2020, recovered half of the loss over the next five months, and has continued a slower recovery since then.

Stage 3: Over the next fourteen months, job growth was still rapid but slower, with a setback in December 2020 as COVID-19 cases soared in many parts of the country. Hiring was strong in in June and July 2021, and more moderate from August through November. The nation came within 2.6 percent (3.5 million jobs) of returning to its previous employment level.[6] During this period, two other issues added complexity to the labor market: supply chain issues and a labor shortage. Both of these developments will be discussed in more detail.

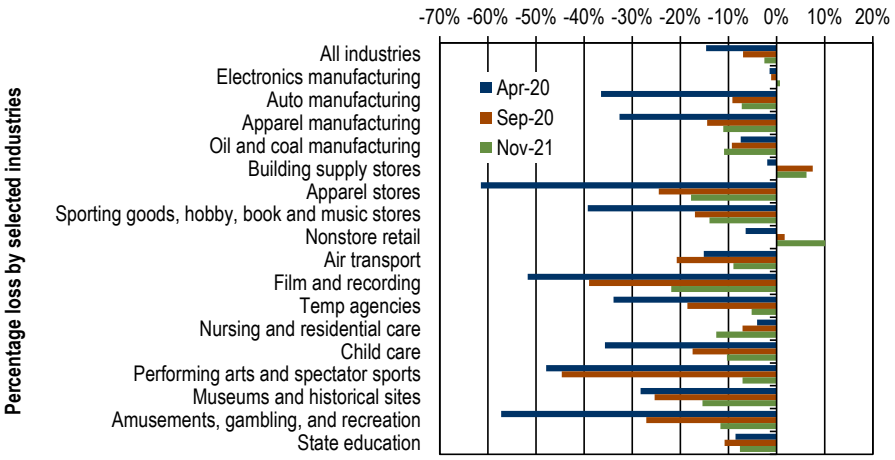
[6] This doesn't count the new jobs needed each month just to keep up with population growth – variously estimated at between 80,000 to 120,000 jobs, or roughly two million jobs through November 2021.

As *Figure 1-6* indicates, the initial impact and the pace of recovery varied widely by sector. Some industries snapped back fairly quickly; for example, retail trade, which declined by 2.4 million jobs (-15.2 percent) through April, gained back 1.8 million of those by September 2020, and in November 2021 was within 175,800 jobs or -1.1 percent, of recovery. Others did less well – both corporate offices and government had smaller initial losses, but have made up little ground over time.

The three industries with the largest percentage losses in April 2020 have all improved significantly, but two were still lagging in employment in November 2021. Arts, entertainment and recreation remained 11.0 percent below its pre-COVID-19 staffing level, with all segment – performing arts, sporting events, museums, casinos – in a double-digit decline. Accommodations and food services employed 1.1 million fewer workers than before the recession (-7.3 percent), with accommodations worse off (-14.4 percent) and food services not as bad (-6.1 percent). Other services – a potpourri including repair services for everything from cars to industrial machinery, a variety of personal services, notably hair salons and mani-pedis, and nonprofit membership organizations ranging from Chambers of Commerce to labor unions, Greenpeace and the Elks – lost almost a quarter of its employees early on, chiefly in personal services. By November 2021, that had improved to a deficit of -2.5 percent, although personal services were still down -7.8 percent.

Broad sectors can hide developments with specific industries. Some examples are shown in *Figure 1-7*. While employment in manufacturing was 2.0 percent short of recovery by November 2021, there was quite a range between electronics manufacturing (+0.7 percent) and auto manufacturing (improving to -7.3 percent), apparel manufacturing (-11.1 percent) and petroleum and coal products (-10.9 percent). Similarly, while transportation and warehousing has fully recovered (+3.6 percent), air transportation was still at -9.0 percent. Losses in information services have been higher than average, in large part to interruptions in the film and recording industry (-51.8 percent in April, improving to -21.9 percent in November). Within health care, outpatient health services has recovered (+0.8 percent), while a pre-COVID-19 staffing shortage has worsened at nursing and residential care facilities (April 2020, -4.1 percent, versus November 2021, -12.5 percent). Finally, child care has finally been recognized for its central role in supporting employment of parents. Early in the recession, jobs at formal child care centers (as opposed to informal home care providers) dropped by more than a third. By November 2021, employment was still off by -10.3 percent.

Figure 1-7. Nonfarm employment, percentage loss by selected industries, seasonally adjusted United States, February 2020 to April 2020, September 2020 and November 2021, respectively
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics



Looking at more detailed industries revealed some wide disparities in the rate of recovery.

Demographics of job loss: race, gender, education and age

Normally, comparing the unemployment rates for various demographic groups is a good benchmark for noting inequities in the labor market. During recessions, however, workers who lose their job may stop looking for work. If so (unless they are on temporary layoff and awaiting recall), they will be categorized as not in the labor force, and will not be counted as unemployed. Another complication emerged during the early months of COVID-19, when some of the unemployed were mistakenly misclassified. The federal Bureau of Labor Statistics (BLS) estimates that the April 2020 unemployment rate, officially recorded as 14.8 percent, may have been up to four percentage points higher. The error continued for several months, but grew smaller – by October 2020, the upper bound of the error was estimated at 0.3 percentage points – i.e., the 6.9 percent official rate may have been as high as 7.2 percent. For all of these reasons, the analysis below will focus primarily on employment loss, and secondarily on the unemployment rate.

The BLS publishes monthly, seasonally adjusted data for a limited set of worker characteristics. These data can fairly be compared month to month. Selected months are shown in *Figure 1-8*. BLS also publishes more detailed monthly data that is not seasonally adjusted, allowing valid comparisons only for the same month in different years. Other data are published on an average annual basis only. Unfortunately, this places some limits on data disaggregation.

As Figure 1-8 shows, some demographic groups had substantially higher unemployment before the recession, and had significantly worse outcomes during the recession and recovery. COVID-19 not only exacerbated existing inequities in health outcome – higher infection and death rates among African Americans, Hispanics or Latinos, Indigenous people and Pacific Islanders, for example – it similarly worsened inequities in the labor market.

Figure 1-8. Employment loss by worker characteristic, percentage loss, seasonally adjusted
United States, February 2020 to November 2021
Source: U.S. Bureau of Labor Statistics, Current Population Survey (data in yellow were at least 20 percent worse than the standard for all workers)

Work characteristics	Unempl. rate Feb. 2020	Unempl. rate Oct. 2021	Change in emply. Feb. 2020 - Apr. 2020	Change in emply. Feb. 2020 - Aug. 2020	Change in emply. Feb. 2020 - Sep. 2020	Change in emply. Feb. 2020 - Oct. 2020	Change in emply. Feb. 2020 - Oct. 2021
Workers aged 16+							
All workers	3.5%	4.8%	-16.0%	-7.0%	-7.0%	-5.7%	-2.2%
African American	6.0%	7.9%	-17.5%	-10.9%	-10.9%	-8.9%	-2.9%
Latinx	4.4%	5.9%	-20.7%	-9.3%	-9.3%	-6.7%	-0.2%
Asian American	2.5%	4.2%	-17.0%	-7.0%	-7.0%	-6.6%	+0.7%
White	3.0%	4.0%	-15.5%	-6.2%	-6.2%	-4.9%	-2.6%
Teenagers 16 to 19							
All Teens	11.5%	11.9%	-35.1%	-6.9%	-6.9%	-3.8%	-0.3%
African American teens	21.7%	16.1%	-26.0%	+1.0%	+1.0%	-3.3%	-4.2%
Latinx Teens	14.8%	15.7%	-36.5%	-8.2%	-8.2%	-2.9%	+5.2%
White Teens	9.8%	10.7%	-36.3%	8.1%	8.1%	-4.5%	-1.4%
Workers aged 20+							
All workers	3.2%	4.3%	-15.3%	-7.1%	-7.1%	-5.8%	-2.2%
Women	3.1%	4.4%	-17.0%	-7.6%	-8.1%	-6.4%	-2.8%
Men	3.2%	4.3%	-13.9%	-6.6%	-6.1%	-5.2%	-1.9%
African American women	4.9%	7.0%	-18.1%	-12.4%	-11.9%	-9.6%	-4.2%
African American men	6.0%	8.3%	-16.3%	-9.6%	-10.5%	-8.4%	-1.4%
Latinx women	4.9%	5.7%	-23.1%	-9.8%	-12.7%	-9.4%	-2.4%
Latinx men	3.2%	5.2%	-17.7%	-8.4%	-6.8%	-4.8%	+1.2%
White women	2.8%	3.9%	-16.7%	-6.6%	-7.1%	-5.4%	-3.2%
White men	2.8%	3.6%	-13.1%	-5.8%	-5.3%	-4.5%	-2.1%
Workers aged 25+							
All workers	2.9%	4.0%	-13.9%	-6.3%	-6.5%	-5.4%	-2.2%
Less than HS Diploma	5.8%	7.4%	-24.9%	-18.3%	-13.8%	-9.6%	-9.2%
HS/GED only	3.5%	5.4%	-21.9%	-11.9%	-9.1%	-6.9%	-4.3%
Some College	3.0%	4.4%	-15.8%	-6.8%	-8.5%	-7.5%	-5.6%
Bachelor's or more	1.9%	2.4%	-6.3%	-0.4%	-3.0%	-3.0%	+1.9%
Other age breakouts:							
Ages 20-24	6.3%	8.0%	-29.6%	-13.9%	-11.4%	-7.4%	-3.0%
Ages 25-34	3.7%	5.3%	-15.6%	-8.6%	-7.7%	-6.1%	-1.9%
Ages 35-44	2.7%	4.0%	-11.3%	-4.2%	-5.0%	-4.4%	-0.7%
Ages 45-54	2.5%	3.9%	-3.3%	-1.3%	-2.0%	-1.1%	-3.1%
Ages 55+	2.6%	3.6%	-4.2%	-1.3%	-2.5%	-2.6%	-3.0%

Some demographic groups had higher unemployment on the eve of the recession, and fared worse during the downturn and recovery.

- Among racial/ethnic and gender groupings,[7] African American women, Hispanic or Latino women, and African American men had higher unemployment before the pandemic, and suffered greater job loss throughout the pandemic when compared with the average worker. White women had somewhat higher job loss than white men, but were significantly less impacted than African American and Hispanic or Latino women.
    - *Figure 1-8* shows data for August, September and October 2020. Readers may recall that after the release of September data, media stories focused on the number of women dropping out of the labor force, and indeed there were 669,000 fewer women in the labor force that month. The labor force participation rate – the percentage of women aged 16 and older who are either employed or actively seeking work – fell from 56.2 percent to 55.6 percent; a big change for one month. Buried in the details: the number of employed women fell by 183,000 – most of the women who stopped looking for work that month (486,000) were already jobless. Further, there was no follow-up the next month, when women's employment jumped by 351,000 – there were more women employed in October than in August. When analyzing labor market trends, it's important to look at more than one month, and it's important to look at employment, unemployment, and labor market participation.
    - Asian Americans as a group experienced higher than average job losses in most of the first 16 months of a recession, until a hiring surge in July 2021 led to a complete recovery in October. Asian Americans are a very diverse group, with more details available only on an annual average basis. Comparing 2019 with 2020, Vietnamese Americans had extremely high job loss (-21.7 percent); Filipino Americans (-9.6 percent), Japanese Americans (-8.1 percent), and Chinese Americans (-6.7 percent) had higher than average job loss,[8] while Korean Americans (-5.8 percent) and Asian Indian Americans (-3.0 percent) had lower than average losses. Overall, employment for Asian American women (-8.9 percent) declined more than for men (-4.5 percent).

[7] When it comes to gender, the Census Bureau and the Bureau of Labor Statistics recognize only "males" and "females."

[8] The loss for all workers from 2019 to 2020 was -6.2 percent.

  - Again, on an annual basis, Indigenous Americans had lower than average job loss (-4.0 percent) from 2019 to 2020, with men's employment (-1.7 percent) dropping more than women's (-6.6 percent). Their unemployment rate remained significantly higher than average, however – 11.7 percent in 2020, versus 8.1 percent for all workers.
  - Over the same time period, Pacific Islander employment fell by -12.9 percent, more than twice the rate for all workers – a -12.3 percent loss for women, and a -13.4 percent decline for men.

- By educational attainment, workers with less formal education had a proportionately higher job loss. In February 2020, roughly one out of every 15 workers had not received a high school diploma or a GED. This group suffered a -24.9 percent job loss at the height of the recession, and was still down by -9.2 percent in November 2021. Job loss was also higher than average for those with a diploma or GED, as well as those with some college (including an associate degree). Employment for those with a bachelor's degree or more in terms of formal education had fully recovered. The disparity around education held true within different racial/ethnic groups as well. For example, employment of African Americans with a bachelor's degree or higher has increased, while dropping for those with less than a bachelor's.
- By age groups, young adult workers aged 20 to 24 had substantially higher job losses through much of the recession, peaking at almost -30 percent in April 2020, before improving to -3.9 percent in October 2021. Interestingly, the age group that has fared the best was teenagers. Before the pandemic, teen unemployment was much higher than the general population – 11.5 percent overall, 14.8 percent for Latinx youth, and 21.7 for African American youth. Rates continued to be much higher in November 2021. Teenager job loss followed the same pattern as for the overall labor market until April 2021, when hiring soared. More 16- to 19-year-olds were employed that month than before the pandemic began – perhaps because virtual schooling allowed students the flexibility to work in the daytime. While teen employment has dropped slightly since then, the pandemic-related loss was still lower than for any other age group.

Working at home

The number of people working from home had been gradually increasing for at least the past decade, but at a rather pedestrian pace pre-pandemic. According to the Census Bureau's American Community Survey, 5.9 million Americans worked from home in 2010, 4.3 percent of all those employed. By 2019, their numbers had increased to just under 9.0 million/5.7 percent. In short order, COVID-19 changed all that. By May 2020, in addition to those who were previously telecommuting, 48.7 million workers – 35.4 percent of those employed – reported that they worked at home sometime during the month specifically because of the pandemic. Like everything else about COVID-19, working remotely exacerbated inequities along lines of race and income.

There were wide differences by occupation, ranging from a high of 80.9 percent in education to a low of 4.0 percent in building and grounds cleaning and maintenance occupations. Similarly, industries ranged from 66.8 percent of workers in finance and insurance, down to 8.0 percent in accommodations and food services, and 6.6 percent in agriculture. Telecommuting was more prevalent among government workers (56.4 percent) than private sector workers (32.8 percent) and the self-employed (25.6 percent). Clearly, the type of job (e.g., physical presence required or job-based on computer usage) played a factor in who could telecommute.

Not surprisingly, there were demographic differences among virtual workers as well. Higher percentages of virtual workers were found among:

- Middle-aged workers (ages 25-54, 38.8 percent), versus younger (under 25, 18.9 percent) and older workers (55+, 33.4 percent).
- Women (40.9 percent) than men (30.8 percent).
- Asian Americans (51.9 percent) versus white (35.3 percent), African American (29.3 percent) or Latinx (23.0 percent) workers.
- Workers with children under 18 (38.9 percent) versus those without (33.7 percent).
- Those with a bachelor's or higher degree (59.6 percent), declining by formal education to 25.1 percent for those with some college, 15.3 percent of those with a high school diploma only, and 5.2 percent for those without a high school diploma.

Income was also a factor. The PEW Foundation found in a survey that 76 percent of low-income workers had jobs that could not be done at home, versus 63 percent for middle-income and 44 percent of upper-income

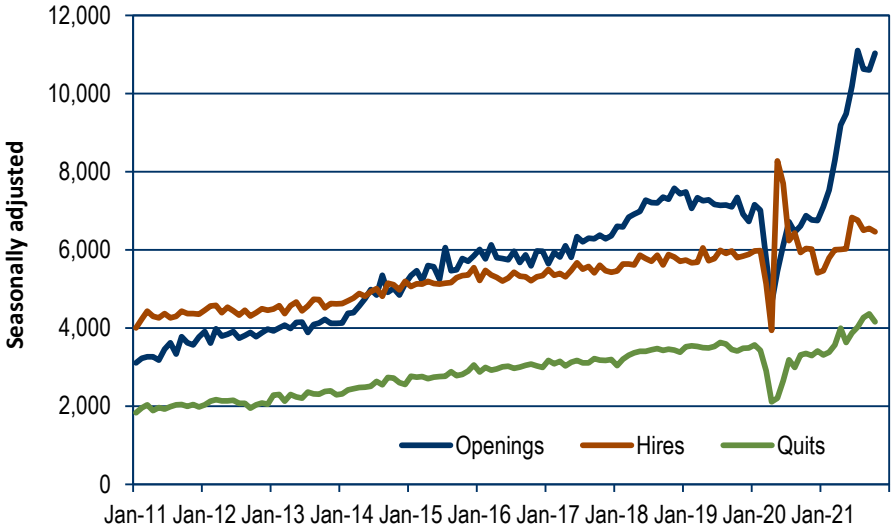
workers. Lower-income workers were also more concerned about being exposed to the virus at work, and less satisfied with protective measures taken at their workplace.

Working from home because of COVID-19 declined from May to August 2020, falling to 24.3 percent, stabilized over the six months, and then beginning in April 2021, declined steadily to 11.3 percent in November. The demographics remained largely the same. What did change was the number of workers who demanded the option of continuing to telecommute. Some employers embraced a hybrid model, while other employers pushed for a return to office and were forced to retreat and compromise. The trend raised all sorts of questions about the future of downtowns, commercial real estate, the use of office space, and the fate of businesses that depend upon a robust downtown workforce.

From labor surplus to labor shortage

And then, seemingly in a flash, the nation pivoted from massive unemployment to a labor shortage. Beginning in January 2021, job openings soared well above previous historical highs (*Figure 1-9*), peaking at just under 11.1 million in July. One would have thought, with over 10 million unemployed and over four million people who dropped out of the labor force, that employers would have been deluged with job applicants. One would have been wrong, however. While there has been solid job growth during 2021, and unemployment steadily declined, hiring didn't increase nearly as much as job openings. Even more unexpectedly, the number of people quitting their job rose to record highs during the summer. The quit rate – the percentage of incumbent workers who quit their job – averaged 2.3 percent in 2019. It rose to 2.8 percent in April 2021, and then hit a high of 3.0 percent in September 2021. By industry, rates were highest for accommodations and food services (6.6 percent in August, before declining to 6.0 percent in October), arts, entertainment and recreation (5.3 percent in September, before dropping to 3.8 percent in October), and retail trade (4.4 percent) – all lower-wage industries with many jobs working closely with the public, increasing the risk of exposure to COVID-19, and with reports of growing abuse from customers. The quit rate was markedly lower for large employers (5,000+ employees, only 1.0 percent). A number of employers were raising entry-level wages and offering signing bonuses, which may be effective in attracting some workers but not others.

Figure 1-9. Job openings, hires and quits, adjusted for seasonal patterns
United States, January 2011 through October 2021
Source: U.S. Bureau of Labor Statistics/JOLTS



Job openings soared, hiring didn't keep up, and workers quit their jobs in record numbers.

The reasons for these divergent trends were manifold, overlapping, and difficult if not impossible to quantify. They included:

- **COVID-19.** Many potential workers were worried about exposure to COVID-19 in the workplace.
- **Child care/caring for school-age children.** Availability of affordable child care was an issue before the pandemic, particularly for the growing number of parents whose work schedules changed weekly on an unpredictable basis. COVID-19 only exacerbated this challenge – and as noted above, formal child care employment was still 10.3 percent below pre-pandemic levels. Also, parents of school-age children had to deal with students who initially were learning in a virtual or hybrid setting, and then were sometimes unexpectedly sent home due to exposure to COVID-19 at school.
- **Unemployment benefits.** With normal unemployment benefits augmented initially by $600 per week, later by $300 per week, some former low-wage workers received more in benefits than they did from work. Some states ended federal programs early in order to address that issue. The result, according to one study, was a modest upward bump in employment; the economic benefits were outweighed by the drop in income and spending from lower

benefits. One survey found that the augmented unemployment benefits may have been a factor for one out of six potential workers staying out of the labor force.

- **Working conditions.** Americans work longer hours, with less vacation, weaker workplace protections (e.g., regular schedules), less in the way of benefits, more expensive and lower quality health care, and weaker social support systems than workers in most industrialized countries. With COVID-19 giving many workers some time to think about their lives and their values, millions of workers have re-evaluated what they want from a job. Anecdotally, for example, some better-paid workers have opted out of the rat race and sought lower-pressure jobs with a shorter work week. Some lower-wage workers, meanwhile, realizing they were stuck in a dead-end job, have sought work that was more-rewarding, both personally and in terms of wages and benefits.
- **Retirements.** A recent study by the San Francisco Federal Reserve Bank suggested that the rate of retirement has sped up. There may be (again) a variety of reasons for this trend – ranging from upper income workers who saw their investments appreciate to the point where they could afford to retire early, to lower-income workers who, desperate for income, enrolled in Social Security (at a greatly reduced monthly benefit check compared with if they had been able to wait a few years more). It should be noted that Social Security benefits have not shown an uptick, casting some doubt on this hypothesis.
- **Mismatches** between jobs in demand and the skills of unemployed workers, and the location of job openings and the location of workers. Shortages that were occurring before COVID-19 came back into focus again as the economy recovered.

Employers have enjoyed the upper hand in the labor market for much of the past 45 years, with the result being stagnant wages for workers without a bachelor's degree, an erosion benefits, and policies and practices which impeded unionization. The big question for the coming year is how long the balance of power will stay on the side of labor, and that will affect wages, benefits and working conditions over the long-term.

Supply chain

The first notice that COVID-19 had affected the supply chain for goods and services came early in the pandemic with the shortage of toilet paper (TP). When consumers wondered why it would take so long to end the shortage, they discovered an inconvenient truth about present-day manufacturing. In the past, factories were built with extra capacity, to accommodate ups and downs in the demand for products. Over the past few decades, however, there has been a big push for efficiency and "just-in-time" production, and capacity has been squeezed out of the production system. As a result, TP makers couldn't ramp up production, and it took quite a while before availability was back to normal.

As COVID-19 progressed, other shortages began to crop up as well. The nation struggled to keep up with the demand for effective masks and other personal protective equipment and COVID-19 tests. Then automakers cut short their production, due to a shortage of computer chips. These shortages were compounded when semiconductor plants overseas were shuttered due to COVID-19 infections – in turn caused by hoarding of vaccines by richer nations and the refusal of the large vaccine manufacturers to relax their patent rights and allow generic manufacturers to provide effective vaccines at a reduced cost in lower-income countries (in fact, they have raised their prices to increase their already substantial profits). Supply chain issues then worsened and generalized when ports became a traffic jam and the whole system of getting imports off of ships and onto store shelves seemed to seize up.

While COVID-19 has been the proximate cause of supply chain issues, the underlying causes have been decades in the making. These root causes include:

- Lax enforcement of anti-trust laws, allowing monopolies and quasi-monopolies to develop in numerous industries.
- Offshoring of manufacturing and parts suppliers. Some of this has been abetted by large retailers forcing their finished goods suppliers to continually lower their costs (which led to downward pressure on wages for domestic suppliers and more offshoring).
- The shift of manufacturers using a single supplier, leading to consolidation of smaller suppliers – consolidate or die, since larger businesses often have a cost advantage over smaller producers. Of course, once a single business has captured a niche, it can then raise prices without being challenged by competitors.
- Deregulation of shipping industries. Ocean shipping, for example, shifted from being a well-regulated industry with large and small competitors, transparent prices, and stability across

> business cycles to oligopolies that became extremely concentrated, highly profitable (and you thought added fees and surcharges were limited to consumers) and, after initial productivity gains, less and less efficient.[9]

Systems analysts contrast systems that are "loosely-coupled" and "tightly-coupled." The former have built-in redundancy, so that if one part of the system fails, there are alternatives at hand. They are less efficient but more resilient. The latter have eliminated slack, operate more efficiently, but when one part fails, there is a cascading domino effect that leads to major damage – think of the financial system in 2008 to 2009, when the implosion of Lehman Brothers almost brought the whole system down.

When COVID-19 hit, it exposed these often invisible changes in markets. At points in the supply chain where there was little or no competition, prices and profits went up. If that supplier happened to be overseas, the cost of shipping went up, and availability went down or disappeared. Supply chain issues may abate as COVID-19 eases, but they are not going away, and will return in force when the next crisis hits, be it an earthquake, hurricane, pandemic or bank failure. They are baked into the current structure of the economy. It will take substantial re-regulation of key industries, enforcement of anti-trust laws, and "re-shoring" – domestic investment to create more competition in the supply chain – to permanently restore resiliency to the supply chain.

Inflation

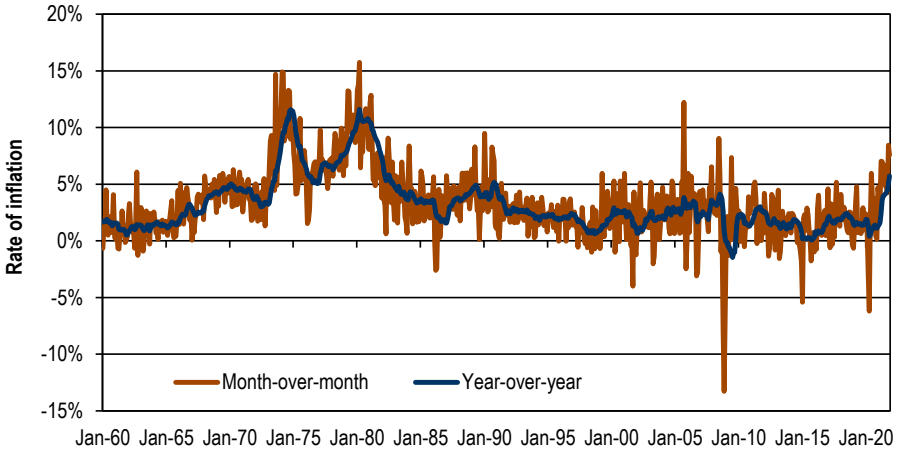
It wasn't that long ago – in the years following the 2008 to 2009 recession – that deflation, a decline in the average price of goods and services, was a major worry for the economy. Even when the fear of deflation had passed, inflation was consistently below the Federal Reserve Bank's target of 2 percent. That all changed in early in 2021, when the general level of prices started steadily rising. In November, year-over-year inflation was higher than it has been since the early 1980s.[10]

[9] See Matt Stoller's Too Big to Sail: How a Legal Revolution Clogged Our Ports and The World's Most Profitable Traffic Jam.

[10] There are a number of measures of inflation. Policymakers at the Fed generally use the BEA PCE deflator (featured in *Figure 1-10*) and the Chained Consumer Price Index (and variations of these two, for example with food and energy removed), as opposed to the Consumer Price Index for all urban consumers (CPI-U), which is generally regarded as being biased upward.

The increase in inflation sparked a debate about the cause of the sudden burst in prices. Some blamed federal policies like low interest rates, quantitative easing, and spending programs that they believe overstimulated consumer demand. Others focused on COVID-19 or on supply bottlenecks. Each argument has merit, and in a number of cases higher prices reflect the interaction of all three.

Figure 1-10. Month-over-month and year-over-year rate of inflation, personal consumption expenditures, seasonally adjusted
United States, January 1960 to November 2021
Source: U.S. Department of Commerce, Bureau of Economic Analysis



Year-over-year inflation was higher than it's been since the early 1980s.

While a full analysis of inflation is beyond the scope of this report, here are a few examples of the complexities involved.

- The different stimulus programs approved by Congress helped boost household income and, in turn, consumer spending. This is clearly shown above in *Figure 1-4* and *Figure 1-5*. Higher demand, especially in conjunction with supply and labor shortages, helped push prices up.
- According to the BLS, just over two percentage points (2.01 points) of the 6.8 percent increase in the Consumer Price Index over the past year were due to higher energy prices, mostly gasoline. This was clearly primarily a supply issue, as OPEC cut oil production at the beginning of the pandemic, and investors have reportedly pushed fracking operations to limit their production.[11] Gasoline consumption fell early in the pandemic, and while it rose in 2021, it was still below pre-pandemic levels, so demand is not an issue here.

[11] See Oil Prices report by Yves Smith.

- Another important factor in the BLS analysis was the increase in the price of cars (0.42 percentage points due to new cars, 0.87 points from a sharp increase in the price of used vehicles). When COVID-19 began, semiconductor producers shifted their chip production, lowering their output for the auto industry while raising production of chips for other uses, and were unable to quickly switch back when demand for new cars came back stronger than expected. COVID-19 infections also affected production in overseas fabrication plants. With a shortage of new cars and growing demand, consumers bid up the price of used cars.
- As previously discussed and shown in *Figure 1-5*, corporate profits have soared during the pandemic. Profits have increased by over $700 billion (over $2,100 per person in the U.S.) One analysis estimated that higher profits accounted for as much as 45 percent of the increase in prices.[12]
- When interest rates are low for a protracted period, asset prices get bid up. Stock prices have increased in part due to record profits, and in part due to easy monetary policy. Another asset that has seen higher prices is housing, with the September Case-Shiller housing index up 19.5 percent nationally.

Income and wealth

Data on income are based on annual Census Bureau surveys, while wealth is assessed once every three years by the Federal Reserve Bank. Quarterly estimates, based on the tri-annual survey, are also available. Experience has shown that household surveys understate the income and wealth at the upper end of the distribution.

According to the Census Bureau, incomes in many households declined in 2020.[13] The median household income fell by an inflation-adjusted 2.9 percent, while the poverty rate increased from 10.5 percent to 11.4 percent. The median income for most demographic groups dropped, the one exception being African American households, which did not change significantly. Large disparities between the median incomes of different groups remained. For example, the median for those with a bachelor's degree or higher degree was $106,936, while those whose formal education ended with a high school diploma or GED had a median income of $47,405. Median income for African Americans, at $45,870, was well below that of non-Latinx white households ($71,231).

[12] See Corporate Profits drive 60% of Inflation Increases by Matt Stoller.
[13] According to the Census Bureau, survey respondents during COVID-19 were likely biased slightly towards those with higher income and educational attainment, so the data presented were probably rosier than the reality.

Federal Reserve estimates of wealth in third quarter 2021, showed that over the course of the pandemic, wealth increased, and the distribution of wealth became slightly less unequal at the bottom and more unequal at the top. The bottom 50 percent of households saw their wealth increase from 1.8 percent of the total to 2.5 percent, primarily through rising housing values (which increased at a faster rate than for higher wealth groups). This was still a smaller share than the peak of 4.3 percent in the early 1990s. Because home ownership for African American, Indigenous, Latinx, and Pacific Island households is well below average, it is likely that wealth disparities by race have widened. Also, more than a third of all households are renters, with little in the way of wealth, so it's likely that much of the increase in wealth for the bottom 50 percent accrued to the top third as opposed to the bottom two-thirds.

The top 1 percent also increased their share of total national wealth from 30.8 percent to 32.1 percent (an average increase of $7.7 million per household, unadjusted for inflation), primarily through the stock market. The 1 percent increased their ownership of household-held stocks and mutual funds to 53.8 percent. Their share of both stocks and total wealth were the highest on record going back to the start of the series in 1989. Note that the Federal Reserve Bank estimates are well below those of Thomas Piketty in *Capital and Ideology*; his estimates of the share of wealth held by the top 1 percent in 2015 were 7 to 8 percent higher.

Looking ahead: key economic challenges

As the U.S. economy and labor market transition to a full short-term recovery as measured by typical business cycle indicators – a number of hard truths face the nation. Among them, in no particular order:

- Racial inequities. As previously indicated, in almost all of our tracked economic measures, there are wide disparities by race.
- Climate change. This is clearly the biggest issue facing humanity. Serious economic impacts are already baked into the coming century; immediate, deep actions are needed to prevent even more serious impacts.
- Housing. Before the pandemic, 48.4 percent of renters (almost 20 million households) were income distressed, with over 30 percent of their income going to housing costs. Half of those distressed households were paying more than half of their income in housing. In December 2021, 15.2 percent of tenants were behind on their rent. Half of those had children (well over 6 million children live in these households), almost half were unemployed, and almost two-thirds were people of color. A

majority (58.7 percent) had not applied for rental assistance. More than one out of six (18.0 percent) were waiting to hear whether they would qualify, and one out of 12 (8.1 percent) were denied assistance. Most housing experts agree that voucher programs are effective (and could become even more so with some tweaks), but are underfunded, and the supply of affordable housing is too low.

- The growing concentration of wealth and income.
- The ability of monopolies and oligopolies to control important industries.
- The financialization of the economy. Financial deregulation was the primary cause of the 2008 to 2009 recession, but little has been done to better regulate large banks, speculation, private equity funds and the shadow banking system.

Chapter 2: Washington's economy and labor market

This chapter focuses on the economic ecosystem in Washington state, primarily through a labor market lens for 2020 and 2021. Typically, the annual report dives into detail about the economic situation for the most recent year. This report addresses the years of 2020 and 2021 together, as the unusual economic conditions present in 2021 were highly dependent on the unique situation brought on by the COVID-19 pandemic in early 2020.

Gross domestic product

Gross domestic product (GDP) measures how much value was added through the production of goods and services during a period of time. By this measure, Washington state was the 10th largest state in the nation. Washington's GDP increased from $597.8 billion in 2019 to $604.3 billion in 2020,[14] despite major disruptions associated with the 2020 COVID-19 pandemic recession. The table below summarizes the broad industry contributions to Washington's GDP in 2020. A few of the top industries are described below.

Figure 2.1. GDP by industry contribution
Washington state, 2020
Source: U.S. Bureau of Economic Analysis; Gross Domestic Product

Washington state GDP (in millions)	2020 GDP	Percent of 2020 GDP	Rank
All industry total	**$604,253.8**		
Finance, insurance, real estate, rental and leasing	$101,877.1	16.9%	1
Information	$98,344.4	16.3%	2
Government and government enterprises	$76,219.6	12.6%	3
Professional and business services	$63,952.6	10.6%	4
Retail trade	$58,599.6	9.7%	5
Manufacturing	$57,043.3	9.4%	6
Educational services, health care and social assistance	$38,537.3	6.4%	7
Wholesale trade	$30,564.9	5.1%	8
Construction	$25,528.9	4.2%	9
Arts, entertainment, recreation, accommodation and food services	$15,889.4	2.6%	10
Transportation and warehousing	$12,940.5	2.1%	11
Other services (except government and government enterprises)	$10,795.6	1.8%	12
Agriculture, forestry, fishing and hunting	$8,807.3	1.5%	13
Utilities	$4,778.4	0.8%	14
Mining, quarrying, and oil and gas extraction	$374.8	0.1%	15

Finance, insurance, real estate, rental and leasing made the largest contribution to Washington's GDP in 2020.

[14] 2012 chained dollars.

In GDP accounting, the financial activities sector includes two components. First, there is the value of business in the financial, insurance and real estate industries. Second, GDP for real estate also includes what is known as "owners' equivalent rent" – the rent a homeowner would be paying if they were renting their house from a landlord instead of owning it. This methodology treats all housing the same, whether it is owned or rented by its resident. Note that if the owners' equivalent rent were not included, GDP would go down when a renter becomes a homeowner, because the rent they pay (included in the first component) would no longer be included in GDP.

According to the Bureau of Economic Analysis, the financial activities sector was the primary contributor to Washington state's GDP in 2020, but was surpassed by the information sector during the pandemic. In second quarter 2021, the financial activities sector contributed more than $84 billion to the state economy.

The information sector is the second-largest contributor to Washington's GDP. In second quarter 2021, the information sector contributed more than $122 billion to the state economy. This is 21.6 percent of the total contribution by any industry. The information sector has been marked by impressive growth over the past decade. From 2019 to 2020, the GDP of the sector grew by 16.6 percent, and from 2010 to 2020, the contribution to the state GDP grew by nearly 187.0 percent.

The government sector includes a diverse collection of activities, ranging from municipal, county, tribal, state and federal government agencies to school districts, public colleges and universities, tribal enterprises, port districts and public utility districts. Altogether, the public sector was the third-largest contributor to the statewide GDP in 2020. Total GDP for the government sector amounted to more than $76 billion in 2020. Within government, the largest economic contribution came from state and local government, which was responsible for 73.0 percent. Federal civilian activity made up 17.2 percent and the military contributed 9.8 percent.

Retail sales collectively made up the fifth-largest contribution to Washington's GDP, contributing nearly $58.6 billion. Despite relatively low average GDP growth in retail trade, on an annual basis in general (1.1 percent not adjusted for inflation), the contribution made by retail trade jumped by 12.6 percent over the year.

Washington's employment situation

Covered industry employment and wages

GDP is one of many metrics that tells the story of Washington's economy. This report focuses on Washington's labor market, including industry and wage trends. A high-level view of Washington's economy from the vantage point of GDP tells an important part of the story – which sectors produce the most value? The employment situation, however, looks a bit different, as high value doesn't necessarily translate to the largest job providers (for example, finance, insurance and real estate is the largest contributor to GDP [16.9 percent] but only 2.9 percent of covered employment). The following table describes average annual employment and wage by industry in 2020.

Figure 2.2. Covered employment and wages by industry
Washington state, 2020
Source: Employment Security Department/DATA Division, U.S. Bureau of Labor Statistics; Quarterly Census of Employment and Wages (QCEW)

Industry	Average employment 2020	Total wages 2020	Average wage 2020	Share of employment 2020	Share of total wages 2020
Total	**3,255,985**	**$250,062,147,696**	**$76,801**	**100.0%**	**100.0%**
Agriculture, forestry, fishing and hunting	99,281	$3,590,991,842	$36,170	3.0%	1.4%
Mining	2,059	$151,295,987	$73,480	0.1%	0.1%
Utilities	5,224	$568,505,399	$108,826	0.2%	0.2%
Construction	199,845	$13,951,786,091	$69,813	6.1%	5.6%
Manufacturing	268,654	$22,025,363,086	$81,984	8.3%	8.8%
Wholesale trade	128,791	$11,246,816,984	$87,326	4.0%	4.5%
Retail trade	379,946	$27,127,494,166	$71,398	11.7%	10.8%
Transportation and warehousing	101,215	$6,660,752,620	$65,808	3.1%	2.7%
Information	148,235	$35,859,937,523	$241,913	4.6%	14.3%
Finance and insurance	95,043	$10,792,738,281	$113,556	2.9%	4.3%
Real estate, rental and leasing	52,642	$3,331,600,816	$63,288	1.6%	1.3%
Professional, scientific and technical services	210,649	$23,580,987,822	$111,944	6.5%	9.4%
Management of companies and enterprises	43,516	$5,615,435,122	$129,043	1.3%	2.2%
Administrative and waste management services	160,913	$9,185,058,032	$57,081	4.9%	3.7%
Educational services	40,898	$1,823,818,298	$44,594	1.3%	0.7%
Health care and social assistance	426,047	$24,187,244,732	$56,771	13.1%	9.7%
Arts, entertainment and recreation	34,968	$1,359,369,751	$38,875	1.1%	0.5%
Accommodation and food service	220,795	$5,459,454,041	$24,726	6.8%	2.2%
Other services (except public administration)	89,077	$4,156,983,829	$46,667	2.7%	1.7%
Total government, all industries, all ownerships	**548,188**	**$39,386,513,274**	**$71,849**	**16.8%**	**15.8%**

Washington businesses supported nearly 3.3 million jobs in 2020.

Total nonfarm employment trends

Washington's labor market and economic situation was generally strong in the leadup to the COVID-19 pandemic recession. The post-Great Recession labor market expansion in Washington state began in February 2010. From February 2010 to February 2020, the economy added more than 60,000 jobs, and in the months leading up to the pandemic recession, the statewide unemployment rate hovered in the 4.0 percent range. The combination of steady growth and a low unemployment rate put upward pressure on wages, as employers competed for workers in Washington's strong economy.

Toward the end of 2019, the global economy began to succumb to the COVID-19 pandemic.

The first documented case of COVID-19 in the U.S. was observed in Western Washington in January 2020, making Washington residents, businesses and lawmakers among the first in the nation to swiftly assess and manage pandemic-related risks. One of the tools included a suite of policy responses that temporarily closed or reduced capacity of certain in-person activities, impacting industries differently based on the extent to which their primary activities involved face-to-face activities and whether they were considered essential or not based on criteria laid out in temporary regulations.

Total nonfarm employment dropped by more than 420,000 or 12.0 percent from February 2020 to May 2020, with the deepest losses observed in April. In terms of the number of jobs lost, this brought Washington state back to levels last observed in 2014. During this time, the Employment Security Department also processed an unprecedented tsunami of unemployment insurance claims.

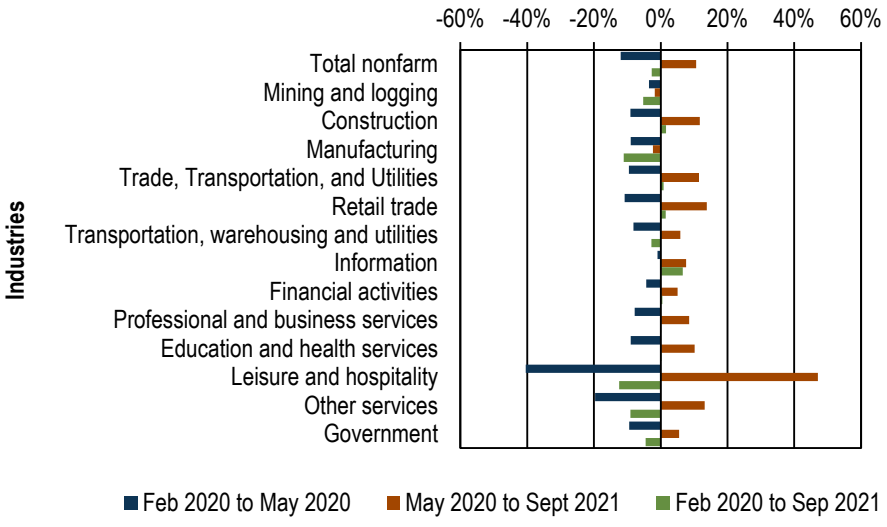
By June 2020, blunt regulatory tools that had been put into place were adjusted in light of more information about the nature of COVID-19, and businesses and households were able to adjust, armed with a greater degree of knowledge in a still highly-uncertain environment. Total employment has expanded almost every month from May 2020 through September 2021. To date, the tally of jobs in Washington is about 3.42 million, which is still nearly 93,300 jobs short of the pre-recession tally, and about the equivalent of employment levels observed in 2018.

Over the course of the pandemic, the specific challenges shifted, as evident in the data. COVID-19 infections, hospitalizations and deaths waxed and waned, and employment growth did as well. As vaccinations

became widely available and as regulations relaxed with lower COVID-19 numbers, the number of job openings – especially in the most impacted sectors – proliferated. Meanwhile, the labor force remains below pre-pandemic levels, resulting in a low unemployment rate and a labor market where employers are competing for workers.

Of course, each industry was impacted by the pandemic in a different way and to a different extent. The industries that were impacted to the greatest extent were generally characterized by face-to-face work that is not easily adapted to virtual environments or telecommuting. Workers in leisure and hospitality were laid off in the greatest numbers and proportions. In contrast, industries that were able to quickly adapt to virtual work environments, such as information and financial activities, suffered relatively minimal job losses and recovered quickly. The remainder of this chapter is dedicated to describing the unique employment situations faced by different sectors in the Washington state economy. Each recession has its signature – the industry or collection of industries that are impacted to the greatest extent by the economic correction. The COVID-19 pandemic recession arguably left its mark on every industry, but impacted industries that rely on face-to-face interaction – such as leisure and hospitality – to the greatest extent.

Figure 2.3. Employment losses and recovery by industry
Washington state, February 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



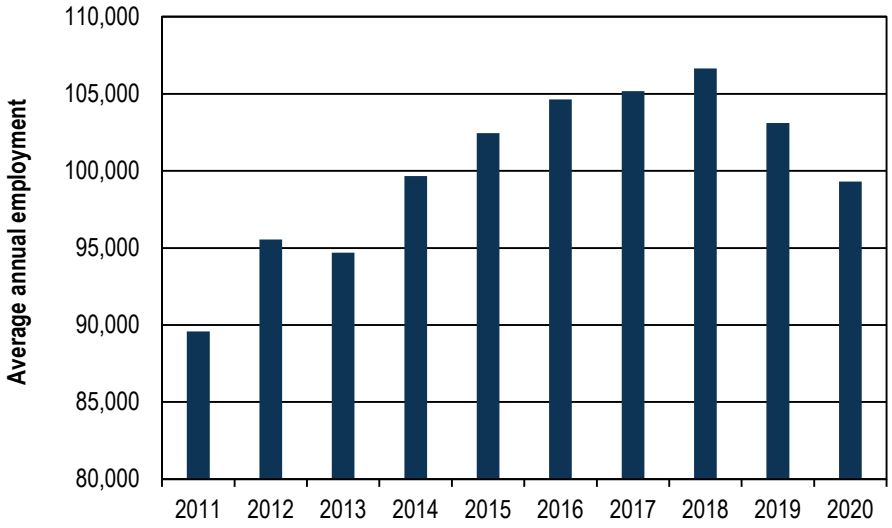
The leisure and hospitality sector suffered the deepest job losses during the pandemic.

Agriculture

Employment in Washington's agriculture sector is highly seasonal. This description smooths out seasonality by comparing average annual employment between 2019 and 2020.

Like most industries, Washington's agricultural sector faced major setbacks during the COVID-19 recession. Average annual covered employment in 2020 was 99,281 workers – down 3.6 percent relative to 2019. In 2020, employers in agriculture collectively paid $3.6 billion in wages, representing 1.4 percent of total wages paid. This translates to an average annual wage of $36,170 per worker. Over the year, wages in agriculture increased by $2,468 or 7.3 percent.

Figure 2.4. Average annual employment in agriculture
Washington state, 2011 through 2020
Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages



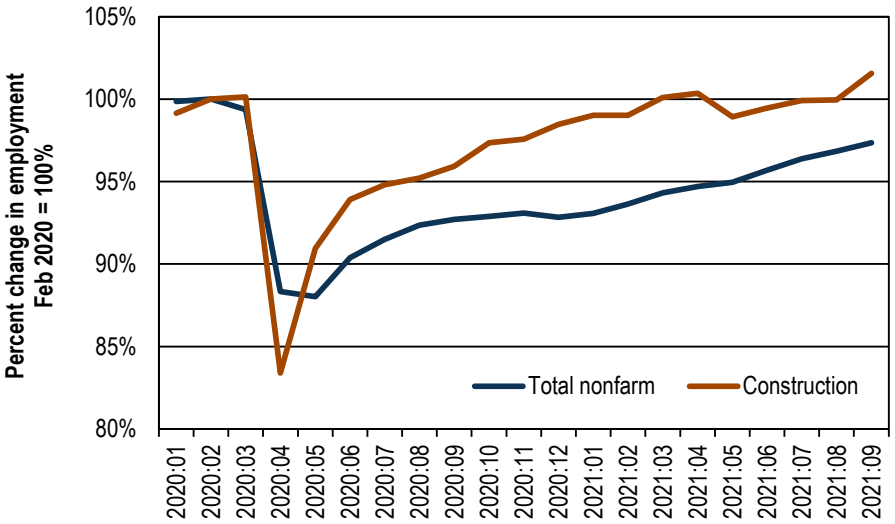
Average annual covered employment in agriculture was down nearly 4,000 jobs from 2019 to 2020.

Construction

Construction is traditionally among the most exposed industries during recessions. The Great Recession (2008 to 2010) disproportionately impacted the construction industry as demand for new construction came grinding to a halt. This time, construction was the first of the major industries to rebound from initial losses, as demand for projects barely missed a beat.

Construction made up 6.1 percent of total jobs in 2020, and 5.9 percent of total wages. The total wages paid to construction workers in 2020 amounted to nearly $14 billion. This breaks down to an average wage of $69,813.

Figure 2.5. Pandemic employment trend: construction
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Construction employment reached pre-pandemic levels in late 2021.

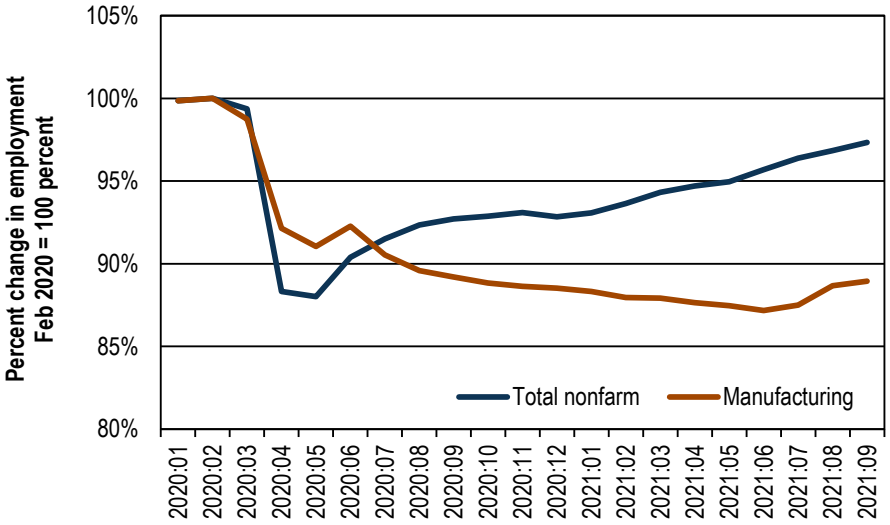
The construction industry was swiftly impacted by the social distancing measures put into place in March 2020. April employment was nearly 17.0 percent below the level observed just before the pandemic. By the following month, employment had already bounced back by nearly 50.0 percent, and employment had returned to pre-recession levels within the year, led by residential building construction and buoyed by specialty trade contractors and some major heavy and civil engineering projects. The market for nonresidential building construction was dampened by uncertainty about the future of office-based work, but is on track to recover in the coming months.

In 2020, the Census Bureau tallied 43,881 total new housing starts in the state of Washington, including 682 structures containing five or more units. The count of housing starts is down over the year (48,424 housing units were approved in 2019).

Manufacturing

Washington's manufacturers were collectively supplied 8.3 percent of jobs statewide, paying more than $22 billion in direct wages, or 8.8 percent of all wages. The average annual wage in manufacturing was $81,984 in 2020, compared to an average annual wage of $76,801 statewide. Transportation equipment manufacturing (which is dominated by aerospace) supplied 33.1 percent of total employment in manufacturing and paid 45.1 percent total wages, which is proportional to GDP share for this sector. The average annual wage in transportation equipment manufacturing was $111,706 in 2020.

Figure 2.6 Pandemic employment trend: manufacturing
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Manufacturing employment dropped throughout most of 2020 and 2021.

The employment situation in manufacturing differs drastically between durable and nondurable goods. Durable goods manufacturing (dominated by the aerospace industry) dropped throughout 2020, only beginning to build back employment in mid-2021. Nondurable goods manufacturing followed a similar pattern to total nonfarm employment; jobs bounced back more quickly than durable goods manufacturing.

Most manufacturing industries entered the pandemic with a loss of employment. The nature of production work involves a lot of hands-on tasks and teamwork, and many jobs within this set of industries do not lend themselves to telecommuting arrangements. As workplace restrictions were lifted and modified, food manufacturers, wood product manufacturing and nonmetallic mineral product manufacturing began to rebound in response to demand for food and construction materials. Other manufacturing industries, led by aerospace, continued to see employment drop until late into the pandemic. As a whole, manufacturing industries together lost an estimated 37,700 jobs – a drop of nearly 13.0 percent from the beginning of the pandemic to June 2021. This trend primarily reflects the influence of the aerospace component.

Before the pandemic was even a concern, Washington's aerospace industry was already working through challenges related to the Boeing 737 Max. These challenges were compounded when the pandemic hit. International travel restrictions and domestic concerns about travel during a pandemic essentially grounded the airline industry, leading to withdrawn orders for aircraft. The Boeing Company and many regional suppliers downsized their workforce over the course of 2020 and 2021 in response. The Boeing Company issued its first of several Worker Advisory Retraining Notifications (WARNs) with the state in July 2020.

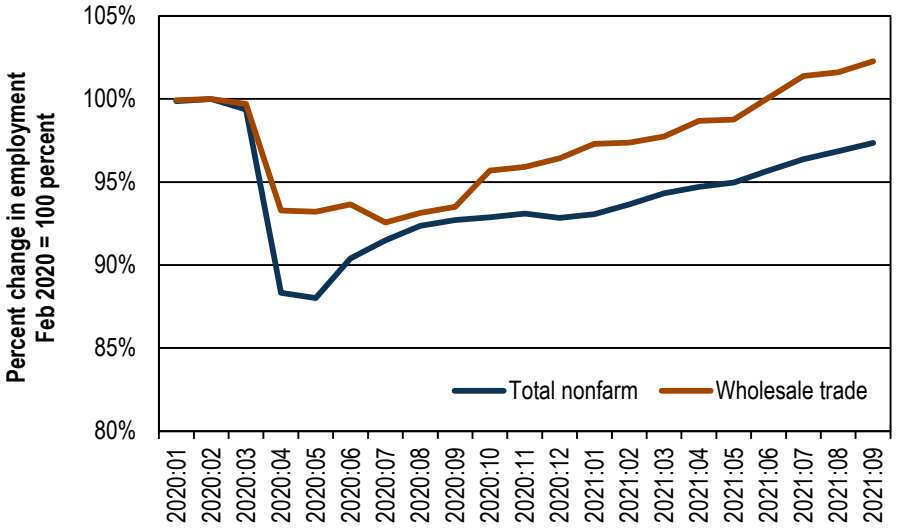
Although aircraft products and parts manufacturing suffered deeper losses than most, other durable goods manufacturers suffered similar setbacks. Fabricated metal product manufacturing, machinery manufacturing and computer and electronic product manufacturing all saw deep employment losses that have yet to turn the corner.

Nondurable goods manufacturers experienced the pandemic differently. Printing and related support activities suffered deep losses as demand for printed materials diminished with office work going online. The drop was swift, and has not shown any signs of reversal to date. Employment at food manufacturing industries fluctuated over the year, but never fell below 90.0 percent of the pre-recession level. Despite risks associated with COVID-19 in an in-person work environment, demand for food products kept the industry afloat.

Wholesale trade

Wholesale trade facilitates the connection between goods producers and goods suppliers. Wholesale trade was worth about $38.5 billion to the Washington economy based on GDP in 2020. Wholesale trade employed an average 128,791 Washington workers (about 4.0 percent) in 2020 and contributed $11 billion in total wages. Workers, on average, brought home $87,326 in annual wages.

Figure 2.7. Pandemic employment trend: wholesale trade
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Wholesale trade has recovered from pandemic-related employment losses.

Wholesale trade, as a whole, exhibited a similar pattern of rapid decline and gradual growth as total nonfarm employment. An early drop impacted merchant wholesalers of durable and nondurable goods – each fell approximately 6.0 percent – and expanded from there. As of September 2020, merchant wholesalers, nondurable goods, was 3.0 percent above the pre-recession peak. Merchant wholesalers, durable goods were nearly 1.0 percent above the pre-recession tally. Electronic markets and agents and brokers, a smaller subset, saw a great deal of volatility during the pandemic, experiencing deep losses during summer 2020, followed by an equally swift recovery in October 2020, and growth to the present.

Retail

Retail trade is a collection of industries that is as diverse as the products each sells directly to consumers. Accordingly, the pandemic affected retailers differently depending on variables including the nature of products sold, mode of delivery (e.g., in person versus online shopping) and policies that classified retailers as essential or non-essential. As large segments of the workforce swapped dress shoes for slippers, apparel and accessories sales and employment dropped. At the same time, online retail thrived for consumers that were increasingly unable or unwilling to leave home during the pandemic. Grocery stores saw increased (non-taxable) business as people prepared meals at home in lieu of eating out. In Washington, the retail industry includes an unusually large online presence as well – a reminder that retail includes a workforce that ranges from cashiers and stockers to delivery drivers and software engineers.

Early in the pandemic, retailers' experiences quickly diverged. Even before COVID-19 restrictions were put into place, foot traffic at in-person retail establishments slowed, as consumers exercised caution around gathering with others. The early policy response assigned "essential" and "non-essential" status to retailers based on the goods and services they provided, combined with capacity restrictions in order to slow the spread of the Novel Coronavirus. As the pandemic wore on and recession transitioned into recovery, consumers and retailers alike shifted modes of operation as they quickly gained familiarity with online ordering, curbside delivery and other innovative solutions. Evidence of the pandemic, policy around the pandemic, and innovative adjustments are evident in multiple datasets.

Consumer retail shifted substantially during the pandemic. While retail, as a whole, weathered the storm relatively well, the experience of retailers varied substantially by retail niche. Comparing taxable retail sales in second quarter 2019 with second quarter 2020, the deepest proportional losses were observed in apparel and accessories and in furniture and home furnishing, which lost 50.1 percent and 28.0 percent of retail sales respectively. Businesses such as apparel and furniture were labeled "non-essential" during the early days of the pandemic and were impacted by consumers' decisions to stay home to reduce the spread of the Novel Coronavirus, and policy designed to do the same.

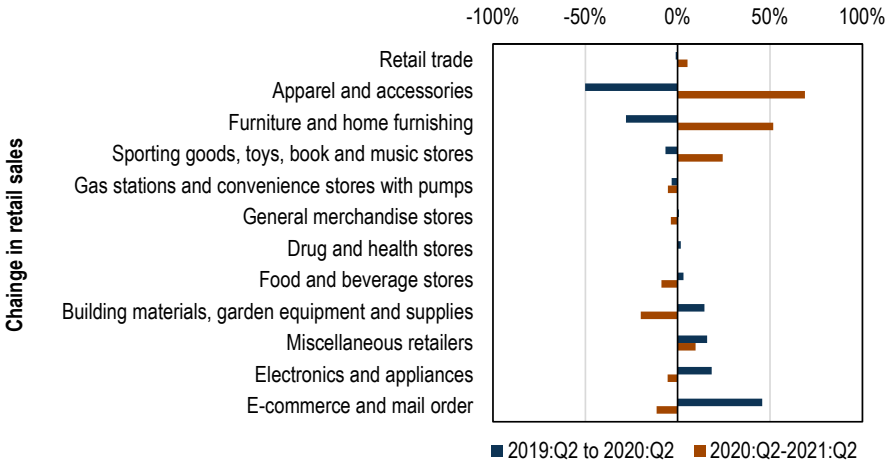
Not all retailers were negatively impacted. Indeed, e-commerce thrived during the early days of the pandemic, as did electronics and appliances. E-commerce, which had been growing in market share for years, flourished early in the pandemic, as homebound consumers shifted from in-person shopping to online retail. E-commerce and mail-order retailers saw a 45.8 percent increase in taxable sales from second quarter 2019 to second quarter 2020. Electronics and appliances and building materials,

garden equipment and supplies also benefitted from early pandemic responses, as consumers spent more time at home and invested in their living (and now working from home) spaces.

Taxable retail sales

From second quarter 2020 to second quarter 2021, many of the retail shifts observed in taxable sales shifted back somewhat. The sectors that had lost the largest share of sales at the beginning of the pandemic began to recover. Apparel and accessories saw a 68.9 percent increase in sales, furniture store sales increased by 51.7 percent over the year, and sporting goods, toys, books and music stores increased sales over the year. Some retailers that experienced large relative gains in the early pandemic saw decreased sales later on. E-commerce dipped somewhat, as people began to venture out of their houses for some of their shopping again, and building materials, garden equipment and supplies decreased sales by 19.9 percent from second quarter 2020 to second quarter 2021.

Figure 2.8. Change in taxable retail sales by industry
Washington state, second quarter 2019 through second quarter 2021
Source: Washington State Department of Revenue; Taxable retail sales



Some retailers that experienced large relative gains in the early pandemic saw decreased sales later on.

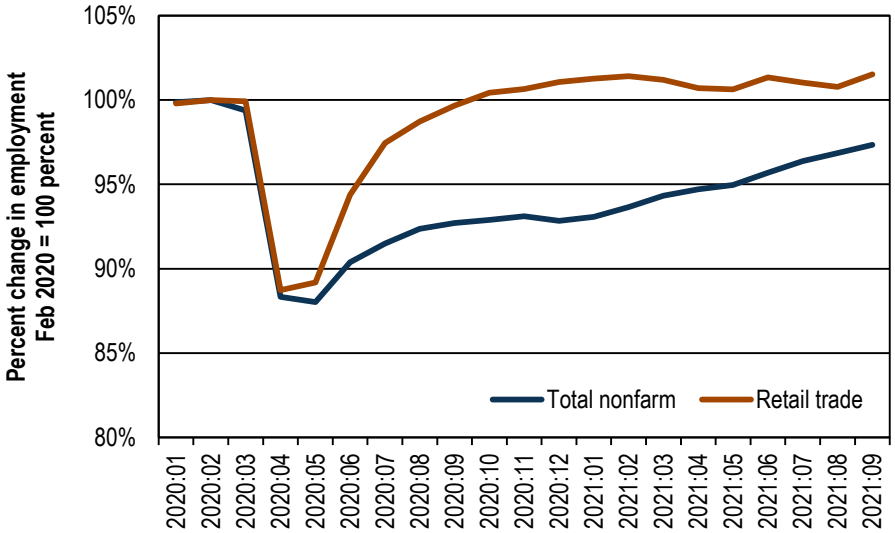
Employment and wages in retail

Retail trade is one of the largest sectors in Washington's economy, both in terms of GDP and in terms of headcount. In 2020, Washington retailers employed an average of nearly 380,000 workers, representing 11.7 percent of all jobs in the state. The retail workforce is occupationally diverse, and

the average wage is lower than the statewide average due to a relatively large low wage workforce. Wages paid to workers in retail trade exceeded $27 billion in 2020, making up 10.8 percent of direct wages.

The average annual wage paid to retail workers in 2020 was $71,398, up 14.0 percent over the year from $62,264 (un-adjusted). Of course, there are many dynamics at play beneath the surface. Within retail trade, there is a wide range of wages by occupation and industry niche. Average annual wages range from below $20,000 for some retail industries to nearly $200,000 in "other retail" – a collection of retail industries that includes online retailers.

Figure 2.9. Pandemic employment trend: retail trade
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Employment in retail trade recovered more quickly than most industries.

Retail trade employment as a whole suffered an early blow by the pandemic, but has recovered based on a total headcount. The sector lost an estimated 42,900 jobs during the pandemic recession, but by September 2021, had added back an estimated 48,900 jobs. By September 2021, most retail industries had returned to pre-pandemic levels of employment, however significant differences remain between different niches.

The industry-specific employment story is similar to that revealed in their sales. Food and beverage stores – an essential retail industry – added jobs throughout the pandemic. Building material and garden supply stores, other retail (including online retail), health and personal care stores, and general merchandise stores recovered more quickly than many. By contrast, clothing

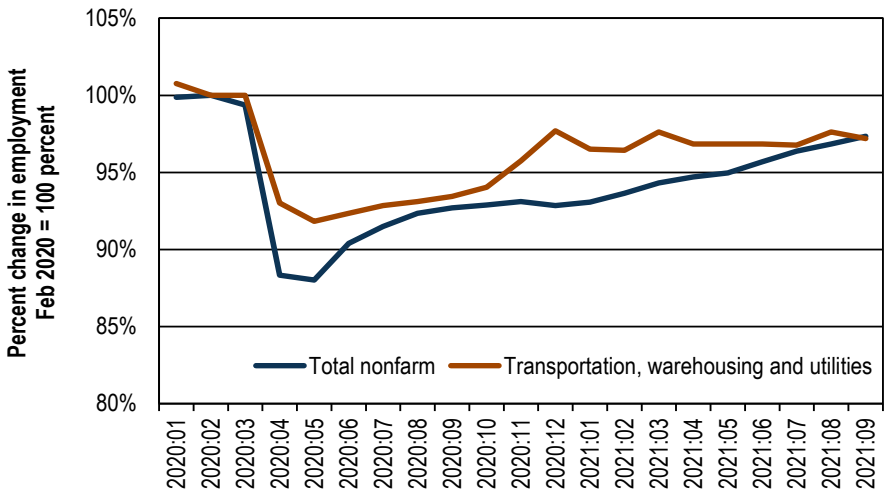
and clothing accessory stores fell the farthest (down 61.0 percent in May 2020), and has taken the longest to recover. Furniture and home furnishing stores and motor vehicle and parts and dealers have also struggled to return to pre-pandemic levels of employment.

The combination of booming online business and the ability to work from home kept some retailers humming through the pandemic economy. A large portion of the tech-savvy workforce in online retail packed up their computers and worked remotely. Other retail sectors that have recovered to pre-recession levels of employment include food and beverage stores, building material and garden supply stores, health and personal care stores, and general merchandise stores. Retailers that continue to struggle include clothing and clothing accessory stores (still down nearly 18.0 percent compared to February 2020), furniture and home furnishing stores (down 16.0 percent) and motor vehicle and parts dealers (down 5.0 percent).

Transportation and warehousing

Transportation and warehousing can be thought of as the industries that connect and move people and things from one place to another in a complex economic system. Without transportation and warehousing, the consumer economy would come to a standstill. Transportation and warehousing as a whole contributed nearly $13 billion to Washington's economy in 2020.

Figure 2.10. Pandemic employment trend: transportation, warehousing and utilities
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Transportation, warehousing and utilities employment has yet to return to pre-pandemic levels.

Truck transportation dropped by nearly 7.0 percent from February to May 2020, but recovered relatively quickly, as online shopping took off and supply chains began to adjust to the situation. From an employment perspective, truck transportation was fully recovered as of November 2020, and continues to expand. As of September 2021, the industry is now 5.0 percent larger than it was when the pandemic began.

Warehousing was one of the few industries that never experienced a significant downturn in the early months of 2020. Warehousing exhibited a steady pattern of growth throughout 2020 and 2021, expanding by about 5.0 percent from the start of the pandemic to September 2021.

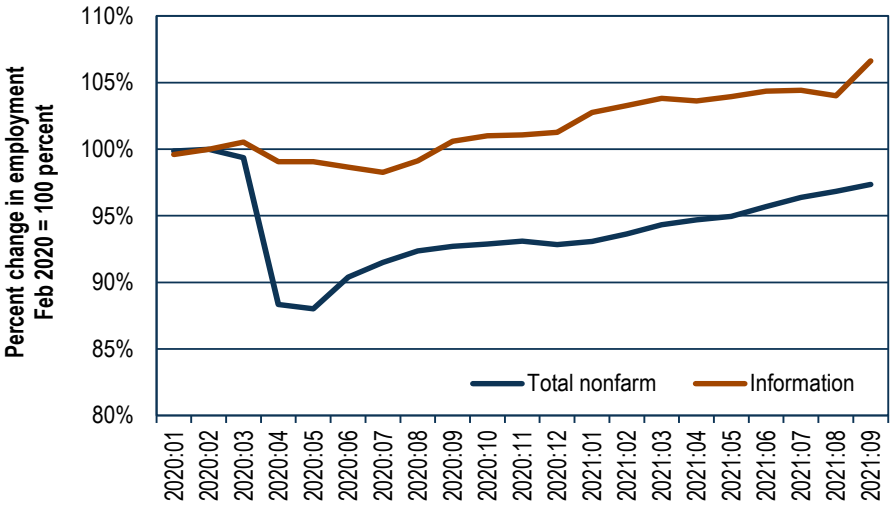
One part of the industry did, essentially, come to a standstill during the pandemic: air transportation slowed significantly as passenger air traffic was impacted by international travel bans and domestic restrictions on travel, as well as general concerns around the role of transportation in spreading COVID-19. Support activities for transportation (many of which are closely connected to air travel) also suffered deep losses in 2020 and 2021.

Information

Information refers to a collection of industries that are directly involved in the publication and dissemination of information. In Washington, the industry includes everything from software publishing to print media and broadcasting to movie theaters and data processing centers. Washington is notably home to a large and growing software publishing industry, centered in the Seattle area. While not all technology-sector employment is attributable to the information sector, a large portion is, by many measures.

In addition to a rapidly growing and significant contribution to the state GDP, the information industry demands a highly skilled workforce that is generally well compensated. In 2020, employers in the information industry collectively paid nearly $36 billion in direct wages, or 14.3 percent of total wages paid that year. Compare this to the size and share of the workforce. Despite representing more than 21.0 percent of Washington's GDP, the workforce represented 4.6 percent of the total covered workforce. The average wage for workers in the information industry in 2020 was $241,913. Compare to an annual wage of $76,801.

Figure 2.11. Pandemic employment trend: information
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



In 2020, employers in the information industry collectively paid nearly $36 billion in direct wages, or 14.3 percent of total wages paid that year.

Employment in the information sector has been characterized by sustained high growth. From 2014 to 2019, annual growth averaged 5.7 percent per year, compared to total covered average employment growth of 3.9 percent over the same time period.

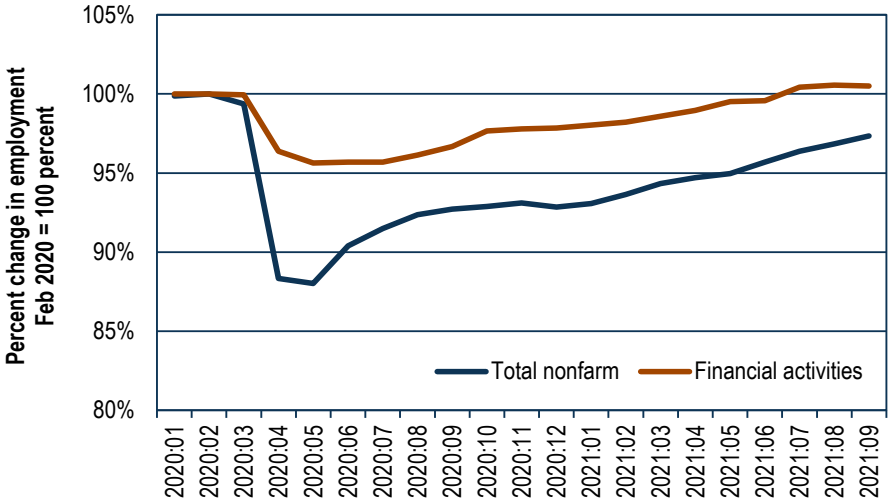
High employment growth has led to the Seattle area establishing itself as a well-known technology hub. As of first quarter 2021, Washington had the highest concentration in the nation for information-sector employment. The second-highest concentration of information industry employment was in California; despite being home to both Silicon Valley and Hollywood.

The information sector was generally well-positioned to weather the storm brought on by the COVID-19 pandemic. Businesses and workers were able to quickly adapt to telecommuting arrangements, insulating the industry from resorting to layoffs. The industry was also well-positioned to take advantage of the technology and communication needs brought on by the pandemic. Employment in the information industries dipped by about 2.0 percent in early 2020 and quickly adjusted course, recovering by September 2020. Within the collection of industries, software publishing never missed a beat. As of September 2021, the information industry employed an estimated 159,100 workers.

Financial activities

In 2020, financial activities made up 2.9 percent of the covered workforce and 4.3 percent of total wages. This translates to a relatively high average wage. The average annual wage for workers in this collection of industries was $113,556 compared to the annual wage for all industries at $76,801.

Figure 2.12. Pandemic employment trend: financial activities
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Employment losses in the financial activities sector were relatively low. Employment is back to pre-recession levels.

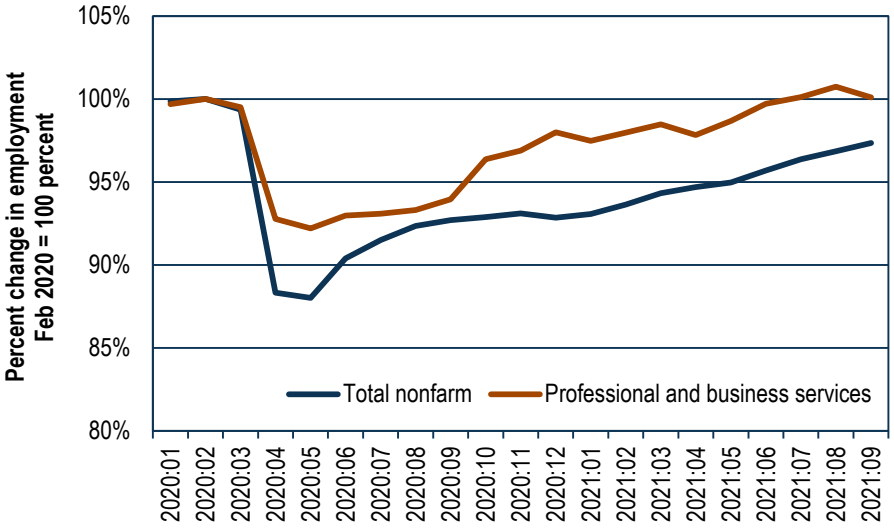
Employment in the financial activities industry has been relatively stable before and throughout the pandemic, lagging behind the growth rate for total employment. From 2014 to 2019, average annual employment growth was 1.9 percent. Employment in real estate and rental and leasing dropped by about 10.0 percent in the first months of the pandemic and has gradually been recovering. As of September 2021, employment in real estate was about 1.0 percent shy of the level observed in February 2020. Finance and insurance dipped by only about 1.0 percent early in the pandemic, and reached pre-recession levels by the end of 2020.

Professional and business services

Professional and business services includes a variety of professional and technical services such as accounting and engineering services. It also includes administrative support and management services and supports day-to-day business operations with services such as housekeeping and temporary employment services. In short, these are the businesses

that provide operational support to others in the business community. This eclectic set of businesses is an economic powerhouse for the state. Together, these services contributed nearly $64 billion to Washington's economy in 2020. This represents the fourth-largest contribution at a broad industry level.

Figure 2.13. Pandemic employment trend: professional and business services
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Many jobs in professional and business services could be done remotely. The industry has recovered the total number of jobs lost during the pandemic.

The umbrella covers three sets of businesses: professional, scientific and technical services; management of businesses and enterprise; and administrative support and waste management and remediation services. Over the past several years, the fastest growing category of industries within professional and business services has been professional, scientific and technical services. In 2020, the contribution to GDP from professional, scientific and technical service providers made up 63.5 percent of the total GDP contribution for professional and business services. Management of companies and enterprises made up 36.6 percent of the total contribution, and administrative and support and waste management and remediation services contributed 25.0 percent.

Professional, scientific and technical services includes a large range of technically focused industries. In Washington, the top three contributing industries from an employment perspective in 2020 were computer systems design services (34,378 jobs), engineering services (23,316 jobs), and custom computer programming services (21,020 jobs). All other

breakouts – ranging from legal offices to research labs – were also well represented, but the concentration in computer-related activities and engineering reinforces and reflects some of the economic strengths of the state's unique labor force and industry make-up.

During the pandemic, many of the jobs in professional, scientific and technical services were insulated from the effects of the pandemic, as they could be done remotely. Furthermore, many of the computer-related services likely faced increased demand as businesses set up telecommuting arrangements and found new ways to utilize technology as a stand-in for face-to-face interactions. This set of industries lost only 2.8 percent of jobs (300 in all) from the pre-pandemic peak to March 2020. By November 2020, employment was back to the pre-recession level. As of September 2021, employment is up 5.5 percent.

Jobs in professional, scientific, and technical services tend to be highly skilled and highly educated on average. They also tend to be well-reimbursed. In 2020, this set of industries made up an estimated 6.5 percent of total jobs, and earned an estimated 9.4 percent of total distributed wages. The average wage was $111,944, increasing $8,009 over the year.

Management of business and enterprise was somewhat insulated from the pandemic early on, but the size of the workforce contracted over time. As of September 2021, the industry has shed 4,000 jobs or 8.8 percent relative to February 2020.

Jobs in management of business and enterprise also tend to be well-paid. The average annual wage for workers in this industry was $129,043 in 2020. Over the year, the average wage increased by $5,535.

Administrative and support and waste management and remediation is a set of industries broken into two parts: Administrative and support services support day-to-day operational services ranging from employment services to call centers and collection agencies, to building security and janitorial services and more. Administrative and support services were swiftly impacted by the pandemic, shedding about 15.0 percent of employment as a whole early in the pandemic. As business began to return to buildings, so did the need for administrative and support services. Employment services, such as temporary help services, plummeted in the early days of the pandemic, but has seen a relatively quick recovery as employers struggle to fill open positions. Waste management and remediation services include waste collection, treatment, disposal and remediation. In many ways, they resemble utilities. Accordingly, employment tended to be fairly stable over the course of the pandemic.

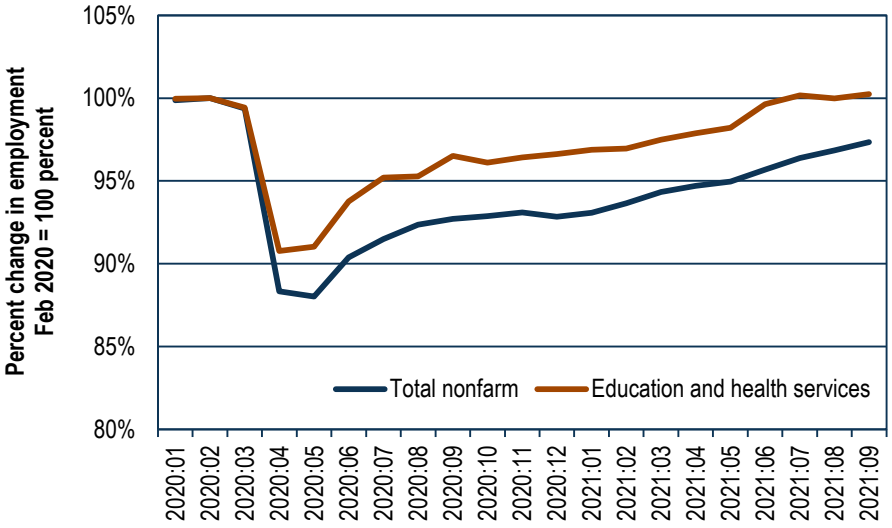
Jobs in administrative and support and waste management and remediation tend to be less lucrative than jobs in the other two categories of professional and business services. The average annual wage for workers in this collection of industries was $57,081. Wages increased over the year, but still fell shy of the average wage for all industries in 2020 ($76,801).

Educational services, health care and social assistance

Educational services, health care and social assistance is the seventh-largest set of industries in terms of GDP – in 2020, this collection of activities contributed $38.5 billion to the state economy – about 6.4 percent of total GDP. In terms of employment, these human service-focused industries have a larger footprint than GDP alone would suggest. This is the second-largest set of industries behind government, making up 14.3 percent of total employment in 2020 with nearly 467,000 jobs. Wages paid to workers in education, health care and social assistance totaled more than $26 billion, averaging $55,705 per worker.

Although educational services and health care are often thought of as "recession-proof" industries, the arrival of a global pandemic tested the limits of this theory. Employment dropped swiftly at the start of the pandemic as educational and medical needs shifted, and social distancing measures went into effect. Of course, the impacts of the pandemic differed from one activity to another.

Figure 2.14. Pandemic employment trend: education and health services
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Education and health services dipped by more than 9.0 percent early in the pandemic.

Educational services, in this case, is defined as private sector education. Public education including school districts and public colleges and universities are classified within government for the purposes of this report. Private educational services includes private schools, colleges and training programs, ranging from holistic education programs to targeted skills development such as cosmetology school, flight training, driver education, sports and recreation training and more. At the start of the pandemic, educational services employed an estimated 65,600. By May 2020, the estimated tally of jobs dropped by 14,100 or 21.5 percent. Employment climbed back, fluctuating with social distancing requirements and COVID-19 levels. Employment levels reached their pre-recession equivalent in June 2021. The average annual wage for workers in private sector educational services was $44,594 in 2020, up from $40,223 (not adjusted) compared to 2019.

Health care and social assistance includes easily identifiable health care institutions such as hospitals, medical practitioners' offices and nursing homes. It also includes social assistance services such as senior centers, child care centers, community food services and shelters. Health care and social assistance workers, on average, brought home $56,771 in 2020.

Ambulatory care services refers to offices of physicians, dentists, and other health care practitioners, health clinics, medical labs, etc. These are (usually) where people seek medical care in non-emergency health care situations. This is also where the largest number of health care jobs are found. As social distancing measures were put into place, offices were closed to non-essential services such as routine health appointments. From February to May 2020, ambulatory care services dipped by 24,800, or 15.0 percent, before a sharp rebound that brought employment back to 95.0 percent by July 2020, and back to pre-recession levels by August 2021.

Employment at hospitals held relatively steady throughout the pandemic. Some activities shifted in order to prioritize care of COVID-19 patients, such as postponement of elective surgeries, but in all, employment levels have generally hovered just two percentage points below pre-recession levels. There are concerns in the industry that the stresses introduced during the pandemic have already and could continue to result in burnout and hinder employment retention and growth.

Arguably, nursing homes and residential care facilities were the first industries impacted by the COVID-19 pandemic. The first major outbreaks in Washington state were linked to nursing homes. Obviously, the most important impacts were on the health and lives of residents and workers. Focusing on the employment situation is by no means intended to overshadow the true impact, but is in line with the scope of this report.

Employment in nursing and residential care has fallen throughout the pandemic, even as other industries have shown signs of recovery. As of September 2021, employment was down 11.1 percent, and still falling.

Social assistance programs suffered a minor impact early in the recession, dropping by about 5.0 percent in the first couple of months of the pandemic. In the face of increased need, employment expanded quickly, exceeding pre-recession levels by October 2020. Within this set of industries, specific needs have shaped the pattern of recovery. Increased acute community need led to increased employment at community food services and temporary shelters over the course of 2020 and into 2021. Employment in services for elderly and disabled people also expanded throughout 2020 and into 2021. The deepest employment losses in social assistance were observed in child day care centers. In light of stay-at-home orders and physical distancing requirements, child care services dropped by nearly 30.0 percent from February to May 2020, and saw little recovery throughout the remainder of the year. The most recent detailed data available indicates that child day care services were still down nearly 14.0 percent from pre-recession levels as of March 2021.

The stories reflected in nursing and residential care facilities and child care services underpins some of the challenges that are being confronted by employers throughout Washington. The pandemic disproportionately impacted families with young children and those who have taken on the responsibility of caring for older relatives. The labor shortage is partially a result of conflicting responsibilities between work and home.

Leisure and hospitality

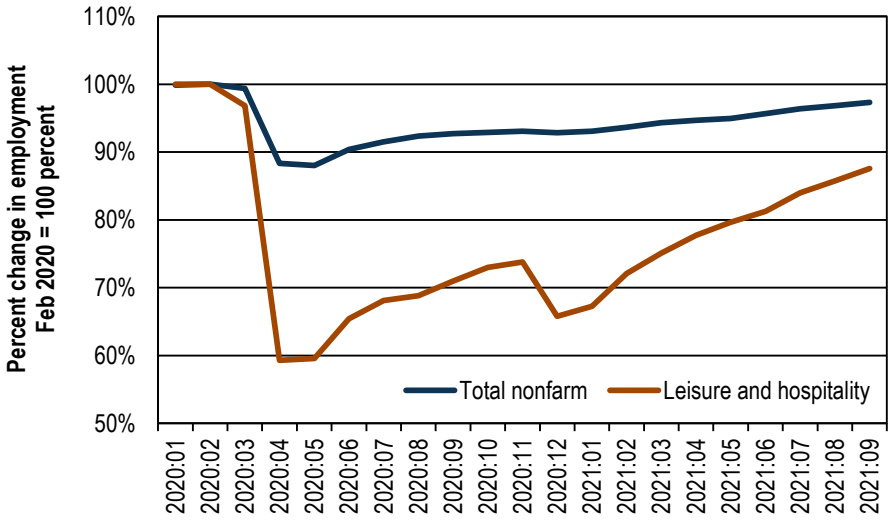
Leisure and hospitality is the sector that feeds, hosts, and entertains Washingtonians and visitors alike. The largest number of businesses and jobs is in the restaurant industry. However, hotels, stadiums, museums, convention halls, etc., also fall within this umbrella industry. Nationally and locally, this was the set of industries that was impacted to the greatest extent by the pandemic itself and by policy ranging from local capacity requirements to international travel prohibitions.

In 2020, the collection of industries that make up the leisure and hospitality sector (arts, entertainment, recreation, accommodation and food services) contributed nearly $16 billion to Washington's GDP. This is more than $6 billion (28.0 percent) lower than 2019.

Leisure and hospitality (arts, entertainment and recreation and accommodation and food services) made up nearly 8.0 percent of total employment in 2020, (a steep drop from 10.0 percent the year before), and workers brought home nearly 3.0 percent of total wages, earning an

average wage of $26,661. Putting this into perspective, with 8.0 percent of total employment, leisure and hospitality is one of the largest sectors in Washington. Prior to the pandemic, this sector provided an estimated 350,200 jobs.

Figure 2.15. Pandemic employment trend: leisure and hospitality
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Employment losses in leisure and hospitality were the deepest of any sector. As of September 2021, the sector is still down more than 10.0 percent relative to February 2020.

The pandemic hit the leisure and hospitality sector swiftly and to a greater extent than any other major industry sector. Hotels saw rapidly declining demand with international travel restrictions. Restaurant dining rooms and bars were closed by policies intended to reduce contagion, and later worked through capacity restrictions and changing customer consumption patterns. From February to May 2020, leisure and hospitality experienced a net loss of more than 40.0 percent of all jobs in the sector – 142,500 jobs were lost on either a temporary or permanent basis.

Following the steep drop in employment, businesses innovated new methods of service delivery ranging from curbside delivery, online ordering, and outdoor dining to virtual museum tours and online concerts. Despite a steep recovery curve, the hole that this set of industries experienced was so deep that as of September 2021, leisure and hospitality is still down 12.0 percent compared to February 2020.

Even within leisure and hospitality, impacts differed by type of activity. With the onset of travel restrictions at an international scale, hotel reservations were canceled en masse. Employment at hotels and other

accommodations dropped by more than 50.0 percent during the pandemic recession. As of September 2021, employment remains more than 20.0 percent below pre-recession levels. Arts, entertainment and recreation venues experienced a similar magnitude of loss and a similarly challenging recovery. While restaurants and bars did not experience the same proportional depth of losses, the number of jobs lost was monumental. Employment dropped by 36.0 percent, which amounts to more than 93,000 jobs lost statewide.

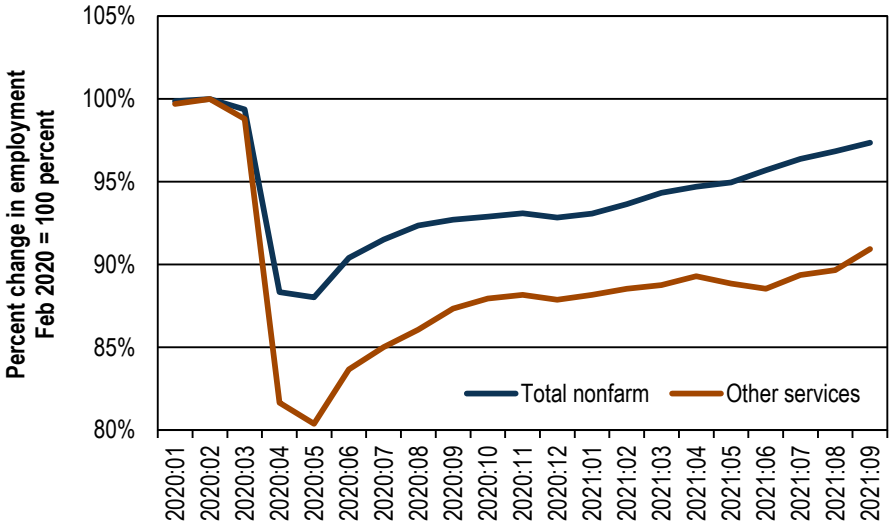
Employment and GDP losses tell part of the story, but consumer spending provides another viewpoint on the situation. Fundamentally, economics is about the decisions that people make every day. The service provided by restaurants and bars is not only entertainment, but food. Consumers substituted visits to their favorite restaurant for a larger grocery cart. Consumer spending[15] at grocery stores increased by about 20.0 to 30.0 percent throughout the pandemic, mirroring deep declines in spending at restaurants and hotels – down about 70.0 percent at the start of the pandemic, but recovering over time. By summer 2021, spending at restaurants and hotels had periodically risen to pre-recession levels, assisted by vaccine uptake, relaxation of physical distancing policies, government stimulus, and inflation.

Other services

Other services is a collection of industries that include repair and maintenance, personal care and laundry, religious and grantmaking activities, social and professional organizations, and private households. It is, by some measures, an odd collection of services. Other services contributed about $10.8 billion to the state GDP in 2020. This is down about $1 billion from 2019. Similarly, to leisure and hospitality, many activities classified within the umbrella of other services depend on in-person activities and transactions that cannot be done remotely.

[15] TrackTheRecovery.org, Affinity Solutions "change in average consumer credit and debit card spending indexed to January 4-31, 2020 and seasonally adjusted…."

Figure 2.16. Pandemic employment trend: other services
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Other services dropped by 20.0 percent at the start of the pandemic.

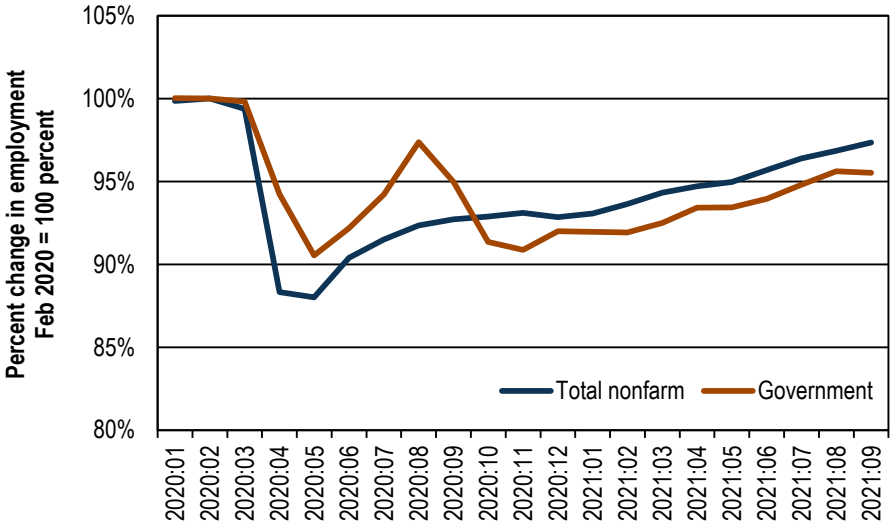
As a whole, employment in other services dropped by about 20.0 percent at the start of the pandemic. Recovery has been relatively slow when compared to other sectors. As of September 2021, the employment tally for other services remains 10.0 percent below the level observed at the start of the pandemic, and none of the three major sub-categories (repair and maintenance, membership associations and organizations, and personal and laundry services) has reached pre-pandemic employment levels. However, the deepest losses were felt within personal and laundry services, which includes hair and nail salons, pet care services and more. Personal and laundry services employment fell by nearly 65.0 percent from February to May 2020. As restrictions were lifted, employment rebounded to about 80.0 percent of normal, but has stubbornly remained nearly 20.0 percent below pre-recession levels, as people have shifted their routines.

With average annual employment below 90,000 in 2020, other services made up 2.7 percent of total employment in 2020. Employers paid nearly $4.2 billion in wages, averaging an annual wage of $46,667 per worker – an average increase of $4,083 over the year.

Government

Employment and wage data for government workers do not include military institutions, but do include all other state and local components, and most civilian federal employment. Because of the variety and size of institutions included in this sector, government employment makes up the largest proportion of jobs in the state, as well as for most locations throughout the state. In 2020, civilian government employment made up 16.8 percent of covered jobs in the state and distributed 15.8 percent of total wages. The average annual wage for government employees in 2020 was $71,849. This was up 7.3 percent over 2019 and was slightly below the average annual wage for the average of total employment ($76,801). Non-military employment in Washington made up 16.8 percent of covered jobs and 15.8 percent of total wages.

Figure 2.17. Pandemic employment trend: government
Washington state, January 2020 through September 2021
Source: Employment Security Department/DATA Division; Washington Employment Estimates



Government employment is still down about 5.0 percent relative to the pre-pandemic peak.

A large portion of civilian government jobs shifted to an online format, particularly when K-12 and higher education institutions are taken into consideration. This had an insulating effect for office-based positions and instructional jobs, but left building-based staff and transportation staff exposed to job loss. As a whole, the sector dipped by nearly 10.0 percent from February to April 2020, and began to recover in fall 2020. By September 2021, government employment was still down a little less than 5.0 percent from the pre-recession peak.

Conclusion

In any recession, a major economic disruption impacts industries differently depending on the nature of the triggering event. In 2020, the global COVID-19 pandemic exposed industries that rely on face-to-face interaction to the greatest extent. A year and a half later, industries such as leisure and hospitality and other services continue to struggle the current environment, while Washington's high tech and office-based industries are well on their way to recovery.

At the time that this chapter is being written, the pandemic is still present and influencing the ways in which people interact. Masks are still required for indoor gatherings, and concerns around COVID-19 infections continue to shape the human, economic, and policy environment. As a whole, the recovery has been swift, when considering the depth of the impact, but employment tallies remain below the pre-recession peak. Employment is expanding in most Washington industries at this point.

Chapter 3: Seasonal, structural and cyclical industry employment

The purpose of this chapter is to identify the most influential factors affecting employment trends for different industries in Washington state, based on administrative data. The results are important for both providing a better understanding of current employment trends and for practical applications such as job placement, unemployment insurance and training programs. Annually, for instance, industries with high levels of seasonality experience significant variation in monthly employment. With this monthly variation, short-term high job demand follows upon employment declines. For industries with high cyclical variation, periods of booming employment can be followed by periods of decline. Training programs should be developed in anticipation of such employment variation.

We also analyzed the relationships between industry and total state employment (*Appendix 2*). The results of this analysis can help create a better understanding of the key components of state employment trends.

Our analysis is based on historical employment data from January 2002 through December 2020.[16] The analysis splits industry employment trends among the following four components:

1. **Seasonal:** regular and predictable employment changes that recur each calendar year, caused by seasonal factors, which can include natural factors (changes in weather), administrative measures (starting and ending of the school year) and social, cultural or religious traditions (fixed holidays such as New Year's Day).

2. **Trend:** shifts in long-term employment growth trends driven by fundamental structural change and productivity trends in industries, rather than the cyclical fluctuations in employment. Structural changes in employment can be initiated by productivity improvement, policy changes or permanent changes in resources, technology or society. Technological innovation has introduced entirely new industries and caused other industries to decline. In addition, it has reshaped the entire labor market through increased efficiencies, such as automated manufacturing, data collection and analysis and communications.

3. **Cyclical:** employment changes attributed to the business cycle in general or specific events such as the housing bubble bursting in 2007, cyclical variation in aerospace employment or the economic impact from the COVID-19 pandemic during 2020.

[16] Historical data for employment covered by the unemployment insurance system was categorized by NAICS (North American Industrial Classification System) code, at the 3-digit code level. Altogether, the historical time series data included 95 industries and one series for total employment.

4. **Irregular:** random employment changes not picked up by regular seasonal and cyclical components (e.g., non-regular seasonality, weather variation and labor strikes).

Seasonal industries

The analysis this year showed that of 95 industries in Washington state, 18 have high levels of seasonality with a seasonal factor[17] over 4.0 percent. Crop production, scenic and sightseeing transportation, and support activities for agriculture and forestry were the most seasonal industries (*Figure 3-1*).

Figure 3-1. Industries with high levels of seasonality
Washington state, 2002 to 2020
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Seasonal factor
111	Crop production	31.03%
487	Scenic and sightseeing transportation	20.29%
115	Support activities for agriculture and forestry	17.01%
525	Funds, trusts, and other financial vehicles	13.37%
213	Support activities for mining	11.52%
711	Performing arts, spectator sports, and related industries	9.99%
237	Heavy and civil engineering construction	7.25%
814	Private households	6.06%
114	Fishing, hunting and trapping	5.62%
492	Couriers and messengers	5.36%
721	Accommodation	5.18%
312	Beverage and tobacco product manufacturing	5.06%
316	Leather and allied product manufacturing	5.02%
519	Other information services	4.96%
448	Clothing and clothing accessories stores	4.83%
713	Amusement, gambling and recreation industries	4.31%
311	Food manufacturing	4.24%
512	Motion picture and sound recording industries	4.07%

Crop production, scenic and sightseeing transportation and support activities for agriculture and forestry have historically been the industries with the highest degree of seasonality in Washington state.

[17] See *Appendix 2* for seasonal factor definition.

Structural and cyclical industries

Annual totals of seasonal, irregular and cyclical components represent a statistically insignificant share of employment. Cyclical is balanced between years, while seasonal and irregular are balanced within a year. For annual trends, the combination of the trend and cycle components represents virtually all total employment changes.

For total covered employment, the trend component accounts for 63.8 percent of employment changes (*Appendix figure A2-2*). There were 14 industries where the structural (trend) component accounted for at least two-thirds of the change in employment (*Figure 3-2*). Ambulatory health care services, other information services, wholesale electronic markets and agents and brokers, and nonstore retailers were most highly influenced by the trend factor, and consequently influenced less by the cyclical factor. The trend component contributed relatively more to these four industries than to employment changes in total nonfarm employment. The remaining 91 industries have lower trend contributions than total nonfarm employment.

Figure 3-2. Industries most influenced by structural factors
Washington state, 2002 to 2020
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Structural factor
621	Ambulatory health care services	78.38%
519	Other information services	78.10%
425	Wholesale electronic markets and agents and brokers	76.61%
454	Nonstore retailers	75.20%
511	Publishing industries (except Internet)	75.20%
238	Specialty trade contractors	72.62%
236	Construction of buildings	71.45%
444	Building material and garden equipment and supplies dealers	70.69%
541	Professional, scientific and technical services	69.67%
452	General merchandise stores	68.55%
337	Furniture and related product manufacturing	67.85%
113	Forestry and logging	67.77%
312	Beverage and tobacco product manufacturing	67.35%
611	Educational services	66.11%

These Washington industries have been most influenced by structural factors such as technology changes, policy changes and changing demographics.

For 25 industries, the cyclical component accounted for more than half of the change in employment in the indicated industries (*Figure 3-3*). For total covered employment, the cyclical component accounted for 36.3 percent of total employment change. Support activities for mining, transportation equipment manufacturing, and oil and gas extraction were most highly influenced by the cyclical factor, and consequently less by the structural (trend) factors.

Figure 3-3. Industries most influenced by cyclical factors
Washington state, 2002 to 2019
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Cyclical factor
213	Support activities for mining	64.84%
336	Transportation equipment manufacturing	61.29%
211	Oil and gas extraction	60.88%
486	Pipeline transportation	60.45%
491	Postal service	57.71%
525	Funds, trusts, and other financial vehicles	56.99%
315	Apparel manufacturing	54.71%
324	Petroleum and coal products manufacturing	54.62%
221	Utilities	54.56%
316	Leather and allied product manufacturing	54.33%
114	Fishing, hunting and trapping	53.90%
111	Crop production	53.26%
485	Transit and ground passenger transportation	53.25%
332	Fabricated metal product manufacturing	53.04%
443	Electronics and appliance stores	52.38%
482	Rail transportation	51.88%
813	Religious, grantmaking, civic, professional and similar organizations	51.40%
331	Primary metal manufacturing	51.38%
483	Water transportation	51.09%
487	Scenic and sightseeing transportation	50.90%
562	Waste management and remediation services	50.72%
314	Textile product mills	50.70%
713	Amusement, gambling and recreation industries	50.49%
339	Miscellaneous manufacturing	50.19%
712	Museums, historical sites and similar institutions	50.11%

These Washington industries have been most sensitive to cyclical-factor movements and have exhibited shifts of relatively rapid employment growth and decline.

See *Appendix 2* for a description of the statistical methodology used to categorize and measure the major factors behind employment change by industries, and *Appendix figures A2-2* and *A2-3* with the full results of these analyses.

In summary, training providers and other planners should be aware that not every upswing in employment is an indication of an increase in demand. The upswing may simply be annual seasonal or cyclical fluctuations.

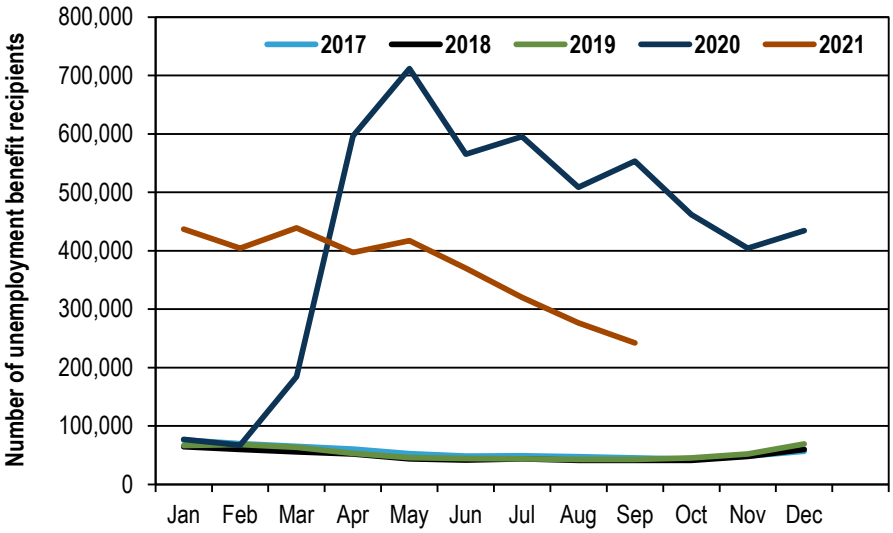
Chapter 4: Unemployment

This chapter discusses two important indicators of Washington's labor market: unemployment benefits and unemployment rates.

Unemployment insurance benefit recipients

In September 2021, more than 242,000 people received an unemployment benefit payment for all benefit entitlements. *Figure 4-1* shows the number of monthly beneficiaries in Washington state from 2017 through September of 2021 that received at least one payment of unemployment insurance (UI) benefits under regular unemployment compensation, pandemic unemployment assistance (PUA), pandemic emergency unemployment compensation (PEUC), or the extended benefits (EB) program. The number of beneficiaries in 2020 increased significantly starting in March 2020 with the COVID-19 pandemic. The number of paid claims increased by a factor of three in April 2020. The number of claimants receiving benefits peaked at 711,945 in May 2020. Since May 2020, the number of individuals receiving benefits in Washington state has decreased. In September 2021, the number was 242,000 claimants. The decrease in beneficiaries reflects factors including individual beneficiaries finding jobs, and less people being laid off and needing to apply for benefits.

Figure 4-1. Unemployment benefit recipients by month, all benefit entitlements[18]
Washington state, January 2017 through September 2021
Source: Employment Security Dept./DATA Division, Unemployment Insurance Data Warehouse



The number of Washingtonians receiving unemployment benefits as of September 2021 was 242,000.

[18] All benefit entitlement programs include regular unemployment compensation, pandemic emergency unemployment compensation (PEUC), pandemic unemployment assistance (PUA) and extended benefits (EB).

Unemployment insurance benefit payments

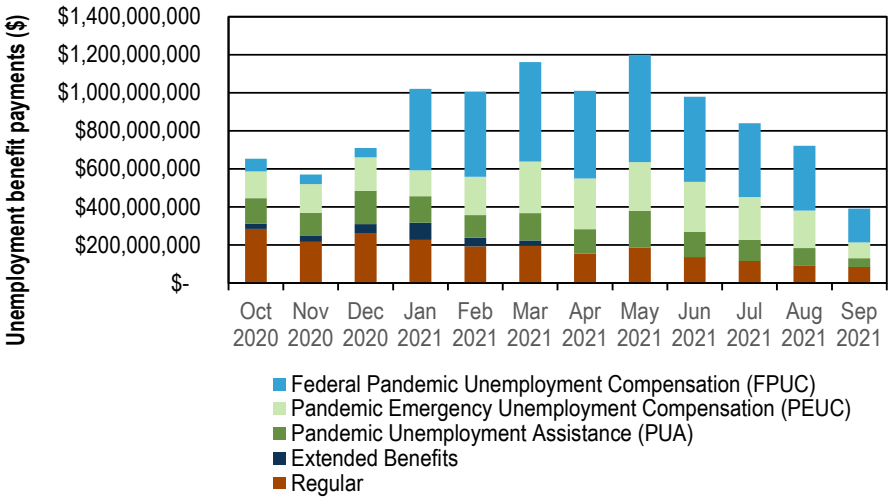
Typically, workers covered by unemployment insurance can receive up to 26 weeks of regular unemployment benefits in a 52-week benefit year. The 52-week benefit year begins when an individual applies for unemployment benefits.

Because of the unusually steep loss of jobs related to the COVID-19 pandemic, additional weeks of federally funded unemployment benefits were made available to unemployed workers after they used all of their regular unemployment benefits. Claimants could receive up to a total of 59 weeks of benefits – 26 weeks of regular benefits, 13 weeks of PEUC benefits and 20 weeks of EB. On December 13, 2020, federal law reduced the number of EB weeks available from 20 to 13. Then, due to the lower unemployment rate in Washington state, the EB program ended on March 13, 2021. Federal benefits extensions, included PUA and PEUC, expired on September 4, 2021.

The CARES Act was also signed into law on March 27, 2020. This established an emergency program to increase unemployment benefits for Americans who are out of work because of the COVID-19 pandemic, called Federal Pandemic Unemployment Compensation (FPUC). Under FPUC, eligible people who collect certain unemployment insurance benefits, including regular unemployment compensation, received an extra $600 in federal benefits each week through July 31, 2020. Under the Consolidated Appropriations Act and the American Rescue Plan Act (ARPA), FPUC was extended at a reduced rate, allowing unemployed individuals to receive an additional $300 per week through September 6, 2021.

Figure 4-2 shows the monthly unemployment insurance benefit payouts from October 2020 through September 2021 for all benefits payments, and includes regular benefits, FPUC, PUA, PEUC and EB benefits. From October 2020 through September 2021, ESD has paid more than $10.2 billion in unemployment benefit payments.

Figure 4-2. Unemployment benefit payments by month, all benefit payments[19]
Washington state, October 2020 through September 2021
Source: Employment Security Dept./DATA Division, Unemployment Insurance Data Warehouse



Monthly benefits payments for all entitlement programs peaked in May 2021 at $1.16 billion and are down to $390.2 million as of September 2021.

Benefit exhaustions have been increasing

Unemployed individuals exhaust their benefits when they have received all regular unemployment benefits, PUC and EB available to them. The following exhaustion analysis will focus on claimants that have exhausted regular benefits between October 2020 and September 2021. In March 2020, Congress passed the CARES Act (federal stimulus) which included several programs of benefit extensions to support unemployed workers, including PUA and PEUC. *Figure 4-3* shows the monthly exhaustions for Washington state regular unemployment benefits. The level of exhaustions of regular claims has been increasing steadily since March 2020 with the peak of regular benefit exhaustions occurring in September 2020 (60,158 regular benefit exhaustions). Since September 2020, exhaustions of regular benefits have been decreasing, with September 2021 exhaustions at 10,182 claimants.

[19] All benefit payments include regular unemployment compensation, pandemic emergency unemployment compensation (PEUC), pandemic unemployment assistance (PUA), federal pandemic unemployment compensation (FPUC) and extended benefits (EB).

Figure 4-3. Number of people exhausting regular unemployment benefits
Washington state, January 2010 through September 2021
Source: Employment Security Dept./DATA Division, Unemployment Insurance Data Warehouse

In September 2021, 10,182 people exhausted their regular unemployment benefits.

Benefit exhaustions by industry, occupation and area

Higher levels of benefit exhaustions are generally associated with long-term unemployment. The following figures detail patterns of benefit exhaustions by industry, occupation and location.

Exhaustions by industry

Figure 4-4 presents exhaustions by industry for the 12 months ending in September 2021. To provide further context, the figure also includes each industry's percent of total nonfarm employment and exhaustion-to-employment ratio. The exhaustion-to-employment ratio can be used to identify industries characterized by long-term unemployment that continue to struggle in their recovery. The larger the exhaustion-to-employment ratio, the more likely workers were to exhaust.

From October 2020 through September 2021, workers in the arts, entertainment and recreation sector, and the educational services sector, were most likely to exhaust regular unemployment benefits with an exhaustion-to-employment ratio of 20.0 percent and 14.9 percent respectively.

The accommodation and food services sector accounted for the greatest portion of regular benefit exhaustions at 15.9 percent. The manufacturing and construction industries' shares of total covered employment were

8.3 percent and 6.1 percent, respectively; the exhaustion-to-employment ratio for those sectors was 8.1 and 7.0, respectively. Health care and social assistance represented 8.2 percent of all exhaustions.

Figure 4-4. Unemployment regular benefit exhaustions by industry
Washington state, October 2020 through September 2021
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry sector	Annual exhaustions, regular benefits	Percent of all exhaustions	Industry share of nonfarm employment	Exhaustions-to-employment ratio
72	Accommodation and food services	27,555	15.9%	6.8%	12.5%
31 - 33	Manufacturing	21,685	12.5%	8.3%	8.1%
44 - 45	Trade	16,230	9.4%	11.7%	4.3%
62	Health care and social assistance	14,147	8.2%	13.1%	3.3%
23	Construction	13,955	8.1%	6.1%	7.0%
56	Administrative and support and waste management and remediation services	12,347	7.1%	4.9%	7.7%
48 - 49	Transportation and warehousing	8,582	5.0%	3.1%	8.5%
54	Professional, scientific and technical services	7,987	4.6%	6.5%	3.8%
71	Arts, entertainment and recreation	7,011	4.0%	1.1%	20.0%
42	Wholesale trade	6,670	3.8%	4.0%	5.2%
81	Other Services	6,657	3.8%	2.7%	7.5%
61	Educational services	6,104	3.5%	1.3%	14.9%
-	Unknown	5,322	3.1%	N/A	N/A
51	Information	5,318	3.1%	4.6%	3.6%
11	Agriculture, forestry, fishing and hunting	4,595	2.7%	3.0%	4.6%
53	Real estate, rental and leasing	3,346	1.9%	1.6%	6.4%
GOV	Government	2,778	1.6%	16.8%	0.5%
52	Finance and insurance	2,258	1.3%	2.9%	2.4%
55	Management of companies and enterprises	429	0.2%	1.3%	1.0%
22	Utilities	202	0.1%	0.2%	3.9%
21	Mining	83	0.0%	0.1%	4.0%
-	**Total**	**173,261**	**100.0%**	**100.0%**	**5.3%**

N/A = Nonfarm employment and does not include farmworkers, private households or non-profit organization employees. Exhaustion totals were not comparable to nonfarm employment totals. *The majority of workers in "unknown" industries were a product of out-of-state employers. Washington State Employment Security Department is unable to identify industries where the primary employer is out of state. NAICS is defined as the North American Industry Classification System used to classify business establishments.

Arts, entertainment and recreation workers were most likely to exhaust unemployment benefits from October 2020 through September 2021 (20.0 percent – exhaustion-to-employment ratio).

Exhaustions by occupation

Figure 4-5 examines regular unemployment benefit exhaustions by occupational group. Food preparation and serving related occupations accounted for the largest share of exhaustions between October 2020 and September 2021 at 14.2 percent. Along with management occupations and office and administrative support occupations, the three groups combined account for over 36 percent of all exhaustions. Since total covered employment is reported only by industry and not by occupation, each occupation's percent of total covered employment and exhaustion-to-employment ratio were not available to be included in *Figure 4-5*.

Figure 4-5. Unemployment regular benefit exhaustions by major occupational groups
Washington state, October 2020 through September 2021
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse

SOC	Major occupational group	Annual exhaustions, regular benefits	Percent of all exhaustions
35	Food preparation and serving related	24,547	14.2%
11	Management	22,113	12.8%
43	Office and administrative support	16,374	9.5%
53	Transportation and material moving	13,451	7.8%
51	Production	12,495	7.2%
47	Construction and extraction	12,445	7.2%
41	Sales and related occupations	11,140	6.4%
39	Personal care and service	7,030	4.1%
-	Unknown	6,796	3.9%
13	Business and financial operations	5,723	3.3%
17	Architecture and engineering occupations	4,752	2.7%
37	Building and grounds cleaning and maintenance	4,683	2.7%
15	Computer and mathematical	4,566	2.6%
49	Installation, maintenance and repair	4,536	2.6%
31	Health care support	4,177	2.4%
25	Education, training and library	3,805	2.2%
45	Farming, fishing and forestry occupations	3,591	2.1%
27	Arts, design, entertainment, sports and media	3,372	1.9%
29	Healthcare practitioners and technical	2,450	1.4%
33	Protective service	1,827	1.1%
21	Community and social services	1,321	0.8%
19	Life, physical and social science	1,116	0.6%
23	Legal	631	0.4%
55	Military specific	320	0.2%
-	**Total**	**173,261**	**100.0%**

Unemployed workers in food preparation and serving related occupations accounted for 14.2 percent of all individuals to exhaust regular unemployment benefits from October 2020 through September 2021.

Exhaustions by workforce development area

Figure 4-6 presents exhaustions by workforce development area (WDA) for October 2020 through September 2021. To provide further context, the figure also includes each industry's percent of total nonfarm[20] employment and exhaustion-to-employment ratio. The exhaustion-to-employment ratio can be used to identify areas characterized by long-term unemployment that continue to struggle in their recovery. The larger the exhaustion-to-employment ratio, the more likely workers were to exhaust.

From October 2020 through September 2021, workers in the Snohomish, Pierce County and Northwest Washington WDAs were most likely to exhaust regular unemployment benefits with exhaustion-to-employment ratios of 1.4, 1.2, and 1.1.

Seattle-King County and Snohomish County accounted for more than one-fourth of exhaustions at 30.7 and 11.7 percent, respectively. Seattle-King County's and Snohomish County's share of total covered employment was 41.7 percent and 8.5 percent, respectively; the exhaustion-to-employment ratio was 0.7 and 1.4, respectively.

Seattle-King County accounted for the largest share of exhaustions and employment with an exhaustion-to-employment ratio of 0.7.

Figure 4-6. Unemployment regular benefit exhaustions by workforce development area
Washington state, October 2020 through September 2021
Source: Employment Security Dept./DATA Division, UI Data Warehouse; U.S. Bureau of Labor Statistics, Qtrly. Census of Employment and Wages

Workforce development area	Annual exhaustions, regular benefits	Percent of exhaustions	2020 industry share of nonfarm employment	Exhaustions-to-employment ratio
Seattle-King County	53,166	30.7%	41.7%	0.7
Snohomish County	20,265	11.7%	8.5%	1.4
Out of state/unknown	19,677	11.4%	N/A	N/A
Pierce County	19,030	11.0%	9.3%	1.2
Northwest WA	9,091	5.2%	4.8%	1.1
Pacific Mountain	9,086	5.2%	5.6%	0.9
Spokane County	8,875	5.1%	6.7%	0.8
Southwest WA	8,718	5.0%	6.0%	0.8
South Central WA	7,026	4.1%	4.2%	1.0
Olympic	5,692	3.3%	3.7%	0.9
Benton-Franklin	5,325	3.1%	3.7%	0.8
North Central WA	4,913	2.8%	3.6%	0.8
Eastern WA	2,398	1.4%	2.2%	0.6
Total	**173,261**	**100.0%**	**100.0%**	**-**

Seattle-King County accounted for the largest share of exhaustions and employment and had an exhaustion-to-employment ratio of 0.7.

[20] All Nonfarm employment does not include farmworkers, private households or non-profit organization employees. Exhaustion totals were not comparable to nonfarm employment totals.

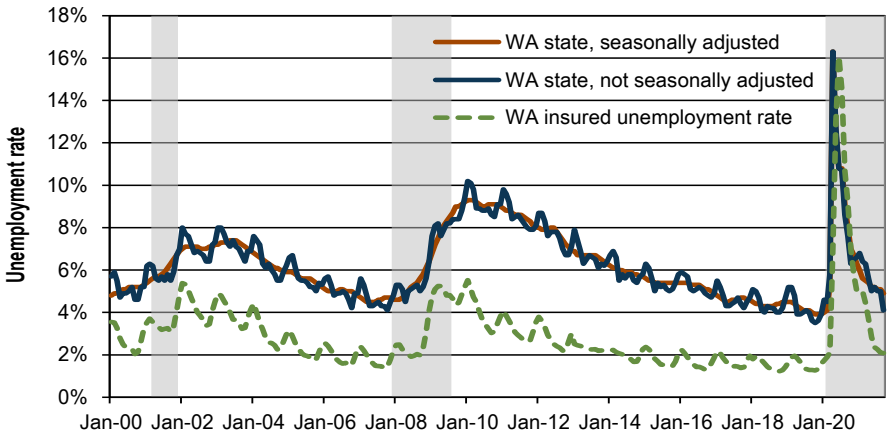
Unemployment rate

The overall unemployment rate is a ratio of the estimated number of unemployed individuals looking for work divided by the civilian labor force. The labor force is made up of individuals who are employed or who are actively seeking work. This is the most familiar unemployment rate and includes both workers covered by unemployment insurance and those who are not.[21]

Particularly in the context of a discussion about unemployment benefits, the insured unemployment rate can be useful. The insured unemployment rate is a ratio of the number of insured unemployed (those drawing unemployment benefits) divided by the total number of individuals (working and not working) covered by unemployment insurance.

Figure 4-7 compares the overall and insured unemployment rates for Washington. The rates have basically moved in tandem, with the insured rate historically about half the overall unemployment rate. In late 2008, both measures of unemployment began a dramatic rise, with rates peaking during first quarter 2010. However, since the onset of the COVID-19 pandemic, the gap between the overall and insured unemployment rates has narrowed. This means there were increasing numbers of unemployed workers eligible for unemployment benefits.

Figure 4-7. Overall unemployment rate, seasonally and not seasonally adjusted, and insured unemployment rate
Washington state, January 2000 through September 2021
Source: Employment Security Dept./DATA Division; U.S. Bureau of Labor Statistics, LAUS



Shaded areas are U.S. recession periods.

The gap between unemployed workers who are eligible for unemployment benefits and those who are narrowed following the most recent recession.

[21] Workers covered by unemployment insurance are unemployed through no fault of their own, as determined by state law. In order to qualify for this benefit program, they must have worked at least 680 hours in covered employment during the past 12 to 18 months. At least some of these hours must have been earned in Washington state. They must also be able to work and be available for work each week that they are collecting benefits.

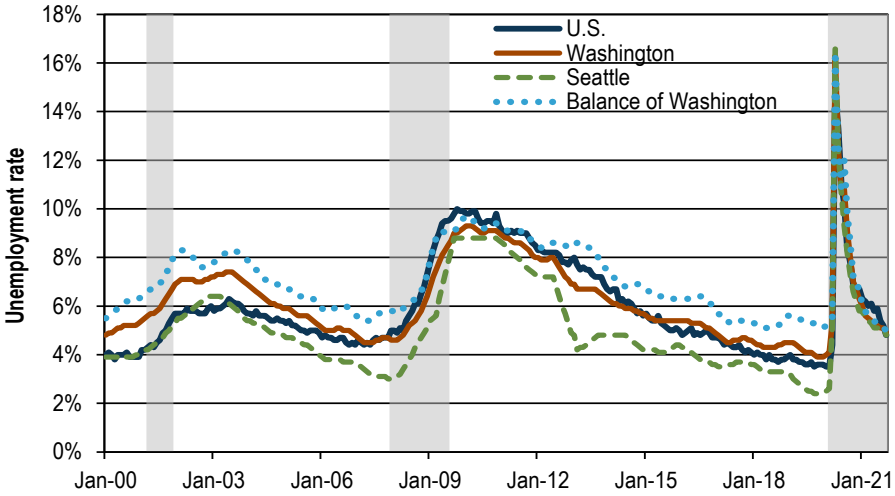
The overall unemployment rate

The overall unemployment rate is widely used in economic analysis as a lagging indicator of the direction of the economy. As noted previously, the unemployment rate is a ratio of the estimated number of unemployed who are seeking work, divided by the labor force. The labor force is limited to individuals who are employed or seeking work.

As shown in *Figure 4-8*, the state unemployment rate peaked in second quarter 2020 at 16.3 percent. During most of 2010, 2011 and 2012, the unemployment rate for Washington state remained higher than the national rate. Starting in August 2012, the state unemployment rate fell below the national rate and remained there through September 2014 before rising above the nation in September 2014 at 6.0 percent. For September 2014 through June 2020, the state unemployment rate remained above the national rate. In April 2020, both the national and state unemployment rate saw increases. The state rate increased from 5.3 percent in March 2020 to 16.3 percent in April 2020. The national unemployment rate increased from 4.4 percent in March 2020 to 14.8 percent in April 2020. By April 2020, both the state and national unemployment rates dropped below 10.0 percent. By September 2021, the state and national rates were at 5.1 and 4.8 percent, respectively.

The Seattle-Bellevue-Everett Metropolitan Division (MD) has reported a lower unemployment rate than the rest of Washington, and the nation, since 2004. However, during April 2020, the Seattle MD experience a higher unemployment rate than nation and the state. The unemployment rate in the Seattle MD increased from 2.6 percent in March 2020 to 16.6 percent by April of 2020. For comparison, the national unemployment rate increased from 4.4 percent in March 2020 to 14.8 percent in April of 2020. By September 2021, the Seattle-Bellevue-Everett MD unemployment rate was at 4.0 percent.

Figure 4-8. Historical U-3 unemployment rates, seasonally adjusted
United States and Washington state, January 2000 through September 2021
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics; National Bureau of Economic Research



Shaded areas are U.S. recession periods.

National and state unemployment rates tracked closely during the pandemic. From May 2020 through September 2021, the Seattle unemployment rate declined more rapidly than both the Washington state and U.S. unemployment rates.

Other measures of unemployment

Alternative unemployment rates

The U.S. Bureau of Labor Statistics (BLS) reports six alternative measures of labor underutilization, or unemployment. The commonly used definition of the unemployment rate, shown in *Figure 4-8*, is a ratio of the estimated number of unemployed who are seeking work, divided by the labor force. This is equivalent to what the BLS calls "U-3."

A common criticism of the standard measurement of unemployment is that it is too narrow – for instance, it excludes individuals who are not working and would like to work, but have given up looking for work.

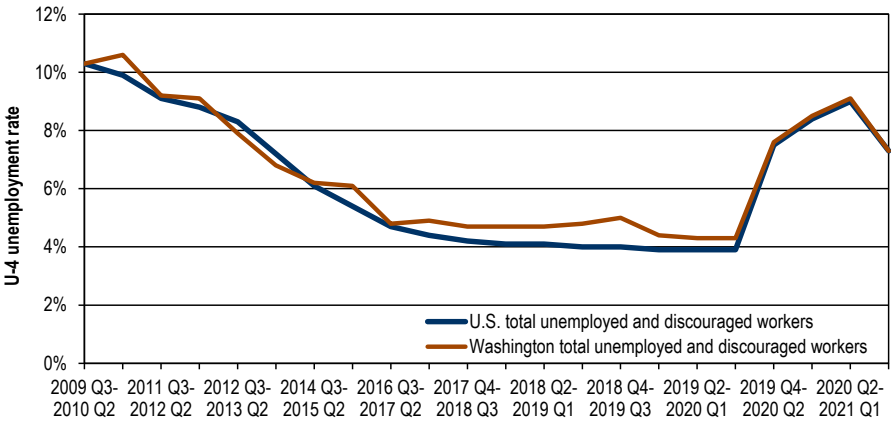
In response to criticism, the BLS has made available alternative measurements that are progressively more inclusive than the commonly reported unemployment rate. The standard measurement (U-3), along with two of the six alternative measurements, are defined as:

- U-3 – Unemployed as a percent of the labor force.
- U-4 – Unemployed plus discouraged workers, as a percent of the labor force plus discouraged workers.

- U-6 – Unemployed plus all marginally attached workers and employees working part time for economic reasons, all as a percent of the labor force plus all marginally attached workers.

The U-4 measure followed a similar pattern of decline in Washington state, and the country as a whole, coming out of the great recession (*Figure 4-9*). The moving average for third quarter 2009 through second quarter 2010 had Washington state and the nation both at 10.3 percent. From second quarter 2010 through second quarter 2020, the Washington state U-4 unemployment rate decreased to 4.3 percent, while the nation's rate decreased to 3.9 percent. With the onset of the COVID-19 pandemic, the U-4 unemployment measure for both the state and nation increased significantly, peaking at 9.0 percent for the nation and 9.1 percent for the state, for the four-quarter period ending first quarter 2021. The U-4 rate for both Washington state and the nation, for third quarter 2020 through second quarter 2021, is 7.3 percent.

Figure 4-9. U-4 unemployment rate (incl. discouraged workers), four-quarter moving average
United States and Washington state, third quarter 2009 through second quarter 2021
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics



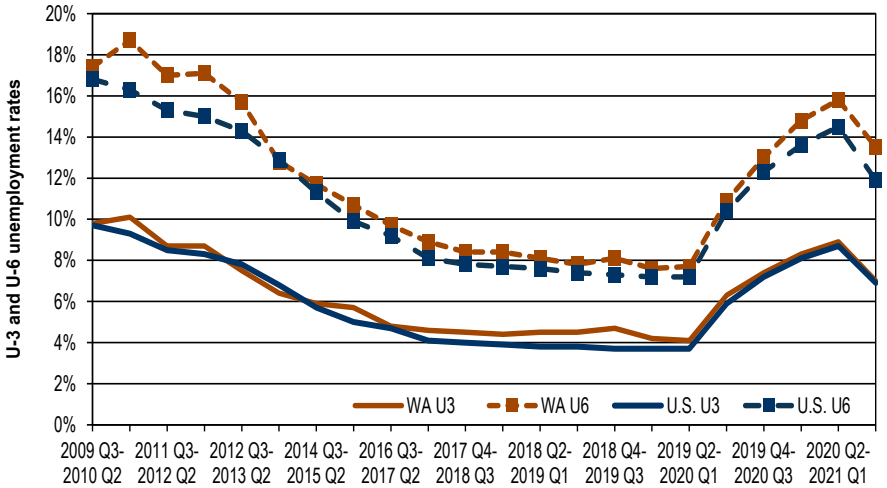
The U-4 measure of unemployment increased with the onset of the COVID-19 pandemic. As of June 2021, both the U.S. and Washington's U-4 rate are at 7.3 percent.

U-6 is the broadest measure of unemployment. The gap between the U-6 and U-3 rates has, for both the state and the nation, increased with the onset of the COVID-19 pandemic. This demonstrates the increase in the ranks of discouraged workers, marginally attached workers and those working part time involuntarily (*Figure 4-10*). This holds true for the state of Washington, where many underutilized workers are in the employed part time for economic reasons category. Washington's U-6 four-quarter moving average unemployment rate has remained higher than the nation's

since 2014. Most recently, Washington's U-6 rate remains 1.60 percentage points above the national rolling average from third quarter 2020 through second quarter 2021 at 13.5 percent and 11.9 percent respectively.

All measures of unemployment tend to respond in a similar fashion to the business cycle. Regardless of which measure is deemed appropriate, rates of labor underutilization have generally moved up and down together. While the rates for measure U-6 are high relative to the official definition of the unemployment rate (U-3), both U-3 and U-6 show very similar economic trends in Washington's labor market over time. The gap between the U-3 and U-6 rate for both the state and the nation increased with the onset of the COVID-19 pandemic as the number of discouraged workers, marginally attached workers and those working part time involuntarily increased. As the economy continues its recovery from the pandemic, we expect the number of those working part time for economic reasons to fall. During recovery periods, the number of unemployed people typically declines faster than the number of those working part time for economic reasons, as reflected in the persistent gap between the U-3 and U-6 unemployment measures.

Figure 4-10. U-3 (standard) and U-6 (includes marginally attached workers and those working part time involuntarily) unemployment rates, four-quarter moving average United States and Washington state, third quarter 2009 through second quarter 2021
Source: U.S. Bureau of Labor Statistics, Current Population Survey, Local Area Unemployment Statistics



The most broadly defined U-6 measure of unemployment for Washington remains above the national rolling average.

Chapter 5: Employment projections

About the employment, industry and occupational projections

Employment projections provide a general outlook for industry and occupational employment in Washington state. They provide job seekers, policy makers and training providers an idea of how much an industry or occupation is projected to change over time and show the future demand for workers.

On an annual basis, the Employment Security Department (ESD) produces industry employment projections for two, five and 10 years from a base period. For this annual report, the base period for the two-year (short-term) projections is second quarter 2020. The base period for the five-year (medium-term) and 10-year (long-term) projections is 2019.

Staffing patterns show proportional compositions of occupations within industries and are used to convert industry projections into occupational projections.

Industry classifications are based on the North American Industry Classification System (NAICS). However, they have been modified to match industry definitions used by the U.S. Bureau of Labor Statistics' (BLS) Occupational Employment Statistics (OES) program. These modified industry definitions are called Industry Control Totals (ICTs). The Standard Occupational Classification (SOC) system is used to group occupations. *Appendix 6* contains frequently asked questions relating to projections. *Appendix 7* provides a glossary of terms.

Data sets used to develop projections

The following data sets are used to produce projections:

1. Historical employment time series, consisting of U.S. Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW) data.
2. Employment not covered by the unemployment insurance system from the U.S. Bureau of Labor Statistics' Current Employment Statistics (CES) program.
3. Occupational employment by industries (staffing patterns) based on an OES survey.
4. National data for self-employed ratios, change factors, etc.
5. Independent variables (predictive indicators), which help to project the future direction of the economy, from IHS Global Insight's national forecast.

Use of employment projections

Employment projections are intended for career development over time, not as the basis for budget or revenue projections, or for immediate corrective actions within the labor market.

Employment projections are the basis of the Occupations in Demand (OID) list covering Washington's 12 workforce development areas (WDAs) and the state as a whole. This list is used to determine eligibility for a variety of training and support programs but was created to support the unemployment insurance Training Benefits Program. *Appendix 4* contains a technical description of the OID list.

The full OID list is accessible through the "Learn about an occupation" tool located at: https://esd.wa.gov/labormarketinfo/learn-about-an-occupation#/search

This chapter highlights findings on specific aspects of Washington's employment outlook. In the first section, industry projections results, we describe changes in employment by industry from 2019 to 2029. In the next section, occupational projections results, we look at:

- Major occupational groups
- Specific occupations

Detailed information on the projected demand for industry and occupational employment is available in the Employment Projections data files at: https://esd.wa.gov/labormarketinfo/projections

In addition, detailed skill projections information is available in *Appendix 5* of this report.

The formal description of industry and occupational projection processes is presented in the 2019 Employment Projections Technical Report. The technical report can also be found at the data files link above.

Key findings

The 10-year average annual growth rate for total nonfarm employment for the 2019 to 2029 period is projected to be 0.40 percent. This is a decrease from the 1.37 percent average annual growth rate predicted last year for 2018 to 2028.

Industry projections

- The largest increases by share of employment is projected for the information sector and other services sector.
- The largest decreases by shares of employment are projected for the manufacturing sector and construction sector.

Occupational projections

- The largest increases by shares of employment are projected for the computer and mathematical occupations.
- The largest decreases by shares of employment are projected for the construction and extraction occupations.
- The largest employment shares in 2029, from largest to smallest, are projected for the office and administrative support occupations, sales and related occupations and business and financial operations occupations. As was the case in last year's projections report, the first two occupational groups are projected to have declining employment shares.

Two approaches to occupational job openings

A *separations* approach is based on BLS national rates. An *alternative* approach is based on job opening rates specific to Washington state. The *separations* method does not track job openings created by turnover when workers stay within an occupation, but change employers, while the *alternative* method attempts to track these openings.

The *separations* and *alternative* data are available in the Occupational Projections data files at: **https://esd.wa.gov/labormarketinfo/projections.**

Information about the *separations* methodology is available at: https://www.bls.gov/opub/mlr/2018/article/occupational-separations-a-new-method-for-projecting-workforce-needs.htm. Information about the *alternative* methodology is available on our projections landing page at: https://esd.wa.gov/labormarketinfo/projections.

- For the *separations* method, software developer occupations are projected to have the largest number of average annual total openings.
- For the *alternative* method, software developer occupations are projected to have the largest number of average annual total openings.
- For both *separations* and *alternative* occupations, no growth openings exceeded turnover openings.

2021 industry projections results

Figure 5-1 presents 2019 estimated employment, and 2019, 2024 and 2029 employment shares, as well as changes in employment shares from 2019 to 2024, 2024 to 2029 and 2019 to 2029 by industry for Washington state.

Through 2029, the three industry sectors with the largest increases in employment shares are projected to be information, education and health services and retail trade.[22]

For this same time period, the industry sector with the largest decrease in employment shares is leisure and hospitality. The second- and third-largest decreases are manufacturing and construction.

Figure 5-1. Base and projected nonfarm industry employment
Washington state, 2019, 2024 and 2029
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Industry sector*	Est. empl. 2019	Est. empl. shares 2019	Est.. empl. shares 2024	Est. empl. shares 2029	Percentage point change in empl. shares 2019-2024	Percentage point change in empl. shares 2024-2029	Percentage point change in empl. shares 2019-2029
Natural resources and mining	5,800	0.17%	0.17%	0.1%	0.00%	-0.02%	-0.02%
Construction	219,500	6.33%	6.27%	6.1%	-0.06%	-0.18%	-0.23%
Manufacturing	293,000	8.45%	8.13%	7.6%	-0.32%	-0.53%	-0.84%
Wholesale trade	136,500	3.93%	3.87%	3.7%	-0.06%	-0.14%	-0.21%
Retail trade	390,600	11.26%	11.67%	11.9%	0.42%	0.24%	0.66%
Transportation, warehousing and utilities	116,400	3.35%	3.39%	3.3%	0.03%	-0.05%	-0.02%
Utilities	5,200	0.15%	0.15%	0.1%	0.00%	-0.01%	-0.01%
Information	144,400	4.16%	5.16%	5.7%	1.00%	0.54%	1.53%
Financial activities	160,100	4.61%	4.77%	4.7%	0.16%	-0.10%	0.06%
Professional and business services	435,100	12.54%	13.05%	13.2%	0.50%	0.19%	0.69%
Education and health services	502,300	14.48%	15.24%	15.5%	0.77%	0.27%	1.03%
Leisure and hospitality	347,000	10.00%	7.24%	7.2%	-2.76%	0.00%	-2.76%
Other services	128,300	3.70%	3.41%	3.6%	-0.29%	0.23%	-0.06%
Federal government	75,800	2.18%	2.29%	2.2%	0.11%	-0.14%	-0.03%
State and local government other	257,200	7.41%	7.64%	7.4%	0.23%	-0.19%	0.04%

*The sectors presented in the table are based on CES definitions.

The largest growth sectors for the state are projected for information, education and health services and retail trade.

[22] All tables contain values that are calculated and then rounded. As a result, details might not always add up to totals.

Historical and projected growth rates

Figure 5-2 shows the historical and projected growth rates for the state and Washington's 12 workforce development areas (WDAs). Figure data are sorted on the projected growth rate 2019 to 2029 column.

Ten of the 12 WDAs have modest projected positive growth rates while two have modest projected negative growth, all of which are less than the previous 10 years' growth. Seattle-King County has the highest projected growth rate of 0.77 percent with statewide coming in second at 0.40 percent. The statewide projected growth rate is 1.74 percentage points less than the historical growth rate.

The last column in *Figure 5-2* represents the long-term growth rate on the historical linear trend line on all available history. Variances between long-term trend line rates and projected growth rates show the effects of the most recent changes in local employment trends. These variances may reflect differences in cyclical behavior.

Figure 5-2. Historical and projected total nonfarm employment growth
Washington state and workforce development areas, 1990 to 2019 and 2019 to 2029
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Workforce development area[1]	Historical growth[2] rate 2009-2019	Projected growth rate 2019-2029	Historical trend line growth rate[3] 1990-2019
Seattle-King County	2.50%	0.77%	1.41%
Washington State	**2.14%**	**0.40%**	**1.54%**
Southwest	2.50%	0.32%	1.87%
Eastern	1.13%	0.26%	1.00%
Spokane	1.44%	0.25%	1.29%
Tacoma-Pierce	2.13%	0.18%	1.78%
Pacific Mountain	1.65%	0.17%	1.35%
Benton-Franklin	2.62%	0.14%	2.31%
North Central	1.88%	0.11%	1.41%
Olympic	1.30%	0.10%	1.14%
South Central	1.47%	0.06%	0.93%
Northwest	1.55%	-0.09%	1.75%
Snohomish	1.92%	-0.11%	2.13%

[1]Workforce development areas are regions within Washington state with economic and geographic similarities.

[2]Historical growth is based only on covered employment.

[3]Historical trend growth is defined as the growth rate of the linear trend line.

Ten of the 12 WDAs have modest projected positive growth rates.

2021 occupational projections results

Figure 5-3 shows major occupational group employment estimates and employment shares for Washington state.

At the state level, as was the case in last year's report, one occupational group stands out with increases in employment shares from 2019 to 2029. Computer and mathematical occupations are projected to increase employment shares by 1.51 percentage points. The next highest increase in shares is projected for business and financial operations occupations, with an increase of 0.98 percentage points.

The three largest decreases in employment shares at the state level are: food preparation and serving, 1.67 percentage points, sales and related, 0.69 percentage points, and production occupations, 0.45 percentage points.

By 2029, the top three state occupational groups for shares of employment are projected to be:

1. Office and administrative support occupations (10.48 percent)
2. Sales and related occupations (8.68 percent)
3. Business and financial operations occupations (7.83 percent)

By 2029 combined, these three major groups are projected to represent 27.0 percent of total employment shares for the state.

Figure 5-3. Base and projected occupational employment
Washington state, 2019 to 2029
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics

2-digit SOC	Major occupational group	Est. empl. 2019	Est. empl. shares 2019	Est. empl. shares 2024	Est. empl. shares 2029	Percentage point change in empl. shares 2019-2024	Percentage point change in empl. shares 2024-2029
11-0000	Management	226,672	5.77%	6.21%	6.45%	0.44%	0.23%
13-0000	Business and financial operations	269,384	6.86%	7.53%	7.83%	0.67%	0.31%
15-0000	Computer and mathematical	211,651	5.39%	6.41%	6.90%	1.03%	0.48%
17-0000	Architecture and engineering	82,407	2.10%	2.16%	2.09%	0.06%	-0.07%
19-0000	Life, physical and social science	47,273	1.20%	1.29%	1.27%	0.08%	-0.01%
21-0000	Community and social service	67,756	1.72%	1.91%	2.00%	0.18%	0.10%
23-0000	Legal	29,576	0.75%	0.78%	0.76%	0.03%	-0.02%
25-0000	Education, training and library	219,008	5.57%	5.57%	5.51%	0.00%	-0.06%
27-0000	Arts, design, entertain. sports and media	74,973	1.91%	1.92%	2.04%	0.02%	0.11%
29-0000	Health care practitioners and technical	191,429	4.87%	5.01%	4.99%	0.14%	-0.02%
31-0000	Health care support	152,278	3.88%	4.23%	4.41%	0.36%	0.17%

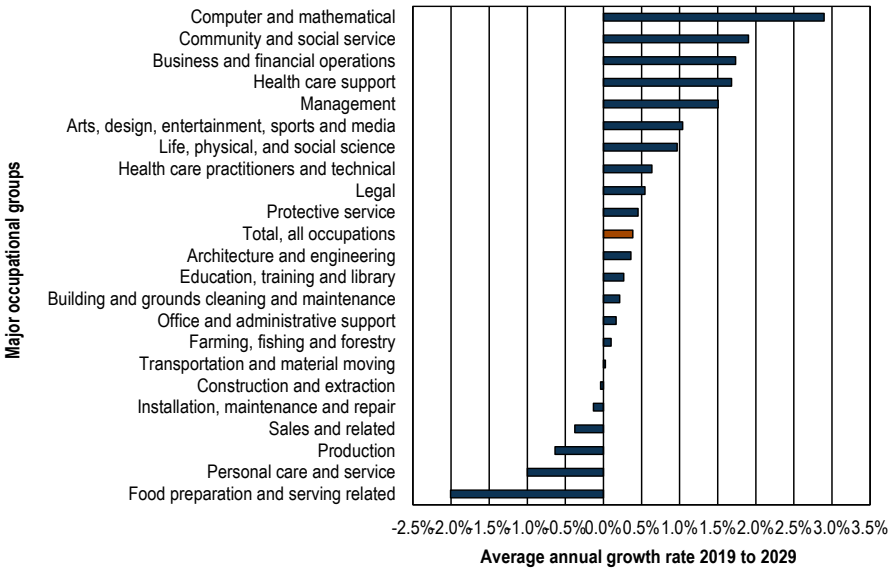
2-digit SOC	Major occupational group	Est. empl. 2019	Est. empl. shares 2019	Est. empl. shares 2024	Est. empl. shares 2029	Percentage point change in empl. shares 2019-2024	Percentage point change in empl. shares 2024-2029
33-0000	Protective service	68,890	1.75%	1.78%	1.77%	0.03%	-0.02%
35-0000	Food preparation and serving related	305,159	7.77%	6.09%	6.10%	-1.68%	0.01%
37-0000	Bldg. and grounds cleaning and maint.	122,816	3.13%	3.05%	3.07%	-0.07%	0.02%
39-0000	Personal care and service	115,884	2.95%	2.49%	2.57%	-0.46%	0.08%
41-0000	Sales and related	368,139	9.37%	8.96%	8.68%	-0.41%	-0.28%
43-0000	Office and administrative support	420,933	10.71%	10.66%	10.48%	-0.05%	-0.18%
45-0000	Farming, fishing and forestry	99,683	2.54%	2.59%	2.47%	0.05%	-0.13%
47-0000	Construction and extraction	240,658	6.13%	6.06%	5.87%	-0.06%	-0.19%
49-0000	Installation, maintenance and repair	150,617	3.83%	3.74%	3.64%	-0.09%	-0.10%
51-0000	Production	180,474	4.59%	4.40%	4.15%	-0.20%	-0.25%
53-0000	Transportation and material moving	283,290	7.21%	7.13%	6.95%	-0.08%	-0.18%

At the state level, computer and mathematical occupations stand out for their increase in employment shares.

The projected average annual growth rates for the major occupational groups in Washington state are presented in *Figure 5-4*. Computer and mathematical occupations (2.90 percent), community and social service occupations (1.90 percent), and business and financial operations occupations (1.73 percent) are projected to grow faster than other occupational groups from 2019 to 2029.

In the long term, six occupational groups are projected with negative average annual growth rates: food preparation and serving related (-2.01 percent), personal care and services (- 1.00 percent), production (- 0.63 percent), sales and related (- 0.38 percent), installation, maintenance and repair (- 0.13 percent), and construction (- 0.04 percent).

Figure 5-4. Projected average annual growth rates for major occupational groups
Washington state, 2019 to 2029
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics



Computer and mathematical, community and social service, and business and financial operations are projected to experience the largest growth rates from 2019 to 2029 (2.90, 1.90 and 1.73 percent, respectively).

Separations and alternative job openings

The Bureau of Labor Statistics (BLS) separations method measures job openings created by workers who leave occupations and need to be replaced by new entrants. In this method, workers who exit the labor force or transfer to an occupation with a different Standard Occupational Classification (SOC) are identified as generating separation openings at the national level. This method does not track turnover within occupations. Turnovers within occupations occur when workers stay in occupations, but change employers. This also means that under the BLS method, jobs filled by interstate movement when workers stay within occupations, are not identified as new jobs.

Beginning with the 2017 projections cycle, ESD created a new Washington state specific *alternative* occupational method to the BLS *separations* method. The objective was to track job openings that occur when workers transfer within occupations. For simplicity, we refer to this method as the *alternative* method and to the rates as the *alternative* rates.

While the *alternative* method can be used for any states that have useable wage files, the *alternative* results are based on Washington state wage records, making them specific to Washington state.

The *alternative* rates track openings created by turnover within occupations (i.e., workers stay within occupations but transfer to different companies) and when workers leave one occupation for another or leave the workforce.

The method consists of three major steps:

1. Estimating the total number of annual industry transfers that include:
    a. Transfers between industries
    b. Transfers inside industries
    c. New individuals in Washington state wage records (wage file)
    d. Exits or individuals who are no longer in the wage file
2. Converting industry transfers to occupational transfers using occupation-to-industry staffing patterns (shares of occupations for each industry).
3. Calculating *alternative* rates as total transfers, minus growth or decline, divided by estimated occupational employment for a base period.

Information about the *separations* methodology is available at: https://www.bls.gov/opub/mlr/2018/article/occupational-separations-a-new-method-for-projecting-workforce-needs.htm and information about the *alternative* methodology is available at: https://esd.wa.gov/labormarketinfo/projections.

For a complete list of *separations* and *alternative* projected employment, see: https://esd.wa.gov/labormarketinfo/projections.

Figure 5-5 presents a comparison between *separations* and *alternative* methodologies. Average annual total openings are compared at the two-digit SOC level. *Alternative* openings are on average almost two and a half times larger than *separations* openings. The *alternative* method increase makes sense since it measures openings not tracked by BLS. The *alternative* method measures turnover within occupations, while the BLS method does not. Also, BLS labor force exits measure national exits, but do not track exits from states.

The average ratio for *alternative* to *separations* is 3.14. A ratio above this average indicates that a worker is more likely to change jobs within a given occupation than to transfer to another occupation.

In *Figure 5-5*, the three largest *alternative-to-separations* ratios are for health care practitioners and technical (4.60), construction and extraction (4.56) and installation, maintenance and repair (3.67) occupations.

Figure 5-5. Comparison of *alternative* and *separations* methodologies on total openings
Washington state, 2019 and 2029
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

2-digit SOC	Major occupational group	Est. empl. 2019	Est. empl. 2029	Alternative average annual total openings 2019-2029	Separations average annual total openings 2019-2029	Ratio alternative to separations
11-0000	Management	226,672	263,197	83,286	24,217	3.44
13-0000	Business and financial operations	269,384	319,922	94,713	34,517	2.74
15-0000	Computer and mathematical	211,651	281,592	82,257	29,445	2.79
17-0000	Architecture and engineering	82,407	85,433	19,509	6,110	3.19
19-0000	Life, physical, and social science	47,273	52,047	12,470	4,896	2.55
21-0000	Community and social service	67,756	81,808	21,673	9,611	2.26
23-0000	Legal	29,576	31,224	7,603	2,134	3.56
25-0000	Education, training, and library	219,008	224,900	47,560	19,175	2.48
27-0000	Arts, design, entertain., sports and media	74,973	83,144	26,974	9,118	2.96
29-0000	Health care practitioners and technical	191,429	203,923	56,545	12,299	4.60
31-0000	Health care support	152,278	179,933	61,217	23,147	2.64
33-0000	Protective service	68,890	72,085	19,568	8,082	2.42
35-0000	Food preparation and serving related	305,159	249,129	106,994	30,275	3.53
37-0000	Building and grounds cleaning and maintenance	122,816	125,468	47,633	14,893	3.20
39-0000	Personal care and service	115,884	104,828	38,505	11,711	3.29
41-0000	Sales and related	368,139	354,507	120,652	38,733	3.11
43-0000	Office and administrative support	420,933	427,927	130,313	45,038	2.89
45-0000	Farming, fishing and forestry	99,683	100,699	46,335	14,454	3.21
47-0000	Construction and extraction	240,658	239,797	97,783	21,463	4.56
49-0000	Installation, maintenance and repair	150,617	148,637	44,729	12,189	3.67
51-0000	Production	180,474	169,351	46,493	14,861	3.13
53-0000	Transportation and material moving	283,290	283,989	98,884	32,018	3.09
00-0000	**Totals**	**3,928,950**	**4,083,540**	**1,311,693**	**418,380**	**3.14**

On average, alternative openings are 3.14 times larger than separations openings.

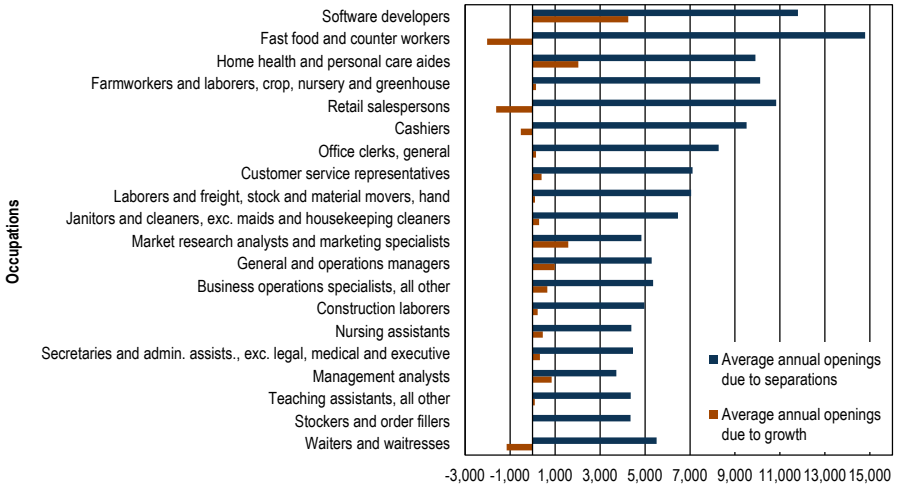
Specific occupations

Figure 5-6 shows the top 20 specific occupations by total openings based on the *separations* methodology. *Figure 5-7* shows the top 20 specific occupations by total openings based on the *alternative* methodology.

The number of openings due to **job growth** did not exceed openings due to *separations* or *alternative* **job turnover** in any of the top 20 occupations.

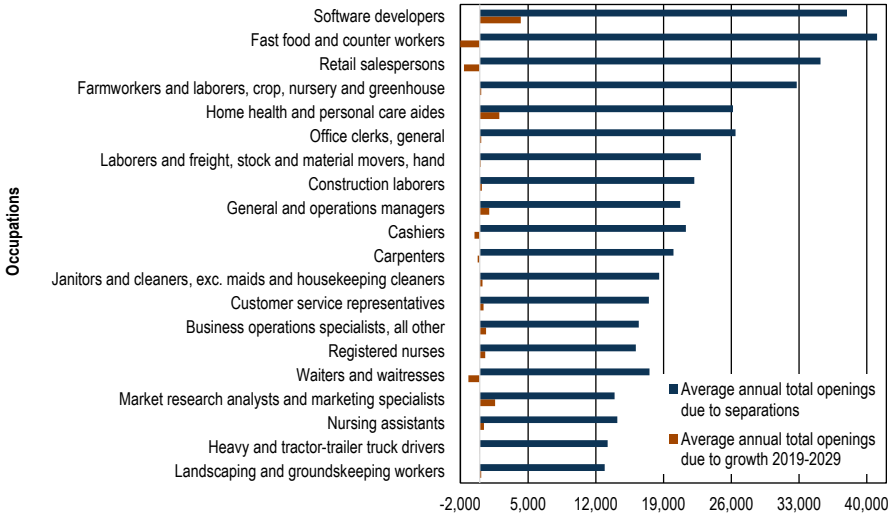
For the *separations* methodology, the software developers occupation is projected to have the largest number of total openings, while for the *alternative* methodology, retail salespersons occupations are projected to have the largest number of total openings. Sixteen of the top 20 specific occupations are the same occupations in both methods.

Figure 5-6. Top 20 specific occupations by average annual total openings, *separations* methodology
Washington state, 2019 to 2029
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics



In the separations methodology, the number of openings due to job growth did not exceed openings due to job turnover in any occupations.

Figure 5-7. Top 20 specific occupations by average annual total openings, *alternative* methodology
Washington state, 2019 to 2029
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics



In the alternative methodology, the number of openings due to job growth did not exceed openings due to job turnover in any occupations.

Chapter 6: Wages

Summary

- Across the nation, job losses during the COVID-19 recession were predominantly in lower-wage jobs. The same was true for the state of Washington. While full-time equivalent (FTE) employment fell by 3.7 percent, the number of FTE jobs paying below $20.00 declined by 16.4 percent.
- The loss of lower-wage jobs meant that the average wage for jobs that were left was higher than in 2019. Both the average hourly wage and the median hourly wage had their largest increases on record (going back to 1990).
- Wage inequities among different demographic groups have persisted for decades and continued in 2020. The average monthly wage for African American workers was 76.9 percent of the average for all workers, lower than it was in 1992 and 2005. Earnings for Indigenous workers were 67.0 percent below average, while Pacific Islanders earned 69.2 percent of the average, and Latino/Hispanic workers were at 68.3 percent. The average for women was 78.8 percent of the all-job average, and 65.7 percent of the average for men, not substantially different from 1992.
- The distribution of wages by industry continued to vary widely. In 2020, for example, the median wage for child care services was $16.47 per hour, while the median for pre-packaged software was $105.51. In accommodations (hotels, motels etc.), 67.3 percent of the jobs paid below $20.00 per hour, while in computer systems design, only 4.3 percent paid that low.
- Job loss was concentrated in lower-wage industries, but also in lower-wage jobs within industries. In residential nursing facilities, for example, overall job loss was 1.7 percent, while the number of jobs paying below $20.00 per hour fell 7.8 percent. In fabricated metals, total job loss was 12.0 percent, versus 22.4 percent in jobs paying below $20.00 per hour. Some industries, for example general merchandise stores, raised wages, helping them to attract and retain workers.
- Workers that did keep their job did well. The median increase in the hourly wage – unadjusted for inflation – was over 5 percent in 2020, higher than a comparable national figure of 3.5 percent.
- Wage inequality increased substantially in 2020. The gap between the average wage for the lowest-paid and highest-paid 10 percent of jobs widened considerably, even though the minimum wage

increased by $1.50 per hour to $13.50, because of the growth of higher-wage jobs (those paying more than $56.00 per hour, which annualized would be $117,000 per year).

Introduction

The COVID-19 recession began in mid-March 2020. Unemployed insurance claims soared in the last two weeks of the month, and April brought the largest one-month drop in employment on record. A good share of the lost jobs returned in June, followed by a slower, uneven recovery. In this chapter, we'll examine the impact on wages using the state's quarterly wage files. These files include the wages earned, hours worked, and employer for every non-federal employee in the state, for every quarter (three-month period) going back to 1990.[23] In each quarter in 2020, there were more than 3.6 million jobs. The quarterly wage files allow us to determine the hourly wage for each job, and from there to calculate the median and average hourly wage, average wage by decile (e.g., the average wage for the lowest-paid 10 percent of jobs), and the number of jobs in different wage ranges (e.g., below $14 per hour). Data is available by county and industry, but there is no information on the demographics of workers in the quarterly files. All data in this chapter has been adjusted for inflation to 2020 dollars.

Note that almost 50,000 corporate officers (usually the highest-paid employees in large corporations) are not included in the data, as they have opted out of the system. Also, benefits and tips are not included as wages.

A quarterly analysis means we'll lose some of the nuance of monthly changes. However, we'll gain some insight into the total hours worked – when workers might not have lost their job, but had their hours cut, for example, or worked intermittently (e.g., one week on, one week off).

Quarterly employment from the wage files will be reported on a full-time equivalency (FTE) basis, with 40 hours per week – usually 520 hours per quarter – considered as one FTE job. Two half-time jobs are equal to one FTE job. This is different from the monthly employment published in the Quarterly Census of Employment and Wages (QCEW) data series, in which a part-time job and a full-time job are both considered to be one job.

In addition, we'll make use of another quarterly database, the Local Employment Dynamics (LED) database, a partnership of the Census Bureau and the states. The LED provides an average wage for each quarter going back to 1990 by county, industry, and demographics like gender, age, race, ethnicity and education.

[23] In addition, employment at private households (NAICS 814) and state-reimbursed home health care (part of NAICS 624120) were excluded due to data quality issues.

Overview: Employment down, payroll up, average wage up

In 2020, the number of jobs covered by unemployment insurance (QCEW jobs, with the exclusions noted in *Figure 6-1*) averaged 3.13 million a month, a decline of 5.8 percent from the previous year. Again, this measure is based on average monthly counts of jobs, with full- and part-time work getting equal weight. When jobs were weighted by the number of hours worked, there were 2.62 million FTE jobs – 3.7 percent fewer than in 2019. Meanwhile, total payroll, after adjustment for inflation, increased by 4.6 percent to $245.54 billion.

When employment drops more than hours worked, that means that a disproportionate number of part-time and/or seasonal jobs were eliminated (as opposed to full-time, year-round jobs). When employment falls and payroll increases, then the average wage will increase. This can mean:

- There was a disproportionate loss of lower-wage jobs. Lower-wage jobs may be jobs with a shorter average work week (i.e., part-time or seasonal jobs) or jobs with a lower-than-average hourly wage, or both. It could also mean lower-wage jobs had their hours cut (for example, if work was on-again/off-again like it was at restaurants during COVID-19).
- The number of higher-wage jobs increased, or there were larger pay increases for higher-wage jobs.
- Or both of the above.

Figure 6-1. Covered employment, FTE employment, covered payroll ("covered" means jobs covered by unemployment insurance); federal employment, NAICS 814 and DSHS/COPES employment excluded, adjusted for inflation to 2020 dollars, quarterly data not seasonally adjusted
Washington state, 2007 through 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse

Year	Covered employment (millions)	Change from previous year	FTE employment (millions)	Change from previous year	Covered payroll (billions)	Change from previous year
2007	2.83	2.8%	2.29	3.3%	$154.23	5.2%
2008	2.85	0.8%	2.30	0.3%	$156.18	1.3%
2009	2.73	-4.3%	2.19	-4.8%	$153.02	-2.0%
2010	2.69	-1.5%	2.16	-1.4%	$151.54	-1.0%
2011	2.72	1.4%	2.19	1.5%	$155.44	2.6%
2012	2.78	2.0%	2.27	3.5%	$160.83	3.5%
2013	2.84	2.3%	2.32	2.1%	$165.98	3.2%
2014	2.92	2.8%	2.38	2.8%	$174.56	5.2%
2015	3.01	3.1%	2.46	3.2%	$184.12	5.5%
2016	3.11	3.1%	2.53	2.9%	$195.95	6.4%
2017	3.18	2.4%	2.60	3.0%	$207.20	5.7%
2018	3.26	2.6%	2.63	1.2%	$222.16	7.2%
2019	3.32	1.9%	2.72	3.3%	$234.82	5.7%
2020	3.13	-5.8%	2.62	-3.7%	$245.54	4.6%
Quarterly data*						
2019 Q4	3.34	2.3%	2.78	6.2%	$60.19	7.3%
2020 Q1	3.29	2.1%	2.68	4.8%	$61.16	4.4%
2020 Q2	2.97	-10.6%	2.59	-6.5%	$55.97	-1.0%
2020 Q3	3.12	-7.6%	2.55	-7.4%	$60.54	1.8%
2020 Q4	3.11	-7.0%	2.69	-3.5%	$64.48	7.1%

*Quarterly data compared with the same quarter of the previous year.

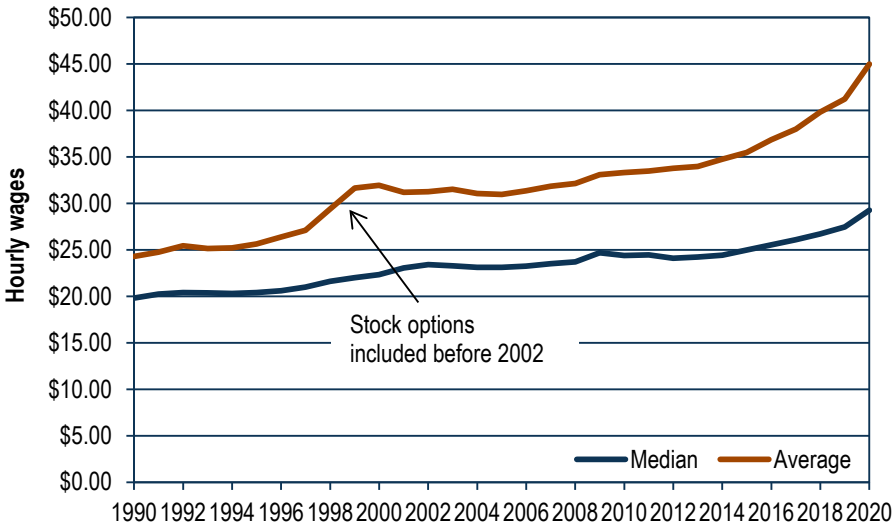
Monthly employment dropped; FTE employment (hours worked) dropped even more in 2020, while payrolls had a much smaller decline.

This is exactly what happened. As Chapter 2 showed, while job loss in some high-wage industries (for example, aerospace) was higher than average, most of the loss occurred in lower-wage industries with shorter work weeks. More than a third of the loss came in accommodations and food services, and another 10 percent in arts, entertainment and recreation. In addition, some higher-wage industries expanded in 2020, including non-store retailers, software, other information services, and computer systems design.

Average wages increased in 2020. The a*verage annual wage* is defined as total payroll divided by average annual QCEW employment; it rose from an inflation-adjusted $70,651 in 2019 to $78,454 in 2020, a gain of 11.0 percent, easily the largest percentage gain on record. Some longer-term context: from 2007 to 2020, the average annual wage in the U.S. increased by 17.4 percent. Washington's average rose by 39.0 percent, the highest in the nation.[24]

Both the average and the median hourly wage[25] increased sharply in 2020, as shown in *Figure 6-2*. The average hourly wage rose 9.4 percent, from $41.13 to $44.99, while the median hourly wage climbed 6.6 percent from $27.46 to $29.28. Those were both record increases for the 30 years that ESD has tracked that measure.

Figure 6-2. Median hourly wage and average hourly wage; federal employment, NAICS 814 and DSHS/COPES employment excluded, adjusted for inflation
Washington state, 1990 through 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse



Both the average and median hourly wage had record increases in 2020.

[24] North Dakota (via the expansion of fracking) was second at 36.7 percent; California was third at 28.2 percent.

[25] The average hourly wage is defined as total payroll divided by total hours worked. The median hourly wage is that wage where half of the hours worked paid a higher hourly wage, and half paid a lower hourly wage.

COVID-19's biggest impact was on low-wage jobs

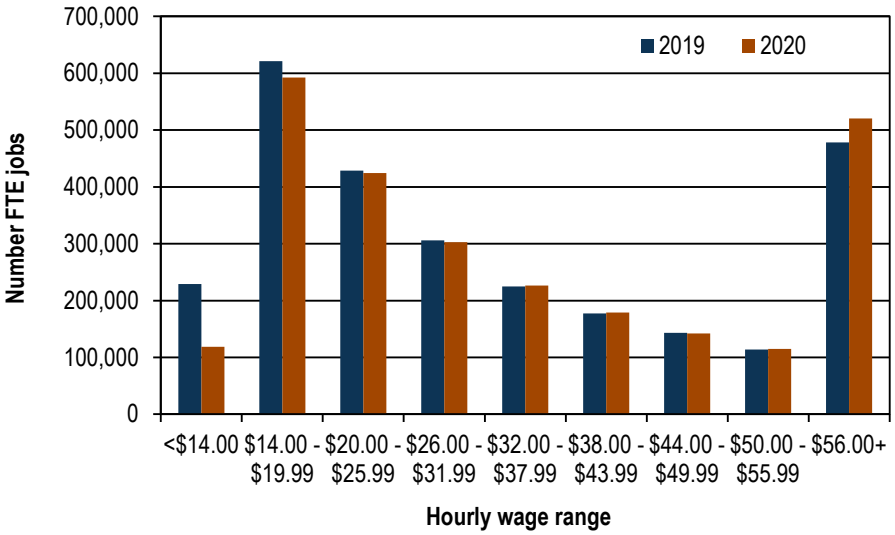
Average wages went up in 2020 because job losses were proportionately greater for lower-wage industries and lower-wage jobs. *Figure 6-3* shows FTE employment by hourly wage range for both 2019 and 2020. In 2019, over 229,000 jobs paid below $14.00 per hour – 8.4 percent of all FTE jobs (alternatively, 8.4 percent of all hours worked paid below $14.00 per hour). In 2020, just under 119,000 paid below that amount, only 4.5 percent of the total.

The state's minimum wage rose from $12.00 per hour to $13.50 per hour on the first of the year, the last large adjustment from an initiative approved by voters in 2016.[26] Based on the following evidence, this does not appear to have been a factor in the loss of low-wage jobs in 2020. First, employment in the accommodations and food services sector (which accounted for almost a quarter of these positions) followed normal seasonal trends in January and February 2020. Second, the vast majority – 84 percent – of the jobs paying below $13.50 per hour in fourth quarter 2019 continued into first quarter 2020, with only a small decline in hours worked, likely due to seasonal factors. A third of these jobs paid $14.00 per hour or more, so many of these workers received a bump in pay which moved them into the next wage range (*Figure 6-3*). Combining the lowest two wage ranges: the number of jobs paying below $20.00 per hour fell by 16.4 percent, much higher than the 3.7 percent decline for all jobs.

Meanwhile, the number of jobs at the top end of the wage scale – those paying $56.00 per hour or more (roughly $117,000 per year or more, annualized) increased by over 42,000, or 8.8 percent. Preliminary analysis indicates that most of these were new jobs, while some came from "bracket creep," as pay increases pushed jobs into this pay range. Many of these high-end jobs came in pre-packaged software, internet service providers, other information services, nonstore and furniture retail trade,[27] and professional services, along with local governments, aerospace had fewer jobs in this wage category in 2020.

[26] Beginning in 2021, the minimum wage will be adjusted for inflation each year.
[27] These two industries were combined due to data disclosure restrictions.

Figure 6-3. Employment by hourly wage ranges; federal employment, NAICS 814 and DSHS/COPES employment excluded; adjusted for inflation
Washington state, 2019 and 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse



Job losses in the COVID-19 recession were disproportionately low-wage jobs.

Wages by industry

Figure 6-4 compares the 2020 wage profile for several low-, middle- and high-wage industries. Over 19 percent of jobs in the child care industry paid below $14.00 per hour, and over half paid (55.8 percent) between $14.00 and $19.99 per hour (the median hourly wage was $16.47). Pay was slightly higher in the nursing and residential care industry, which includes both skilled nursing facilities along with care facilities for mental health and substance abuse treatment, elderly care, and other concerns. In that industry, the median hourly wage was $18.08 per hour, 13.0 percent of jobs paid below $14.00 per hour, and almost half (48.7 percent) paid in the next-highest wage range. Both of these industries were recognized as essential services during the pandemic.

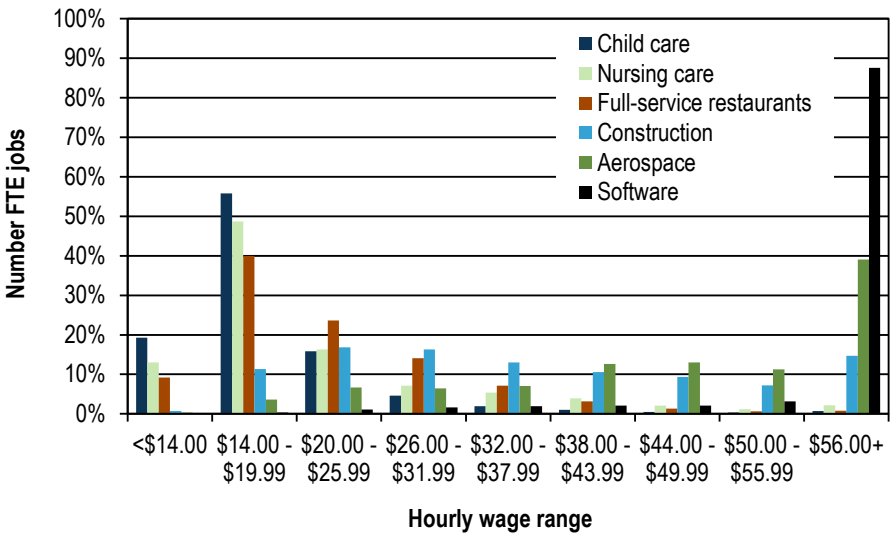
Full-service restaurants[28] had a higher median wage ($20.09 per hour), fewer lower-wage jobs, and more jobs in the $20.00 to $25.99) range (still below the overall median for all industries of $29.35 per hour). This industry was one of the hardest hit by COVID-19, and one of the slowest to recover.

[28] Tips are not included in ESD's wage data.

The median hourly wage in construction was above average at $34.04 per hour. Few construction jobs paid below $14.00 per hour, while around half paid in the $20.00 to $37.99 range – 16.7 percent between $20.00 and $25.99, another 16.1 percent between $26.00 and $31.99, and 12.8 percent between $32.00 and $37.99.

Only a relative handful of jobs in the first three industries above paid $56.00 per hour or more, while in construction, 14.5 percent of jobs were in the highest wage range shown. In contrast, 39.1 percent of aerospace jobs, and 87.6 percent of jobs in the pre-packaged software industry, paid what would be a six-figure salary on an annualized basis. Only 10.5 percent of aerospace jobs paid below $26.00 per hour, while less than 2 percent of software jobs paid in that range. The median wage in aerospace was $50.19 per hour, while in software it was more than double that at $105.51.

Figure 6-4. Employment by hourly wage ranges, selected industries, child care (NAICS 6244), nursing and residential care (NAICS 623), full-service restaurants (NAICS 722511), construction (NAICS 23), aerospace (NAICS 3364), and pre-packaged software (NAICS 5112)
Washington state, 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse

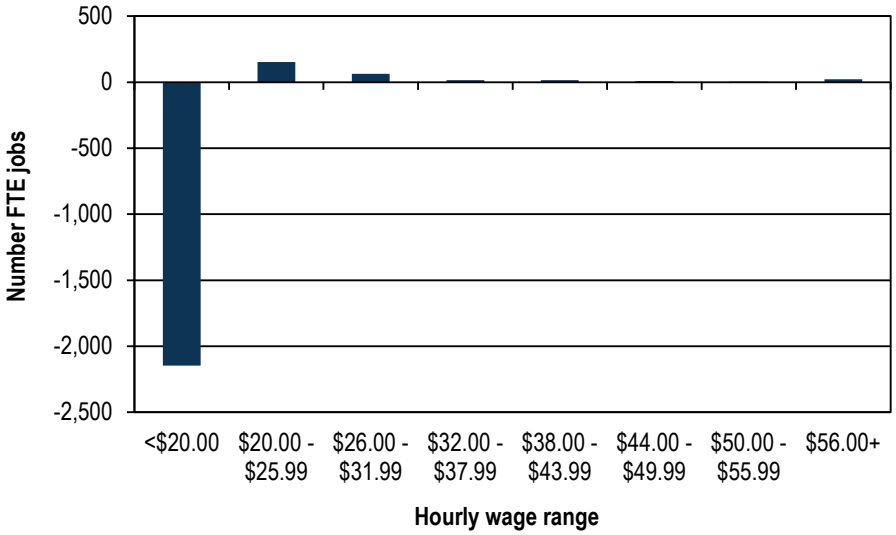


Wage profiles vary greatly by industry.

How wages changed by industry: some examples

As previously shown, job losses during COVID-19 were disproportionately at the lower end of the wage spectrum. *Figures 6-5* to *6-9* show that there are some interesting differences between industries, including some with closely related products or services. For example, in child care, job losses were concentrated for lower-wage jobs (particularly for those paying below $14.00 per hour), while there was an increase in jobs paying above $20.00 per hour. Those that didn't lose their jobs ended up making a higher wage, perhaps because wages were raised in an attempt to retain workers and to fill the gap left by those who left due to working conditions.

Figure 6-5. Change in FTE employment by hourly wage ranges, child care (NAICS 6244) Washington state, 2019 to 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse



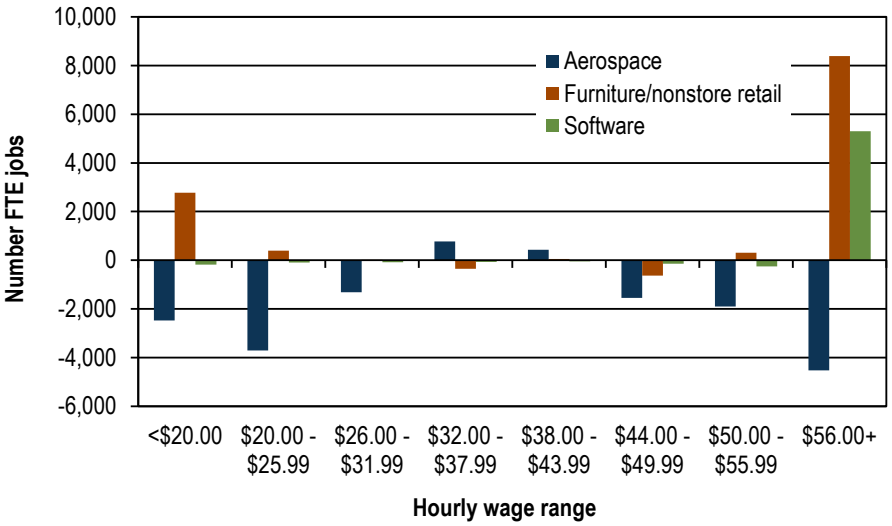
Child care services employment declined by 12.7 percent, mostly at the lower end of the wage scale.

Now a look at three high-wage industries (*Figure 6-6*). Pre-packaged software, with a median wage of $105.51 per hour, was minimally impacted by COVID-19, because demand for product remained high, and much of the work could be done remotely. This industry saw little change in employment in all wage ranges, except at the top, which netted virtually all of the 6.6 percent employment gain over the year. Aerospace (median wage: $50.19) was working through challenges related to the Boeing 737 Max issues before COVID-19, and then was beset by cancelled orders when demand for air travel collapsed early in

the pandemic. Overall, FTE employment fell by 16.0 percent. Cuts were deeper for lower-wage jobs (about 44.0 percent for jobs paying between $14.00 and $25.99 per hour), but not as severe on the upper end (14.4 percent for jobs paying $44.00 per hour or higher), while there was a small increase in the number of jobs paying in the middle ranges.

The combination of retail furniture stores and nonstore retail trade had a median wage of $68.62 per hour in 2020.

Figure 6-6. Change in FTE employment by hourly wage ranges, aerospace (NAICS 3364), furniture and nonstore retail trade (NAICS 442 and 454) and pre-packaged software (NAICS 5112)
Washington state, 2019 to 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse



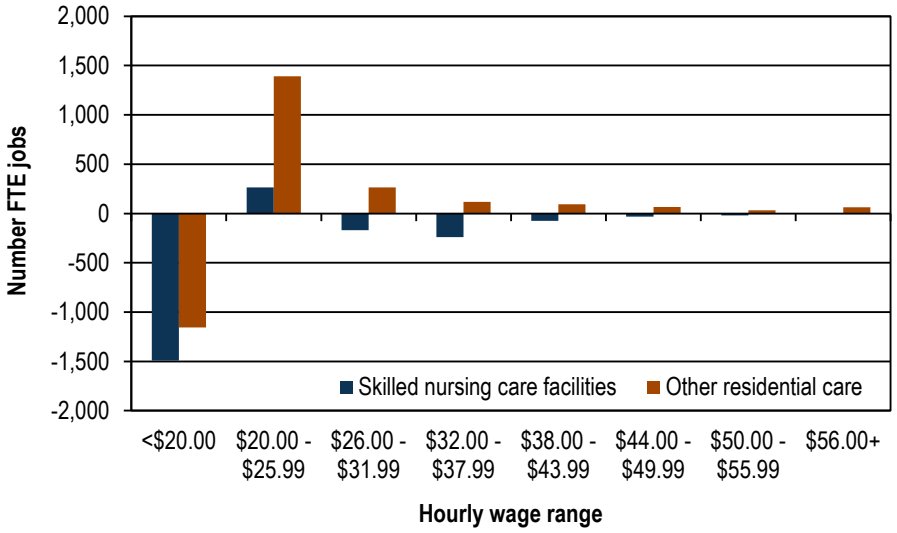
Software employment increased by 6.6 percent, with the net change all at the top end, while aerospace jobs declined by 16.0 percent, with losses at the bottom and top of the wage scale.

Figure 6-7 contrasts wage changes in skilled nursing facilities and other residential care facilities. The former employs more health care professionals, chiefly registered nurses, licensed practical nurses, and a variety of therapists, while the latter employs a large number of counselors and social workers. Staffing in both industries includes many health support workers in skilled nursing facilities, mostly nursing assistants, and in other residential care facilities, mostly personal care aides.

Skilled nursing facilities were at the epicenter of COVID-19 in Washington, with the first cases in the state detected there. Further, the industry has had a long-standing issue filling positions, exacerbated by the pandemic. FTE employment at these facilities declined by 9.1 percent in

2020, with job losses predominantly in jobs paying less than $20.00 per hour. In contrast, other residential care facilities had an increase in total hours worked in 2020, with FTE employment rising by 2.4 percent. These facilities had a noticeable shift upward in wages. While there are likely a number of factors at play here, the contrast in the ability of each industry to retain/attract workers was noticeable, and raises a question of how much a factor the shift to higher wages played in the relative success of other residential care facilities.

Figure 6-7. Change in FTE employment by hourly wage ranges, skilled nursing care facilities (NAICS 6231) and other residential care facilities (NAICS 6232 and NAICS 6233) Washington state, 2019 to 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse



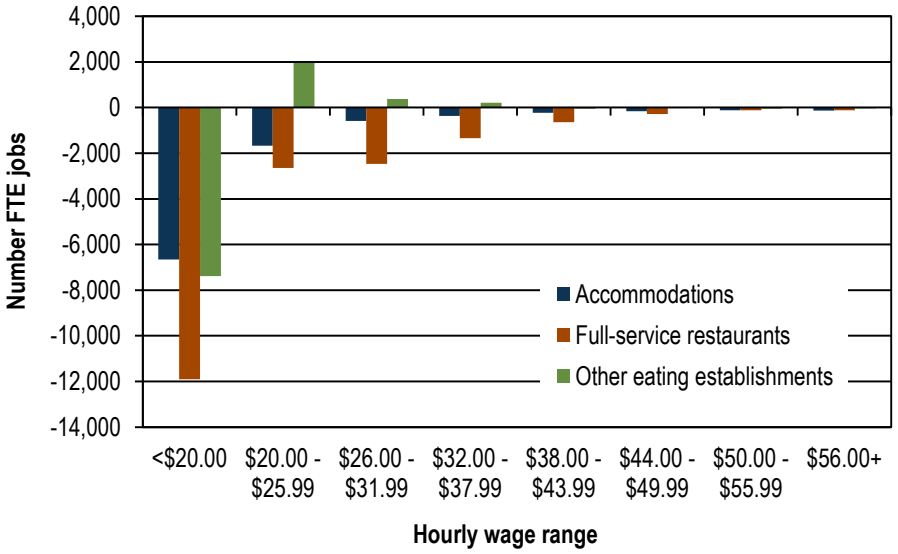
Skilled nursing facilities lost lower-wage jobs, while other residential care increased employment and wage rates.

Figure 6-8 contrasts wage changes in full-service restaurants with other eating establishments, including limited-service restaurants, cafeterias, buffets, coffee shops and other non-alcoholic beverage and snack shops. FTE employment in full-service restaurants fell by 19,500 jobs, more than any other industry, a decline of 29.6 percent. Other eating establishments were less but still substantially affected (-4,975 FTE jobs at -7.6 percent). Both industries employed many workers at or near the minimum wage.

At full-service restaurants, there were job cuts across the wage spectrum, but somewhat more so at the lower end – the number of jobs paying below $20.00 per hour fell by 34.3 percent versus 29.6 percent overall. Other eating establishments had fewer jobs at the bottom end (-13.5

percent, again higher than the industry total of 7.6 percent) and slightly fewer at the upper end, while adding jobs in the middle (from $20.00 per hour to $38.00 per hour).

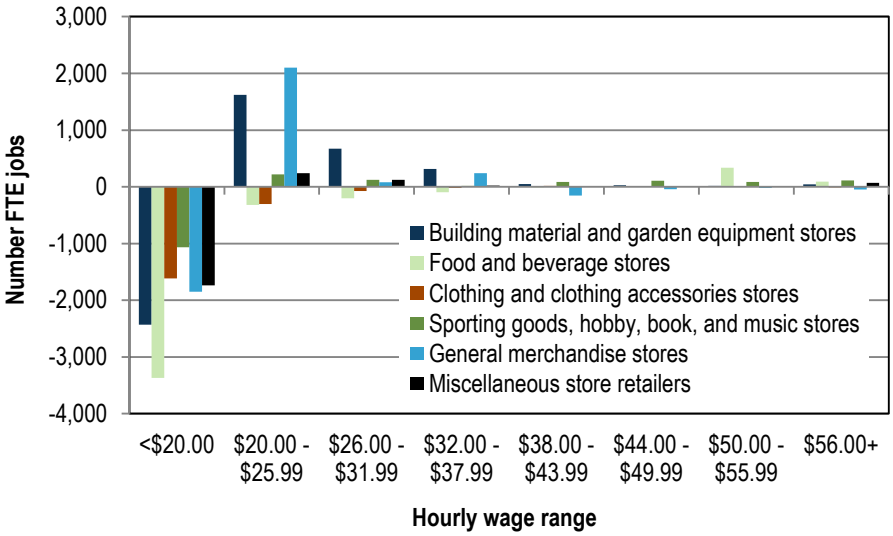
Figure 6-8. Change in FTE employment by hourly wage ranges, accommodations (NAICS 721), full-service restaurants (NAICS 722511) and other eating establishments (NAICS 722513, NAICS 722514, and NAICS 722515)
Washington state, 2019 to 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse



Both full-service restaurants and other eating establishments had fewer lower-wage jobs, but the latter increased middle-wage jobs.

Finally, *Figure 6-9* shows how selected retail industries fared in 2020. All lines of retail had fewer lower-wage jobs in 2020. In some cases that was due to severe losses. For example, clothing and accessory stores cut overall employment by 16.5 percent, while jobs paying below $20.00 per hour dropped by 19.6 percent. In other cases, there was an upward shift in employment. Both building materials stores and general merchandise stores added jobs over the year (+1.2 percent, +0.6 percent), both had fewer lower-wage jobs (-15.8 percent, -5.9 percent) and both had sharp increases in jobs paying above $20.00 per hour.

Figure 6-9. Change in FTE employment by hourly wage ranges, building material and garden equipment stores (NAICS 444), food and beverage stores (NAICS 445), clothing stores (NAICS 448), sporting goods stores (NAICS 451), general merchandise stores (NAICS 452) and miscellaneous retailers (NAICS 453)
Washington state, 2019 to 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse

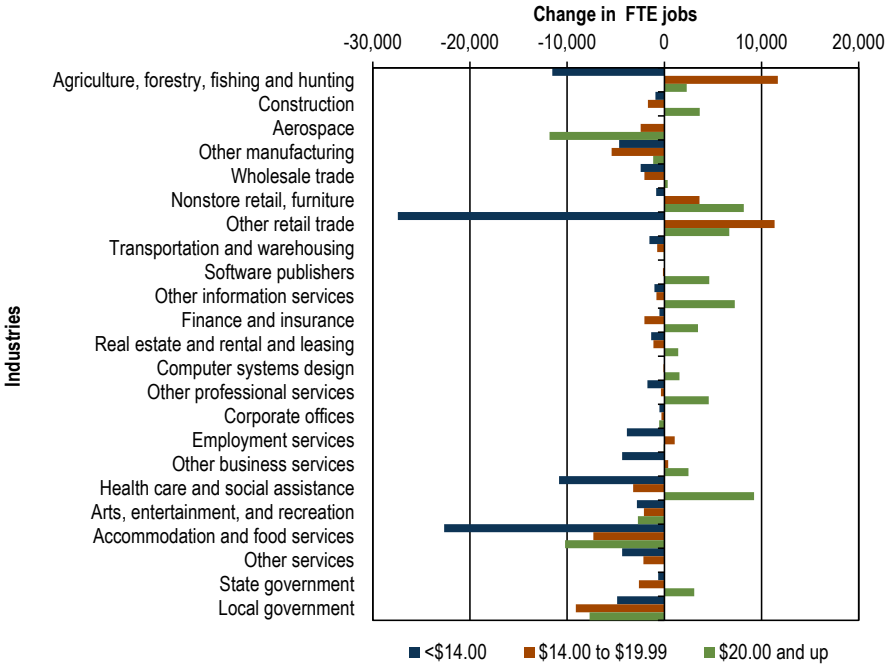


Retailers had far fewer lower-wage jobs, some due to job losses, others due to an upward shift in wages.

Figure 6-10 provides a recap of the change in the number of FTE jobs by sector, in three broad wage categories: below $14.00 per hour, $14.00 to $19.99 per hour, and $20.00 per hour and above. A few final comments:

- Agriculture, an essential activity, saw increased employment (mostly in crops and support activities like fruit packing) and an upward shift in wages.
- Information services, finance and insurance and professional services all have high potential for working remotely, and all added high-wage jobs.
- Local educational services – public K-12 schools – suffered a 16.7 percent drop in employment; jobs paying below $20.00 per hour dropped by 39.5 percent. These were largely lower-paid positions like educational assistants, special education paraprofessionals, and bus drivers.

Figure 6-10. Change in FTE employment by hourly wage ranges, by sector and selected industries
Washington state, 2019 to 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse



Job losses in the COVID-19 recession were disproportionately low-wage jobs but varied widely by sector.

Incumbent workers fared well

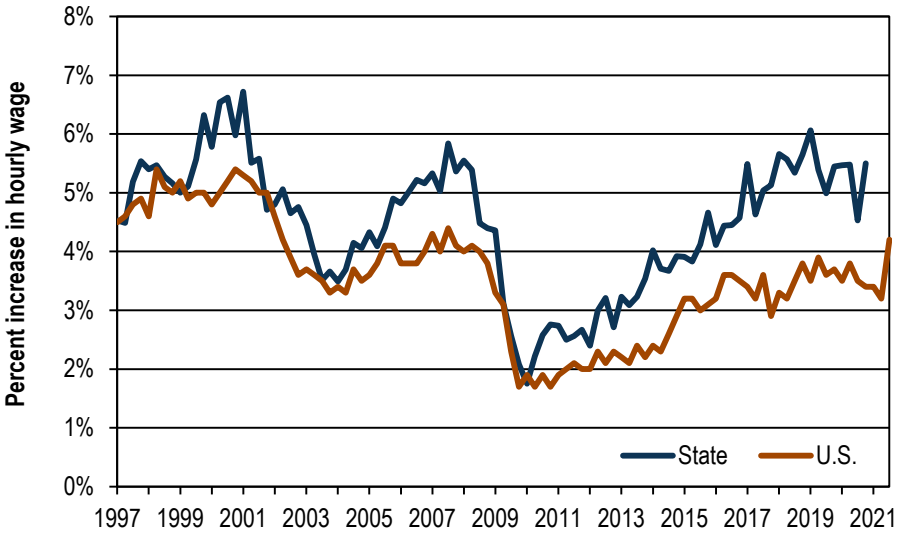
It's important to remember that when we're comparing what employers pay at different time periods, we're talking about a different set of workers in each time period. Some workers from an earlier time period will have withdrawn from the state workforce for a variety of reasons – retirement, caring for family members, moving out of state, pandemics, etc., – while for similar reasons, the later time period will contain workers not in the earlier period. So, if we ask whether average wages have gone up faster in the state than nationally, does this mean that individual workers have (on average) been doing better here as well? The answer is not necessarily. The average may have been pushed up, for example, because new jobs paid above the average. However, it again turns out to be true in this case.

The Federal Reserve Bank of Atlanta's Wage Growth Tracker[29] measures the median over-the-year change in hourly wages for nonfarm workers. According to their analysis, the median increase for individual full-time

[29] www.frbatlanta.org/chcs/wage-growth-tracker.

workers' wages hovered around 3.5 percent from 2016 into 2021. It dropped to 3.2 percent in second quarter 2021 before jumping to 4.2 percent in third quarter 2021, not adjusted for inflation.[30] That was the highest rate since 2007. Using a similar set of workers – individuals who worked at least 455 hours in each quarter (the equivalent of working 35 hours per week) – wage increases in Washington have been substantially higher (*Figure 6-11*), exceeding 5 percent in all but two quarters in 2018 to 2020. As the Atlanta Fed notes, the individuals in their national dataset were somewhat older, more educated, and more likely to work as a professional than the general population, due to the requirement for continuous employment; those same characteristics were likely true for the comparable state dataset.

Figure 6-11. Median year-over-year increase in hourly wage for full-time workers, not adjusted for inflation
U.S. and Washington state, 1997 through third quarter 2021
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse; Atlanta Federal Reserve Bank



Incumbent Washington workers have usually enjoyed larger increases in hourly wages than their counterparts around the nation.

When the dust settled, wage inequality increased

A common way to measure wage inequality is to compare wage levels at the top with wages at the bottom. We can divide jobs into 10 equal groups, starting with the 10 percent of jobs with the lowest hourly wage, then the next 10 percent, and so on until we get to the top 10 percent. The mathematical term for each group is a decile. To track wage

[30] Adjustment for inflation would have lowered the gain to about 1.8 percent.

inequality, we can calculate the 90/10 ratio, defined as the ratio of the average hourly wage for the top 10 percent of jobs with the average hourly wage for the bottom 10 percent of jobs.

First, a look back at the last time the economy was in a recession: in 2008 to 2009, job losses were initially concentrated at the lower end of the wage spectrum, before broadening a bit as the recession deepened. The remaining jobs, as a whole, had a higher average wage because of the loss of lower-wage jobs. Average wages for deciles (each 10 percent of jobs, from the lowest-paid 10 percent on up) rose by about 4 percent, except at the top, where the average increased by only 2.1 percent. The distance between the top and the bottom – the 90/10 ratio – declined slightly, from 9.9 to 9.7. In essence, jobs at the top paid about 10 times the hourly wage as those on the bottom.

After 2009, the 90/10 ratio increased in most years, reaching 11.2 in 2019. In 2020, wage inequality increased, and the 90/10 ratio jumped to 12.0. That was the largest single year increase over the past 30 years, with the exception of 1998 and 1999, when stock options were included in the data and a bubbling stock market created some large payouts. It was also the highest ratio during that period, except for 1999. What makes this extraordinary is that the average wage for the bottom 10 percent of jobs had its largest increase on record, in part due to the sizable increase in the minimum wage, and in part due to the substantial loss of lower-wage jobs. Wages at the top end increased much faster than those at the bottom.

To add a bit more nuance, the gap between the average wage for the top 10 percent and the median hourly wage increased to its highest level on record with the former 5.7 times higher the latter, while the distance between the median and the average for the bottom 10 percent closed slightly to a ratio of 2.1, the lowest on record. Stated more plainly, the average job in the top 10 percent paid almost six times the median hourly wage, while jobs in the bottom 10 percent averaged about half of the median wage.

Figure 6-12 summarizes the increase in wage inequality over the past 30 years. It shows that while both the median and average have been trending upward over the past three decades, the gap between the two has widened considerably. In 1990, the median was 81.5 percent of the average; by 2018 it was only 65.1 percent. The widening gap indicates that wage inequality has been increasing. Note that during the 1998 to 2002 period, stock options were included as part of wages and heavily influenced the average.

Figure 6-12. Measuring the wage gap, 2020 dollars
Washington state, 2001 through 2020
Source: Employment Security Department/DATA Division, Unemployment Insurance Data Warehouse

Wages	2001	2007	2017	2018	2019	2020	Percent change 2019-2020
Median hourly wage	$23.05	$23.53	$26.10	$26.72	$27.46	$29.28	6.6%
Average hourly wage for:							
All jobs	$31.18	$31.84	$38.01	$39.74	$41.13	$44.99	9.4%
Lowest-paid 10 percent of jobs	$9.97	$10.19	$11.84	$12.31	$12.76	$13.85	8.6%
Second-lowest 10 percent of jobs	$12.68	$12.70	$14.63	$15.12	$15.71	$16.67	6.1%
Third-lowest-paid 10 percent of jobs	$15.39	$15.47	$17.16	$17.62	$18.17	$19.35	6.5%
Fourth-lowest-paid 10 percent of jobs	$18.26	$18.48	$20.20	$20.67	$21.25	$22.66	6.6%
Fifth-lowest-paid 10 percent of jobs	$21.38	$21.75	$23.93	$24.52	$25.19	$26.82	6.5%
Fifth-highest 10 percent of jobs	$24.92	$25.59	$28.57	$29.35	$30.20	$32.16	6.5%
Fourth-highest 10 percent of jobs	$29.36	$30.64	$34.86	$35.85	$36.97	$39.29	6.3%
Third-highest 10 percent of jobs	$35.46	$37.74	$43.65	$44.91	$46.38	$49.27	6.2%
Second-highest 10 percent of jobs	$44.22	$48.23	$57.06	$58.98	$61.20	$65.23	6.6%
Highest-paid 10 percent of jobs	$100.58*	$97.88	$128.51	$138.17	$143.22	$165.91	15.8%
Ratio of highest 10 to lowest 10	10.1	9.6	10.9	11.2	11.2	12.0	NA
Ratio of highest 10 to median	4.4	4.2	4.9	5.2	5.2	5.7	NA
Ratio of median to lowest 10	2.3	2.3	2.2	2.2	2.2	2.1	NA

*Boosted by stock options. Without stock options, the average would have been about $84.00.

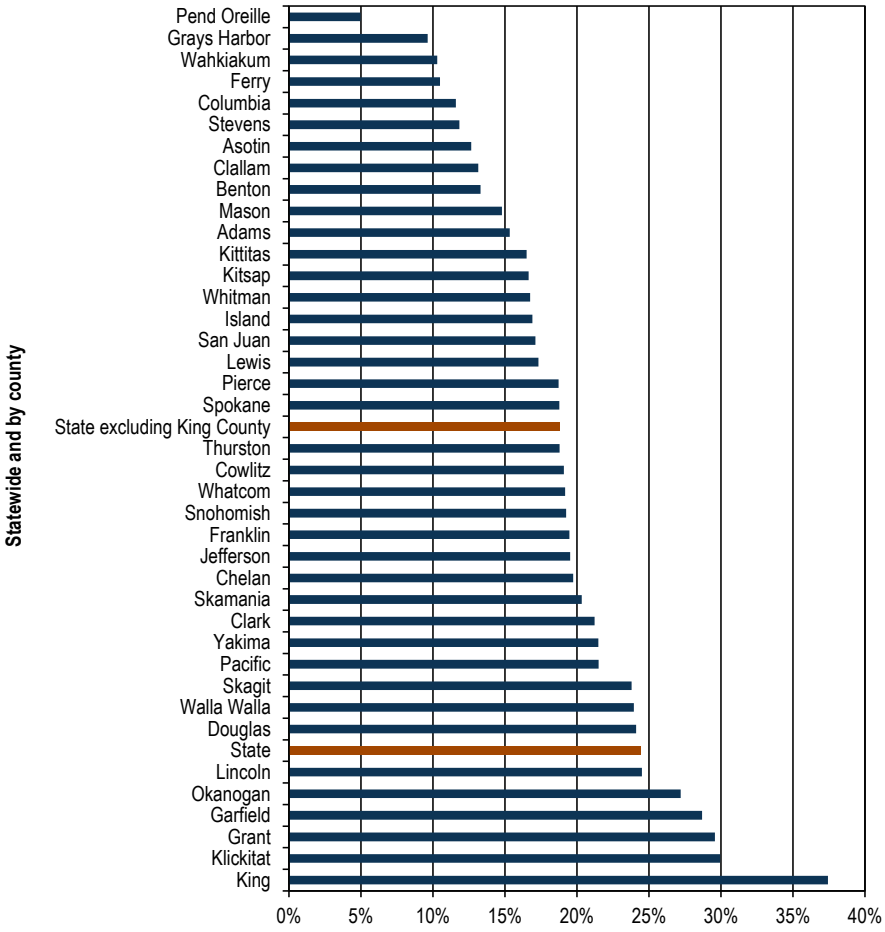
The gap between the highest- and lowest-paid jobs increased again from 2019 to 2020.

Wage inequality across the state

Not surprisingly, wage levels vary widely across the state. The median hourly wage by county in 2020 varied from $38.86 in King County to $18.27 in Okanogan County. Wages at the county level will be determined in large part by the industries present, the occupational pattern of employment in those industries, and the cost of living (the biggest difference county to county being housing costs).

Figure 6-13 shows the inflation-adjusted change in the median hourly wage for each county, from 2007 to 2020. While King County takes the top spot, most of the counties with more rapid growth in the median were east of the Cascades.

Figure 6-13. Change in median hourly wage, 2020 dollars
Washington state, 2007 to 2020
Source: Employment Security Department/DATA Division; Unemployment Insurance Data Warehouse



The median hourly wage increased in every county from 2007 to 2020. Seven counties exceeded the state's gain of 24.4 percent, led by King County at 37.4 percent.

Average monthly wages by worker demographics

The Longitudinal Employment-Household Dynamics (LEHD) program is a partnership between the U.S. Census Bureau and states in which Census adds demographic detail to state employment databases. One of the program's products is the Local Employment Dynamics (LED) database, which provides employment data and average monthly wage by industry and county with three demographic breakouts: age group by gender (although only male and female are available); education by gender (for those aged 30 and above); and race by ethnicity (Hispanic/non-Hispanic).

LED data is based on the quarterly wage files, and so does not correspond exactly to monthly employment estimates from the Quarterly Census of Employment and Wages (QCEW). Calculating an average wage is problematic on a quarterly basis because the number of hours worked by a particular worker with a particular employer can vary tremendously, from as little as one hour, up to 520 hours (equivalent to working eight hours a day, five days a week) or more depending upon overtime. LED solves this problem in part by identifying "full-quarter" jobs – jobs which exist not only in the quarter being analyzed, but in the previous and subsequent quarters as well. The presumption is that the job provided steady work (whether part time or full time) throughout the quarter, and so an average monthly wage – total quarterly earnings divided by three – would be representative. Note that because shorter-term jobs, which generally are lower paid, are not included, the averages shown are significantly higher than the average wage for all jobs.

As shown in *Figure 6-14*:

- The average monthly wage for full-quarter jobs held by women ($5,256) was 78.8 percent of the average for all jobs. The ratio of the average for women versus the average for men was 65.7 percent. This was only modestly higher than the 60.4 percent from 1992.
- The average monthly wage for jobs held by African American, Indigenous, Pacific Islander, and multi-racial workers was significantly below the average for all jobs. Wages for African American and Indigenous workers have grown slower than the average for all workers. Indigenous workers had the lowest average wage in 2020.
- The average for jobs held by Asian American workers was substantially higher than the average for all jobs. It should be noted that this racial group, like all others, is very diverse, with some members whose families have been here for many generations to some (like Syrian war refugees) who have only recently arrived in this country. There is likely a more unequal distribution of wages within this group than any other.
- The average for Latino/Hispanic workers was the second-lowest for any racial/ethnic group.
- The peak age for earnings was the 45 to 54 age group. Average wages increase with age, before dropping somewhat above the age of 54, probably because higher-wage workers can afford to retire earlier.

- The wage premium for graduating with a four-year degree (or more) has increased since 1992, but has changed little since 2006.

Figure 6-14. Demographic wage gaps, 2020 dollars
Washington state, 1992, 2006 and 2020
Source: Local Employment Dynamics database/Census Bureau, states. Calculations by Employment Security Department/DATA Division

Type of transfer payment	1992	Percent of average for all jobs	2006	Percent of average for all jobs	2020	Percent of average for all jobs
All jobs	**$4,003**	**100.0%**	**$4,711**	**100.0%**	**$6,669**	**100.0%**
By gender:						
Female	$4,752	118.7%	$5,733	121.7%	$7,994	119.9%
Male	$3,178	79.4%	$3,642	77.3%	$5,256	78.8%
By race:						
African American	$3,347	83.6%	$3,766	80.0%	$5,127	76.9%
Indigenous	$2,938	73.4%	$3,463	73.5%	$4,467	67.0%
Asian American	$3,427	85.6%	$4,709	100.0%	$9,057	135.8%
Pacific Islander	$2,888	72.1%	$3,392	72.0%	$4,618	69.2%
Multi-racial	$3,151	78.7%	$3,814	81.0%	$5,465	81.9%
White	$4,085	102.1%	$4,808	102.1%	$6,536	98.0%
By ethnicity:						
Latino/Hispanic	$2,636	65.8%	$3,230	68.6%	$4,555	68.3%
Non-Latino/Hispanic	$4,063	101.5%	$4,828	102.5%	$6,940	104.1%
By age:						
14-18	$714	17.8%	$909	19.3%	$1,174	17.6%
19-21	$1,513	37.8%	$1,673	35.5%	$2,058	30.9%
22-24	$3,032	75.7%	$2,564	54.4%	$3,522	52.8%
25-34	$3,560	88.9%	$4,097	87.0%	$5,809	87.1%
35-44	$4,741	118.4%	$5,418	115.0%	$7,691	115.3%
45-54	$4,850	121.1%	$5,667	120.3%	$8,271	124.0%
55-64	$4,584	114.5%	$5,329	113.1%	$7,152	107.2%
65+	$2,267	56.6%	$3,036	64.4%	$4,980	74.7%
By educational attainment (aged 30 older)						
Did not finish high school	$2,839	70.9%	$3,005	63.8%	$4,986	74.8%
High school diploma/GED	$3,434	85.8%	$3,809	80.9%	$5,529	82.9%
Some college/AA	$4,038	100.9%	$4,532	96.2%	$6,203	93.0%
Bachelor's or higher	$5,644	141.0%	$6,935	147.2%	$9,802	147.0%
Under age 30	$2,067	51.6%	$1,963	41.68%	$2,688	40.3%

Data for full-quarter jobs show that there are significant differences between the average wage for workers by gender, race, ethnicity, age and education, many of which have persisted for decades.

Chapter 7: Economic comparisons with other states

This chapter presents several tables of economic data, comparing Washington to the nation as a whole as well as other states and the District of Columbia. Minimum wage, unemployment rate, job growth, annual exports, per capita income, privately owned building permits and median single-family home cost are presented as economic indicators for comparison, as well as a current ranking for Washington state.

- *Figure 7-1* shows the growth of the minimum wage in Washington state compared to other states. Currently, Washington state has the second-highest minimum wage of $13.69 per hour with only the District of Columbia with a higher rate of $15.20.
- *Figure 7-2* depicts the highest and lowest unemployment rate for Washington compared to other states and the nation. In 2020, Washington state was in 41st place.
- *Figure 7-3* shows the highest and lowest average annual job growth rates for states. As of 2020, Washington state had an average annual job growth rate of 0.90 percent, placing it ninth in the nation.
- *Figure 7-4* ranks the highest and lowest annual exports for states. In 2020, Washington was in ninth place with over $41 billion in annual exports. These figures are specifically tied to the exports flowing through ports and terminals, and only reflect the value of goods flowing through Washington state, which are not necessarily produced within the state.
- *Figure 7-5* compares the highest and lowest per capita income and average annual growth rate for states in 2010 and 2020. Washington ranks seventh for income and third for growth.
- *Figure 7-6* shows the number of housing building permits for 2010 and 2020. Washington ranked eighth in 2020.
- *Figure 7-7* shows median single-family house prices in metropolitan statistical areas (MSAs) as well as the rate of change between 2018 and 2020. Several MSAs in Washington are included in this list with the Seattle-Tacoma-Bellevue area listed as the eighth highest in the nation with a 2020 median house price of $596,900 and a 19.0 percent rate of change between 2018 and 2020. The Kennewick-Richland MSA, Spokane-Spokane Valley MSA and Yakima MSA were in 42nd, 51st, and 62nd place respectively.

Minimum wage

Figure 7-1 States with minimum wage higher than federal minimum wage, based on 2020 ranking
United States and Washington state, 2011, 2016 and 2021
Source: U.S. Department of Labor

Rank	State	2011	2016	2021
N/A	**United States**	**$7.25**	**$7.25**	**$7.25**
1	District of Columbia	$8.25	$11.50	$15.20
2	**Washington**	**$8.67**	**$9.47**	**$13.69**
3	Massachusetts	$8.00	$10.00	$13.50
4	California	$8.00	$10.00	$13.00
4	Connecticut	$8.25	$9.60	$13.00
5	Oregon	$8.50	$9.75	$12.75
6	New York	$7.25	$9.00	$12.50
7	Colorado	$7.36	$8.31	$12.32
8	Arizona	$7.35	$8.05	$12.15
8	Maine	$7.50	$7.50	$12.15
9	New Jersey	$7.25	$8.38	$12.00
10	Maryland	$7.25	$8.75	$11.75
10	Vermont	$8.15	$9.60	$11.75
11	Rhode Island	$7.40	$9.60	$11.50
12	Arkansas	$6.25	$8.00	$11.00
12	Illinois	$8.25	$8.25	$11.00
13	New Mexico	$7.50	$7.50	$10.50
14	Alaska	$7.75	$9.75	$10.34
15	Missouri	$7.25	$7.65	$10.30
16	Hawaii	$7.25	$8.50	$10.10
17	Minnesota	$6.15	$9.50	$10.08
18	Nevada	$8.25	$8.25	$9.75
19	Michigan	$7.40	$8.50	$9.65
20	Virginia	$7.25	$7.25	$9.50
21	South Dakota	$7.25	$8.55	$9.45
22	Delaware	$7.25	$8.25	$9.25
23	Nebraska	$7.25	$9.00	$9.00
24	Ohio	$7.40	$8.10	$8.80
25	Montana	$7.35	$8.05	$8.75
25	West Virginia	$7.25	$8.75	$8.75
26	Florida	$7.25	$8.05	$8.65

Figure 7-2. Highest and lowest state unemployment rates, not seasonally adjusted, based on 2020 ranking
United States and Washington state, 2010, 2015 and 2020
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Unemployment rates

Rank	State	2010	2015	2020
	United States	**9.6%**	**5.3%**	**8.1%**
1	Nebraska	4.6%	3.0%	4.2%
2	South Dakota	5.0%	3.1%	4.6%
3	Utah	7.8%	3.6%	4.7%
4	North Dakota	3.8%	2.8%	5.1%
5	Iowa	6.0%	3.8%	5.3%
6	Idaho	9.0%	4.2%	5.4%
7	Maine	8.1%	4.4%	5.4%
8	Vermont	6.1%	3.6%	5.6%
9	Wyoming	6.4%	4.3%	5.8%
10	Alabama	10.5%	6.1%	5.9%
11	Kansas	7.1%	4.2%	5.9%
12	Montana	7.3%	4.2%	5.9%
40	New Mexico	8.1%	6.5%	8.4%
41	**Washington**	**10.0%**	**5.6%**	**8.4%**
42	Massachusetts	8.3%	4.8%	8.9%
43	Pennsylvania	8.5%	5.3%	9.1%
44	Rhode Island	11.2%	6.0%	9.4%
45	Illinois	10.4%	6.0%	9.5%
46	New Jersey	9.5%	5.8%	9.8%
47	Michigan	12.6%	5.4%	9.9%
48	New York	8.6%	5.3%	10.0%
49	California	12.2%	6.2%	10.1%
50	Hawaii	6.9%	3.6%	11.6%
51	Nevada	13.5%	6.8%	12.8%

Nonfarm employment

Figure 7-3. Highest and lowest state average annual job growth rates, nonfarm employment
United States and Washington state, 2000 to 2020
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

Rank	State	Average annual growth rate
	United States	**0.37%**
1	Utah	1.79%
2	Idaho	1.51%
3	Texas	1.31%
4	Arizona	1.21%
5	North Dakota	1.15%
6	Nevada	1.09%
7	Florida	0.94%
8	Montana	0.92%
9	**Washington**	**0.90%**
10	Colorado	0.89%
11	District of Columbia	0.70%
12	Wyoming	0.66%
40	Maine	-0.06%
41	Pennsylvania	-0.08%
42	Rhode Island	-0.18%
43	New Jersey	-0.19%
44	Vermont	-0.20%
45	Mississippi	-0.20%
46	Louisiana	-0.21%
47	Illinois	-0.30%
48	Ohio	-0.34%
49	Connecticut	-0.39%
50	West Virginia	-0.44%
51	Michigan	-0.74%

Figure 7-4. Highest and lowest state annual exports,* based on 2020 ranking
United States and Washington state, 2010, 2015 and 2020
Source: U.S. Department of Commerce, Office of Trade and Economic Analysis

Annual exports

Rank	State	2010	2015	2020
	United States	**$1,278,494,525,839**	**$1,503,328,349,746**	**$1,424,934,919,133**
1	Texas	$206,992,356,499	$248,780,410,089	$276,369,086,396
2	California	$143,208,226,608	$165,360,377,800	$155,885,762,551
3	New York	$69,684,943,969	$83,124,545,673	$65,596,406,582
4	Louisiana	$41,370,690,441	$48,678,638,510	$58,367,501,192
5	Illinois	$50,060,707,025	$63,368,690,936	$53,325,226,578
6	Florida	$55,399,353,874	$53,903,078,437	$45,726,838,635
7	Ohio	$41,504,651,676	$51,261,855,967	$45,065,642,203
8	Michigan	$44,851,338,759	$53,944,933,483	$44,367,005,911
9	**Washington**	**$53,345,329,885**	**$86,374,679,575**	**$41,140,212,396**
10	Georgia	$28,898,749,200	$38,596,033,966	$38,846,276,612
42	New Mexico	$1,542,649,869	$3,781,702,640	$3,688,039,118
43	Idaho	$5,156,539,809	$4,302,089,548	$3,406,606,663
44	District of Columbia	$1,482,780,613	$1,088,013,785	$2,770,038,009
45	Rhode Island	$1,948,784,173	$2,132,706,241	$2,357,807,184
46	Vermont	$4,278,137,163	$3,176,353,744	$2,357,335,844
47	Maine	$3,162,186,695	$2,761,768,870	$2,339,412,110
48	Montana	$1,393,457,515	$1,404,092,314	$1,436,741,082
49	South Dakota	$1,259,405,035	$1,420,507,519	$1,378,644,130
50	Wyoming	$983,304,393	$1,174,994,159	$1,163,796,502
51	Hawaii	$684,102,935	$1,896,394,504	$319,882,693

*Annual exports represent the value of goods flowing through ports/terminals. These goods may originate from places other than the port-state and thus export values do not necessarily reflect the health of the economy in the state where the port(s) are located.

Personal income

Figure 7-5. Highest and lowest state per capita personal income,[1] in 2020 dollars,[2] based on 2020 ranking
United States and Washington state, 2010 and 2020
Source: U.S. Bureau of Economic Analysis

Rank	State	2010	2020	Average annual growth rate[3]
N/A	**United States**	**$40,278**	**$59,510**	**4.0%**
1	District of Columbia	$61,875	$86,567	3.4%
2	Connecticut	$62,121	$78,609	2.4%
3	Massachusetts	$53,058	$78,458	4.0%
4	New York	$48,145	$74,472	4.5%
5	New Jersey	$51,330	$73,460	3.6%
6	California	$43,323	$70,192	4.9%
7	**Washington**	**$42,206**	**$67,126**	**4.7%**
8	New Hampshire	$47,154	$67,097	3.6%
9	Maryland	$49,885	$66,799	3.0%
10	Colorado	$39,930	$63,776	4.8%
42	Oklahoma	$35,912	$49,878	3.3%
43	Arizona	$33,565	$49,648	4.0%
44	Idaho	$31,728	$48,759	4.4%
45	South Carolina	$32,161	$48,021	4.1%
46	Kentucky	$33,031	$47,339	3.7%
47	Arkansas	$31,801	$47,235	4.0%
48	Alabama	$33,696	$46,479	3.3%
49	New Mexico	$33,111	$46,338	3.4%
50	West Virginia	$32,080	$44,994	3.4%
51	Mississippi	$30,568	$42,129	3.3%

[1] Per capita personal income is total personal income divided by total mid-year population. The Bureau of Economic Analysis (BEA) state per capita personal income statistics are calculated using Census Bureau mid-year population estimates. These annual mid-year estimates are based on the 2010 census. The BEA will incorporate Census Bureau mid-year population estimates based on the 2020 census results when they become available.

[2] Note – All dollar estimates are millions of current dollars (not adjusted for inflation). Calculations are performed on unrounded data.

[3] Last updated: September 23, 2021 – revised statistics for 1998 to 2020.

Figure 7-6. Highest and lowest states in number of authorized privately owned housing units authorized, based on 2020 ranking
United States and Washington state, 2010 and 2020
Source: U.S. Census Bureau

Rank	State	2010 building permits	2020 building permits	Percent change 2010 to 2020
	United States	**604,610**	**1,471,141**	**143.3%**
1	Texas	88,461	230,503	160.6%
2	Florida	38,679	164,074	324.2%
3	California	43,716	106,075	142.6%
4	North Carolina	33,889	80,474	137.5%
5	Arizona	12,370	60,342	387.8%
6	Georgia	17,265	55,827	223.4%
7	Tennessee	16,475	49,719	201.8%
8	**Washington**	**20,691**	**43,881**	**112.1%**
9	South Carolina	14,021	42,340	202.0%
10	Colorado	11,591	40,469	249.1%
42	Maine	3,034	5,304	74.8%
43	New Mexico	4,533	5,219	15.1%
44	New Hampshire	2,670	4,320	61.8%
45	North Dakota	3,833	3,493	-8.9%
46	West Virginia	2,395	3,204	33.8%
47	Hawaii	3,442	3,164	-8.1%
48	Wyoming	2,298	2,128	-7.4%
49	Vermont	1,319	2,077	57.5%
50	Alaska	904	1,420	57.1%
51	Rhode Island	934	1,374	47.1%

Building permits

House prices

Figure 7-7. Median single-family house prices, based on 2020 ranking
Selected U.S. metropolitan areas
United States and Washington state, 2018 to 2020
Source: National Association of Realtors

Rank	Metropolitan area	2018	2020	Percent change 2018 to 2020
	United States	**$261,600**	**$300,200**	**14.8%**
1	San Jose-Sunnyvale-Santa Clara, CA	$1,340,000	$1,385,000	3.4%
2	San Francisco-Oakland-Hayward, CA	$987,500	$1,100,000	11.4%
3	Anaheim-Santa Ana-Irvine, CA	$820,000	$900,000	9.8%
4	Urban Honolulu, HI	$802,700	$851,500	6.1%
5	San Diego-Carlsbad, CA	$634,000	$710,000	12.0%
6	Los Angeles-Long Beach-Glendale, CA	$590,800	$662,300	12.1%
7	Boulder, CO	$607,400	$645,900	6.3%
8	**Seattle-Tacoma-Bellevue, WA**	**$501,400**	**$596,900**	**19.0%**
9	Boston-Cambridge-Newton, MA-NH	$477,400	$563,700	18.1%
10	Nassau County-Suffolk County, NY	$476,900	$545,200	14.3%
14	Denver-Aurora-Lakewood, CO	$449,900	$492,700	9.5%
18	Portland-Vancouver-Hillsboro, OR-WA	$395,700	$451,000	14.0%
30	Eugene, OR	$291,700	$354,900	21.7%
32	Salem, OR	$294,800	$353,600	19.9%
42	**Kennewick-Richland, WA**	**$276,900**	**$328,500**	**18.6%**
51	**Spokane-Spokane Valley, WA**	**$239,500**	**$307,400**	**28.4%**
62	**Yakima, WA**	**$226,800**	**$281,300**	**24.0%**
175	Wichita Falls, TX	$120,000	$140,900	17.4%
176	Waterloo-Cedar Falls, IA	$127,000	$138,400	9.0%
177	Erie, PA	$118,700	$135,100	13.8%
178	Peoria, IL	$124,300	$128,100	3.1%
179	Binghamton, NY	$121,100	$127,700	5.5%
180	Cumberland, MD-WV	$100,500	$120,900	20.3%
181	Elmira, NY	$111,200	$120,400	8.3%
182	Youngstown-Warren-Boardman, OH-PA	$94,000	$119,000	26.6%
183	Decatur, IL	$90,800	$102,200	12.6%

Appendices

Appendix 1. Washington's workforce development areas

Appendix figure A1-1. Washington state workforce development aeas (WDAs)

Appendix 2: Seasonal, structural and cyclical industry employment

Theoretical base for employment decomposition

We used R's advanced decomposition models for time series.

Decomposition of employment for each point in time (months, in our case) is:

Employment = (trend + cycle) + seasonal + irregular

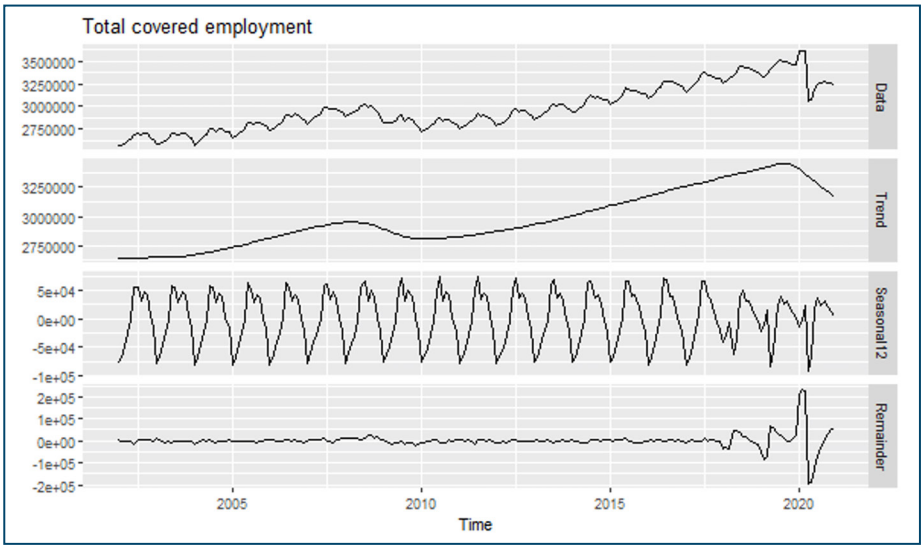
Within the decomposed employment components, trends are a result of structural changes.

There are two steps in the process of time series decomposition:

1. We split the series between; combined trend (which includes trend + cycle), seasonal and irregular (remainder) components.
2. We split the combined trend (trend + cycle) into trend and cyclical components.

Appendix figure A2-1 represents the main components of decomposition for total nonfarm employment. The trend component in the figure is the result of the first step of decomposition and represents the combination of trend plus cycle. The trend plus cycle component is used in further sequential processing steps later in the decomposition process.

Appendix figure A2-1. Total covered employment time series and its main components Washington state, 2002 to 2020
Source: Employment Security Department/DATA Division; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages



We used a state space model with auto selection of model variations (types of error, trend and seasonality). Model variations can be additive, multiplicative, none, etc. The software also includes the choice of 30 exponential smoothing variations. The main advantage of this type of approach is that the types of models are not predefined and thus can vary for different series. In standard U.S. Census Bureau ARIMA models, parameters are estimated for each series, but models are predefined and remain the same for all series.

The software selects the model that minimizes the Akaike's Information Criteria (AIC).

The state space approach allows for the optimized selection of models for each individual series. This entails the selection of the best model and then parameters are subject to change as time periods change. This is a major difference from classical regression (one level models). In addition, under this approach, regardless of the selection of seasonal or irregular models (additive or multiplicative), the sum of decomposition components (combined trend, seasonal and irregular) remains equal to the initial series for each month.

In step two, we used the combined trend series from step one for our analyses of the contributions of structural and cyclical components to growth. To accomplish this, we used the Hodrick-Prescott (HP) filter. This filter is a smoothing method that is widely used among macroeconomists to obtain a smooth estimate of the long-term trend component of a series.

Technically, the HP filter is a two-sided linear filter that computes the smoothed series s of y by minimizing the variance of y around s, subject to a penalty that constrains the second difference of s. That is, the HP filter chooses s to minimize:

$$\sum_{t=1}^{T}(y_t - s_t)^2 + \lambda * \sum_{t=2}^{T-1}[((s_{t+1} - s_t) - (s_t - s_{t-1})]^2$$

The penalty parameter λ controls the smoothness of the series s. The larger the λ, the smoother the s. As λ=∞, s approaches a linear trend.

We used default value λ=14,400 for monthly frequencies. This default value was defined by dividing the number of months per year by four raised to a power (default value 2)[31] and multiplying by 1,600. For our purpose, for all series regardless of the model selected, the HP filter chooses s to minimize:

[31] We stayed with the power of two for this analysis, but the other possibility is to use the power of four.

$$\sum_{t=1}^{T}(y_t - s_t)^2 + 14{,}400 * \sum_{t=2}^{T-1}[((s_{t+1} - s_t) - (s_t - s_{t-1})]^2$$

Industry seasonality levels

The level of employment seasonality for an industry is defined as an average of absolute values of the seasonal component divided by the initial series (mean (|seasonal| /employment)). The levels are presented in column three of *Appendix figure A2-2*. A larger level value indicates a larger seasonality value for the industry. To interpret the seasonal factors, arbitrary thresholds were established. Industries with a seasonal factor value of up to 1.0 percent were identified as not seasonal. Industries with a factor value greater than 1.0 and up to 2.0 percent were identified as having low levels of seasonality. Industries with a factor value greater than 2.0 and up through 4.0 percent were identified as having moderate levels of seasonality, while industries with a factor value greater than 4.0 percent were considered to have high levels of seasonality. The results are listed in column four of *Appendix figure A2-2*.

Structural and cyclical contributions to industry employment changes

Relative contributions to monthly employment change are calculated as the average for all months of absolute differences (one-month difference) for specific factors (presented in columns five and six of the table in *Appendix figure A2-2*). The percentages of relative contributions for trend (structural) and cycle components are presented in columns seven and eight. The industry that had the lowest cyclical component contribution (8.6 percent) was ambulatory health care services, while support activities for mining had the highest cyclical component contribution (67.2 percent). The structural component (trend) accounted for the dominant share of change in total employment (79.7 percent), while the cyclical component accounted for the residual (20.3 percent).

Appendix figure A2-2. Employment decomposition components
Washington state, 2002 to 2020
Source: Employment Security Department/DATA Division; Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Seasonal factor	Level of seasonality	Trend (average number)	Cycle (average number)	Trend (percent)	Cycle (percent)
000	**Total covered employment**	**1.29%**	**Low**	**4,382**	**2,491**	**63.75%**	**36.25%**
111	Crop production	31.03%	High	129	147	46.74%	53.26%
112	Animal production and aquaculture	2.25%	Moderate	6	5	53.52%	46.48%
113	Forestry and logging	2.33%	Moderate	16	8	67.77%	32.23%
114	Fishing, hunting and trapping	5.62%	High	4	5	46.10%	53.90%
115	Support activities for agriculture and forestry	17.01%	High	65	62	51.05%	48.95%
212	Mining (except oil and gas)	3.35%	Moderate	10	6	64.60%	35.40%
213	Support activities for mining	11.52%	High	2	3	35.16%	64.84%
221	Utilities	1.41%	Low	9	11	45.44%	54.56%
236	Construction of buildings	2.43%	Moderate	216	86	71.45%	28.55%
237	Heavy and civil engineering construction	7.25%	High	63	34	64.84%	35.16%
238	Specialty trade contractors	3.06%	Moderate	523	197	72.62%	27.38%
311	Food manufacturing	4.24%	High	33	26	56.31%	43.69%
312	Beverage and tobacco product Manufacturing	5.06%	High	30	15	67.35%	32.65%
313	Textile mills	1.75%	Low	1	1	53.50%	46.50%
314	Textile product mills	1.10%	Low	5	5	49.30%	50.70%
315	Apparel manufacturing	1.73%	Low	6	7	45.29%	54.71%
316	Leather and allied product Manufacturing	5.02%	High	1	2	45.67%	54.33%
321	Wood product manufacturing	1.07%	Low	48	29	62.01%	37.99%
322	Paper Manufacturing	0.65%	Not seasonal	26	15	63.12%	36.88%
323	Printing and related support activities	0.80%	Not seasonal	22	14	61.06%	38.94%
324	Petroleum and coal products manufacturing	1.68%	Low	5	6	45.38%	54.62%
325	Chemical manufacturing	0.58%	Not seasonal	15	11	56.11%	43.89%
326	Plastics and rubber products manufacturing	0.80%	Not seasonal	21	15	57.87%	42.13%
327	Nonmetallic mineral product manufacturing	1.98%	Low	26	15	63.52%	36.48%
331	Primary metal manufacturing	0.80%	Not seasonal	18	20	48.62%	51.38%
332	Fabricated metal product manufacturing	0.81%	Not seasonal	42	47	46.96%	53.04%
333	Machinery manufacturing	0.80%	Not seasonal	43	42	50.72%	49.28%
334	Computer and electronic product manufacturing	0.33%	Not seasonal	39	35	53.05%	46.95%
335	Electrical equipment, appliance and component manufacturing	0.51%	Not seasonal	9	8	51.84%	48.16%
336	Transportation equipment manufacturing	1.56%	Low	231	366	38.71%	61.29%
337	Furniture and related product manufacturing	1.06%	Low	29	14	67.85%	32.15%
339	Miscellaneous manufacturing	0.85%	Not seasonal	14	14	49.81%	50.19%
423	Merchant wholesalers, durable goods	0.51%	Not seasonal	110	84	56.61%	43.39%
424	Merchant wholesalers, nondurable goods	1.25%	Low	42	37	53.14%	46.86%

NAICS	Industry	Seasonal factor	Level of seasonality	Trend (average number)	Cycle (average number)	Trend (percent)	Cycle (percent)
425	Wholesale electronic markets and agents and brokers	1.05%	Low	105	32	76.61%	23.39%
441	Motor vehicle and parts dealers	1.11%	Low	89	49	64.68%	35.32%
442	Furniture and home furnishings stores	2.11%	Moderate	25	20	56.20%	43.80%
443	Electronics and appliance stores	2.68%	Moderate	25	27	47.62%	52.38%
444	Building material and garden equipment and supplies dealers	3.47%	Moderate	72	30	70.69%	29.31%
445	Food and beverage stores	1.36%	Low	53	50	51.80%	48.20%
446	Health and personal care stores	1.28%	Low	18	14	56.79%	43.21%
447	Gasoline stations	1.58%	Low	11	10	51.99%	48.01%
448	Clothing and clothing accessories stores	4.83%	High	88	70	55.86%	44.14%
451	Sporting goods, hobby, musical instrument and book stores	3.58%	Moderate	30	24	55.61%	44.39%
452	General merchandise stores	3.08%	Moderate	131	60	68.55%	31.45%
453	Miscellaneous store retailers	2.05%	Moderate	51	29	63.45%	36.55%
454	Nonstore retailers	1.60%	Low	293	97	75.20%	24.80%
481	Air transportation	0.65%	Not seasonal	40	27	60.39%	39.61%
483	Water transportation	2.91%	Moderate	9	9	48.91%	51.09%
484	Truck transportation	2.06%	Moderate	34	26	57.13%	42.87%
485	Transit and ground passenger transportation	2.33%	Moderate	14	16	46.75%	53.25%
486	Pipeline transportation	1.41%	Low	1	1	39.55%	60.45%
487	Scenic and sightseeing transportation	20.29%	High	4	4	49.10%	50.90%
488	Support activities for transportation	1.07%	Low	49	33	59.82%	40.18%
491	Postal service	3.77%	Moderate	1	1	42.29%	57.71%
492	Couriers and messengers	5.36%	High	48	25	65.54%	34.46%
493	Warehousing and storage	2.17%	Moderate	49	43	53.66%	46.34%
511	Publishing industries (except Internet)	0.97%	Not seasonal	156	51	75.20%	24.80%
512	Motion picture and sound recording industries	4.07%	High	24	20	54.34%	45.66%
515	Broadcasting (except Internet)	0.77%	Not seasonal	7	6	54.52%	45.48%
517	Telecommunications	0.41%	Not seasonal	52	29	64.71%	35.29%
518	Data processing, hosting and related services	1.52%	Low	55	34	61.85%	38.15%
519	Other information services	4.96%	High	137	38	78.10%	21.90%
521	Monetary Authorities-Central Bank	0.77%	Not seasonal	1	0	62.19%	37.81%
522	Credit intermediation and related activities	0.41%	Not seasonal	115	67	63.09%	36.91%
523	Securities, commodity contracts, and other financial investments and related activities	0.35%	Not seasonal	19	16	55.10%	44.90%
524	Insurance carriers and related activities	0.34%	Not seasonal	35	30	53.69%	46.31%
525	Funds, trusts and other financial vehicles	13.37%	High	2	3	43.01%	56.99%
531	Real estate	1.20%	Low	73	38	65.99%	34.01%
532	Rental and leasing services	2.86%	Moderate	39	21	64.57%	35.43%
533	Lessors of nonfinancial intangible assets (except copyrighted works)	3.81%	Moderate	4	3	59.78%	40.22%

NAICS	Industry	Seasonal factor	Level of seasonality	Trend (average number)	Cycle (average number)	Trend (percent)	Cycle (percent)
541	Professional, scientific and technical services	0.45%	Not seasonal	377	164	69.67%	30.33%
551	Management of companies and enterprises	0.43%	Not seasonal	84	52	61.62%	38.38%
561	Administrative and support services	2.93%	Moderate	388	219	63.90%	36.10%
562	Waste management and remediation services	0.85%	Not seasonal	31	32	49.28%	50.72%
611	Educational services	3.45%	Moderate	91	46	66.11%	33.89%
621	Ambulatory health care services	0.42%	Not seasonal	254	70	78.38%	21.62%
622	Hospitals	0.35%	Not seasonal	130	73	63.97%	36.03%
623	Nursing and residential care facilities	0.31%	Not seasonal	59	42	58.77%	41.23%
624	Social assistance	1.36%	Low	356	313	53.19%	46.81%
711	Performing arts, spectator sports and related industries	9.99%	High	36	36	50.07%	49.93%
712	Museums, historical sites and similar institutions	3.74%	Moderate	9	9	49.89%	50.11%
713	Amusement, gambling and recreation industries	4.31%	High	99	101	49.51%	50.49%
721	Accommodation	5.18%	High	100	99	50.24%	49.76%
722	Food services and drinking places	1.99%	Low	612	387	61.25%	38.75%
811	Repair and maintenance	0.92%	Not seasonal	37	28	56.43%	43.57%
812	Personal and laundry services	1.17%	Low	73	46	61.21%	38.79%
813	Religious, grantmaking, civic, professional and similar organizations	2.18%	Moderate	46	48	48.60%	51.40%
814	Private households	6.06%	High	325	294	52.46%	47.54%
901	Federal government (other)	1.01%	Low	67	57	53.99%	46.01%
902	State government (other)	1.60%	Low	71	56	55.96%	44.04%
903	Local government (other)	1.62%	Low	354	202	63.65%	36.35%

Theoretical base to identify relations between industry and total employment

The Granger causality test is a technique for determining whether one time series is useful in forecasting another. Put another way: this test answers the question of whether a time series "X" causes time series "Y." Also, it tests to see how much of the current "Y" values can be explained by past values of the same series, and then to see whether adding lagged values of "X" can improve the explanation.

In our case, the question is whether employment in specific industries "Granger-causes" total employment.

The results of Granger causality are not always clear enough to be able to state that a series "X" Granger-causes series "Y," but not the other way around. In such cases, we can find that neither series Granger-causes the other, or that each Granger-causes the other.

Moreover, Granger causality does not imply true causality. If both series "X" and "Y" are driven by a common third process (variable, series), but with different lags, there would be Granger causality. However, the changes in one series would not have a significant effect on the other. To address this issue, we estimated Granger causality in both directions. We estimated specific industry on total employment and total employment on specific industry employment.

Results of industry and total employment analysis

The last five columns of *Appendix figure A2-3* represent an attempt to connect employment time series for specific industries with employment time series of total covered employment. The first of these five columns represents correlations of series of monthly employment between industries and total employment, while the second of these columns represents correlations of the first differences (monthly changes) for the same series.

The third of these five columns represents an attempt to identify the industries for which monthly employment could help in predicting the next month's total employment. F-statistics from the Granger causality test for time series, with a lag of one month, are presented in this column. The value of "F" indicates the significance of the impact of employment in the industry on the next month's total employment. Larger values indicate effects that were more significant. Probabilities for the rejection of the hypotheses of significance, associated with F-statistics, are listed in the next to last column. A lower probability indicates higher confidence that the effect is significant. To address the issue of possible mutual causality we also tested inverse causality of total employment on specific industries. As previously noted, if both direct and inverse causality are significant, it means that an industry employment series might not be a good indicator for the next month's total employment. The last column of *Appendix figure A2-3* indicates if significant direct causality of industry on total employment without significant inverse causality exists (indicator "yes"). All other cases have an indicator of "no". The cutoff for such definitions was the following: p-value for direct test is not more than 0.01, but for inverse test not less than 0.1. Last year, 17 industries had the indicator "yes." This year, nine industries have an indicator of "yes."

The combination of predictive abilities (indicator "yes") and correlation with total employment and total employment growth can be used to identify the main industries used as coincidental and leading (i.e., one step ahead) economic indicators. In addition, this combination can be used for the one-step-ahead prediction of employment changes. The industries identified by this process are support activities for agriculture and forestry and oil and gas extraction.

Appendix figure A2-3. Relationships between industry and total employment
Washington state, 2002 to 2020
Source: Employment Security Department/DATA Division; Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

NAICS	Industry	Correlation with total employment	Correlation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
000	**Total covered employment**	**100.0%**	**100.0%**	**NA**	**NA**	**NA**
111	Crop production	81.4%	33.6%	47.25	0.00	No
112	Animal production and aquaculture	92.7%	40.4%	19.67	0.00	No
113	Forestry and logging	-75.6%	29.3%	4.94	0.03	No
114	Fishing, hunting and trapping	-90.3%	25.1%	6.10	0.01	No
115	Support activities for agriculture and forestry	96.8%	44.8%	9.24	0.00	Yes
211	Oil and gas extraction	79.5%	12.0%	6.85	0.01	Yes
212	Mining (except oil and gas)	-53.8%	39.7%	8.51	0.00	No
213	Support activities for mining	56.2%	18.7%	15.21	0.00	No
221	Utilities	69.0%	35.7%	538.63	0.00	No
236	Construction of buildings	64.6%	65.7%	8.41	0.00	No
237	Heavy and civil engineering construction	24.5%	60.6%	1.47	0.23	No
238	Specialty trade contractors	76.4%	67.3%	10.94	0.00	No
311	Food manufacturing	90.6%	80.9%	0.56	0.46	No
312	Beverage and tobacco product manufacturing	96.5%	84.0%	0.46	0.50	No
313	Textile mills	-48.0%	28.7%	0.06	0.81	No
314	Textile product mills	-29.7%	55.5%	0.06	0.81	No
315	Apparel manufacturing	-59.9%	40.4%	1.42	0.23	No
316	Leather and allied product manufacturing	-55.4%	-13.5%	30.05	0.00	No
321	Wood product manufacturing	-60.2%	41.0%	2.88	0.09	No
322	Paper manufacturing	-81.7%	31.7%	0.26	0.61	No
323	Printing and related support activities	-74.5%	67.9%	0.21	0.65	No
324	Petroleum and coal products manufacturing	69.4%	28.7%	3.16	0.08	No
325	Chemical manufacturing	95.3%	49.6%	17.48	0.00	No
326	Plastics and rubber products manufacturing	-34.8%	65.2%	17.92	0.00	No
327	Nonmetallic mineral product manufacturing	27.7%	76.8%	15.40	0.00	No
331	Primary metal manufacturing	-21.7%	54.8%	14.55	0.00	Yes
332	Fabricated metal product manufacturing	87.0%	87.5%	16.54	0.00	No
333	Machinery manufacturing	75.9%	72.4%	74.96	0.00	No
334	Computer and electronic product manufacturing	-63.3%	52.9%	0.32	0.57	No
335	Electrical equipment, appliance and component manufacturing	92.2%	10.4%	25.50	0.00	No
336	Transportation equipment manufacturing	65.1%	62.9%	1.02	0.31	No
337	Furniture and related product manufacturing	-40.0%	62.8%	2.94	0.09	No
339	Miscellaneous manufacturing	57.9%	77.2%	3.17	0.08	No

NAICS	Industry	Correlation with total employment	Correlation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
423	Merchant wholesalers, durable goods	59.3%	84.7%	14.98	0.00	No
424	Merchant wholesalers, nondurable goods	86.7%	84.3%	7.21	0.01	No
425	Wholesale electronic markets and agents and brokers	63.2%	11.3%	31.36	0.00	No
441	Motor vehicle and parts dealers	56.9%	81.6%	22.91	0.00	No
442	Furniture and home furnishings stores	-41.0%	72.5%	20.06	0.00	No
443	Electronics and appliance stores	22.8%	52.4%	14.97	0.00	No
444	Building material and garden equipment and supplies dealers	86.6%	37.3%	32.65	0.00	Yes
445	Food and beverage stores	90.3%	-13.2%	19.17	0.00	No
446	Health and personal care stores	88.6%	66.4%	28.86	0.00	No
447	Gasoline stations	-68.3%	33.3%	0.80	0.37	No
448	Clothing and clothing accessories stores	-37.2%	77.7%	34.45	0.00	No
451	Sporting goods, hobby, musical instrument and book stores	-67.1%	79.3%	55.26	0.00	Yes
452	General merchandise stores	75.6%	-5.0%	9.24	0.00	No
453	Miscellaneous store retailers	79.2%	85.9%	7.39	0.01	Yes
454	Nonstore retailers	91.9%	-24.2%	87.83	0.00	Yes
481	Air transportation	66.9%	75.4%	1.93	0.17	No
482	Rail transportation	-5.6%	-28.2%	6.22	0.01	No
483	Water transportation	53.5%	83.6%	170.24	0.00	No
484	Truck transportation	64.2%	59.8%	6.23	0.01	No
485	Transit and ground passenger transportation	73.5%	83.2%	53.52	0.00	No
486	Pipeline transportation	86.4%	21.5%	26.33	0.00	No
487	Scenic and sightseeing transportation	39.0%	70.8%	444.22	0.00	No
488	Support activities for transportation	95.1%	88.9%	378.30	0.00	No
491	Postal service	51.2%	0.6%	4.61	0.03	No
492	Couriers and messengers	75.0%	-42.0%	148.40	0.00	No
493	Warehousing and storage	90.5%	16.4%	124.74	0.00	No
511	Publishing industries (except Internet)	91.5%	0.7%	375.03	0.00	No
512	Motion picture and sound recording industries	38.8%	86.3%	248.94	0.00	No
515	Broadcasting (except Internet)	-83.6%	79.3%	43.94	0.00	Yes
517	Telecommunications	-88.8%	26.0%	1.04	0.31	No
518	Data processing, hosting and related services	91.2%	27.0%	57.60	0.00	No
519	Other information services	92.6%	-3.6%	161.23	0.00	No
521	Monetary Authorities-Central Bank	-58.1%	27.6%	8.13	0.00	No
522	Credit intermediation and related activities	-54.9%	27.8%	1.85	0.17	No
523	Securities, commodity contracts, and other financial investments and related activities	92.9%	35.3%	62.47	0.00	No

NAICS	Industry	Correlation with total employment	Correlation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
524	Insurance carriers and related activities	57.8%	48.4%	0.12	0.73	No
525	Funds, trusts, and other financial vehicles	-83.7%	-14.2%	27.91	0.00	No
531	Real estate	97.6%	82.9%	61.77	0.00	No
532	Rental and leasing services	-56.4%	84.9%	1.02	0.31	No
533	Lessors of nonfinancial intangible assets (except copyrighted works)	-15.2%	46.1%	4.79	0.03	No
541	Professional, scientific and technical services	96.1%	67.4%	47.69	0.00	No
551	Management of companies and enterprises	96.6%	79.8%	16.46	0.00	No
561	Administrative and support services	95.5%	85.0%	67.50	0.00	No
562	Waste management and remediation services	71.4%	-1.1%	106.26	0.00	No
611	Educational services	95.6%	87.7%	9.98	0.00	No
621	Ambulatory health care services	95.5%	78.4%	6.00	0.02	No
622	Hospitals	93.1%	48.5%	12.42	0.00	No
623	Nursing and residential care facilities	81.6%	57.0%	6.95	0.01	No
624	Social assistance	93.9%	16.7%	0.45	0.50	No
711	Performing arts, spectator sports, and related industries	53.3%	84.2%	300.93	0.00	No
712	Museums, historical sites and similar institutions	89.1%	85.7%	123.57	0.00	No
713	Amusement, gambling and recreation industries	49.4%	87.7%	175.33	0.00	No
721	Accommodation	65.0%	89.8%	218.12	0.00	No
722	Food services and drinking places	91.6%	91.3%	601.27	0.00	No
811	Repair and maintenance	24.3%	91.3%	19.77	0.00	Yes
812	Personal and laundry services	93.0%	88.2%	145.02	0.00	No
813	Religious, grantmaking, civic, professional and similar organizations	95.2%	84.2%	0.76	0.38	No
814	Private households	-85.0%	-27.7%	2.47	0.12	No
901	Federal government (other)	71.1%	-61.2%	56.31	0.00	No
902	State government (other)	89.6%	24.2%	18.94	0.00	No
903	Local government (other)	96.3%	85.9%	0.15	0.70	No

Significant, direct causality of industry on total employment, displays a “Yes” indicator in the last column.

Appendix 3. Use and misuse of employment projections

Employment Projections are intended for career development over time, not as the basis for budget or revenue projections, or for immediate corrective actions within the labor market.

Employment projections provide a general outlook for industries and occupations in Washington state. Occupational projections show how many job openings are projected due to occupational employment growth and replacement needs (*separations* and *alternative*).[32] For technical details see: ***2019 Employment Projections Technical Report***.

For the *separations* method, replacement includes openings created by retirements and occupational separations. It does not measure turnover within occupations, i.e., when workers stay within the same occupation, but change employers. For the *alternative* method, replacement includes normal turnover as workers go from one employer to another while staying in the same occupation. *Separations* total openings from occupational projections do not represent total demand, but can be used as an indicator of demand. Alternative total openings for occupational projections do represent total demand. Total demand may be filled by new entrants to the state market. New entrants can be workers from other states or nations, and new entrants can also be graduates from this state, other states or nations. In addition, occupations can be filled by workers already within the market, within a given occupation or from another occupation. Available job openings cannot be reserved for any of these categories since the majority of jobs are open and competitive.

Occupational details for employment (with at least 10 jobs) are presented for the state and all workforce development areas in our employment projections data files available online at: ***https://esd.wa.gov/labormarketinfo/projections***.

Observed and predicted extremes in employment growth and other indicators, such as fastest-growing occupations and shortage of skills, can be used for placement and short-term training decisions. However, these should be limited for use when developing long-term education programs. There are two main reasons for this limitation:

[32] This is discussed in the 2019 Employment Projections Technical Report at: https://esd.wa.gov/labormarketinfo/projections. Due to the non-additive for calculating total openings, in this round of projections we calculated total openings for aggregated occupations as a total for detailed occupations. As a result, the aggregated level of total openings might not equal the total of growth plus replacement.

1. First, with more education targeting occupations with skills shortages, there is a higher probability that this will cause an oversupply in those occupations and skills sets.[33]

2. Second, the general development of transferable skills is much more productive than trying to catch up with a skills shortage.

The U.S. Bureau of Labor Statistics cautions on using Office of Management and Budget (OMB) classifications: "The 2018 SOC was designed solely for statistical purposes. Although it is likely that the 2018 SOC also will be used for various non-statistical purposes (e.g., for administrative, regulatory, or taxation functions), the requirements of government agencies or private users that choose to use the 2018 SOC for non-statistical purposes have played no role in its development, nor will OMB modify the classification to meet the requirements of any non-statistical program.

Consequently, the 2018 SOC is not to be used in any administrative, regulatory, or tax program unless the head of the agency administering that program has first determined that the use of such occupational definitions is appropriate to the implementation of the program's objectives."[34]

Different programs use different SOC coding systems. Combining the employment projections with other data sources generally requires a case-by-case analysis; an understanding of the differences of each program should be clearly explained and properly handled.

[33] Occupational projections are the basis of the Occupations in Demand list. This list is used for determining eligibility for a retraining program (Training Benefits), as well as other education and training programs. See: https://esd.wa.gov/labormarketinfo/LAAO.

[34] See: https://www.bls.gov/soc/2018/soc_2018_user_guide.pdf, pages xxv-xxvi.

Appendix 4. Occupations in Demand (OID) methodology

Employment projections are the basis of the Occupations in Demand (OID) list covering Washington's 12 workforce development areas (WDAs) and the state as a whole. This list is used to determine eligibility for a variety of training and support programs, but was initially created to support the unemployment insurance Training Benefits Program.

The full OID list is accessible through the "Learn about an occupation" tool located at: *https://esd.wa.gov/labormarketinfo/LAAO*.

All occupations in the list have demand indication definitions. The definitions come in three forms; **in demand**, **not in demand** or **balanced**. These definitions indicate the probability of a job seeker gaining employment in a given occupation. The term **in demand** indicates a greater probability of gaining employment. The term **not in demand** indicates a lesser probability and **balanced** indicates an uncertain probability between success and failure in gaining employment.

The definitions are created through a four-step process.

The data sources for the OID list:

The 2021 list is based on projections with state specific *alternative* rates used for turnover openings:

- Five-year projections for 2019 to 2024, using average annual growth rates and total job openings.
- Ten-year projections for 2019 to 2029, using average annual growth rates and total job openings.
- A combination of two-year (second quarter 2020 to second quarter 2022) and ten-year (2019-2029) projections, using average annual growth rates and total job openings.

All of these time frames use unsuppressed occupations with employment in a base year (2019), consisting of 50 or more employees, for the state and WDAs.

In addition to projections, the OID list uses supply and demand data:

- Supply data: annual counts of unemployment claimants for WDAs for the period June 2020 to May 2021.
- Demand data: annual counts of job announcements from The Conference Board, Help Wanted OnLine mid-monthly time series for the period June 2020 to May 2021.

Step one: Identify initial "in demand" and "not in demand" categories for each period.

- For each time frame, occupations with average annual growth rates of at least 90 percent of their respective geographic area's (statewide or WDA), total average annual growth rates and a share of total openings of at least 0.08 percent are defined as **in demand**.
- Occupations with average annual growth rates less than 70 percent of their respective geographic area's total growth rates *and* a share of total openings of less than 1.0 percent are defined as **not in demand**.

Step two: Identify provisional occupational categories.

- If within any of the three projection time frames (five-year, 10-year and two-/10-years combined), an occupation is categorized as being **in demand**, it receives the first provisional identification as **in demand**.
- If within any of the three projection time frames, an occupation is categorized as **not in demand**, it receives a second provisional identification of **not in demand**.

Step three: Create final projections definitions.

- If an occupation has only one provisional definition, it equals the final projections definition.
- If an occupation has two provisional definitions of **in demand** and **not in demand**, it gets identified as **balance**d.
- All other occupations, without provisional definitions (i.e., not meeting the thresholds from step one), are identified as **balanced**.

Step four: Create final adjustment definitions.

The projections definitions are now put through an adjustment process, using current labor market supply/demand data which compares online job announcements to information on unemployment insurance (UI) claimants.

Adjustments are applied when current supply/demand data significantly contradicts the model-based projections definitions.

The adjustment methodology

- Supply/demand data are used for adjustments if they are significant. Significant supply-demand data are those data where the share of the largest value between UI claimants and online job announcements are more than 1 percent of openings, and where the largest values between announcements and UI claimants more than 10, or the largest values between UI and announcements not less than five, for the period 2019 to 2029.
- If the projections definition is **in demand** or **balanced** but the ratio of supply to demand is more than 2.5, then the adjusted definition is **not in demand**.
- If the projections definition is **in demand** and the ratio of supply to demand is not larger than 2.5, but more than 1.5, then the adjusted definition is **balanced**.
- If the projections definition is **not in demand** or **balanced**, but the ratio of supply to demand is less than 0.4, then the adjusted definition is **in demand**.
- If the projections definition is **not in demand** and the ratio is at least 0.4, but less than 0.6, then the adjusted definition is **balanced**.

The final list: Local adjustments

The Employment Security Department's Data Architecture, Transformation and Analytics (DATA) Division uses the methodology outlined above to prepare the initial lists for the state as a whole and by workforce development area. Those lists are then given to local workforce development councils to review, adjust and approve based on their local experience and knowledge.

Appendix 5. Skill projections

In order to project skills, occupational projections are converted into skill projections. To project skills, we rely on the content of employers' job postings rather than predefined, general O*NET skills.

Data sources

The main source for this analysis was a download of hard skills for each detailed (six-digit SOC) occupation for Washington state from The Conference Board, Help Wanted OnLine job announcements. The downloaded files represent extracted hard skills for each occupation from online job announcements, posted in the last three years (from July 2018 to June 2020).[35] Each skill is displayed with the number of job announcements from which it was extracted. A skill drawn from a greater number of job announcements is relatively more important. The number of job announcements is summed for each occupation. Some occupations contain very few, if any listed skill components, and thus the summation value for a given occupation can be very small or nonexistent and are removed in later processes.

For creating skills-to-occupations matrices, we included occupations that satisfy the following conditions only:

1. Total skill counts are not less than five.
2. Total skill counts are not less than 2.0 percent of base year employment.
3. Estimated employment for second quarter 2019 are not less than five.

Each occupational vector of skill numbers was normalized (i.e., scaled) to totals of one.

By combining these vectors, we created skills-to-occupations matrices. These matrices were used to convert occupational estimations and projections into comparable numbers expressed as hard skills.

The skills-to-occupations matrices are similar in structure and function to normalized matrices used for occupational/industries staffing patterns. The skills-to-occupations matrices were based on statewide data and were used to convert occupational projections for the state and all WDAs into skills projections.

[35] In last year's projections report we used a sample for the period July 2014 to June 2017.

After conversion, we deleted all records where estimated or projected employment numbers were less than five. We consider estimations below five as unreliable. As a result of excluding missing skill/occupation vectors and removing results below five, only a portion of the occupational employment estimates were converted into skills.

A uniform skill to occupation staffing matrix is applied to all areas. Due to differences in occupational employment in each area, and the exclusion of employment below five, available skill counts in each area vary. As a result, the largest number of detailed skills were 575 for Washington state and the Seattle-King County WDA, followed by the Tacoma-Pierce County WDA with 553. The lowest number was for Eastern Washington at 461 skills.

Some results

Detailed skills from online job postings for Washington state were grouped into 26 distinct skill categories and ranked on combined average annual openings and growth rates for 2019 to 2029. These skill categories are presented in *Appendix figure A5-1*.

The top six skill categories based on projected numbers of job openings for all time periods for the state are: information technology (IT), health care, management, finance, insurance and real estate, media and administrative support. The combined top six skill categories represent 39.90 percent of total openings for the state.

Appendix figure A5-1. Skill categories ranked by combined average annual openings and growth
Washington state, 2010 to 2020
Source: Employment Security Department/DATA Division; The Conference Board, Help Wanted OnLine job announcements

Combined rank	Skill category	Estimated skill employment 2019	Projected skill employment 2029	Average annual growth rate 2019-2029	Total average annual openings
1	Information technology (IT)	210,337	276,989	2.79%	80,542
2	Health care	327,131	359,970	0.96%	110,104
3	Management	168,343	188,796	1.15%	59,573
4	Finance, insurance and real estate	104,869	118,339	1.22%	34,888
5	Media	16,263	21,824	2.98%	7,126
6	Administrative support	317,096	325,925	0.27%	105,660
7	Human resources	16,315	19,925	2.02%	6,812
8	Business support	450,812	447,209	-0.08%	153,546
9	Social	21,744	25,065	1.43%	6,477
10	Sales and marketing	295,547	293,395	-0.07%	99,654
11	Protective service	17,571	19,278	0.93%	6,995
11	Quality control, lean	27,600	29,784	0.76%	8,613
11	Accounting, auditing and bookkeeping	61,340	64,827	0.55%	19,857
11	Maintenance and repair	337,164	328,649	-0.26%	120,723
12	Research and science	11,181	12,697	1.28%	3,193
13	Production	38,402	39,522	0.29%	13,983
13	Education and training	107,559	109,717	0.20%	24,433
14	Transportation and logistics	65,438	66,594	0.18%	23,675
15	Legal	17,910	19,123	0.66%	4,959
15	Construction	76,681	75,986	-0.09%	31,545
16	Food preparation and service	120,172	103,473	-1.48%	42,677
17	Arts and entertainment	3,004	3,253	0.80%	1,002
17	Personal care and services	68,319	66,752	-0.23%	24,512
18	General labor	9,489	9,779	0.30%	3,748
19	Engineering	11,440	11,759	0.28%	2,699
20	Telecommunications	799	796	-0.04%	161

The IT-related skill category ranked number one in the list of top ranks for openings and growth.

Information technology

IT skills naturally dominate shares in computer-related occupations, but also have a very high share in occupations whose primary occupational focus is not computers. The occupations with high computer skill requirements based on IT shares, are presented in *Appendix figure A5-2*. Engineers, all other, industrial engineers and graphic designers hold the highest shares of IT-related detailed skills with shares of 0.922, 0.824 and 0.717 respectively.

Appendix figure A5-2. Occupations, not primarily computer related, with the largest shares of computer skill requirements Washington state, 2020 second quarter occupational estimations (June 2018 to June 2020 sample, skills/occupations matrices) Source: Employment Security Department/DATA Division; The Conference Board, Help Wanted OnLine job announcements

SOC	Occupation	Share of skills that are IT
172199	Engineers, all other	0.922
172112	Industrial engineers	0.824
271024	Graphic designers	0.717
173029	Engineering technicians, except drafters, all other	0.328
119041	Architectural and engineering managers	0.312
131111	Management analysts	0.176
172071	Electrical engineers	0.129
131161	Market research analysts and marketing specialists	0.125
119141	Property, real estate, and community association managers	0.121
419022	Real estate sales agents	0.096
433031	Bookkeeping, accounting, and auditing clerks	0.094
311131	Nursing assistants	0.091
172051	Civil engineers	0.085
273031	Public relations specialists	0.073
492022	Telecommunications equipment installers and repairers, except line installers	0.069
172141	Mechanical engineers	0.068
435111	Weighers, measurers, checkers, and samplers, recordkeeping	0.052
132099	Financial specialists, all other	0.049
119021	Construction managers	0.038

Engineers, all other, industrial engineers and graphic designers hold the highest shares of IT-related skills.

Skill based related occupations

Skills–to-occupations matrices allow us to create a tool for defining related occupations, based on common skills. To achieve this, we calculated a matrix of correlations based on skills between occupations. The results are presented in the macro-enabled file, related_occ_skills_2021.xlsm. The matrix in the file's "main" tab is symmetric around the main diagonal. The main diagonal has all 1s in it. There are two ways of using the file's data when opened with the enabled-macros feature:

1. You can select an occupational title of interest, from a column heading, in the "main" tab and then sort the numbers below the title of interest from largest to smallest. Starting from row three in column B you would see the sorted list of related occupations (row two will be the same occupation as selected). To restore the original sort-configuration, sort the key-column (column A) from smallest to largest.

2. You can select an occupation of interest, from a column heading, in the "main" tab and then click the **Ctrl** and **A** keys simultaneously. This will execute a macro. The macro opens a table in a "table" tab. In the table, you will find a list of the top 15 occupations related to your occupation of interest.

An example of a list for software developers, applications is in *Appendix figure A5-3.*

Appendix figure A5-3. Top 15 occupations related to software developers
Washington state, 2021
Source: Employment Security Department/DATA Division; The Conference Board, Help Wanted OnLine job announcements

SOC	Occupation	151252-Software Developers
151251	Computer programmers	0.807
172199	Engineers, all other	0.791
172112	Industrial engineers	0.595
151241	Computer network architects	0.510
151254	Web developers	0.488
119041	Architectural and engineering managers	0.382
151242	Database administrators	0.333
151212	Information security analysts	0.293
173029	Engineering technicians, except drafters, all other	0.228
151211	Computer systems analysts	0.191
152051	Data scientists	0.190
113021	Computer and information systems managers	0.189
151221	Computer and information research scientists	0.189
152031	Operations research analysts	0.168
172071	Electrical engineers	0.082

Numbers in the table represent coefficients of correlations for normalized vectors of skill shares.

The related occupations tool may be useful for job seekers. The results are specific for Washington state since the skills come from job announcements in this state.

Conclusions

Our view is that it is more important to connect education and training programs with real world skill requirements than with generic occupational skills definitions.

While primary fields are relatively stable and well defined, IT skill sets are constantly changing. IT skills are concentrated mainly in software, algorithms, some hardware and in web applications. In the long run, giving priority to foundational academic subjects such as math and formal logic, multidimensional design, and foundational concepts in object-oriented programing is salient. In other words, foundational abilities to learn, develop and implement new knowledge and technology should take priority for career preparation.

Appendix 6. Frequently asked questions

Q: What are the steps in industry projections?

A: There are two major steps in industry projections. The first step is developing aggregated statewide industry projections using Global Insight national forecasts. The second step produces detailed industry projections. The principal data source for industry projections is a detailed covered employment time series of four-digit NAICS data for all Washington counties, specifically, the U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW).

Q: Why are the detailed industry projections not comparable with U.S. Bureau of Labor Statistics, Current Employment Statistics (CES) definitions?

A: Industry projections are classified according to U.S. Bureau of Labor Statistics, Occupational Employment Statistics (OES) definitions, which are somewhat different from CES.

Q: What is the source for occupational/industry ratios?

A: The primary source for occupational/industry ratios is the OES survey. However, this survey uses different area designations than the state's workforce development areas (WDAs) and has limited industry coverage (agriculture, non-covered employment, private households and self-employment are excluded) necessitating the use of other staffing patterns as well.

Q: Why can the ratio for industry and occupational projections differ from the OES survey outputs?

A: We use raw sample and limited numbers of imputations while standard OES processing using significant share of imputations. We also use extra information from WEB job announcements. In cases when sample is weak or missing, we use substituted area (state staffing patterns) or combined areas (King and Snohomish counties).

Q: Why can occupational/industry ratios differ between the base year and projected years?

A: This is due to the use of change factors, which predict changes in the occupational shares for each industry over time.

Q: Why can't occupational projections be benchmarked or verified?

A: There are no administrative records for employment by occupation; therefore, the data cannot be reliably benchmarked or verified by non-survey means.

Q: How are occupational projections used?

A: Occupational projections are the only data source for statewide and WDA-specific occupational outlooks. Projections are also the foundation for developing the Occupations in Demand list, which is used to determine eligibility for a variety of training and support programs, but was created to support the unemployment insurance Training Benefits Program.

Q: How are industry projections used?

A: Industry projections can be used by policy makers, job seekers, job counselors and economic analysts. For any policy decisions, the projections should be supplemented with other available data sources (e.g., unemployment insurance claims, educational data, job announcements, etc.).

Q: Which occupational codes are used?

A: The 2010 Standard Occupational Classification (SOC) system was used for this round of projections.

Q: Can the SOC be used for administrative purposes?

A: According to BLS, the 2018 SOC was designed solely for statistical purposes. To use SOC for administrative programs, the head of an agency considering using SOC must first determine if the use of SOC definitions is appropriate for a program's objectives.

Q: Why don't the occupational totals by WDA equal the state total?

A: The totals are not additive due to the use of local staffing patterns for projections by WDA, which differ from the statewide staffing pattern.

Q: What is the difference between the Bureau of Labor Statistics separations rate and alternative state specific rate methodologies?

A: The separations method measures job openings created by workers who leave occupations and need to be replaced by new entrants. In this method, workers who exit the labor force or transfer to an occupation with a different Standard Occupational Classification (SOC) are identified as generating separations openings at the national level. This means that jobs filled by workers within the same occupations, are not identified as new jobs.

The alternative rates track openings created by turnover within occupations (i.e., workers stay within occupations but transfer to different companies) and when workers leave one occupation for another or leave the workforce. In contrast to separation methodology, alternative openings represent total job openings and are specific for Washington state.

Appendix 7. Glossary of terms

Industries

A classification of business establishments based on similar production processes.

North American Industry Classification System (NAICS)

North American Industry Classification System (NAICS) is the system used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing and publishing statistical data related to the U.S. business economy. NAICS was developed under the authority of the U.S. Office of Management and Budget.

Occupation

A job or profession, a category of jobs that are similar with respect to the work performed and the skills possessed by the workers.

Occupational projections

Industry projections converted to occupations, based on occupational/industry ratios.

Standard Occupational Codes (SOC)

Standard Occupational Classification (SOC) is the system used by federal statistical agencies in classifying workers into occupational categories for the purpose of collecting, calculating or disseminating data. All workers are classified into their occupational definitions which are structured at four levels of aggregation. SOC was developed under the authority of the U.S. Office of Management and Budget.

Total occupational estimations and projections

Total occupational estimations and projections are calculated to describe employment in base years and future time periods.