2020 LABOR MARKET AND ECONOMIC REPORT

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

Employment Security Department
WASHINGTON STATE

Labor Market and Economic Analysis
March 2021

2020 Labor Market and Economic Report

Published March 2021

Washington State Employment Security Department
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Labor market fast facts

Fast facts 1. Labor force and unemployment, not seasonally adjusted
Washington state, annual data from January 2000 to September 2020
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Year	Labor force	Employed	Unemployed	Unemployment rate
2000	3,059,339	2,901,492	157,847	5.2%
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 January to September*	3,943,199	3,590,499	352,700	8.9%

*2020 data is averaged for nine months.

Fast facts 2. Labor force and unemployment, not seasonally adjusted
Washington state metropolitan areas, January to September 2020
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Metropolitan area	Labor force	Employed	Unemployed	Unemployment rate
Washington state	**3,906,624**	**3,617,002**	**289,622**	**7.4%**
Bellingham	116,057	106,741	9,316	8.0%
Bremerton	130,022	121,241	8,781	6.8%
Kennewick-Pasco-Richland	156,898	146,726	10,172	6.5%
Longview-Kelso	48,459	44,367	4,092	8.4%
Mount Vernon-Anacortes	62,287	57,175	5,112	8.2%
Olympia	142,205	132,063	10,142	7.1%
Seattle-Bellevue-Everett MD*	1,718,462	1,596,474	121,988	7.1%
Spokane	269,397	248,626	20,771	7.7%
Tacoma MD * (Pierce)	444,348	406,252	38,096	8.6%
Wenatchee	69,933	65,653	4,280	6.1%
Yakima	140,742	130,636	10,106	7.2%

*Metropolitan Division

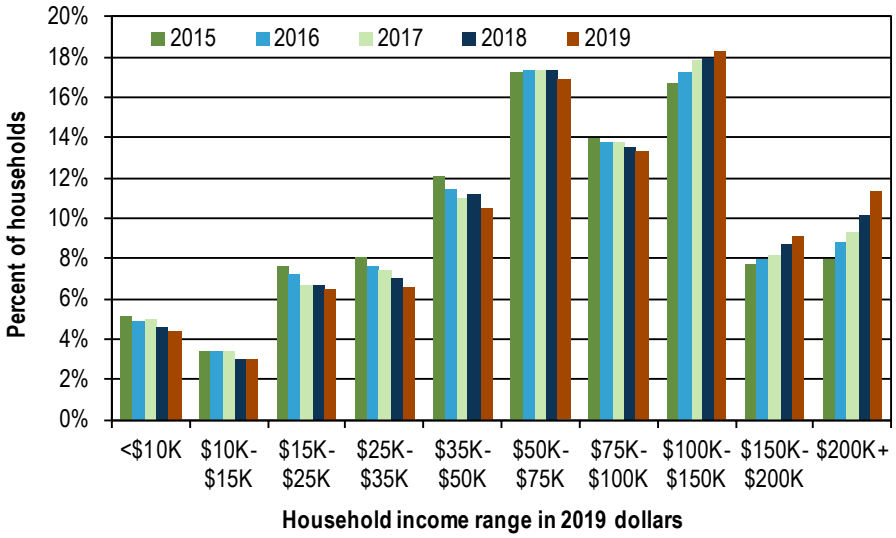
Fast facts 3. Projected industry average annual employment growth rates
Washington state, 2018 to 2028
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics

NAICS	Industry sector	2019 Q2 to 2021 Q2	2018 to 2023	2023 to 2028
	Total nonfarm	**1.32%**	**1.56%**	**1.17%**
22, 48, 49	Transportation, warehousing and utilities	1.39%	1.08%	0.82%
23	Construction	0.14%	0.95%	0.39%
31-33	Manufacturing	0.43%	0.69%	0.35%
42	Wholesale trade	0.55%	0.48%	0.51%
44-45	Retail trade	1.05%	1.04%	1.15%
51	Information	3.48%	3.85%	1.74%
52	Financial activities	1.09%	1.03%	0.66%
54-56	Professional and business services	1.81%	1.72%	1.40%
61-62	Education and health services	1.75%	2.13%	2.09%
71-72	Leisure and hospitality	1.79%	1.39%	1.23%
GOV	Government	1.11%	1.08%	1.08%

Fast facts 4. Wages and employment by industry
Washington state, 2019 annual averages (revised)
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry sector	Average number of firms	Total wages paid	Average employment	Average weekly wage
	Total	**228,397**	**$239,305,634,313**	**3,437,987**	**$1,339**
11	Agriculture, forestry, fishing and hunting	6,845	$3,471,899,226	103,017	$648
21	Mining	136	$168,260,156	2,248	$1,439
22	Utilities	231	$544,796,308	5,174	$2,025
23	Construction	26,254	$13,943,150,382	205,619	$1,304
31 - 33	Manufacturing	7,510	$23,577,121,022	290,238	$1,562
42	Wholesale trade	12,484	$11,024,925,274	133,790	$1,585
44 - 45	Retail trade	14,062	$23,940,081,411	384,491	$1,197
48 - 49	Transportation and warehousing	4,628	$6,789,580,684	104,925	$1,244
51	Information	4,402	$29,788,858,141	143,836	$3,983
52	Finance and insurance	5,875	$9,567,218,584	94,774	$1,941
53	Real estate, rental and leasing	6,909	$3,233,756,895	55,354	$1,123
54	Professional, scientific and technical services	26,501	$21,669,812,834	208,493	$1,999
55	Management of companies and enterprises	651	$5,587,879,141	45,243	$2,375
56	Administrative and waste management services	12,383	$9,119,844,305	171,641	$1,022
61	Educational services	3,432	$1,820,149,250	45,251	$774
62	Healthcare and social assistance	57,546	$23,651,556,863	432,809	$1,051
71	Arts, entertainment and recreation	2,894	$1,782,541,572	53,789	$637
72	Accommodation and food services	14,727	$7,277,988,322	287,434	$487
81	Other services (except public administration)	18,801	$4,366,351,021	102,534	$819
GOV	Government	2,128	$37,979,862,922	567,327	$1,287

Fast facts 5. Percent of households by income range, 2019 dollars
Washington state, 2015 through 2019
Source: U.S. Census Bureau, American Community Survey



Fast facts 6. Contributions to percent change in real GDP, seasonally adjusted annualized rate
United States, third quarter 2018 through third quarter 2020
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income

Contributions	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3
GDP percent change annual rate	2.1	1.3	2.9	1.5	2.6	2.4	-5.0	-31.4	33.1
Percentage contribution by factor									
Consumption expenditures	1.79	1.05	1.25	2.47	1.83	1.07	-4.75	-24.01	25.27
Fixed investment	0.14	0.46	0.50	-0.07	0.42	0.17	-0.27	-5.27	4.96
Change in private inventories	1.58	0.23	0.21	-0.97	-0.09	-0.82	-1.34	-3.50	6.62
Net exports of goods and services	-1.83	-0.27	0.55	-0.79	0.04	1.52	1.13	0.62	-3.09
Government expenditures	0.44	-0.16	0.43	0.86	0.37	0.42	0.22	0.77	-0.68

Fast facts 7. Highest and lowest state unemployment rates, not seasonally adjusted, based on 2019 ranking
United States and Washington state, 2009, 2014 and 2019
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Rank	State	2009	2014	2019
	United States	**9.3%**	**6.2%**	**3.7%**
1	North Dakota	4.1%	2.7%	2.4%
1	Vermont	6.6%	3.9%	2.4%
3	New Hampshire	6.2%	4.3%	2.5%
4	Utah	7.3%	3.8%	2.6%
5	Hawaii	7.2%	4.4%	2.7%
5	Iowa	6.4%	4.2%	2.7%
7	Colorado	7.3%	5.0%	2.8%
7	South Carolina	11.2%	6.5%	2.8%
7	Virginia	6.7%	5.2%	2.8%
10	Idaho	8.8%	4.8%	2.9%
10	Massachusetts	8.1%	5.7%	2.9%
37	California	11.2%	7.5%	4.0%
37	Illinois	10.2%	7.1%	4.0%
37	New York	8.3%	6.3%	4.0%
40	Michigan	13.7%	7.2%	4.1%
40	Ohio	10.3%	5.8%	4.1%
42	Kentucky	10.3%	6.5%	4.3%
42	**Washington**	**9.2%**	**6.1%**	**4.3%**
44	Pennsylvania	8.0%	5.9%	4.4%
45	Arizona	9.9%	6.8%	4.7%
46	Louisiana	6.8%	6.4%	4.8%
47	New Mexico	7.5%	6.7%	4.9%
47	West Virginia	7.7%	6.6%	4.9%
49	**Mississippi**	**9.5%**	**7.5%**	**5.4%**
50	District of Columbia	9.3%	7.8%	5.5%
51	Alaska	7.7%	6.9%	6.1%

Executive summary

U.S. economy and labor market

The U.S. economy entered 2020 with strong momentum. The unemployment rate was on its way to reaching a 50-year low of 3.5 percent in February 2020. The economic expansion, which had been in place since July 2009, appeared poised to run for at least another year.

The emergence and spread of the COVID-19 virus in early 2020 created a world-wide pandemic. Policymakers quickly responded to the crisis by issuing stay-at-home orders and promoting social distancing guidelines. Many businesses that relied on personal contact with customers shut down or drastically scaled back their operations. The abrupt decline in economic activity brought to a halt the period of economic expansion following the Great Recession. Economic growth turned sharply negative before rebounding in the third quarter, prompting the National Bureau of Economic Research to declare that the U.S. economy was in recession beginning in March 2020.

Total nonfarm employment in the United States fell by 1.37 million in March and 20.8 million in April before rebounding to gain 2.7 million in May. Employers added jobs for the fifth consecutive month in September, bringing the total number of jobs recovered from the virus-related low to 11.5 million. This represents just over half of the jobs that were lost in March and April.

Job losses since February 2020 have been widespread across industries. The leisure and hospitality industry, which includes restaurants and bars, hotels, and entertainment and recreation, lost almost half of its jobs during the shutdown period. As the economy reopened, it gained back a good many of lost jobs, but still ranks as the industry suffering the most losses.

Washington's economy and labor market

Washington's economy was very strong for most of the economic expansion that took place after the Great Recession. The COVID-19 outbreak in early 2020 altered the state's economic good fortune and put its resiliency to the test. Washington was one of the first states to suffer an outbreak and one of the first to put in place aggressive mitigation efforts. Those efforts caused the level of economic activity in the state to sharply pull back. Massive job losses resulted in March through May and the state's unemployment rate spiked upward.

Employment bounced back in June with enough forward momentum to carry strong gains into July and August. To date in October 2020, the state has been able to recapture about 60 percent of the jobs lost from March through May. As in most states, leisure and hospitality accounted for the vast majority of job losses.

Since the economy has yet to fully recover, unemployment rates remain elevated. The unemployment rate for the U.S. dropped to 6.9 percent in October 2020 after having reached a high of 14.7 percent in April. Washington's rate has come back down to 6.0 percent, below the national rate. Seattle had an unemployment rate of 4.8 percent in October. In contrast, the unemployment rate for the balance of the state, minus the Seattle-Belleville-Everett area, was 6.8 percent.

Seasonal, structural and cyclical industry employment

An analysis of 95 industries in Washington state identified 18 as having high levels of seasonality. The analysis is based on historical data from January 2002 through December 2019. The industries that are most sensitive to seasonal forces include crop production, scenic and sightseeing transportation, and support activities for agriculture and forestry. There were 29 industries that are most influenced by structural factors. Structural factors such as productivity improvement, policy changes, technological innovation and social change have heavily influenced employment in ambulatory healthcare services, local government, educational services, and beverage and tobacco product manufacturing. For 15 industries, the cyclical component accounts for more than half of the change in employment. Those most influenced by cyclical factors include support activities for mining, oil and gas extraction and scenic and sightseeing transportation.

Unemployment

The number of beneficiaries in 2020 increased significantly starting in March 2020 with the COVID-19 pandemic, with the number of paid claims increasing by nearly three times the number of paid claims in April 2020. The number of claimants receiving benefits peaked at 711,945 claimants in May 2020. For comparison, during the height of the great recession, January 2010, 305,086 people had received unemployment benefits.

The level of exhaustions of regular claims has been increasing steadily since March 2020 with substantial increases in the number of exhaustions of regular unemployment benefits occurring in September 2020 (60,158 regular benefit exhaustions). From October 2019 through September 2020, workers in the arts, entertainment and recreation and the educational service sectors were most likely to exhaust regular unemployment benefits with an exhaustion-to-employment ratio of 8.9 percent and 8.7 percent respectively. The accommodation and food services sector accounted for the greatest portion of regular benefit exhaustions at 18.9 percent.

Employment projections

The 10-year average annual growth rate for total nonfarm employment for the 2018 to 2028 period is projected to be 1.37 percent. This is a decrease from the 1.51 percent average annual growth rate predicted last year for 2017 to 2027. The largest increases by share of employment is projected for the information sector and other services sector. The largest employment shares in 2028, from largest to smallest, are projected for the office and administrative support occupations, sales and related occupations and food preparation and serving-related occupations. As was the case in last year's projections report, the first two occupational groups are projected to have declining employment shares.

Income

Recently released data show the median household income measured in 2019 dollars in Washington rose by 14.5 percent from 2015 to 2019. The median Washington household income expanded more quickly than the median national household income, which grew by 9.9 percent over the same time period. As of 2019, Washington's average household earnings were $107,023, a statistically significant increase of 3.7 percent over the previous year. From 2018 to 2019, median earnings increased from $40,559 to $41,735, an increase of $1,176 or 3 percent. Households with income ranges less than $35,000 accounted for about 24 percent of all households in 2015. By 2019, the share was closer to 21 percent. Households with incomes exceeding $100,000 per year expanded from about 32 percent in 2015 to 39 percent in 2019. Comparing median earnings for male versus female full-time/year-round workers reveals a persistent earnings gap. Women's median earnings ($50,612 in 2019) are 79 percent of men's ($63,988).

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 costs are presented as economic indicators for comparison as well as a current ranking for Washington state.

Chapter 1: U.S. economy and labor market

The U.S. economy entered 2020 with strong momentum. Gross Domestic Product (GDP) increased in every quarter of 2019 despite the uncertainty cast by trade disputes with China. Monetary policy had shifted to becoming accommodative to the economy. Job growth had been steady. The labor market continued to tighten, but not enough to put upward pressure on earnings and threaten inflation. The unemployment rate was on its way to reaching a 50-year low of 3.5 percent in February 2020. A revised North American trade deal, the U.S.-Mexico-Canada Agreement (USMCA), was signed into law in January. During the same month, a new Phase I trade deal was reached with China. Trade tensions appeared to be cooling. The economic expansion, which had been in place since July 2009, appeared poised to run for at least another year.

It wasn't long before a new threat to the economy as well as to world health emerged. A new coronavirus, now known as COVID-19, was identified in China in December 2019 and quickly spread throughout the world. The World Health Organization declared the COVID-19 outbreak a public health emergency of international concern on January 30, 2020, and a pandemic on March 11, 2020.

A Washington state man became the first confirmed domestic case in mid-January. On February 29, Governor Jay Inslee declared a state of emergency for the state of Washington to contain the spread of the virus. Soon, other states that had become infected began to follow suit. States and metropolitan areas, which contain more than three-quarters of the nation's population, quickly implemented stay-at-home policies in March and promoted social distancing. Businesses that most typically relied on onsite group gatherings of customers and consumer spending either shut down or severely curtailed their business operations. Sports venues closed, along with most restaurants, movie theaters, and other forms of entertainment.

Millions of jobs were lost in the leisure and hospitality, healthcare, household and personal services and retailing sectors. Without income from employment, and without many places to spend or reason to frequent businesses, consumer spending plummeted. Economic activity retreated and economic growth came to an abrupt halt. To no real surprise, the National Bureau of Economic Research declared that economic activity in the U.S. had peaked in February and that a recession had begun in March.

Policymakers have responded to the economic fallout from the pandemic through both sizable fiscal and monetary measures. Under normal circumstances these might have jolted the economy toward

recovery sooner rather than later. But this recession is unique in that it results from the extensive shutdown in economic activity put in place to contain the COVID-19 outbreak rather than a buildup of cyclical excesses or "bubbles." As such, the U.S. economic outlook continues to be very dependent on the evolution of the pandemic. As of this writing, COVID-19 cases have begun to re-escalate and could lead to a renewal of lockdowns. On the other hand, news of effective vaccines developed by Pfizer and Moderna respectively create optimism for the near future when the vaccine can be deployed.

Recent changes in GDP

GDP measures the value of the output of goods and services produced by the economy. A goal of the economy is for GDP to grow over time to increase the stock of products available to domestic households, as well as their ability to purchase them. As such, changes in real GDP are used as a measure of economic growth.

GDP grew at a slower pace overall in 2019 compared to the brisk pace it exhibited in 2018. The economy had expanded at an annual rate of 3.0 percent in 2018, owing much of the boost to growth to tax code changes that helped to elevate household and business spending, and to increased levels of government spending. The Tax Cuts and Jobs Act, which was signed into law in late 2017, helped to raise real disposable income, which in turn supported strong growth in real personal spending. The 3.6 percent increase in real disposable income in 2018 was the strongest increase since 2015.

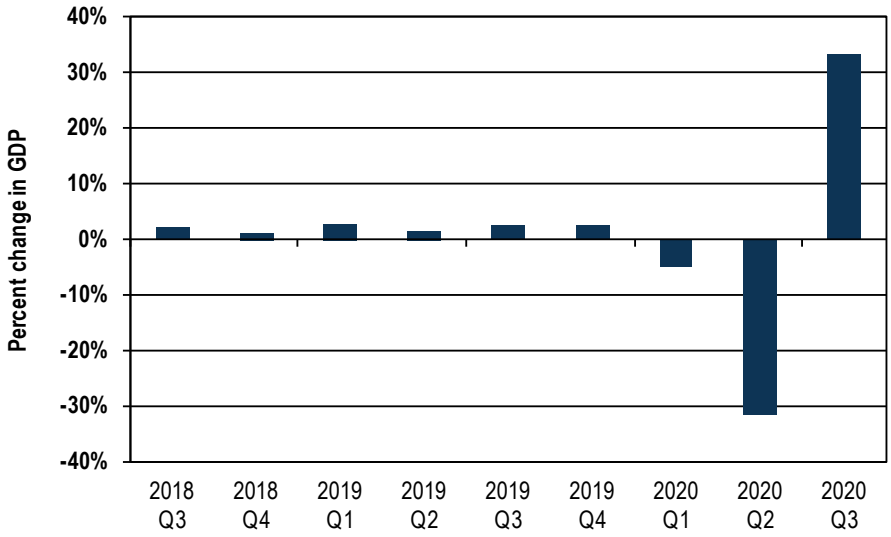
On the business side, corporate tax reform boosted corporate after-tax profit and led to an acceleration in capital spending. Business investment spending increased by 6.3 percent in 2018, which accounted for 1.8 of the 3 percentage points by which GDP increased.

Federal spending increased by 2.8 percent in 2018 after having increased by only 0.3 percent in 2017. The higher federal outlay helped boost total government's contribution to GDP to 0.32 points, up from 0.16 points in 2017.

Growth slowed to a more trend-like pace in 2019 when it registered 2.2 percent annually. Increased foreign trade tensions created uncertainty and dampened business fixed investment, although consumer spending held up well. Expectations had been that growth would continue through 2020 if trade relations would not worsen, all other things being equal.

Economic growth in terms of quarterly changes in GDP over the last three years through third quarter 2020 are represented by *Figure 1-1*. The break in what had been trend growth occurred with first quarter 2020 GDP data, which show a decline of 5.0 percent. As stated by the Bureau of Economic Analysis, the decline reflected the response to the spread of COVID-19, as governments issued "stay-at-home" orders in March. This led to rapid changes in demand, as businesses and schools switched to remote work or canceled operations, and consumers canceled, restricted, or redirected their spending. Most of the economy was open through mid-March. The lockdown of the economy, which occurred in most states, did not really start to take effect until mid-March/early April. First quarter 2020 provided a preview of what was to come when the second quarter arrived.

Figure 1-1. U.S. gross domestic product (chained 2012 dollars), quarterly percent change, seasonally adjusted annualized rate
United States, third quarter 2018 through third quarter 2020
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income



The previous pattern rate of economic growth was disrupted by the viral pandemic and efforts to contain it.

The decline in first quarter 2020 GDP is primarily attributable to a collapse in personal consumption expenditures (PCE), which fell by 6.9 percent, accounting for 4.75 out of the 5.0 GDP percentage points lost (*Figure 1-2*). The decline in consumption made it the steepest rate of decline in forty years to that point. The decrease in PCE mostly reflected less spending on services, led by healthcare as well as food services and accommodations. Business fixed investment (BFI) spending fell by 1.3 percent and subtracted

just over one-quarter point from headline growth. Much of this was due to reduced spending in nonresidential fixed investment, primarily on transportation equipment. The decrease in private inventory investment was mainly in manufacturing, led by petroleum and coal products.

GDP plummeted 31.4 percent in second quarter 2020. The big drop in GDP in the second quarter largely reflects the collapse in economic activity that occurred in late March through mid-May. Once again, the weakness in expenditures was concentrated on the consumer side. PCE plunged by nearly 41 percent. The decrease in consumer spending occurred on both the goods side of the economy, led by clothing and footwear, and on the services side, led by healthcare. Spending on fixed investment by business primarily reflected a decrease in spending on equipment, led by transportation equipment. The decrease in private inventory investment primarily occurred in retail led by motor vehicle dealers. The only real area of growth was the rise in federal government spending related to transfer payments made to individuals and to banks for processing and administering the Paycheck Protection Program (PPP) loans to businesses that were extended during the quarter.

Figure 1-2. Contributions to percent change in real GDP, seasonally adjusted annualized rate
United States, third quarter 2018 through third quarter 2020
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income

Contributions	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3
GDP percent change annual rate	2.1	1.3	2.9	1.5	2.6	2.4	-5.0	-31.4	33.1
Percentage contribution by factor									
Consumption expenditures	1.79	1.05	1.25	2.47	1.83	1.07	-4.75	-24.01	25.27
Fixed investment	0.14	0.46	0.50	-0.07	0.42	0.17	-0.27	-5.27	4.96
Change in private inventories	1.58	0.23	0.21	-0.97	-0.09	-0.82	-1.34	-3.50	6.62
Net exports of goods and services	-1.83	-0.27	0.55	-0.79	0.04	1.52	1.13	0.62	-3.09
Government expenditures	0.44	-0.16	0.43	0.86	0.37	0.42	0.22	0.77	-0.68

Changes to outlays in consumer expenditures have had the most impact on the economy during the 2020 pandemic event.

The U.S. economy bounced back to grow at an annualized rate of 33.1 percent in third quarter 2020 based on the preliminary reading of GDP. The increase in third quarter GDP reflected continued efforts to reopen businesses and resume activities that were postponed or restricted due to COVID-19. Although the third quarter growth was greater than the second quarter decline, the level of GDP is still roughly 3.5 percent below the peak level hit late last year before the pandemic hit. In other words, the size of the American economy at present is 3.5 percent smaller than it was immediately before the COVID-19 pandemic struck the economy.

Much of the turnaround in third quarter GDP growth was supported by the same factors that were involved with the second quarter GDP decline. Consumer spending surged by 40.7 percent annualized to drive the resurgence. Spending was aided by a jump in incomes provided by stimulus checks and expanded unemployment benefits earlier in the summer. The increase in PCE reflected increases in spending on services (led by healthcare as well as food services and accommodations) and goods such as clothing and footwear. Consumers shifting spending away from close-contact services (such as mass transit) towards durable goods (such as on cars) also explains the upturn.

Business spending on equipment jumped 70.1 percent in third quarter, easily offsetting the 35.9 percent drop that occurred in the second quarter. Spending on transportation equipment led the increase. Residential construction leaped up 59.3 percent. Record low mortgage rates and shifting preferences for more livable space have led to a recovery in both single family construction and home sales. Spending on nonresidential structures was off, however, falling 14.6 percent during third quarter. This marks the fourth consecutive quarter in which this spending component has declined. Low energy prices continue to curtail oil and gas drilling activity, and rising vacancy rates are a huge obstacle for new commercial construction. A sharp increase in private inventory investment led by retail motor vehicle dealers boosted GDP growth in the third quarter by 6.6 percentage points. Decreases in federal government spending reflected a decline in transfer payments and fewer fees paid to administer the PPP loans. State and local government spending also declined.

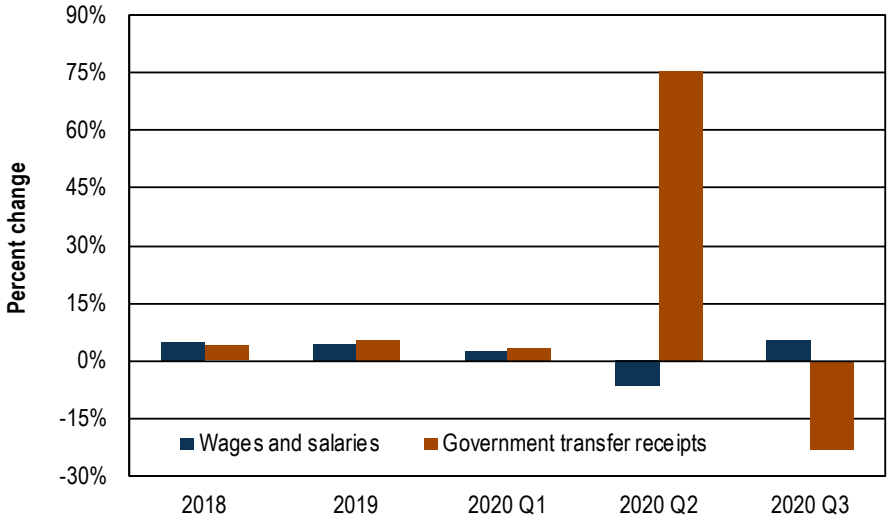
Consumer spending reacts to pandemic policy moves

The economy tends to rely upon the spending propensity of its consumers. Consumer spending makes up the greatest dollar-wise contribution to GDP, accounting for roughly 70 percent of total output value annually. Real personal consumption expenditures (PCE) which account for household spending, depend on both the willingness and ability of the consumer to spend as well as the number of potential consumers earning income to fund the consumption. To that end, the ability to spend largely is a function of income earned after taxes, or disposable personal income (DPI), as well as the opportunity to earn income, which mostly comes from wages and salaries earned from employment. Transfer payments to individuals, primarily from government in the form of social benefits, also contribute to DPI. Social benefit payments are those that are provided through public programs such as Social Security, Medicare and Medicaid, and unemployment insurance benefits. Over the years 2017 through 2019, wages and salaries made up roughly 57 percent of DPI on average while government transfer payments made up about 19 percent.

The states' response to contain the pandemic resulted in the closure or capacity restrictions of many businesses. Stay-at-home guidelines added to the unprecedented number of individuals who became unemployed. To provide economic relief to individuals and fiscal stimulus to the economy, the Coronavirus Aid, Relief, and Economic Security (CARES) Act was passed by Congress and signed into law by President Trump on March 27, 2020. In addition to providing aid to affected businesses, a variety of measures were designed to help household members. The CARES Act expanded unemployment insurance benefits provided through three programs. The Federal Pandemic Unemployment Compensation (FPUC) program provided a temporary weekly supplemental payment of $600 for people receiving unemployment benefits to the end of July 2020. The Pandemic Unemployment Assistance (PUA) program provided unemployment benefits to people who are not usually eligible for state unemployment insurance benefits to the end of December 2020. The Pandemic Emergency Unemployment Compensation (PEUC) program provided unemployment benefits for an extra 13 weeks to people who exhausted all available weeks of state unemployment benefits (26 weeks in Washington) to the end of December 2020. The CARES Act of 2020 also provided $300 billion in direct support economic impact payments to individuals, with advance tax rebate payments distributed mostly in April 2020. A $1,200 refundable tax credit payment was provided to individuals ($2,400 for joint taxpayers) that met specified criteria. In addition, qualified taxpayers with children received $500 for each child.

The extensive shutdown in economic activity put in place to contain the COVID-19 outbreak resulted in a massive surge in unemployment claims and an abrupt decline in nonfarm payroll employment. The downturn carried into April and began to bottom out near the end of May as businesses began to gradually reopen. The loss in employment produced a decline in wages and salaries in second quarter 2020 (*Figure 1-3*). Government transfer payments to people increased in the second quarter dramatically however, more than making up for the lost wage and salary income for many. As more people began returning to work in the third quarter and as the one-time direct economic impact payments ended, wage and salary income growth resumed while the level of transfer payments fell.

Figure 1-3. Percent change in wage and salary income and government transfer receipts, seasonally adjusted annualized rate
United States, 2018 through third quarter 2020
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income



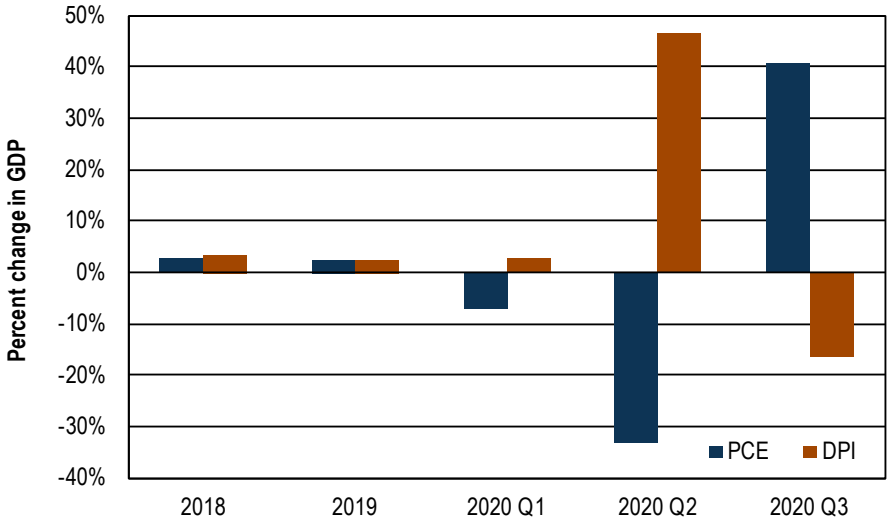
Wage and salaries dipped in second quarter 2020 before rebounding in third quarter. Meanwhile, government transfer payments surged in second quarter.

Real disposable personal income (DPI), a measure of income after accounting for taxes and adjusting for inflation, has been rising with the economic expansion. Its rate of increase will not necessarily be positive from one period to the next, since the level of income generated will change as economic growth changes. A measure of consumer spending is personal consumption expenditures (PCE). All things being equal, it is expected that PCE should move in direct relation to DPI. In practice however, changes in consumers' willingness to spend will occur as other factors change. This could motivate consumers to change the proportion of their incomes they spend, along with their savings rate. Consumers might also consume more than their income in any one-time period, either by borrowing from their savings or from financial institutions, depending on interest rates and credit availability.

PCE continued to rise during most of first quarter 2020 since the reaction to the virus occurred chiefly in March (*Figure 1-4*). As April unfolded, PCE plummeted even as DPI rose due to the receipt of government transfer payments. The difficult March through April period was enough to outweigh a resurgence in spending that began in late May and carried into the third quarter. Extreme circumstances resulted in consumers been asked to stay in their homes and avoid social interaction in the early months of the pandemic. Among many other things, this behavioral

shift has meant an outright inability for consumers to spend on various services from low cost experiences like a haircut or a trip to the movies to more significant outlays like air travel and medical procedures. Although these represent a few examples, they are indicative of the large areas of consumption opportunities that closed.

Figure 1-4. Personal change in real personal consumption expenditures and disposable personal income, seasonally adjusted annual rate
United States, 2018 through third quarter 2020
Source: U.S. Bureau of Economic Analysis, Personal Income and Outlays



Consumption activity declined and then plummeted during the first half of 2020 but rebounded in third quarter 2020.

The CARES Act passed earlier in the year offered a bridge to get affected households to the other side of the crisis and a way to stimulate the economy at the same time. Consumer spending rebounded in the third quarter, with most of it directed toward consumer goods. After years in which the share of spending at bars and restaurants rose steadily, consumers rediscovered the grocery store, which helped to lift spending on non-durable goods above its pre-recession peak. Spending on durable goods also surged.

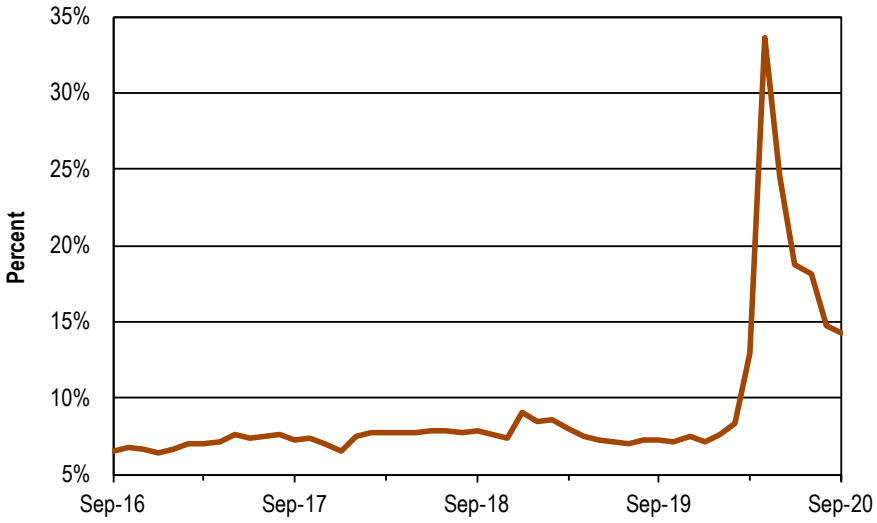
The fact that goods spending rebounded so swiftly suggests the CARES Act had the desired simulative impact.

The inability of consumers to pursue service-spending opportunities resulted in some sense a "forced savings" effect. At the same time, government transfers to people were surging. The combination of regular, state-level unemployment benefits, plus the extra $600 per week from the federal government, led to average wage replacement levels that exceeded 100 percent in some states.

This unspent money on services coupled with the rise in income from transfers caused personal savings to rise to a record level in April. Thus, personal savings as a share of personal disposable income, or what is known as the personal savings rate, shot up to 33.6 percent in April (*Figure 1-5*).

To put things in perspective, the personal saving rate had averaged 7.5 percent in the year leading up to COVID-19. Personal spending on services rebounded to a respectable level in third quarter, but did not completely reverse the collapse in spending on services that occurred in the second quarter. As such, the savings rate remains at an elevated level.

Figure 1-5. Personal savings as a percentage of disposable income, seasonally adjusted annual rate
United States, September 2016 through September 2020
Source: U.S. Bureau of Economic Analysis, Personal Income and its Disposition

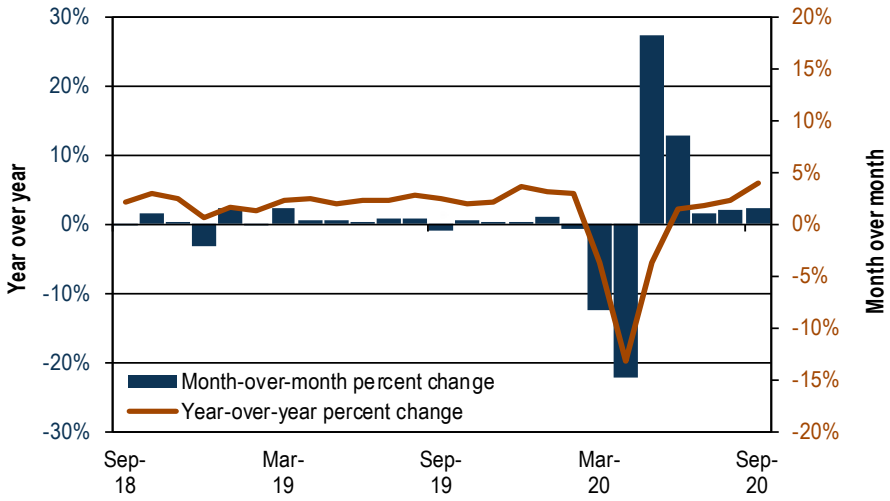


Consumers savings shot up in April 2020 but were used to bolster consumption later.

Retail sales data provide another measurable way to track consumer spending along with the manner to which consumers allocate expenditures towards the purchase of durable and nondurable items offered by retailers. They also provide an indication of the demand for certain retail products and how that might affect hiring decisions within those industries. Since the data are available monthly, it can provide an early indication of how consumer spending is progressing. Retail sales are reported in nominal dollars, and sales value can be volatile since they are affected by price movements of items typically purchased like gasoline. Focusing on longer-term trends helps to navigate through some of this volatility. Annual retail sales grew by 3.5 percent from 2018 to 2019, somewhat less than the 4.4 percent pace established during the same

period a year ago. January 2020 started the year off with sales up 0.8 percent for the month before buying behavior began to radically change starting in February (*Figure 1-6*). The bottom fell out for retailers as the lockdowns took effect in March and April, but sales rebounded strongly in May and June. From there through September, sales continued to grow to where 2020 receipts from January through September are now less than 1.0 percent of what they were during the same period in 2019. Renewed restrictions placed on establishments during November and into December, however, look to end the upward climb.

Figure 1-6. U.S. retail sales, month over month and year over year, seasonally adjusted percent change
United States, September 2018 through September 2020
Source: U.S. Census Bureau, Monthly and Annual Retail Trade Report

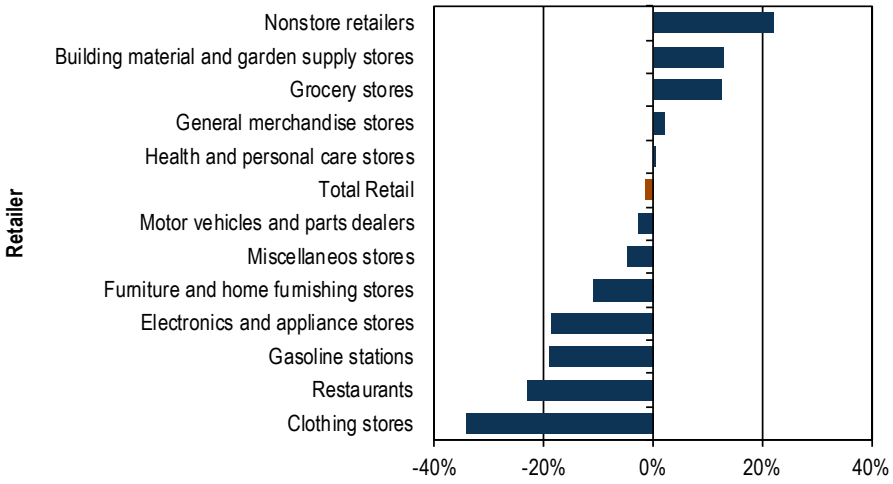


Increases in retail sales were choppy moving into 2019, but stabilized until this past September.

Based on retail data from February through September, it is possible to see how sales have fared throughout the pandemic up to that point. The sales figures for retailers in 2020 can be contrasted with 2019 to see how sales have changed. Since there has been a recent spike in case counts, it probably means that consumer demand is set to shift again. Having an understanding of how things played out in the retail sector during the initial lockdown can inform the outlook for consumer spending amid the resurgence of COVID-19 cases.

While the overall level of sales is nearly back to where it was, outcomes vary dramatically by store type (*Figure 1-7*). In this case, sales from February through September 2020 are compared with sales from the same period one year prior. Those differences that have arisen could be the deciding factor between either making it to the other side of this crisis or literally closing shop for many stores.

Figure 1-7. Percent change in nominal retail sales by retailer, seasonally adjusted
United States, February through September 2020 compared to February through September 2019
Source: U.S. Census Bureau, Monthly Retail Trade Report



Even with the third quarter rebound, sales at most retail establishments in 2020 lag 2019.

While total retail sales for February through September in 2020 are nearly at the level they reached in 2019, most retail stores have not matched their 2019 receipts. Clothing stores suffered the largest sales declines in March and April. Sales came roaring back in August and September, but still have a long way to go to reach 2019 levels. Restaurants, which had been limited to take-out in certain cases and capacity restrictions, were able to extend dine-in services within the first or second phase of many state re-opening plans. This likely led to a pick-up in restaurant visits, as the opportunity to eat out again rather than cook at home was presented. Restaurant sales surged beyond their April low, but remain down from January and February monthly levels. The accelerating COVID-19 case counts, and corresponding containment measures puts the restaurant recovery at risk, however.

Sales at gasoline stations fell during March and April before rebounding. The rebound at gas stations was partly price related as demand picked up amid what are still low levels of mobility. Electronics and appliance stores and furniture and home furnishing stores also re-opened and experienced rising sales. Both categories experienced significant sales increases in June, as did miscellaneous stores, which include florists, used merchandise, and pet supply shops.

Motor vehicle and parts dealers have seen monthly sales volume rise above January and February levels in recent months. The 2020 sales receipts are now roughly in line with those recorded in 2019. Autos sales will likely

continue to support total retail sales in the months ahead if dealerships are not required to close. Given the fast comeback in auto sales, the decline in sales was probably associated with dealership closures.

Nonstore retailers, or online sales, is the one category of retail that continued to see monthly sales increase through May. Online sales got a lift as many people turned to virtual options while confined to their homes. The shift to online was in many ways a continuation of a pre-existing trend, as online sales have been outpacing more traditional forms of retail for many years. Online sales should continue to post gains, particularly since many re-opening plans are being delayed.

Grocery stores were the primary beneficiary of the stay-at-home orders that were enacted in March. Panic buying gripped the nation during the initial onset of the pandemic in early March, and shoppers piled carts high with everything they thought they might need for a long stretch at home. Sales surged in March as people stocked up on basic food items, toilet paper and cleaning supplies. Sales volume also increased in March at health and personal care stores, (which often carry, among other things, toilet paper) and general merchandise stores (which include warehouse clubs such as Costco). Grocery sales then declined in April after the March round of panic buying and have since leveled off, albeit at monthly levels above January and February. Monthly sales at health and personal care stores, along with general merchandise stores, declined in March before rising to or above March levels most recently.

Building material and garden equipment stores held up well during the crisis, with February through September sales in 2020 exceeding 2019 by 13 percent. Part of the success in this category is attributable to retailers such as Home Depot, that were determined to be essential businesses during the lockdowns. Building material sales should continue to hold up due to the improvement taking place in home sales.

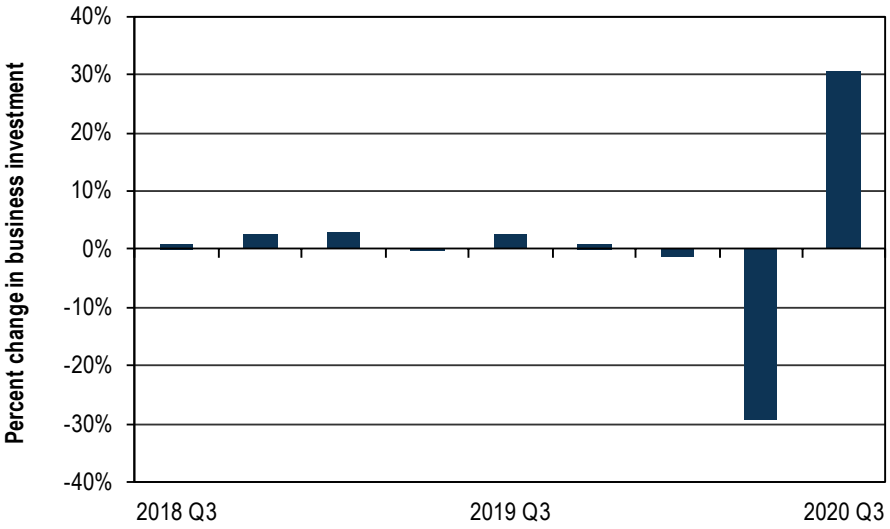
Business fixed investment spending holds up reasonably well

Business fixed investment (BFI) entails spending by businesses on residential and nonresidential structures, equipment and intellectual property products, the major type being software. This type of investment is expressed as "fixed" to distinguish it from investment in inventories. Spending on equipment, which is a component of nonresidential investment, constitutes the largest dollar outlay for businesses.

Real investment spending by American businesses totaled $3.4 trillion in 2019, which was a little more than 17 percent of overall GDP. Trade uncertainty, a global slowdown and a strong U.S. dollar had contributed to a slowing in business investment in fourth quarter that year, as it grew by only 1.0 percent during that time (*Figure 1-8*). In addition to the overall economic climate, Boeing's best-selling 737 MAX aircraft had been grounded. Most of the falloff had occurred in equipment spending, including transportation equipment. Investment in equipment subsequently peaked in first quarter 2019 before declining during the next three quarters as businesses grew increasingly cautious.

The arrival of the pandemic had the same effect on business investment plans as it did in almost every other economic measure – the bottom fell out in March and April. Yet despite the major collapse in GDP over the first two quarters of 2020, business investment declined even less than it did during the Great Recession. The relatively modest pull back in investment since the economic fallout has been mostly tied to the service sector, which tends to be less capital intensive. In addition, companies needed to facilitate working from home arrangements and reinvent themselves during the pandemic, resulting in a shift in investment needs. Equipment categories like computers and information-related products saw increased demand, thus cushioning the blow to investment from the virus. The demand for medical equipment also rose.

Figure 1-8. Real business fixed investment, quarterly percent change, seasonally adjusted annual rate
United States, third quarter 2018 through third quarter 2020
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income



Business fixed investment was disrupted by the virus, but its decline was moderated.

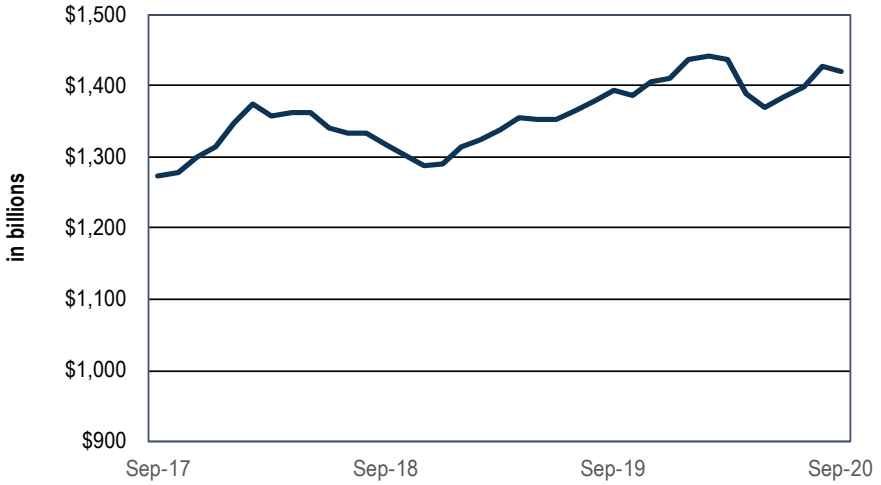
BFI rebounded sharply in third quarter 2020, but has yet to return to pre-pandemic levels. Investment plans have been growing, and there could be some action taken on delayed investment since equipment spending peaked a full year before the pandemic. However, as the virus lingers, overall demand looks set to remain weak, which will limit the incentive companies may have to invest in the near term.

Construction spending moderates, then bounces back

An important category of private fixed investment is the construction of new residential and nonresidential structures. The data provide detail into various sectors of the economy and can indicate where the economy is headed. Although the initial construction spending data are subject to large revisions, trends over several months reflect hard data. Decisions to build a home, office building, warehouse, power plant or manufacturing facility involve some deep thinking and the implications from those decisions are long term.

Total private construction spending outlays had been generally increasing as the most recent economic expansion strengthened. Spending rose by 2.3 percent overall in calendar year 2019 (Figure 1-9). Federal Reserve policy had moved to a more accommodating stance when it cut interest rates three times in 2019. The moves created a more favorable climate for construction activity, and construction spending consequently rose by 1.9 percent over the month in January 2020.

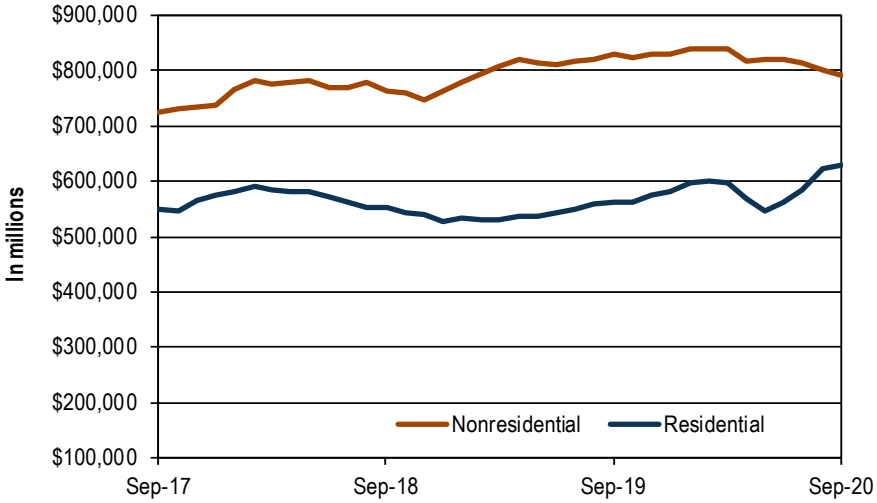
Figure 1-9. Value of total construction put in place, billions of dollars, seasonally adjusted annual rate
United States, September 2017 through September 2020
Source: U.S. Census Bureau, Construction Spending



Total construction spending held up reasonably well during the pandemic.

It did not take long for the effects of the coronavirus to be felt. Construction spending declined in March, April and May. Spending started rebounding after that, but the rebound has been concentrated on the residential side. Nonresidential spending has instead been languishing (*Figure 1-10*).

Figure 1-10. Value of residential and nonresidential construction, millions of dollars, seasonally adjusted annualized rate
United States, September 2017 through September 2020
Source: U.S. Census Bureau, Construction Spending



Residential construction activity has supported the rebound in construction spending in 2020 while nonresidential construction has weakened.

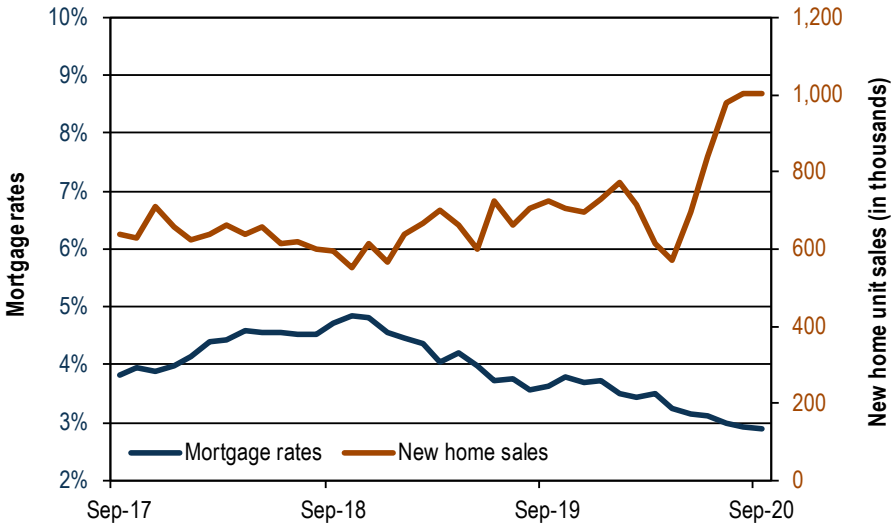
Spending on nonresidential construction is more pronounced and occurs at a level roughly 40 percent higher than residential construction. Normally, lower interest rates tend to reduce commercial mortgage rates and boost demand for income-producing properties. However, the effects of the COVID-19 crisis have heightened uncertainty regarding future tenant cash flows and creditworthiness. Demand has turned sluggish and continues to weigh heavily on most commercial and institutional construction. Nonresidential spending declined 1.6 percent during the month of September 2020, the fourth consecutive monthly drop.

Measures taken to contain the coronavirus have created major difficulties for commercial real estate. Hotel and retail properties have faced the most immediate short-term pain for many businesses. With a steep drop-off in travel of all forms, hotel occupancy has declined sharply. Hotel occupancy rates have improved since the spring but remain severely depressed. Occupancy has only moved sideways since mid-June when the coronavirus reappeared in many parts of the country.

Avoidance of public spaces has also weighed heavily on retail properties, especially those deriving foot traffic from nearby gyms, restaurants, breweries, movie theaters and other entertainment venues. Overall, the uncertainty surrounding the coronavirus has curtailed new retail development, as many projects are delayed or sidelined until the virus subsides. Office spending is another area that remains depressed. The number of office tenants has declined with many workers working from home and with the long-term needs of tenants being uncertain.

Residential construction has been supported by the housing industry, which has been one of the economy's few bright spots. The housing market had strong momentum to start the year. A healthy job market and low mortgage rates made homes more affordable for many consumers, although values crept steadily higher throughout 2019. Sales of new homes totaled 774,000 in January 2020, the highest monthly figure since October 2007 (*Figure 1-11*). Although sales slowed slightly in February, they were running 16 percent of the same pace the year before.

Figure 1-11. Conventional 30-year mortgage rates and new home sales, thousands of units, seasonally adjusted annualized rate
United States, September 2017 through September 2020
Source: Federal Housing Finance Agency; U.S. Bureau of Economic Analysis, New Residential Sales



Sales of new homes in 2018 started slumping as mortgage rates begin to rise.

The sudden stop in economic activity that began in mid-March slowed home sales growth abruptly, but not to a major degree. Although home showings were banned in many areas during April, new homes are much more conducive to virtual showings, which makes social distancing less

of an issue. The support this provided to sales also allowed residential construction activity to keep from cratering and allowed builders to add to inventories. Home construction was deemed an essential activity in most communities that enacted shelter-in-place orders, and most work can be done in ways that are consistent with social distancing guidelines.

New home sales bottomed out in April and have since come roaring back. Record low mortgage rates have spurred a rebound in the housing market and encouraged more higher income renters to become homeowners. On top of this, there has been a shift in housing preferences away from dense urban areas to larger spaces in the suburbs that can more easily accommodate home offices and gyms. With people spending more time at home during the pandemic, many households are looking for more space to accommodate remote workspaces, as well as the presence of more people in the home for more of the day. New homes provide homebuyers better options, as new homes are more apt to be internet friendly and have more open space. The shift to homeownership has also increased spending for additions and renovations.

The resulting divergence between strengthening residential activity and weakening commercial construction became clearer in August. Overall construction spending rose 2.0 percent during the month, an outcome fueled entirely by a 6.8 percent jump in residential spending. This was the third consecutive monthly gain in residential outlays, and residential construction spending has risen at a 3.5 percent annual rate from June through September.

Government enacts fiscal policy measures to combat economic fallout

With the United States economy facing an unprecedented shutdown of economic activity in March 2020, the federal government moved quickly to pass a series of fiscal policy bills designed to keep the economy afloat. Four major laws were enacted in phases. The first, the Coronavirus Preparedness and Response Supplemental Appropriations Act, was passed on March 6, which spent approximately $8 billion on support for things like the development of vaccines and therapies. The second law, the Families First Coronavirus Response Act, passed on March 18, was more expansive and consisted of a mix of public health and economic support measures. Some of the larger items included an increase in the federal government's matching rate for Medicaid ($50 billion), employer tax credits for paid sick leave and paid family medical leave ($95 billion) and more generous supplemental nutritional assistance program (SNAP) benefits ($21 billion).

The CARES Act, enacted on March 27,was easily the biggest fiscal package in terms of size. Major provisions included direct payments to households ($293 billion), the creation of the Payroll Protection Program (PPP) for small businesses ($377 billion), a dramatic expansion of unemployment insurance benefits ($268 billion) and numerous other policy changes designed to support businesses, households, and those responding to the public health crisis.

The fourth and final bill was enacted on April 24 and included additional money for the PPP ($321 billion) and more money for healthcare providers and COVID-19 testing efforts ($100 billion). Altogether, the measures adopted across the four laws represented an enormous expansion of fiscal support that unfolded in just a six-week period. The increase in spending most effectively took place over the second quarter of the year (*Figure 1-12*).

State and local government expenditures declined in the second quarter. Unlike the federal government, most state and local governments must balance their budgets. The severe economic downturn caused a sharp contraction in income and sales tax receipts for state and local governments. Absent federal help, these governments are often forced to cut employment and capital expenditures going forward, which helped contribute to another decline in third quarter 2020. State and local governments have gotten some fiscal aid in previous federal packages, including expanded federal cost-sharing for Medicaid and access to a $150 billion Coronavirus Relief Fund that covers expenses made specifically in response to the pandemic. But while these and some other measures have been passed, there has not yet been a large appropriation of federal funds to cover general revenue shortfalls.

Figure 1-12. Government purchases and gross investment, trillions of dollars adjusted for inflation, seasonally adjusted annualized rate
United States, third quarter 2018 through third quarter 2020
Source: U.S. Bureau of Economic Analysis, Government Current Receipts and Expenditures

Expenditures	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3
Government expenditures percent change annual rate	2.5	-0.9	2.5	5.0	2.1	2.4	1.3	2.5	-4.9
Percentage change from preceding period									
Federal government expenditures	4.5	1.9	1.3	9.2	4.8	4.0	1.6	16.4	-6.2
National defense	5.4	6.4	5.6	4.4	5.6	5.2	-0.3	3.8	2.2
Nondefense	3.3	-4.4	-4.7	16.9	2.8	0.1	4.4	37.6	5.2
State and local government expenditures	1.4	-2.5	3.2	2.6	1.6	1.5	1.1	-5.4	-4.0

Federal government spending escalated in second quarter 2020 to support economic stimulus and relief policy measures.

In August, President Trump issued a series of executive orders. The orders asked the U.S. Treasury to allow for a deferral of payroll taxes from September 1 through December 31 for workers who earn approximately $100,000 or less per year. The payroll tax holiday is not mandatory, so it's possible many employers did not participate. Second, the orders established a "Lost Wages Assistance" program using Federal Emergency Management Agency emergency grant funding to provide $300 (with an optional state match of another $100) for states to supplement weekly unemployment benefit payments following the expiration of the $600 weekly FPUC payment at the end of July. Ultimately, the FEMA fund had enough for states to provide the enhanced benefit for up to 6 weeks. Finally, the orders ensured interest on student loans held by the federal government were waived through the end of 2020, and payments could be deferred until December 31.

Labor market receives devastating blow from COVID-19

Two surveys are used by the U.S. Bureau of Labor Statistics (BLS) to measure national labor market trends. The *establishment survey* provides an estimate of the number of occupied jobs in the private and public sectors (federal, state and local government). The survey of households samples roughly 60,000 out of about 125 million households in the country and estimates the number of people either employed or unemployed but searching for a job.[1]

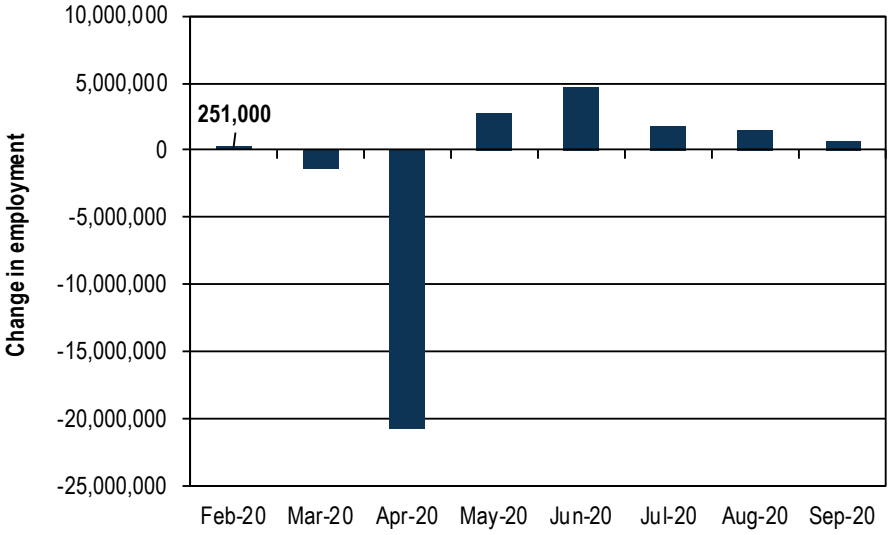
The U.S. labor market had been enjoying the benefits of a record-long expansion through February 2020. Hiring had been steady, and job market conditions were seen as tight, with the economy hovering around what economists consider full employment.

[1] The estimate of the number of households in the United States comes from the quarterly Homeownership and Vacancy report published by the U.S. Census Bureau.

Employment in the United States nosedived in March, however, as shelter-in-place restrictions ordered by most state governors to combat the spread of COVID-19 kicked in. Total nonfarm payroll employment tumbled by 1,373,000 (*Figure 1-13*). Job losses mounted in April, making the losses in March seem almost like a footnote. Nonfarm payrolls plunged almost 20.8 million with job losses spreading across all industry sectors. Many who lost their job were unable or unwilling to look for a new one, either because their industry had been largely shutdown, they did not feel safe returning to the workplace, they were taking care of children who were out of school/daycare, or they were disincentivized to look for work while receiving augmented unemployment insurance benefits under the CARES Act.

Hiring started to pick up in May as states began to loosen restrictions. Employment rebounded by more than 2.7 million and began a bit of a turnaround in the labor market. June followed with an even sharper increase in employment. Employers added jobs for the fifth consecutive month in September, bringing the total number of jobs recovered from the virus-related low to 11.5 million. This represents just over half of the jobs that were lost in March and April.

Figure 1-13. Total monthly nonfarm employment in thousands, seasonally adjusted
United States, February 2020 through September 2020
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics



Payroll employment plummeted in March and April but is now increasing at a slowing pace.

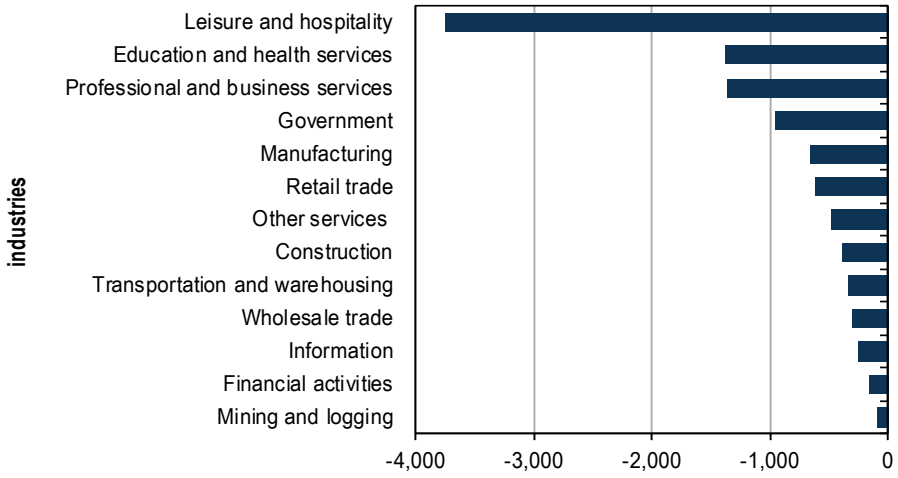
Although the labor market has continued to improve, the pace of job growth is moderating. The latest spike in COVID-19 infections is negatively affecting restaurants, bars, entertainment venues and in-person shopping. Restaurant closings have also picked up. The fallout is likely to become more apparent in the December and January reports.

Job losses have been widespread across industries since February 2020 (*Figure 1-14*). The leisure and hospitality industry, which includes restaurants and bars, hotels, and entertainment and recreation, lost almost half of its jobs during the shutdown period. As the economy was reopening, it gained back a good many of lost jobs, but still ranks as the industry suffering the most losses.

Education and health services, and professional and business services rank two and three respectively with respect to jobs lost. Education in this industry refers to public and not private education, and the survey measures employment associated with public school systems. There has been a shift to remote learning since the pandemic, and although many teachers will still be paid, the support staff for school facilities are directly affected. The demand for health services has declined as many would-be patients are delaying and putting off many medical visits.

Professional and business services include many jobs associated with office work and employment services. Since many of these are in office buildings or malls with large visitor traffic, employment has been restricted. In professional and scientific services, many can work remotely allowing this category to hold up better.

Figure 1-14. Nonfarm employment loss by industry in thousands, seasonally adjusted
United States, February 2020 through September 2020
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics



Nonfarm employment has expanded in all major industries but one in the past year.

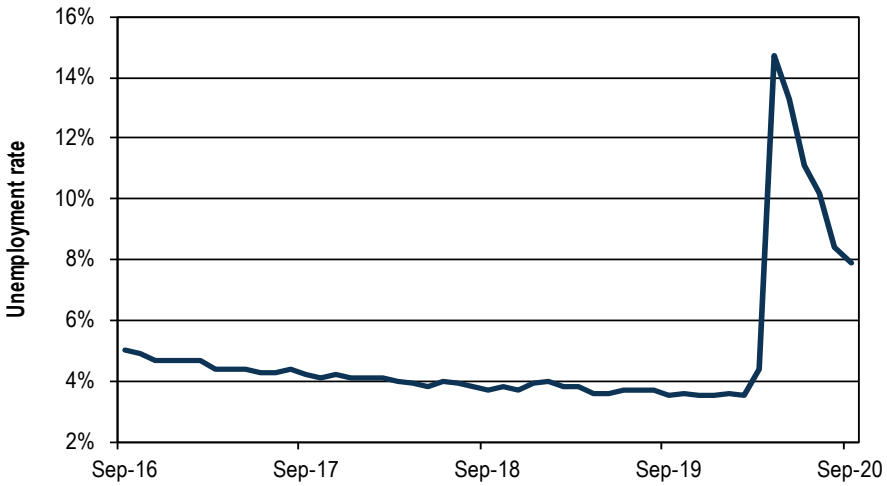
Unemployment rate shocked out of recent downward path

The headline unemployment rate is based on the national household survey and is arguably the most widely used single indicator of labor market conditions. It had been descending during the economic expansion leading up to the pandemic and was at a 50-year low of 3.5 percent in February 2020 (*Figure 1-15*).

The huge drop in payroll employment in March and April elevated the unemployment rate, first to 4.4 percent in March and then to 14.7 percent in April. In order to maintain consistency, the BLS household survey measures the number of employees that were on business and government payrolls during the pay period that contained the 12th of the month. Most of the increase in initial claims for unemployment insurance benefits, which factor into the unemployment rate, occurred in the two weeks following the survey week. This helps to explain the differences in magnitude of the rise in the March unemployment rate versus the decline in March payroll employment.

Unemployment rates began declining as businesses gradually reopened and certain restrictions were lifted. The unemployment rate descended to 7.9 percent in September and was on track to fall further before COVID-19 cases began rising later in the year. A new round of restrictions has been reinstituted by a number of states, which look to change the course of the unemployment rate again in December and January.

Figure 1-15. Monthly unemployment rate, seasonally adjusted
United States, September 2016 through September 2020
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics



The national unemployment rate spiked when the economy halted but improved when businesses gradually reopened.

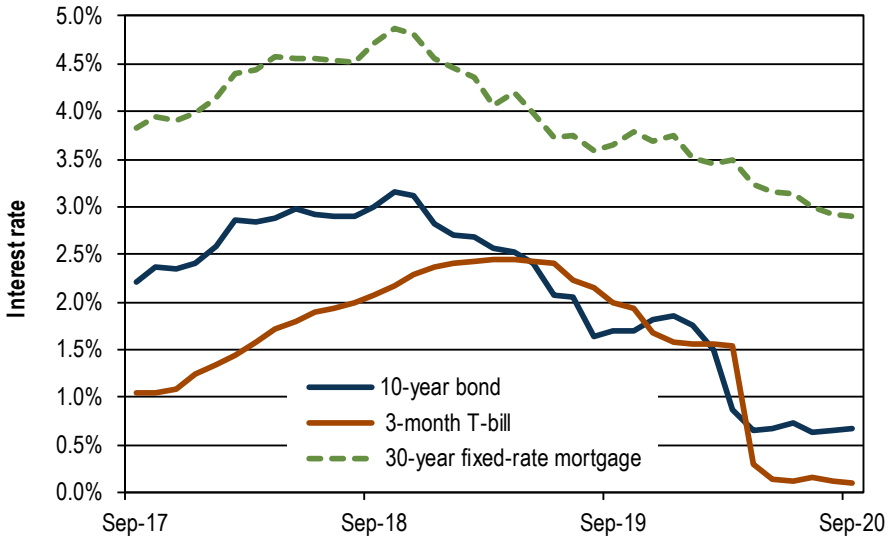
Monetary policy

Between December 2015 and December 2018, the Federal Open Market Committee (FOMC) of the Federal Reserve Board (Fed) had elected to raise its target range for the federal funds rate 225 basis points (bps), or 2.25 percent. Increasing trade uncertainty and deteriorating growth abroad, however, ultimately pushed the FOMC to rapidly reverse itself in 2019 (*Figure 1-16*). By signaling a shift in policy and cutting rates by 75 bps over three meetings, the FOMC helped assuage fears of recession and revitalize the nation's struggling housing sector.

Growing concerns over the economic impact of the virus outbreak prompted the FOMC to cut rates 50 bps on March 3, two weeks ahead of their scheduled meeting on March 18. Fed Chairman Powell had suggested on February 28 that the committee was prepared to ease policy by stating that the Federal Reserve would use its "tools and act as appropriate to support the economy." On March 15, the FOMC acted again. This time it moved to return the target range to 0.00 percent to 0.25 percent and restart its quantitative easing (QE) program. This program consists of purchases of financial assets, including U.S. Treasury securities and mortgage-backed securities (MBS) to support the credit markets.

Since that time, the FOMC has made no significant changes to its policy position. Furthermore, the committee has indicated that it expects to remain in an accommodative policy state for quite some time while acknowledging the growth path for the economy is largely dependent on "the evolution of the virus outbreak and the efforts undertaken to contain it."

Figure 1-16. Selected interest rates
United States, September 2017 through September 2020
Source: Federal Reserve Board, Federal Housing Finance Agency



Federal Reserve Board policy measures in March 2020 hastened the path for falling interest rates.

Chapter 2: Washington's economy and labor market

Washington's level of economic growth, as measured by state GDP, has grown at an annual rate exceeding that of the nation consistently since 2011, while income and employment growth ranked it among the top leading states. The stronger economic growth had propelled the unemployment rate down to a historic series low of 3.8 percent in February 2020. The favorable economic climate had been instrumental in luring waves of job seekers, thereby driving up the demand for homes and commercial space.

The COVID-19 outbreak in early 2020 altered the state's economic good fortune and put its resiliency to the test. Washington was one of the first states to suffer an outbreak and one of the first to put in place aggressive mitigation efforts. Those efforts caused the level of economic activity in the state to sharply pullback. Massive job losses resulted in March through May and the state's unemployment rate spiked upward.

Relief measures to assist the state were undertaken by the federal and the state government to limit the damage, and there has been some turnaround within the state economy since May. Still, the path forward for the Washington state economy rests upon the prevalence of the pandemic, and society's ability to control and eradicate the virus.

Washington state's strong GDP growth ends in 2020

Washington's level of economic activity can be measured by the value of the goods and services it produces at some point in time. This measure of the economic output of the state, formerly known as gross state product and now known as state gross domestic product (GDP), is the sum of all value added by industries within the state. It is the counterpart to the nation's GDP.

The U.S. Bureau of Economic Analysis (BEA) computes state GDP annually and quarterly. Changes in state GDP can be used as a measure of state economic growth, much as changes in national GDP are used to measure national economic growth.

Washington state's real GDP growth has been outpacing that of the nation for most of the expansion. Washington ranked first based on annual growth among all U.S. states and territories in 2017 and 2018. Its GDP expanded by 4.6 percent in 2019 (*Figure 2-1*), ranking it second among all states and outpacing the 2.2 percent growth achieved by the nation.

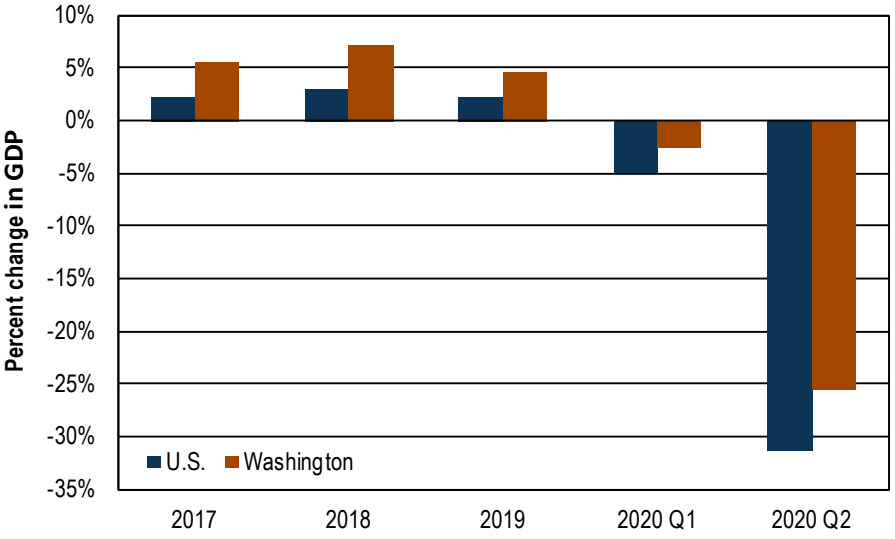
The continued development of the state's tech sector has been largely responsible for catapulting the economy into the upper tier. Technology is largely manifested within the information services industry and in professional and business services. Information services, which includes software development, contributed 1.9 percentage points out of the 4.6 percentage points by which Washington's economy expanded in 2019. The second-largest contributor was professional and business services. This industry accounted for 0.53 percentage points of the total growth in real GDP, led by its professional, scientific and technical services subsector, which contributed 0.33 of the total 0.55 percentage points.

Based on current dollar value, Washington's GDP of $613,997 million in 2019 made it the nation's 10th largest state economy. The largest industry in Washington was financial activities. This industry accounted for 17.8 percent of Washington's GDP and had annual real growth of 4.2 percent. The second-largest industry was information, which accounted for 14.0 percent of Washington GDP and had an annual real growth rate of 15.0 percent.

The state economy, much like the national economy, saw its level of economic activity decline shortly after the outbreak in the first quarter 2020. Washington state's GDP declined by 2.6 percent, and then by just over 25 percent as the shutdown carried over to the second quarter (*Figure 2-1*). Washington was not alone. Real gross domestic product (GDP) decreased in all 50 states and the District of Columbia in the first and second quarters of 2020, according to statistics released by the U.S. Bureau of Economic Analysis. The percent change in real GDP in the first quarter ranged from -1.3 percent in Nebraska to -8.2 percent in New York and Nevada, and from -20.4 percent in the District of Columbia to -42.2 percent in Hawaii and Nevada.

State statistics at this point have not yet been made available for third quarter 2020. The nation's GDP rebounded to show a growth rate of 33.1 percent in third quarter, and Washington should fare comparably. The tech industries that have contributed most to GDP have benefitted the most from a shift to remote work, which has offset some of the fallout from business closures. This should continue into the third quarter.

Figure 2-1. Gross domestic product, (chained 2012 dollars), annual and quarterly percent changes, seasonally adjusted annualized rate
United States and Washington state, 2017 through second quarter 2020
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income



Washington's economy declined along with the national economy in the first half of 2020.

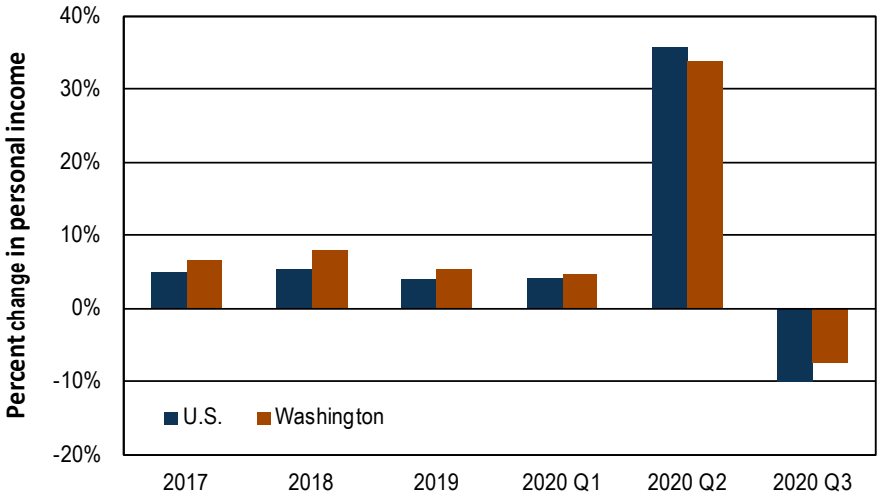
Personal income impacted by business shutdowns and government transfer payments

The growth of Washington's GDP during the expansion had occurred amidst higher employment and income for the state's residents. *Figure 2-2* shows how personal income growth in Washington compares with the U.S. The pattern of income growth is closely related to GDP growth making the results in *Figure 2-2* look very similar to those in *Figure 2-1* up until 2020. In 2019, Washington had a personal income of $493,128 million ranking it 13th in the U.S. From second quarter 2018 to second quarter 2019, the level of personal income in Washington grew by 6.5 percent, while U.S. personal income grew by 4.9 percent.

Personal income includes net earnings by place of residence; dividends, interest, and rent; and personal current transfer receipts received by the residents of Washington. Wages and salaries make up the largest component of personal income. The annual growth in wages and salaries for Washington state is shown in *Figure 2-3*. The wages are expressed in nominal terms, unadjusted for inflation. Personal income increased by over 30 percent in both Washington and the U.S. in second quarter 2020, even as wages and salaries were decreasing. The difference was offset by a massive increase in government transfer payments brought about from the various fiscal stimulus and relief packages passed into law

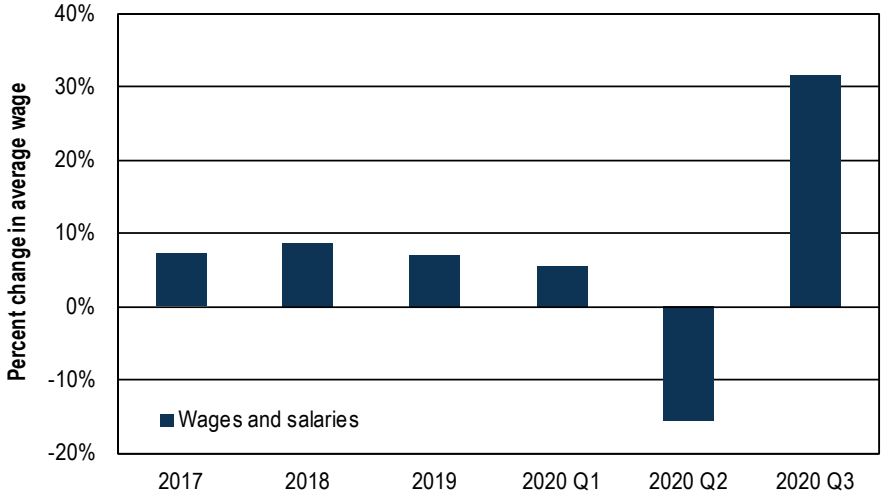
by Congress. Personal transfer receipts to Washingtonians more than doubled during the second quarter, but declined in the third quarter. Wages and salaries rose again in the third quarter when businesses gradually reopened.

Figure 2-2. Personal income, (current dollars), annual and quarterly percent changes, seasonally adjusted annualized rate
United States and Washington state, 2017 through third quarter 2020
Source: U.S. Bureau of Economic Analysis, Personal Income and Outlays



Washington's level of personal income, like the nation's, rose during the second quarter of 2020 before declining in the third.

Figure 2-3. Percent change in annual and quarterly wages and salaries, current dollars
Washington state, 2017 through third quarter 2020
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages



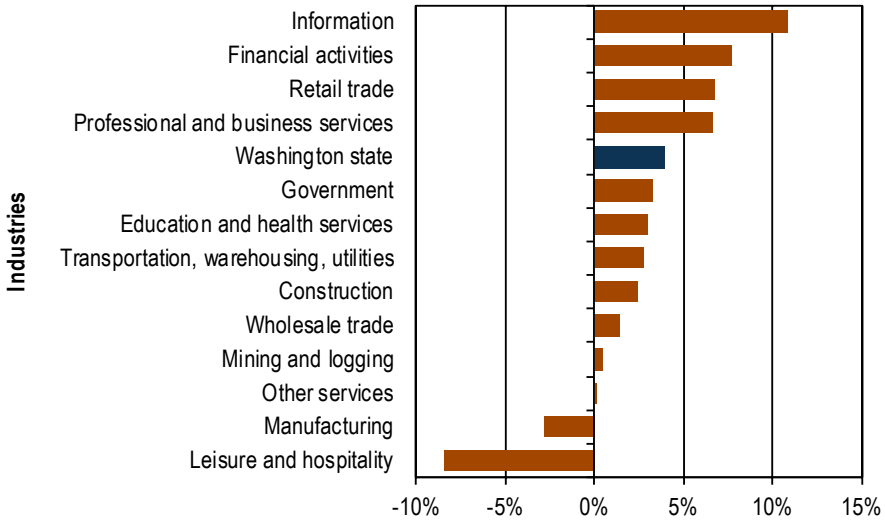
Wage growth in Washington state resumed in third quarter 2020 as businesses partially reopened.

Given that the drop off in wages and salaries paid by businesses in second quarter 2020 was so dramatic, it is worthwhile to see how each major industry was affected over the course of the year. *Figure 2-4* shows on a percentage basis the degree by which nominal wages and salaries changed by industry sector from second quarter 2019 through second quarter 2020. Total wage and salaries during this period increased in three out of the four quarters, leading to an overall increase of 3.9 percent. By comparing each industry to the total, it can be seen which industries were less impacted and which were impacted more.

Wages and salaries would have been paid to employees within each industry group, so the percent change in industry wages and salaries paid should be directly related to employment and job losses. The largest impact of the pandemic has been on businesses that require a high degree of customer contact. The restaurant industry, bars and entertainment venues have been hardest hit. Business establishments in these categories make up the bulk of jobs in the leisure and hospitality sector. Manufacturing was also heavily impacted, primarily in aerospace product and parts manufacturing. The demand for aircraft in 2020 had been declining as airlines around the world reduced the number of flights in response to fewer people not being able to travel. Other services, which include hair and beauty salons, and auto repair and maintenance, paid out roughly the same amount they did one year prior.

Industries whose wages and salaries grew at a rate above the state average and were less impacted by the virus include information, financial activities, retail trade, and professional and business services. Information comprises much of the tech sector, along with a portion of professional and business services. Retail trade includes online retail stores, whose sales grew with increased online shopping under various social distancing guidelines and restrictions. All the industries with above average wage and salary growth also have the advantage of having many of its employees able to work from home using computer access.

Figure 2-4. Percent change in average annual wage by industry
Washington state, second quarter 2019 through second quarter 2020
Source: Employment Security Department/LMEA, U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

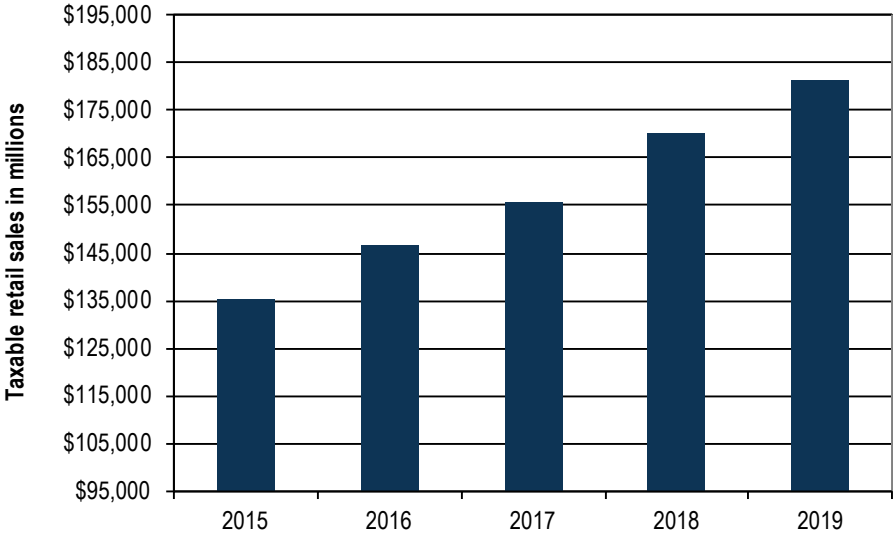


On a percentage basis, wages and salaries grew most annually in information and financial activities and declined the most annually in leisure and hospitality during second quarter 2019 to second quarter 2020.

Retail sales reach record high of $181 billion in 2019

Income and employment growth leading up to 2020 generated more consumer spending resulting in increased retail sales receipts over that time. *Figure 2-5* shows how taxable sales have risen annually from 2015 through 2019. In 2019, taxable retail sales increased by roughly 6.1 percent or $11.0 billion from 2018, pushing total taxable retail sales to a record high of $181.1 billion.

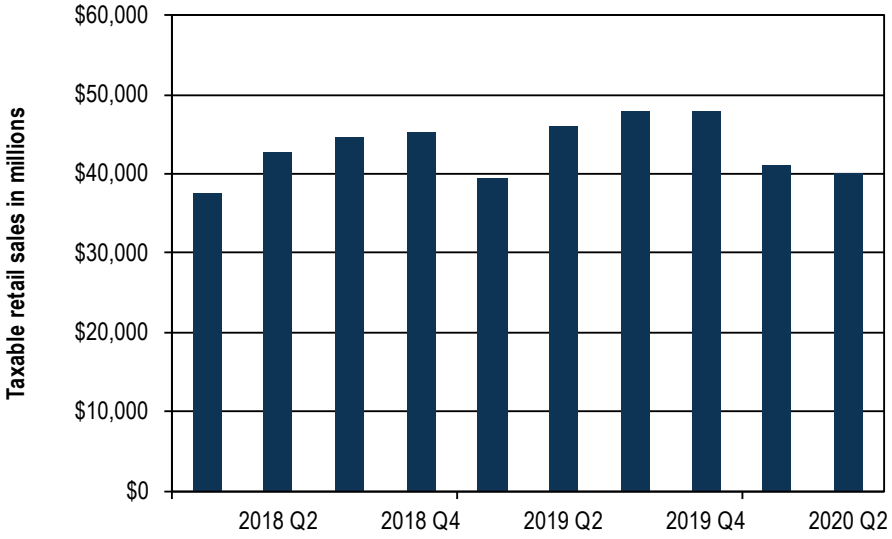
Figure 2-5. Annual taxable retail sales, millions of dollars
Washington state, 2015 through 2019
Source: Washington State Department of Revenue



Retail sales had consistently grown during the expansion.

The present available data are unable to account for the impact the pandemic has had on annual taxable retail sales, but by examining the data on a quarterly basis, it is at least possible to see how second quarter 2020 compares with second quarter 2019 sales (*Figure 2-6*). There is some seasonal variation from quarter to quarter with it being most noticeable in the first and second quarters of the year. After sales dip in the first quarter following the fourth quarter holiday season, they pick up again in the second quarter. Thus, it is reasonable to believe that second quarter 2020 sales would have increased again to a level beyond second quarter 2019 had the virus outbreak not occurred. Although purely speculative, the data are still useful to see what the shortfall in second quarter 2020 sales looks like when directly compared to second quarter 2019. In this case, taxable retail sales were $5.8 billion less in second quarter 2020 than what they were one year earlier. While sales receipts in third quarter 2020 most likely exceeded second quarter 2020 levels, and while total annual 2020 sales were expected to rise above the annual 2019 level, the annual 2020 increase probably will be less than the increase registered in 2019.

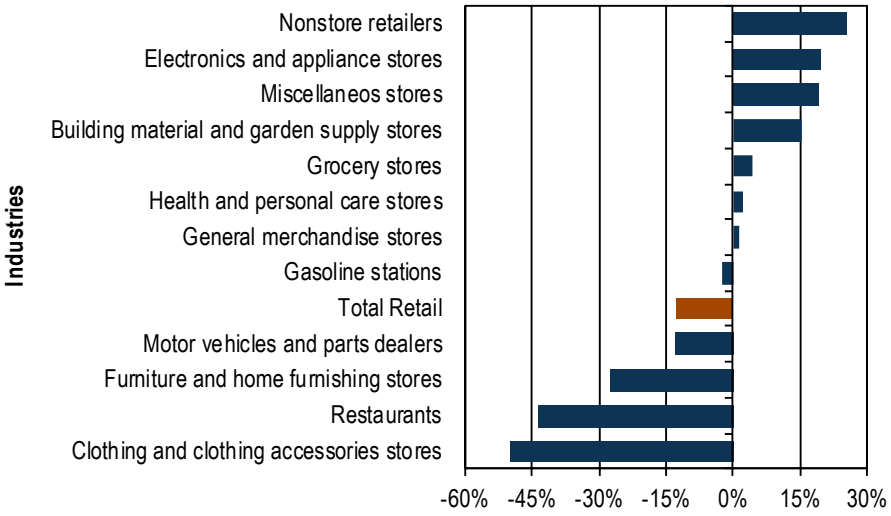
Figure 2-6. Quarterly taxable retail sales, millions of dollars
Washington state, second quarter 2018 through second quarter 2020
Source: Washington State Department of Revenue



The falloff in retail sales in second quarter 2020 is readily observed in the quarterly data.

Figure 2-7 shows how sales in second quarter 2020 among the major retail industries compared with sales registered in second quarter 2019. Total retail sales were already noted to have been less than what they were in second quarter 2020 relative to second quarter 2019 and were down 12.7 percent. The industry data has much in common with what occurred at the national level, with a few minor exceptions. Along with the rest of the nation, clothing stores, restaurants, furniture stores, and motor vehicle dealers in Washington all took the brunt of the decrease in sales. Nonstore retailers, which encompasses online shopping, did very well. Sales by building material and garden supply stores and grocery stores increased much like they did across the nation. Sales at electronics and appliance stores along with miscellaneous stores seemed to fare a little better than their counterparts throughout the nation.

Figure 2-7. Percent change in nominal retail sales by industry
Washington state, second quarter 2020 compared to second quarter 2019
Source: Washington State Department of Revenue



Nonstore retailing sales received a boost when shoppers stayed at home more during the pandemic.

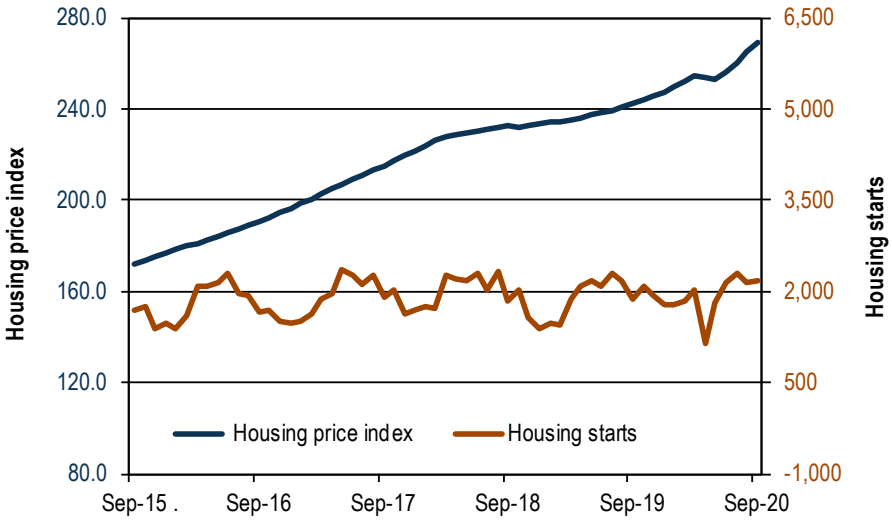
Washington housing activity resumes pace after temporary setback

Years of top-level economic growth had generated employment opportunity and had attracted job seekers to Washington from all over the country. Most new inhabitants come to settle in the western part of the state lying west of the Cascade mountain range with proximity to the Seattle, WA and Portland, OR areas. Now the nation's 13th most populous state, Washington's population growth has pushed up the need for housing and pushed home prices in these areas sharply higher. The desire for more available space, together with more people confined to the home because of the virus, has created more of a demand for homes located farther away from urban areas where values are better and living space is more accessible.

The virus pandemic and economic shutdown also prompted the Fed to cut interest rates which then led to record low mortgage rates. The result further increased the demand for homes, and despite rising home prices, sales bounced back strongly after the initial shutdown. Builders have responded by moving to build more homes (*Figure 2-8*) and have maintained a higher pace since June 2020.

The housing industry, like other industries, will continue to be affected by changes in the economy that react to the evolution of the virus pandemic. Should the ability society develops to control the spread of the virus improve, and the economy recovers further, housing demand and home building activity should increase. Mortgage rates should continue to remain low for some time, as the Fed has indicated its monetary policy position will remain on hold until it is confident a full recovery has taken place.

Figure 2-8. Housing price index and single-family housing starts, three-month moving average, seasonally adjusted
Washington state, September 2015 through September 2020
Source: Federal Home Loan Mortgage Corporation, U.S. Census Bureau



Housing starts maintain their pace while enduring virus and rising prices.

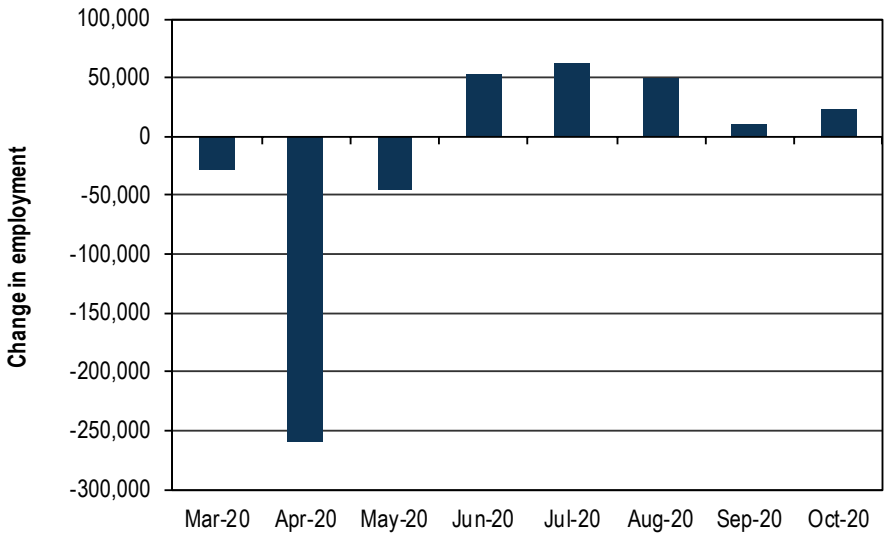
Washington's labor market melts down, moves toward recovery, and then...

Efforts to slow the spread of COVID-19 quickly shut down much of the Washington economy in March through much of May 2020. The restrictions associated with social distancing led to job losses that basically ballooned off the charts, and the word "unprecedented" became a standard part of an economist's vocabulary. Consequently, the figures presented by *Figure 2-9* show the monthly change in nonfarm employment in the state beginning when restrictions were first implemented in March, and then when they were being gradually relaxed starting in May and carrying through October.

The next figure might look like the employment situation of other states, as all 50 states suffered severe job losses in April. Washington's labor market appeared to have bottomed out sometime in May as the state began to ease restrictions. Employment bounced back in June with enough forward momentum to carry strong gains into July and August. After the initial recovery boost, employment growth appeared to be slowing. The virus still lingered, and businesses still needed to operate with social distance caution and limited capacity. To date in October 2020, the state has been able to recapture about 60 percent of the jobs lost from March through May.

As the year moved closer to winter, reported COVID-19 cases began escalating, prompting a reissuing of restrictions on businesses. Payroll employment growth is now threatened by this latest round, and it runs the risk of turning negative in the months of December and January. The discovery of vaccines for the disease has created hope that the virus can be placed under control. New rounds of fiscal stimulus coming with Congressional legislation can hopefully buy enough time for the economy to hold steady while the vaccine distribution process takes, but as has been the case for most of this year, the economy will be tied to the evolution of the virus and policymakers' strategies for managing it.

Figure 2-9. Mionthly employment change, seasonally adjusted
Washington state, March 2020 through October 2020
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Current Employment Statistics

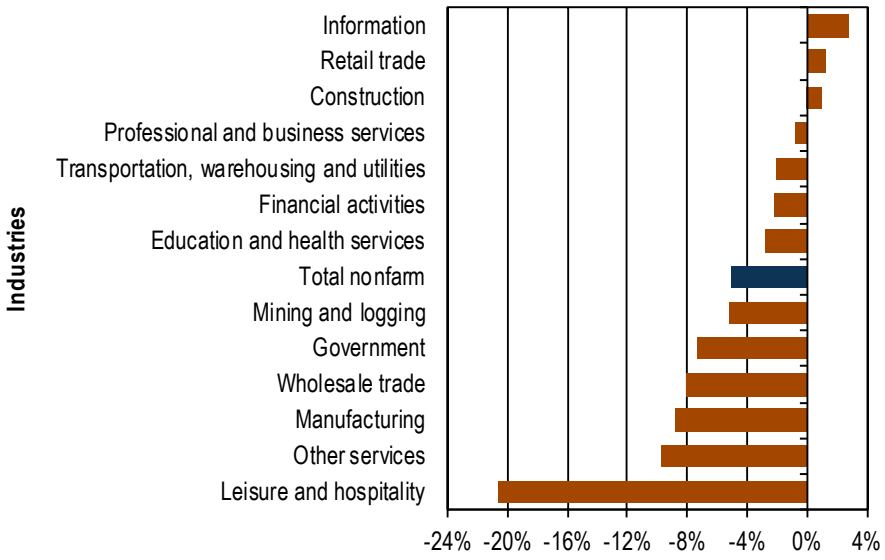


Monthly employment has shifted dramatically with respect to policy instituted to deal with the pandemic.

Figure 2-10 shows how payroll employment has fared by industry over the course of the year from October 2019 through October 2020. As in most states, leisure and hospitality accounted for the vast majority of job losses. To date, employment has been slow to recover with only about half of the workers let go during the lockdown rehired. Another industry that requires a high degree of customer contact or interaction, other services, is also having trouble getting employment back on track. Manufacturing is another industry that was particularly impacted by the virus. Most of the fallout is contained in aerospace product and parts manufacturing. Boeing had already been shedding jobs due to problems with its 737 Max, and the pandemic rapidly decreased air travel.

By contrast, hiring has held up well in information, which has benefitted from a shift to remote work. Retail trade hiring has been mixed with many sectors shifting to provide more online services at the expense of customer services at brick and mortar stores. Warehouse and grocery stores have had more demand for products during the pandemic and have added workers as a result. Hiring has also snapped back in construction. Professional and business services has also recovered jobs to the extent which employment in the industry is only marginally changed over the course of the year.

Figure 2-10. Percent change in nonfarm employment by industry sector
Washington state, October 2019 through October 2020
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Current Employment Statistics



Employment is still down in most industries over the course of the year from October 2019 through October 2020.

National, state and local unemployment rates bounce due to shifts in employment

Washington state's unemployment rate had been steadily declining as employment growth continued during the economic expansion. By February 2020, the state's unemployment rate had sunk to a historical series low of 3.8 percent (*Figure 2-11*). The Seattle Metropolitan Division (MD), a major hub of state economic activity, saw its unemployment rate fall from 3.8 percent in October 2016 to a new series low of 2.6 percent in February 2020.

While Washington state was busy setting records for low unemployment rates, other states were doing the same. Economically diverse states like California and New York recorded new unemployment lows in February 2020; California's rate descending to 3.9 percent and New York's coming in at 3.7. Tourism dependent states like Florida and Nevada were doing well economically with each state seeing record low unemployment rates. Florida's rate reached a low of 2.8 percent in February 2020 while Nevada's unemployment rate hit its low at 3.6 percent. The national unemployment rate for the U.S. matched its 50-year low of 3.5 percent in February 2020. Throughout most of the expansion, the U.S. unemployment rate has usually been slightly lower than the Washington state unemployment rate.

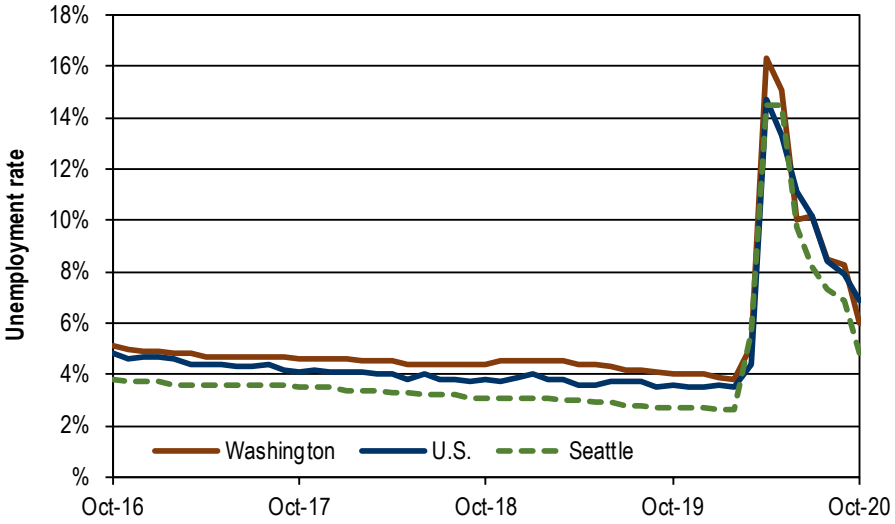
The aggressive mitigation efforts implemented by Washington and other states to slow the spread of COVID-19 caused economic activity to scale back sharply in March, causing the unemployment rate to quickly move up 1.3 points statewide and 3.0 points higher in greater Seattle to 5.6 percent. Job losses across the nation peaked in April, sending unemployment rates to their high-point zenith. The U.S. unemployment rate soared to 14.7 percent, while Washington state's rate reached 16.3 percent and Seattle's rate moved to 14.5 percent. With leisure and hospitality industries experiencing the greatest share of job losses, states like Florida, Hawaii, and Nevada were hit hard. Nevada's unemployment rate reached the highest in the country, coming in at 30.1 percent while Hawaii's rate skyrocketed to 23.8 percent.

Unemployment rates have been falling since then as most states, including Washington, began easing restrictions. Since the economy has yet to fully recover, the rates remain elevated. The unemployment rate for the U.S. dropped to 6.9 percent in October 2020. Washington's rate has come back down to 6.0 percent, below the national rate. Seattle had an unemployment rate of 4.8 percent in October. Other states have experienced a similar decline. Two of the hardest hit states, Hawaii and Nevada, have lower unemployment rates, but those rates are still at the

higher end at 14.2 and 11.9 percent respectively. Two of the states that have had major trouble with the spread of COVID-19, California and New York, now have unemployment rates in the 9.0 percent range.

While its direction has been predictable given what has been happening to payroll employment, the magnitude of the changes in unemployment rates has been harder to determine and remains unpredictable. For now, the recent downward trend in unemployment rates may soon be disrupted as Washington and other states begin reissuing gathering restrictions to combat recently rising COVID-19 cases. How long this may continue will rest with society's ability to tame the virus.

Figure 2-11. Monthly seasonally adjusted unemployment rates
United States, Washington state and Seattle MD, October 2016 through October 2020
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics



Unemployment rates skyrocketed when business restrictions were implemented but have come down when some restrictions were eased.

Chapter 3: Seasonal, structural and cyclical industry employment

The purpose of this chapter is to identify the most influential factors in employment trends for different industries in Washington state. The results inform a better understanding of current employment trends and practical applications such as job placement, unemployment insurance and training programs. Annually, 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 variations.

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

Our analysis is based on historical employment data from January 2002 through December 2019.[2] 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 cchanges attributed to the business cycle in general or specific events such as the housing bubble bursting in 2007 or cyclical variation in aerospace 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).

[2] 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.

Seasonal industries

The analysis this year showed that of 95 industries in Washington state, 18 have high levels of seasonality with a seasonal factor[3] 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 2019
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Seasonal factor
111	Crop production	31.61%
487	Scenic and sightseeing transportation	20.37%
115	Support activities for agriculture and forestry	17.09%
525	Funds, trusts and other financial vehicles	14.23%
213	Support activities for mining	11.85%
711	Performing arts, spectator sports and related industries	10.56%
237	Heavy and civil engineering construction	7.38%
814	Private households	6.55%
114	Fishing, hunting and trapping	5.71%
721	Accommodation	5.35%
492	Couriers and messengers	5.30%
316	Leather and allied product manufacturing	5.27%
519	Other information services	5.17%
312	Beverage and tobacco product manufacturing	5.08%
311	Food manufacturing	4.40%
448	Clothing and clothing accessories stores	4.28%
713	Amusement, gambling and recreation industries	4.25%
512	Motion picture and sound recording industries	4.12%

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

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.

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

For total covered employment, the trend component accounts for 79.7 percent of total employment changes (*Appendix figure A2-2*). There were 29 industries where the structural (trend) component accounted for at least two-thirds of the change in employment (*Figure 3-2*). Ambulatory healthcare services, local government (other), educational services, and beverage and tobacco product manufacturing were the most highly influenced by the trend factor, and consequently less by the cyclical factor. The trend component contributed relatively more to these four industries than to employment changes for total nonfarm employment. All other industries have lower trend contributions than total nonfarm employment.

Figure 3-2. Industries most influenced by structural factors
Washington state, 2002 to 2019
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Structural factor
621	Ambulatory healthcare services	91.41%
903	Local government (other)	82.71%
611	Educational services	82.58%
312	Beverage and tobacco product manufacturing	81.33%
722	Food services and drinking places	78.31%
812	Personal and laundry services	78.06%
519	Other information services	77.15%
531	Real estate	76.75%
425	Wholesale electronic markets and agents and brokers	76.39%
238	Specialty trade contractors	75.17%
453	Miscellaneous store retailers	74.71%
532	Rental and leasing services	74.60%
541	Professional, scientific and technical services	74.26%
511	Publishing industries (except Internet)	73.27%
454	Nonstore retailers	73.09%
236	Construction of buildings	72.97%
622	Hospitals	72.78%
444	Building material and garden equipment and supplies dealers	71.63%
813	Religious, grantmaking, civic, professional and similar organizations	70.61%
551	Management of companies and enterprises	70.12%
481	Air transportation	69.94%
561	Administrative and support services	69.62%
311	Food manufacturing	69.43%
237	Heavy and civil engineering construction	69.26%
452	General merchandise stores	68.89%

NAICS	Industry	Structural factor
337	Furniture and related product manufacturing	68.22%
113	Forestry and logging	67.27%
322	Paper manufacturing	66.90%
522	Credit intermediation and related activities	66.15%

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

For 15 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 20.3 percent of total employment change. Support activities for mining, oil and gas extraction and scenic and sightseeing transportation were the most highly influenced by the cyclical factor, and consequently less by the structural (trend).

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

NAICS	Industry	Cyclical factor
213	Support activities for mining	67.19%
211	Oil and gas extraction	60.93%
487	Scenic and sightseeing transportation	60.40%
486	Pipeline transportation	60.37%
525	Funds, trusts and other financial vehicles	57.77%
114	Fishing, hunting and trapping	55.36%
315	Apparel manufacturing	55.31%
324	Petroleum and coal products manufacturing	54.67%
316	Leather and allied product manufacturing	54.60%
443	Electronics and appliance stores	54.38%
111	Crop production	54.20%
491	Postal service	53.96%
482	Rail transportation	51.57%
562	Waste management and remediation services	50.88%
333	Machinery manufacturing	50.51%

These Washington industries have been most sensitive to cyclical 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 need to be aware that not every upswing in employment is an indication of an increase in demand. The upswing may simply be annual seasonal fluctuations or cyclical fluctuations.

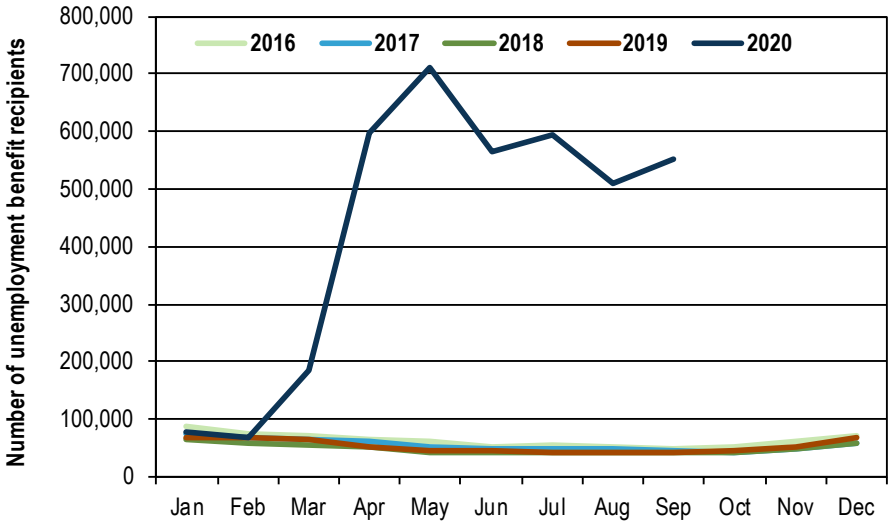
Chapter 4: Unemployment

This chapter discusses unemployment benefits and unemployment rates.

Unemployment benefits

In September 2020, more than 553,289 people received unemployment payments for all benefit entitlements. For comparison, during the height of the great recession, January 2010, 305,086 people had received unemployment benefits. *Figure 4-1* shows the number of monthly beneficiaries in Washington state from January 2016 through September of 2020. These individuals received at least one payment of unemployment benefits under regular unemployment compensation, Pandemic Unemployment Assistance (PUA), Pandemic Emergency Unemployment Compensation (PEUC), or the Extended Benefits program (EB). The number of beneficiaries in 2020 increased significantly starting in March 2020 with the COVID-19 pandemic. In April 2020, the number of paid claims increased by nearly three times. The number of claimants receiving benefits peaked at 711,945 in May 2020.

Figure 4-1. Unemployment benefit recipients by month, all benefits[4]
Washington state, January 2016 through September 2020
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse



The number of Washingtonians receiving unemployment benefits as of September 2020 was 553,289.

[4] All benefit programs include regular unemployment compensation, Pandemic Emergency Unemployment Compensation (PEUC), Pandemic Unemployment Assistance (PUA) and Extended Benefits (EB).

Duration of unemployment benefits

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.

More weeks of unemployment benefits available after the recession

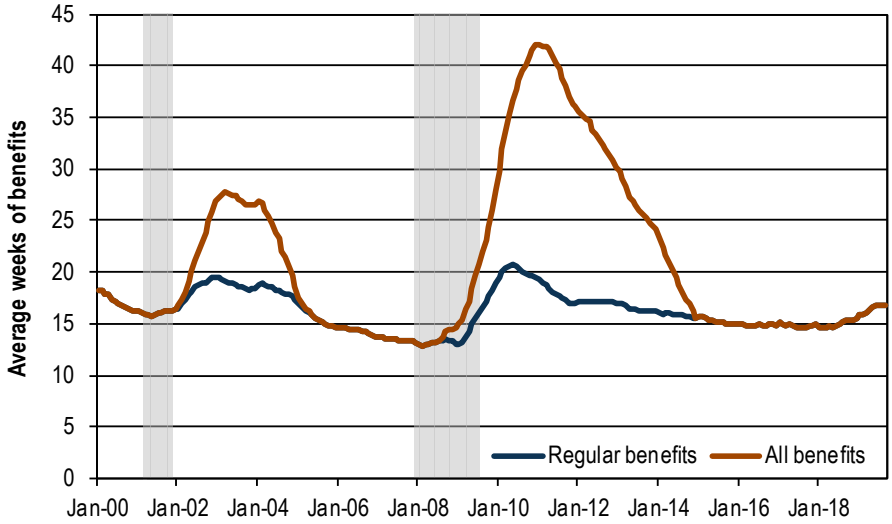
Because of the extraordinary steep loss of jobs related to the COVID-19 pandemic, additional weeks of federally funded unemployment benefits were made available to unemployed workers after they used all their regular unemployment benefits. During 2020, regular unemployment claimant were able to receive up to a total of 59 weeks of benefits: 26 weeks of state benefits, 13 weeks of PEUC benefits and 20 weeks of EB (PUA recipients were able to receive up to 46 weeks into December 2020).

Figure 4-2 compares the average duration of benefits in Washington state for those who were receiving only regular benefits (up to 26 weeks) to the duration of all benefits, that includes regular benefits, PEUC and EB benefits. The average duration information is calculated by looking at the number of weeks compensated for a 12-month period divided by the number of first payments. Because of the surge in first payments of regular benefits payments in April of 2020, and delays in compensating claimants between April and May of 2020, we saw a drop in the overall average duration of benefits in April and May of 2020.

The annual average duration for regular benefits and all benefits peaked in 2010 at 20.7 weeks and 42 weeks, respectively. In 2011, average duration of regular benefits declined to 17.9 weeks and 39.5 weeks for all benefits. The average duration of both regular benefits and all benefits in 2017 was 14.8. From January 2018 through September 2020, the average duration for both regular benefits and all benefits has been increasing going from an average duration of 14.7 weeks in January 2018 to 16.8 weeks as of September 2020 for regular benefit entitlements, and 18.2 weeks for all benefit entitlements.[5]

[5] Federal extensions of benefits were passed in March of 2020. Regular, PEUC, and EB are included here. Since March 2020, claimants could receive up to 56 weeks of total benefit payments.

Figure 4-2. Average duration of regular unemployment benefits compared to all benefits
Washington state, January 2000 through September 2020
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse



Shaded areas are U.S. recession periods.

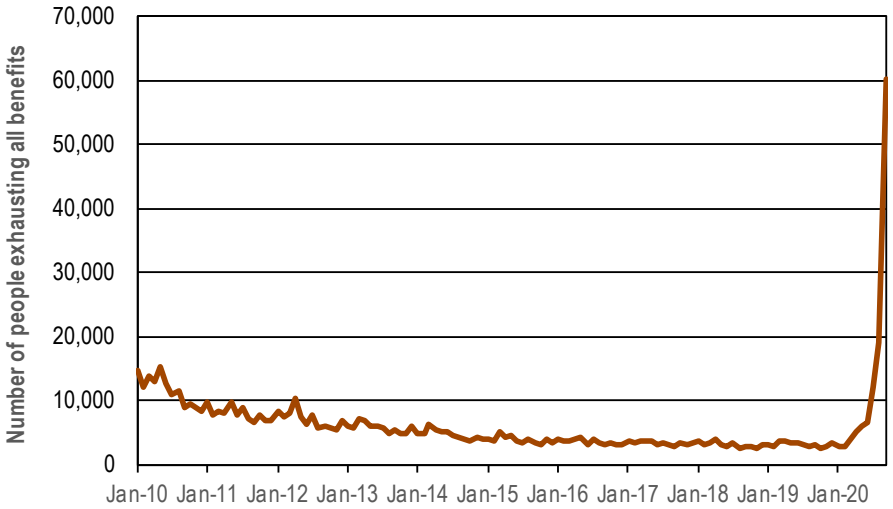
The average duration of benefits as of September 2020 is 16.9 weeks for regular benefit entitlements and 18.2 weeks for all entitlements.

Benefit exhaustions have been increasing

Unemployed individuals exhaust their benefits when they have received all regular unemployment benefits, PEUC and EB available to them. The following exhaustion analysis will focus only on the claimants that have exhausted regular benefits between October 2019 and September 2020. Between January 2019 and April 2020, only regular benefit entitlements were available. In March 2020, the CARES Act (federal stimulus) was passed by Congress and it included the Pandemic Emergency Unemployment Compensation (PEUC) program, providing an extra 13 weeks of benefits to regular unemployment claimants. Washington state triggered onto extended benefits on April 18th, providing 13 additional weeks of unemployment benefits. A high extended benefit period was triggered on June 7th, providing seven additional weeks of extended benefits for a total of 20 weeks of extended benefits.

Figure 4-3 shows the monthly exhaustions for Washington state regular unemployment benefits. The level of exhaustions of regular claims has been increasing since March 2020, with substantial increases in the number of exhaustions of regular unemployment benefits occurring in September 2020 (60,158 regular benefit exhaustions).

Figure 4-3. Number of people exhausting regular unemployment benefits
Washington state, January 2010 through September 2020
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse



In September 2020, 60,158 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 from September 2019 to September 2020. 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 and that continue to struggle in their recovery from the last recession.

From October 2019 through September 2020, workers in the arts, entertainment and recreation sector were most likely to exhaust regular unemployment benefits with an exhaustion-to-employment ratio of 8.9 percent. Workers in the educational service sector were the next most likely to exhaust regular unemployment benefits with an exhaustion-to-employment ratio of 8.7 percent.

The accommodation and food services sector accounted for the greatest portion of regular benefit exhaustions at 18.9 percent. The manufacturing and construction industries' share of total covered employment was 8.4 percent and 6.0 percent, respectively; the exhaustion-to-employment ratio for those sectors was 3.4 and 6.3, respectively. Healthcare and social assistance represented 12.6 percent of exhaustions.

Figure 4-4. Unemployment benefit exhaustions by industry, regular benefits
Washington state, October 2019 through September 2020
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse; U.S. Bureau of Labor Statistics, Current Employment Statistics

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	24,032	18.9%	8.4%	8.4%
23	Construction	13,029	10.2%	6.0%	6.3%
44 - 45	Trade	12,651	9.9%	11.2%	3.3%
31 - 33	Manufacturing	9,881	7.8%	8.4%	3.4%
62	Healthcare and social assistance	9,878	7.8%	12.6%	2.3%
56	Administrative and support and waste management and remediation services	9,197	7.2%	5.0%	5.4%
	Unknown	6,021	4.7%	N/A	N/A
81	Other Services	5,603	4.4%	3.0%	5.5%
54	Professional, scientific and technical services	5,587	4.4%	6.1%	2.7%
42	Wholesale trade	4,869	3.8%	3.9%	3.6%
71	Arts, entertainment and recreation	4,796	3.8%	1.6%	8.9%
48 - 49	Transportation and warehousing	4,247	3.3%	3.1%	4.0%
61	Educational services	3,927	3.1%	1.3%	8.7%
11	Agriculture, forestry, fishing and hunting	3,769	3.0%	3.0%	3.7%
51	Information	3,173	2.5%	4.2%	2.2%
53	Real estate, rental and leasing	2,603	2.0%	1.6%	4.7%
GOV	Government	1,821	1.4%	16.5%	0.3%
52	Finance and insurance	1,703	1.3%	2.8%	1.8%
55	Management of companies and enterprises	233	0.2%	1.3%	0.5%
21	Mining	180	0.1%	0.1%	8.0%
22	Utilities	166	0.1%	0.2%	3.2%
	Total	**127,366**	**100.0%**	**100.0%**	**3.7%**

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.

Arts, entertainment and recreation workers were most likely to exhaust unemployment benefits from October 2019 through September 2020 with an 8.9 exhaustion-to-employment ratio.

Exhaustions by occupation

Figure 4-5 examines unemployment benefit exhaustions by occupational group. Management, construction and extraction, and office and administrative support occupations combined accounted for over 40 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 benefit exhaustions by major occupational groups, regular benefits
Washington state, October 2019 through September 2020
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse

SOC	Major occupational group	Annual exhaustions, regular benefits	Percent of all exhaustions
35	Food preparation and serving related	20,905	16.4%
11	Management	16,148	12.7%
47	Construction and extraction	12,661	9.9%
43	Office and administrative support	12,303	9.7%
41	Sales and related	9,858	7.7%
53	Transportation and material moving	8,053	6.3%
51	Production	7,692	6.0%
39	Personal care and service	5,734	4.5%
37	Building and grounds cleaning and maintenance	4,467	3.5%
13	Business and financial operations	3,747	2.9%
49	Installation, maintenance and repair	3,426	2.7%
25	Education, training and library	3,281	2.6%
45	Farming, fishing and forestry	3,145	2.5%
31	Healthcare support	2,792	2.2%
15	Computer and mathematical	2,684	2.1%
27	Arts, design, entertainment, sports and media	2,427	1.9%
17	Architecture and engineering	1,745	1.4%
29	Healthcare practitioners and technical	1,654	1.3%
33	Protective service	1,385	1.1%
-	Unknown	979	0.8%
21	Community and social services	887	0.7%
19	Life, physical and social science	788	0.6%
23	Legal	397	0.3%
55	Military specific	208	0.2%
	Total	**127,366**	**100.0%**

Unemployed workers in food preparation and serving related occupations accounted for 16.4 percent of all individuals to exhaust regular unemployment benefits from October 2019 through September 2020.

Exhaustions by workforce development area

Figure 4-5 examines unemployment benefit exhaustions by occupational group. Management, construction and extraction, and office and administrative support occupations combined accounted for over 40 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.*

From October 2019 through September 2020, workers in the Pierce County, Snohomish County, and South-Central Washington WDAs, were most likely to exhaust regular unemployment benefits with an exhaustion-to-employment ratio of 1.2.

Seattle-King County and Pierce County accounted for more than one-fourth of exhaustions at 30.4 and 11.3 percent, respectively. Seattle-King County's and Pierce County's share of total covered employment were 41.7 percent and 9.2 percent, respectively; the exhaustion-to-employment ratios were 0.7 and 1.2, respectively.

Seattle-King County accounted for the largest share of exhaustions and employment, but had the lowest exhaustion-to-employment ratio (0.7).

Figure 4-6. Unemployment benefit exhaustions by workforce development area, regular benefits
Washington state, October 2019 through September 2020
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse ; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Workforce development area	Annual exhaustions, regular benefits	Percent of exhaustions	2019 industry share of nonfarm employment	Exhaustions to employment ratio
Seattle-King County	38,660	30.4%	41.7%	0.7
Pierce County	14,347	11.3%	9.2%	1.2
Snohomish County	12,972	10.2%	8.5%	1.2
Out of state	10,946	8.6%	N/A	N/A
Spokane County	7,602	6.0%	6.6%	0.9
Pacific Mountain	7,263	5.7%	5.5%	1.0
Southwest WA	7,251	5.7%	5.9%	1.0
Northwest WA	6,840	5.4%	4.9%	1.1
South Central WA	6,058	4.8%	4.1%	1.2
Benton-Franklin	4,515	3.5%	3.7%	1.0
Olympic	4,499	3.5%	3.6%	1.0
North Central WA	4,313	3.4%	3.6%	0.9
Eastern WA	2,100	1.6%	2.1%	0.8
Total	**127,366**	**100.0%**	**100.0%**	

Seattle-King County accounted for the largest share of exhaustions and employment but had the lowest exhaustion-to-employment ratio (0.7).

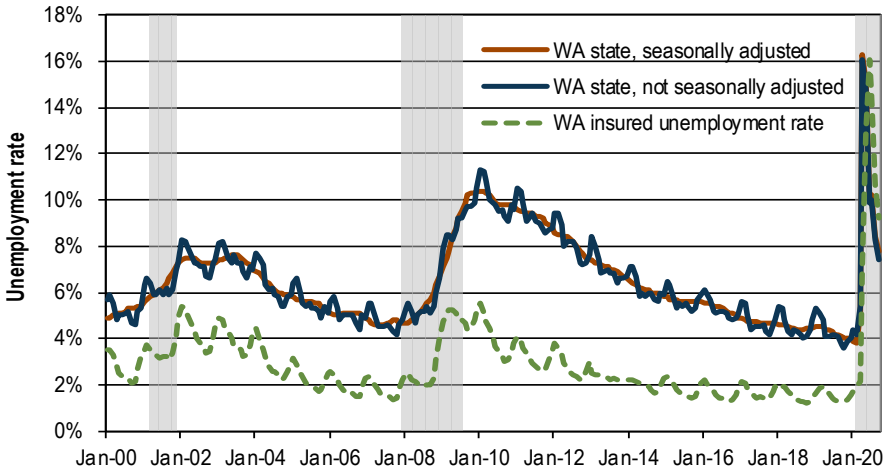
Unemployment rate

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 commonly used unemployment rate, and includes both workers covered by unemployment insurance and those who are not covered.[6]

We also present the insured unemployment rate, which is the 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. The insured rate is historically about half the overall unemployment rate. In late 2008, both measures of unemployment began a dramatic rise, with rates peaking during the first quarter 2010. However, since the onset of the COVID 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 2020
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics



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.

[6] 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.

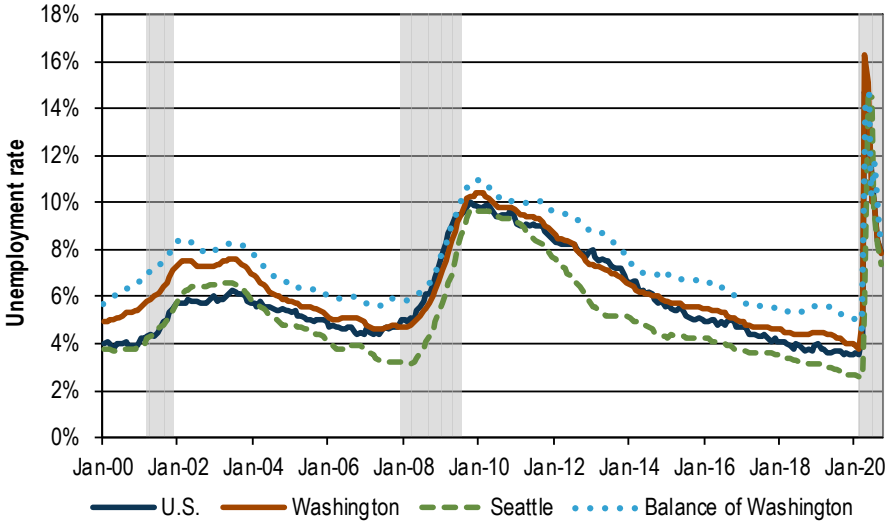
The overall unemployment rate

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 the second quarter of 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 below the national rate through September 2014. It rose above the national rate in September 2014 at 6.0 percent. From September 2014 to June 2020, the state unemployment rate remained above the national rate. In April 2020, both the national and state unemployment rates increased by over 10 percentage points. The state rate increased from 5.1 percent in March 2020 to 16.3 percent in April 2020. The national unemployment rate increased from 4.4 percent in March 2020 to 14.7 percent in April 2020. By September 2020, the state and national rates were at 7.9 and 7.8 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 May and June of 2020 the Seattle MD experienced a higher unemployment rate than nation. The unemployment rate in the Seattle MD increased from 2.6 percent in March 2020 to 14.5 percent by June of 2020. For comparison, the national unemployment rate increased from 4.4 percent in March 2020 to 11.1 percent in June of 2020.

Figure 4-8. Historical U-3 unemployment rates, seasonally adjusted
United States and Washington state, January 2000 through September 2019
Source: Employment Security Department/LMEA; 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 followed similar patterns during the recent recession. From May 2020 through September 2020, the Seattle unemployment rate declined more rapidly than the Washington state unemployment rate.

Other measures of unemployment

Alternative unemployment rates

The U.S. Bureau of Labor Statistics (BLS) reports six alternative measures of labor underutilization. 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.

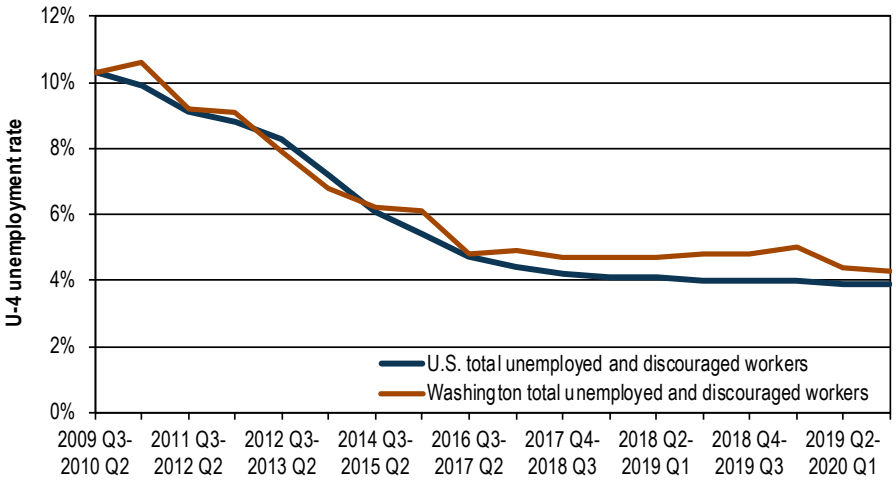
In response to criticism, the BLS has made available alternative measurements that are progressively more inclusive than the commonly reported unemployment rate. The standard measurement (U-3), along with two of the six alternative measurements, are defined as:

- 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 of 2010 through the second quarter of 2020, the Washington state U-4 unemployment rate decreased to 4.3 percent while the nation's rate decreased to 3.9 percent. This indicates that relatively more Washington residents had given up looking for work and had dropped out of the labor force during that period. The Washington U-4 rate, for the third quarter 2019 through the second quarter 2020, is now 4.3 percent and the U.S. rate is 3.9 percent.

Figure 4-9. U-4 unemployment rate (includes discouraged workers), four-quarter moving average
United States and Washington state, third quarter 2009 through second quarter 2020
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

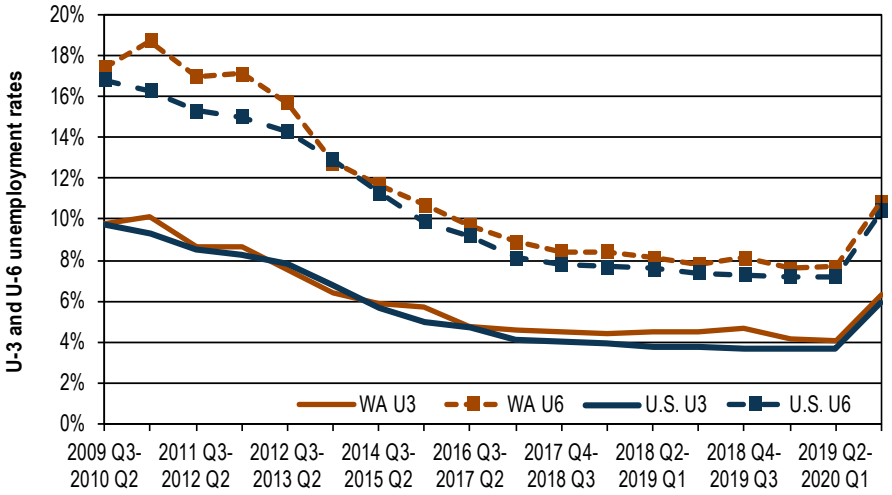


The U-4 measure of unemployment has been declining throughout the recovery. As of June 2020, Washington's U-4 rate is currently 10.9. percent and the U.S. rate at 10.4 percent.

U-6 is the broadest measure of unemployment. The gap between the U-6 and U-3 rates has narrowed to its lowest level post-recession. This demonstrates the decrease in the ranks of discouraged workers, marginally attached workers and those working part time involuntarily, even more

dramatically than the number of unemployed (*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 0.50 percentage points above the national rolling average from third quarter 2019 through second quarter 2020.

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 2020
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, businesses, policymakers 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 2019. The base period for both the five-year (medium-term) and 10-year (long-term) projections is 2018.

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 4* 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. The OID 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 on the ESD labor market information webpage 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 2018 to 2028. In the second 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 be found at the data files link above.

Key findings

The 10-year average annual growth rate for total nonfarm employment for the 2018 to 2028 period is projected to be 1.37 percent. This is a decrease from the 1.51 percent average annual growth rate predicted last year for 2017 to 2027.

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

Major occupational groups

- 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 2028, from largest to smallest, are projected for the office and administrative support occupations, sales and related occupations and food preparation and serving-related 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, retail salespersons 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.
- Totals of job openings caused by *alternative* turnover are about 25 times greater than openings due to growth, while totals of job openings caused by *separations* turnover are about ten times greater than openings due to growth.

2020 industry projections results

Figure 5-1 presents 2018 estimated employment, and 2018, 2023 and 2028 employment shares, and changes in employment shares from 2018 to 2023, 2023 to 2028 and 2018 to 2028 by industry for Washington state.

Through 2028, the three industry sectors with the largest increases in employment shares are projected to be other services, information and health services and social assistance.[7]

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

Figure 5-1. Base and projected nonfarm industry employment
Washington state, 2018, 2023 and 2028
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Industry sector*	Est. empl. 2018	Est. empl. shares 2018	Est.. empl. shares 2023	Est. empl. shares 2028	Percentage point change in empl. shares 2018-2023	Percentage point change in empl. shares 2023-2028	Percentage point change in empl. shares 2018-2028
Natural resources and mining	6,400	0.19%	0.16%	0.15%	-0.02%	-0.01%	-0.04%
Construction	213,000	6.26%	6.07%	5.84%	-0.19%	-0.23%	-0.42%
Manufacturing	286,800	8.43%	8.08%	7.75%	-0.35%	-0.32%	-0.68%
Wholesale trade	136,200	4.00%	3.79%	3.67%	-0.21%	-0.12%	-0.33%
Retail trade	386,100	11.35%	11.06%	11.04%	-0.29%	-0.01%	-0.30%
Utilities	5,000	0.15%	0.14%	0.13%	-0.01%	-0.01%	-0.02%
Transportation and warehousing	109,400	3.22%	3.14%	3.09%	-0.07%	-0.05%	-0.12%
Information	133,900	3.94%	4.40%	4.52%	0.46%	0.13%	0.59%
Financial activities	157,400	4.63%	4.51%	4.39%	-0.12%	-0.11%	-0.23%
Professional and business svcs.	427,100	12.55%	12.65%	12.80%	0.10%	0.14%	0.24%
Education services	62,900	1.85%	1.90%	1.99%	0.05%	0.09%	0.14%
Health svcs. and social assistance	427,000	12.55%	12.74%	13.04%	0.19%	0.31%	0.49%
Leisure and hospitality	341,800	10.05%	10.18%	10.48%	0.14%	0.29%	0.43%
Other services	121,300	3.57%	4.30%	4.30%	0.73%	0.00%	0.73%
Federal government	74,800	2.20%	2.05%	1.93%	-0.15%	-0.12%	-0.27%
State and local gov. (incl. educ.)	513,100	15.08%	14.82%	14.86%	-0.26%	0.04%	-0.22%

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

The largest growth sectors for the state are projected for professional and business services and health services and social assistance.

[7] 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 2018-2028 column.

Three of the 12 WDAs have 2018 through 2028 projected growth rates greater than the previous 10 years' growth, and nine have projected growth less than the previous 10 years' growth. Seattle-King County has the highest projected growth rate of 1.72 percent with statewide second at 1.37 percent. The statewide projected growth rate is 0.33 percentage points less than the 2008 through 2018 historical growth rate.

The three WDAs with projected growth greater than the past are: Northwest, Spokane and Olympic.

The largest positive difference between historical growth rates and projected growth rates is in the Spokane WDA. For the Spokane WDA, the difference between the historical and projected rates is 0.14 percentage points. The Olympic WDA has the second-largest positive increase of 0.13 percentage points.

Even though the Benton-Franklin WDA has the largest negative difference between projected and historical rates of all WDAs and the state, it has the third-highest projected growth rate of 1.23 percent.

The last column in *Figure 5-2* represents the long-term growth rate on the historical linear trend line on all available historical data. 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 2018 and 2018 to 2028
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Workforce development area[1]	Historical growth rate[2] 2008-2018	Projected growth rate 2018-2028	Historical trend line growth rate[3] 1990-2018
Seattle-King County	1.97%	1.72%	1.36%
Washington state	**1.70%**	**1.37%**	**1.51%**
Benton-Franklin	2.56%	1.23%	2.29%
Southwest	2.07%	1.18%	1.84%
Tacoma-Pierce	1.61%	1.17%	1.76%
Northwest	1.13%	1.15%	1.75%
Spokane	1.00%	1.14%	1.27%
Eastern	1.18%	1.07%	1.00%
North Central	1.77%	1.07%	1.40%
Snohomish	1.52%	1.03%	2.14%
Pacific Mountain	1.19%	1.01%	1.34%
South Central	1.30%	1.00%	0.91%
Olympic	0.84%	0.97%	1.13%

[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.

Nine of the 12 WDAs have a projected growth rate less than the previous 10 years' growth.

2020 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 2018 to 2028. Computer and mathematical occupations are projected to increase employment shares by 0.61 percentage points. The next highest increase in shares is projected for management occupations, with an increase of 0.33 percentage points.

The three largest decreases in employment shares at the state level are: sales and related occupations, 0.61 percentage points, production occupations, 0.50 percentage points, and construction and extraction occupations, 0.44 percentage points.

By 2028, the top three state occupational groups for shares of employment are projected to be:

1. Office and administrative support occupations (10.52 percent)
2. Sales and related occupations (8.73 percent)
3. Food preparation and serving related occupations (7.33 percent)

Figure 5-3. Base and projected occupational employment
Washington state, 2018 to 2028
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics

2-digit SOC	Major occupational group	Est. empl. 2018	Est. empl. shares 2018	Est. empl. shares 2023	Est. empl. shares 2028	Percentage point change in empl. shares 2018-2023	Percentage point change in empl. shares 2023-2028
11-0000	Management	226,457	5.92%	6.10%	6.25%	0.18%	0.16%
13-0000	Business and financial operations	253,233	6.62%	6.77%	6.91%	0.15%	0.13%
15-0000	Computer and mathematical	198,214	5.18%	5.58%	5.79%	0.40%	0.21%
17-0000	Architecture and engineering	85,982	2.25%	2.21%	2.15%	-0.04%	-0.05%
19-0000	Life, physical, and social science	43,508	1.14%	1.15%	1.15%	0.01%	0.00%
21-0000	Community and social service	60,901	1.59%	1.76%	1.75%	0.17%	-0.01%
23-0000	Legal	29,884	0.78%	0.78%	0.77%	-0.01%	-0.01%
25-0000	Education, training, and library	209,714	5.48%	5.58%	5.69%	0.10%	0.11%
27-0000	Arts, design, entertain. sports and media	78,429	2.05%	2.15%	2.18%	0.10%	0.03%
29-0000	Healthcare practitioners and technical	180,624	4.72%	4.80%	4.92%	0.08%	0.12%
31-0000	Healthcare support	153,568	4.01%	4.10%	4.23%	0.09%	0.12%
33-0000	Protective service	67,891	1.77%	1.77%	1.77%	-0.01%	0.00%
35-0000	Food preparation and serving related	268,838	7.03%	7.14%	7.33%	0.11%	0.19%
37-0000	Building and grounds cleaning and maint.	121,902	3.19%	3.29%	3.37%	0.10%	0.08%
39-0000	Personal care and service	116,093	3.03%	3.10%	3.16%	0.06%	0.06%
41-0000	Sales and related	357,349	9.34%	8.95%	8.73%	-0.39%	-0.22%
43-0000	Office and administrative support	412,045	10.77%	10.67%	10.52%	-0.10%	-0.15%
45-0000	Farming, fishing and forestry	100,477	2.63%	2.40%	2.33%	-0.23%	-0.07%
47-0000	Construction and extraction	237,916	6.22%	6.01%	5.78%	-0.21%	-0.23%
49-0000	Installation, maintenance and repair	150,151	3.92%	3.83%	3.72%	-0.10%	-0.11%
51-0000	Production	205,170	5.36%	5.10%	4.86%	-0.26%	-0.23%
53-0000	Transportation and material moving	267,171	6.98%	6.78%	6.65%	-0.20%	-0.13%

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

By 2028 combined, these three major groups are projected to represent 26.58 percent of total employment shares for the state.

The projected average annual growth rates for the major occupational groups in Washington state are presented in *Figure 5-4*. Computer and mathematical occupations (2.48 percent), community and social service occupations (2.31 percent), and art, design, entertainment, sports and media occupations (1.97 percent) are projected to grow faster than other occupational groups from 2018 to 2028.

In the long term, seven occupational groups are projected to fall below a 1.00 percent average annual growth rate: architecture and engineering (0.90 percent), transportation and material moving (0.85 percent), installation, maintenance and repair (0.80 percent), sales and related (0.66 percent), construction and extraction (0.60 percent), production (0.36 percent), and farming, fishing and forestry (0.15 percent).

Figure 5-4. Projected average annual growth rates for major occupational groups Washington state, 2018 to 2028
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics

Computer and mathematical, personal care and service and health support occupations are projected to experience the largest growth rates from 2017 to 2027 (2.85, 2.15 and 2.11 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 2.40. A ratio above this average means 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 construction and extraction (3.54), healthcare practitioners and technical (3.45) and management (2.99) occupations.

Figure 5-5. Comparison of *alternative* and *separations* methodologies on total openings
Washington state, 2018 and 2028
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

2-digit SOC	Major occupational group	Est. empl. 2018	Est. empl. 2028	Alternative average annual total openings 2018-2028	Separations average annual total openings 2018-2028	Ratio alternative to separations
11-0000	Management	226,457	273,377	89,582	29,964	2.99
13-0000	Business and financial operations	253,233	302,054	86,975	36,349	2.39
15-0000	Computer and mathematical	198,214	253,281	74,407	49,939	1.49
17-0000	Architecture and engineering	85,982	94,081	22,011	8,556	2.57
19-0000	Life, physical and social science	43,508	50,296	12,558	5,708	2.20
21-0000	Community and social service	60,901	76,556	21,853	10,632	2.06
23-0000	Legal	29,884	33,508	8,480	2,849	2.98
25-0000	Education, training and library	209,714	248,910	56,038	28,964	1.93
27-0000	Arts, design, entertain., sports and media	78,429	95,280	29,895	13,412	2.23
29-0000	Healthcare practitioners and tech.	180,624	215,182	61,091	17,723	3.45
31-0000	Healthcare support	153,568	184,843	64,508	25,645	2.52
33-0000	Protective service	67,891	77,363	20,866	10,075	2.07
35-0000	Food prep. and serving related	268,838	320,379	132,980	60,929	2.18
37-0000	Building and grounds cleaning and maint.	121,902	147,413	55,671	22,698	2.45
39-0000	Personal care and service	116,093	138,263	52,722	23,509	2.24
41-0000	Sales and related	357,349	381,641	128,594	54,947	2.34
43-0000	Office and administrative support	412,045	460,239	141,187	60,804	2.32
45-0000	Farming, fishing and forestry	100,477	102,023	47,331	16,478	2.87
47-0000	Construction and extraction	237,916	252,704	105,422	29,741	3.54
49-0000	Installation, maintenance and repair	150,151	162,651	51,372	17,710	2.90
51-0000	Production	205,170	212,710	59,732	25,503	2.34
53-0000	Transportation and material moving	267,171	290,902	100,887	41,269	2.44
00-0000	**Totals**	**3,825,517**	**4,373,656**	**1,424,158**	**593,401**	**2.40**

On average, alternative openings are 2.40 times larger than separations openings.

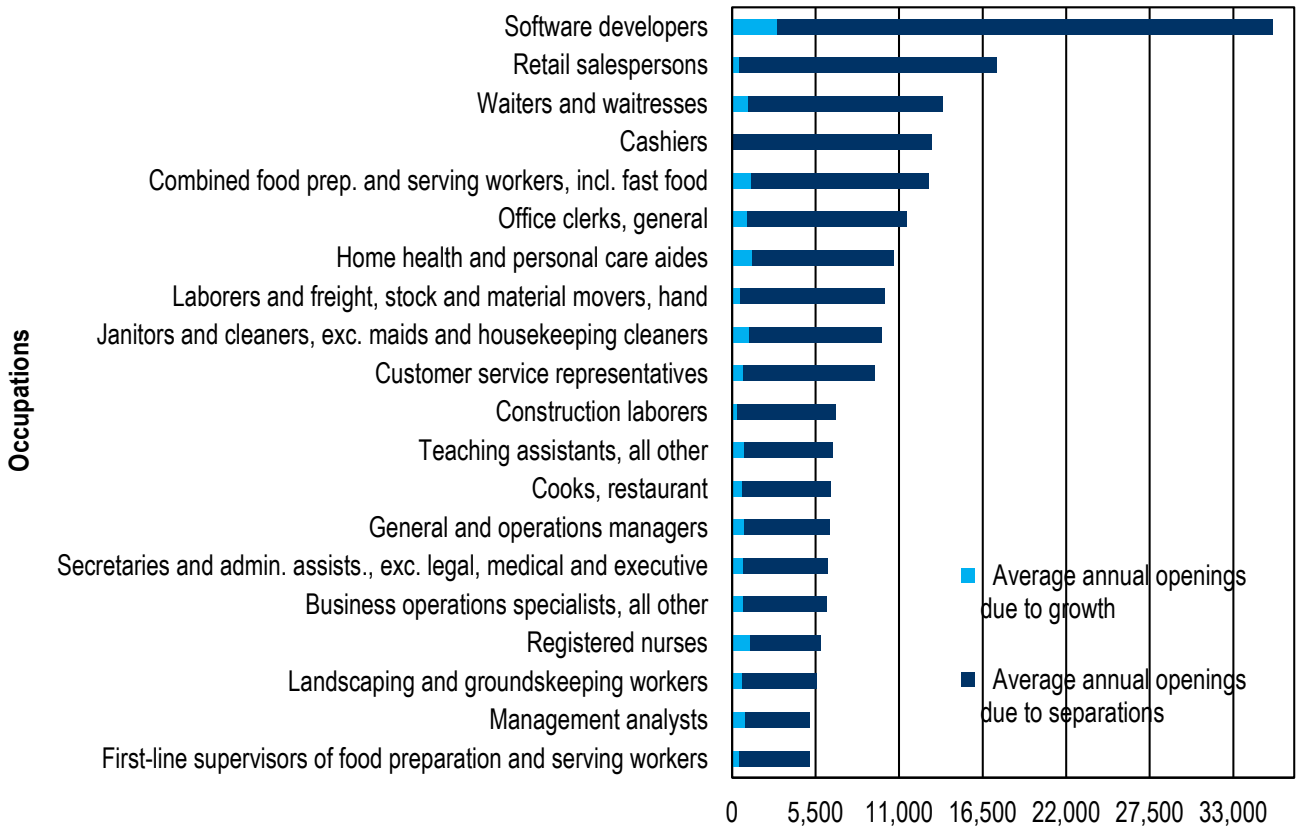
Specific occupations

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.

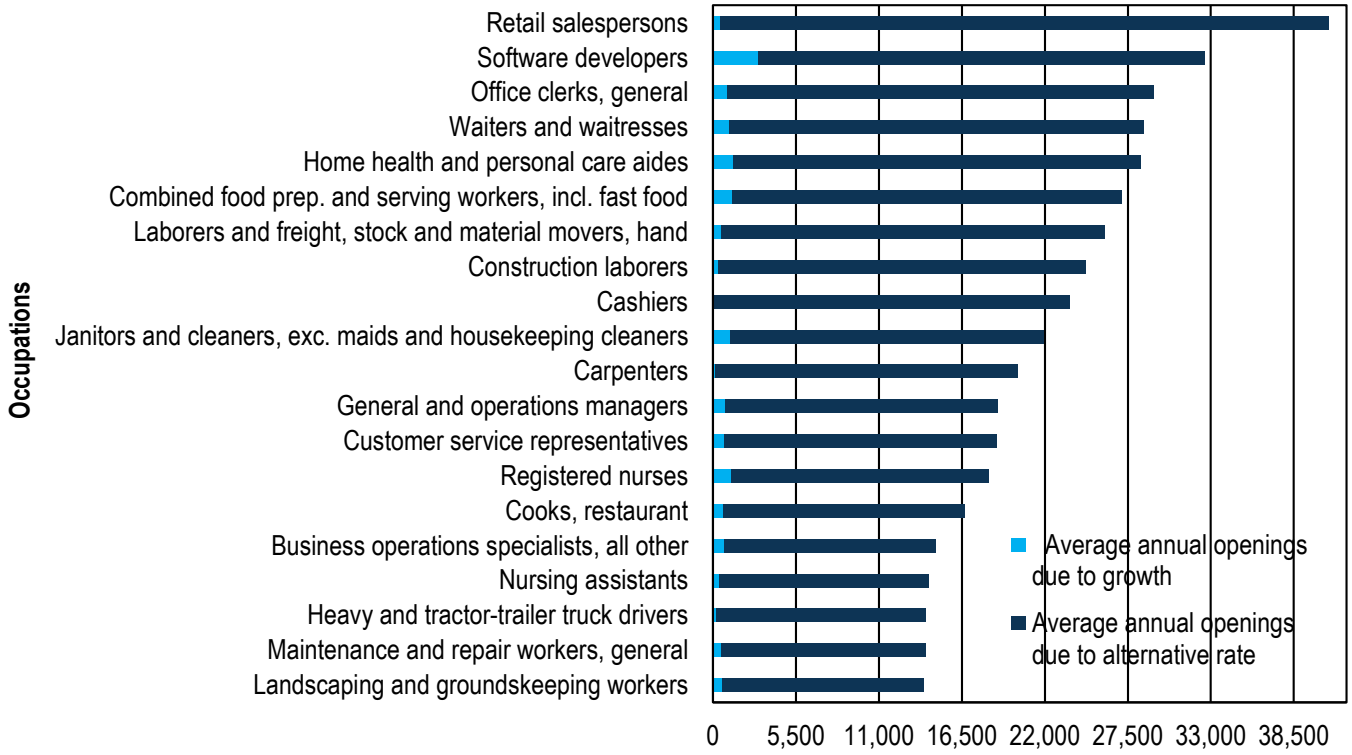
For the *separations* methodology, the software developers occupation is projected to have the largest number of total openings, while for the *alternative* methodology, retail salespersons occupations are projected to have the largest number of total openings. Sixteen of the top 20 specific occupations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

Figure 5-6. Top 20 specific occupations by average annual total openings, *separations* methodology
Washington state, 2018 to 2028
Source: Employment Security Department/LMEA; 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, 2018 to 2028
Source: Employment Security Department/LMEA; 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: Income

On the surface, wage and income data over the past several years seem to tell a story of rising aggregate prosperity. Median household income and wages continue to increase steadily. However, inequality has increased, and other indicators of economic distress have been rising too. This chapter explores some other stories of income and well-being in Washington state as told through other data sources.

This chapter documents Washingtonians' income prior to the COVID-19 global pandemic. The data referenced in this section reference data from the U.S. Census Bureau, and are up to date as of 2019, the final year of the longest economic expansion in recent history.[8] Census snapshots for 2020 will be published in late 2021.

Household[9] and family income

The Great Recession was characterized by deep employment losses from 2008 to 2010. Employment in Washington state began to recover in 2010, and continued to expand until early 2020, with some variation by industry and geography. Employment tallies tell important stories about industrial change and regional transformation, but whether increasing employment results in improvements in quality of life requires further investigation. It is important that we assess how we value work itself.. This chapter explores measures related to household income and well-being for Washington residents.

This chapter describes trends in household income, as published by the U.S. Census Bureau's American Community Survey (ACS). When reading ACS reports, it is important to consider the following:

1. Income is not limited to earnings from wages. Household income, as defined by the Census Bureau, is derived from five sources: earnings from wages, earnings from self-employment, investment income, transfer payments such as Social Security, and private retirement payments.

2. Each annual observation represents a statistical snapshot of a place in a moment of time. Language about increasing income means that the annual income of a region increased, but does not address the mechanisms underlying that change. That is, rising income could reflect year-to-year pay raises; it could also reflect wealthy neighbors moving into the neighborhood.

[8] All data and analyses presented chapter are based on the U.S. Census Bureau American Community Survey (ACS) and have been adjusted for inflation to 2019 dollars. Data from previous annual reports will differ from figures for corresponding years in this report because of that adjustment.

[9] The U.S. Census Bureau divides households into two types. A family household contains at least two people, and at least one other person in the household is related to the householder by birth, marriage or adoption. A non-family household may contain only one person or additional people that are not related to the householder.

In step with widespread employment losses, household incomes fell during the Great Recession. Unlike employment, which bottomed out in 2010 and subsequently climbed to pre-recession peak levels by 2013, income recovery took longer to materialize (*Figure 6-1*). According to the U.S. Census Bureau, the real[10] median household income in Washington state declined by $4,535 or 6.6 percent from 2008 to 2010 and remained flat until 2013.

The median didn't begin to increase until 2014, but has increased every year since then. Looking at the past five years (2015 to 2019), the median household income for Washington households increased by a total of $9,969 or 14.5 percent.

The median Washington household income increased more quickly than the median national household income, which grew by $5,945 or 9.9 percent over the same time period. While a number of different explanations contribute to this finding, it is worth pointing out that Washington added about 445,000 new residents[11] over that time period, and that some of the highest employment growth rates have been observed in high-wage industries including information, professional and business services, and online retail trade.

The median income for family households[12] increased by $12,248 or 14.9 percent, while the median income for non-family households[13] increased by $6,974 or 16.2 percent.

Figure 6-1. Median household income in 2019 dollars
United States and Washington state, 2015 through 2019
Source: U.S. Census Bureau, American Community Survey

Household type	2015	2016	2017	2018	2019	Change, 2015 to 2019
All households, U.S.	**$59,766**	**$60,752**	**$62,585**	**$62,990**	**$65,712**	**9.9%**
All households, Washington	**$68,718**	**$70,757**	**$73,625**	**$75,332**	**$78,687**	**14.5%**
Family households	$82,461	$85,654	$87,747	$89,142	$94,709	14.9%
Non-family households	$43,070	$43,772	$45,861	$47,587	$50,045	16.2%

Real median household income increased by 14.5 percent in Washington state from 2015 to 2019.

[10] Adjusted for inflation using the PCE deflator.

[11] According tto the U.S. Census Bureau, American Community Survey, Washington's population in 2015 was 7,163,657 and the population in 2019 was 7,614,893.

[12] According to the U.S. Census Bureau, "A family includes a householder and one or more people living in the same household who are related to the householder by birth, marriage, or adoption. All people in a household who are related to the householder are regarded as members of his or her family."

[13] A nonfamily household consists of a householder living alone (a one-person household) or where the householder shares the home only with people to whom he/she is not related (e.g., a roommate).

The following section describes a selection of income-related statistics pertaining to Washington households according to the ACS. Supporting data are found in *Figure 6-2.*

Poverty

During the Great Recession, the poverty rate[14] for Washington individuals increased from 11.3 percent in 2008 to 14.1 percent in 2014. As of 2019, the poverty rate had fallen to 9.8 percent.

Children tend to have higher poverty rates than the general population. In 2019, 12.0 percent of children residing in Washington were living beneath the poverty threshold. The peak rate of childhood poverty over the past decade was 18.8 percent in 2013.

Household earnings

The Great Recession had lasting effects on the share of households reporting earnings from wage employment. The share of households reporting earnings from wage employment dropped from 81.3 percent in 2008 to 78.5 percent in 2013. The portion of households reporting wage income in 2019 remained relatively low at 78.8 percent. The large-scale episode of job loss experienced during the pandemic-induced recession will likely reveal a large downward shift in this measure in 2020.

Despite the relative drop in the portion of households reporting earnings from a job, average household earnings have increased steadily over time. As of 2019, the average household earnings from a job was $107,023, a statistically significant increase of 3.7 percent over the previous year.

Households can, and often do, include multiple wage earners that contribute income. It is also worth pointing out that average household earnings from a job actually exceed the median household income. While the median indicates the midpoint of statistical values, average household income can be influenced by high-wage households that tug on the measurement.

Full time/part-time work

For the most part, responses to the ACS are consistent in that the share of workers reporting full-time employment exceeds the share of workers reporting part-time employment. Of course, the opportunities to work decrease during recessions. Prior to the Great Recession, 61.6 percent of workers reported working full time (more than 35 hours per week).

[14] Following the Office of Management and Budget's (OMB's) Directive 14, The Census Bureau uses a set of income thresholds that vary by family size and composition to determine who is in poverty. If the total income for a family falls below the relevant poverty threshold, then the family (and every individual in it) is considered in poverty.

By 2011, this proportion had decreased to 55.7 percent. As of 2019, the portion of workers reporting full-time employment returned to pre-recession levels.

Individuals reporting part-time work (fewer than 35 hours per week) increased from 19 percent in 2007 to 19.9 percent in 2011, as full-time work became less available during the recession. As the economy recovered, many jobs shifted from part time to fulltime hours. By 2019, the portion of workers reporting part-time employment was down to 17.9.

Earnings from a job or self-employment

Inflation-adjusted median earnings have increased every year since 2015. From 2018 to 2019, median earnings increased from $40,559 to $41,735, an increase of $1,176 or 3 percent. The increase in earnings for full-time/year-round workers increased by $3,344 or 6 percent over the year, raising the median to $59,526.

Comparing median earnings for male versus female full-time/year-round workers reveals a persistent earnings gap. Women's median earnings ($50,612 in 2019) are 79 percent of men's ($63,988). From 2018 to 2019, the median earnings for both female and male full-time workers increased. Women's median earnings increased by $1,327 (3 percent) while men's median earnings increased by $858 (1 percent). The earnings gap decreased by one percentage point. In order to achieve equality, women's median earnings would need to increase an additional $12,907 or 25 percent.

Despite proliferation of employment-related apps such as ride sharing, the proportion of people reporting self-employment has remained statistically unchanged over the past several years. In 2019, 5.7 percent of workers reported that they were employed in their own non-incorporated business.

Income other than from earnings[15]

Income includes several components, one of which is earnings. This section describes trends in about transfer payments and retirement income.

Baby Boomers (a particularly large generation) are reaching retirement age. The proportion of households reporting Social Security and pension payments has increased gradually over the past several years. (This is one contributing factor to the phenomenon of decreasing households reporting wage earnings in the previous section.) As of 2019, 29.7 percent

[15] Income data referenced in this section are published by the U.S. Census Bureau and are based on a household survey.

of Washington households received Social Security payments, and 25.0 percent received private pension payments. For perspective, the comparable figures for 2015 were 29.0 percent and 19.2 percent respectively.

The average annual payout for households collecting private pensions in 2019 was $29,541, or an average monthly payment of $2,462. In 2015, the monthly amount was $2,239.

Supplemental Security Income (SSI) is a federal program that pays benefits to disabled adults and children who have limited income and resources, and to people 65 years and older without disabilities who meet financial requirements. In 2019, 4.5 percent of all Washington households received SSI during the year. This proportion has decreased slightly each year since 2015. The average monthly payment for households receiving SSI was $812 in 2019.

The proportion of households collecting welfare cash payments increased rapidly during the Great Recession, reaching a peak of 4.6 percent in 2010. The proportion of households receiving welfare has decreased almost every year since 2010. In 2019, 2.5 percent of Washington households received welfare cash payments. The average monthly payout for welfare recipients was $256, up from $228 per month in 2018, but down from $382 (adjusted) in 2010.

The Supplemental Nutrition Assistance Payment (SNAP) is a type of non-cash transfer payment for households that fall beneath certain income thresholds. As of 2019, 10.6 percent of Washington households received SNAP payments, commonly referred to as food stamps. Over the past 10 years, SNAP benefits have represented a portion of household income for at least 10 percent of households. In 2012, 15.1 percent of households received food stamps. The proportion has decreased each year in the meantime.

Health insurance[16]

Prior to the introduction of the *Affordable Care Act* (ACA, commonly called "Obamacare"), the portion of Washington residents reporting no health coverage hovered around 14 percent. In 2014, the proportion of uninsured households dropped from 14 percent to 9.2 percent. By 2016, the proportion had dropped to 6 percent, and has remained low but has begun to increase slightly. As of 2019, 6.6 percent of Washington residents (496,047 individuals) reported that they had no health coverage.

For the most part, Washington residents with health insurance are covered in the private market – usually through their employers. The proportion of households reporting private coverage has remained steady

[16] Health insurance coverage data referenced in this section are published by the U.S. Census Bureau, and are based on a household survey.

since this question has been asked of respondents. During the great recession, responses dropped from 71.0 percent in 2008 to 68.5 percent in 2012. As of 2019, 71.1 percent of Washington residents were covered by private insurance. On the flip side, residents relying solely on public health insurance jumped from 17.2 percent in 2013 to 20.1 percent in 2014. In 2019, 20.1 percent of Washington residents relied solely on the public market for health insurance.

Homeownership and rent

The homeownership rate in Washington state decreased from 66.1 percent in 2007 to 61.7 percent in 2014. Since 2014, the rate has increased slightly every year. As of 2019, the rate was 63.1 – still well below observed rates prior to the Great Recession.

The cost of living can vary substantially from one place to another, making income levels an inadequate measure when trying to assess local conditions. For example, the same level of household income can imply very different standards of living depending on whether you are residing in Bellevue or Yakima. One way to measure economic stress, regardless of geographic variation, is to compare the cost of housing relative to household income. Thirty percent is a common threshold for indicating economic duress, as there is a general recommendation that households spend less than 1/3 of their income on housing costs if possible.

The percent of Washington households in economic distress due to high housing costs rose in 2008 and 2009, but then declined through the foreclosure process as a large number of homeowners transitioned to renters. The percentage of renters exceeding that threshold increased during the recession, reaching 48.4 percent in 2010. By 2017, the proportion of economically distressed renters decreased to 45.2 percent. In 2018, the downward trend reversed. In 2018 and 2019, 47.7 percent of renters were reported to have paid more than 30 percent of household income on housing-related costs.

Homeowners with a mortgage paying more than 30 percent of their income toward housing rose in the lead-up to the recession, exceeding 40 percent from 2007 to 2010. Over the course of the recovery, that proportion has decreased, in part due to an overall decline of homeownership. By 2019, the proportion of economically distressed homeowners with a mortgage was 28.8 percent, well below pre-recession levels. On the surface, this appears to be a positive statistic. Note, however, that the data represent snapshots in time. Many economically distressed households of the past are now represented among renters.

Figure 6-2. Selected household statistics
Washington state, 2015 through 2019
Source: U.S. Census Bureau, American Community Survey

Household statistic	2015	2016	2017	2018	2019
Median household income	$69,206	$71,455	$73,798	$75,231	$78,687
Median family income	$82,874	$86,477	$88,239	$89,318	$94,709
Poverty rate, all individuals	12.2%	11.3%	11.0%	10.3%	9.8%
Poverty rate, children under 18	15.5%	13.7%	14.3%	12.5%	12.0%
Households with earnings from a job[1]	78.5%	78.8%	79.1%	79.0%	78.8%
Average household earnings from a job[2]	$93,849	$97,931	$100,035	$103,206	$107,023
Full-time workers, percent of population aged 16-64[3]	58.2%	59.5%	60.5%	63.9%	61.9%
Part-time workers, percent of population aged 16-64	18.8%	18.7%	18.5%	18.5%	17.9%
Median earnings for all workers	$37,950	$38,682	$40,017	$40,559	$41,735
Median earnings for full-time, year-round workers	$52,897	$52,839	$55,088	$56,182	$59,526
Median earnings for male full-time, year-round workers	$63,989	$65,777	$65,785	$63,130	$63,988
Median earnings for female full-time, year-round workers	$47,740	$47,618	$49,806	$49,285	$50,612
Percent of workers who are self-employed	5.9%	5.8%	5.7%	6.0%	5.7%
Households receiving Social Security	29.0%	29.6%	29.4%	29.7%	29.7%
Households receiving private pension payments	19.2%	19.7%	19.1%	19.6%	25.0%
Avg. mo. payout for households receiving private pensions	$2,239	$2,371	$2,360	$2,403	$2,462
Households receiving Supplemental Security Income (SSI)[1]	4.9%	4.8%	4.8%	4.6%	4.5%
Average monthly payout for those receiving SSI	$880	$887	$875	$884	$812
Households receiving welfare cash payments)[1]	3.5%	3.1%	3.0%	2.9%	2.5%
Average monthly payout for welfare recipients	$248	$245	$212	$228	$256
Households receiving food stamps)[1]	13.4%	12.6%	12.3%	11.1%	10.6%
Residents without health insurance	6.6%	6.0%	6.1%	6.4%	6.6%
Number of residents without health insurance	467,967	428,092	446,106	477,284	496,047
Residents with private health insurance	71.1%	71.4%	70.8%	70.6%	71.1%
Residents relying solely on public health insurance	19.9%	20.3%	20.7%	20.7%	20.1%
Renters paying more than 30 percent of income for housing	45.4%	44.9%	45.2%	47.7%	47.7%
Homeownership rate	62.4%	62.5%	62.8%	62.8%	63.1%
Homeowners with a mortgage paying more than 30 percent of income for housing	29.5%	29.2%	28.8%	29.1%	28.8%

[1] Households may fall into more than one of these categories.
[2] Includes earnings from all members in the household.
[3] Full-time workers usually worked at least 35 hours per week (but may not be year-round workers).

In 2019, a number of indicators about the well-being of households in Washington showed continued improvement.

Income inequality

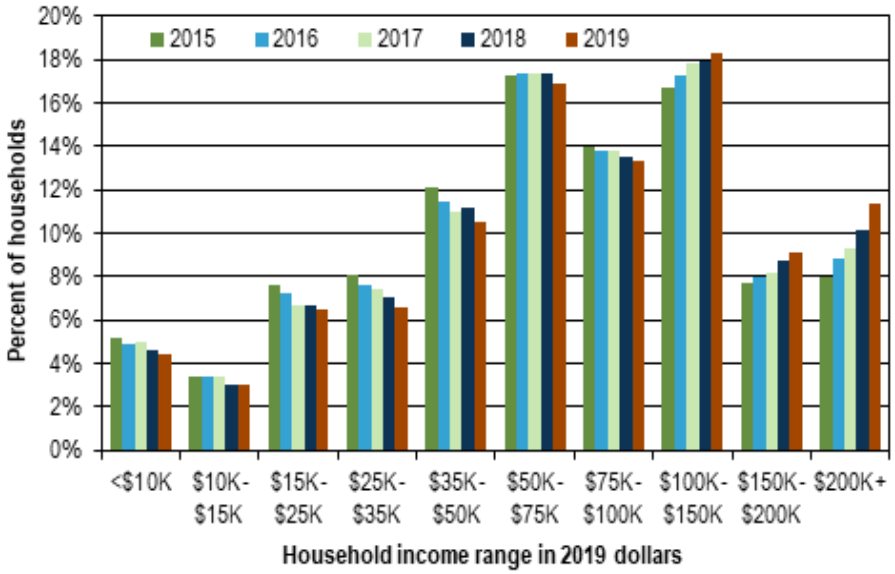
Many of the metrics presented in the chapter describe a long economic recovery that continued through 2019. One of the challenges of working with aggregated data, however, is that nuanced stories and trends can get lost beneath the surface. *Figure 6-3* illustrates the share of households that fell within certain income ranges in 2019 dollars. Examining household income ranges allows for a more nuanced view of how the economic recovery has varied across socioeconomic groups.

Over the past five years, the proportion of households with $35,000 or less in annual income has steadily decreased. Households with income ranges less than $35,000 accounted for about 24 percent of all households in 2015. By 2019, the share was closer to 21 percent. This suggests poverty rates fell during the recovery.

The share of middle income households declined slightly at the lower end and remained steady at the upper end. Overall, this is the household income range that experienced the least change proportionally. From 2015 to 2019, the share of households with incomes between $35,000 and $100,000 per year barely changed, decreasing from about 43 percent in 2015 to just under 41 percent in 2019.

Meanwhile, upper and upper-middle income households increased as a share of total Washington households over the past five years. Households earning more than $100,000 per year increased as a share of total households each year from 2015 through 2019. Over that time period, the share of households with incomes exceeding $100,000 per year expanded from about 32 percent in 2015 to 39 percent in 2019.

Figure 6-3. Percent of households by income range, 2019 dollars
Washington state, 2015 through 2019
Source: U.S. Census Bureau, American Community Survey



The share of households in upper income brackets continued to rise in 2019, while the proportion of lower income households decreased proportionally.

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 costs 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 $13.50 per hour with only the District of Columbia with a higher rate of $15.00.
- *Figure 7-2* depicts the unemployment rate for Washington compared to other states and the nation. In 2019, Washington state was in 42nd place.
- *Figure 7-3* shows the average annual job growth rate of each state. As of 2019, Washington state had an average annual job growth rate of 1.24 percent, placing eighth in the nation.
- *Figure 7-4* ranks annual exports for each state. In 2019, Washington was in fifth place with over $60 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 per capita income and average annual growth rate by state for 2009 and 2019. Washington ranks seventh for income and second for growth.
- *Figure 7-6* shows the number of building permits for 2009 and 2019. Washington ranked seventh in 2009 and sixth in 2019.
- *Figure 7-7* shows median single-family house prices in metropolitan statistical areas (MSAs) as well as the rate of change between 2017 and 2019. Several MSAs in Washington are included in this list with the Seattle-Tacoma-Bellevue area listed as the eighth highest with a median house price of $524,700 and a 12.6 percent rate of change between 2017 and 2019. The Kennewick-Richland MSA, Spokane-Spokane Valley MSA and Yakima MSA were in 36th, 54th, and 63rd place respectively.

Minimum wage

Figure 7-1 States with minimum wage higher than federal minimum wage, based on 2019 ranking
United States and Washington state, 2010, 2015 and 2020
Source: U.S. Department of Labor

Rank	State	2010	2015	2020
	United States	**$7.25**	**$7.25**	**$7.25**
1	District of Columbia	$8.25	$10.50	$15.00
2	**Washington**	**$8.55**	**$9.47**	**$13.50**
3	Massachusetts	$8.00	$9.00	$12.75
4	Arizona	$7.25	$8.05	$12.00
4	California	$8.00	$9.00	$12.00
4	Colorado	$7.24	$8.23	$12.00
4	Connecticut	$8.25	$9.15	$12.00
4	Maine	$7.50	$7.50	$12.00
4	Oregon	$8.40	$9.25	$12.00
5	New York	$7.25	$8.75	$11.80
6	Maryland	$7.25	$8.25	$11.00
6	New Jersey	$7.25	$8.38	$11.00
7	Vermont	$8.06	$9.15	$10.96
8	Rhode Island	$7.40	$9.00	$10.50
9	Alaska	$7.75	$8.75	$10.19
10	Hawaii	$7.25	$7.75	$10.10
11	Arkansas	$6.25	$7.50	$10.00
11	Illinois	$8.25	$8.25	$10.00
11	Minnesota	$6.15	$9.00	$10.00
12	Michigan	$7.40	$8.15	$9.65
13	Missouri	$7.25	$7.65	$9.45
14	South Dakota	$7.25	$8.50	$9.30
15	Delaware	$7.25	$8.25	$9.25
16	Nebraska	$7.25	$8.00	$9.00
16	Nevada	$7.55	$8.25	$9.00
16	New Mexico	$7.50	$7.50	$9.00
17	West Virginia	$7.25	$8.00	$8.75
18	Ohio	$7.30	$8.10	$8.70
19	Montana	$7.25	$8.05	$8.65
20	Florida	$7.25	$8.05	$8.56

Figure 7-2. Highest and lowest state unemployment rates, not seasonally adjusted, based on 2019 ranking
United States and Washington state, 2009, 2014 and 2019
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Unemployment rates

Rank	State	2009	2014	2019
	United States	**9.3%**	**6.2%**	**3.7%**
1	North Dakota	4.1%	2.7%	2.4%
1	Vermont	6.6%	3.9%	2.4%
3	New Hampshire	6.2%	4.3%	2.5%
4	Utah	7.3%	3.8%	2.6%
5	Hawaii	7.2%	4.4%	2.7%
5	Iowa	6.4%	4.2%	2.7%
7	Colorado	7.3%	5.0%	2.8%
7	South Carolina	11.2%	6.5%	2.8%
7	Virginia	6.7%	5.2%	2.8%
10	Idaho	8.8%	4.8%	2.9%
10	Massachusetts	8.1%	5.7%	2.9%
37	California	11.2%	7.5%	4.0%
37	Illinois	10.2%	7.1%	4.0%
37	New York	8.3%	6.3%	4.0%
40	Michigan	13.7%	7.2%	4.1%
40	Ohio	10.3%	5.8%	4.1%
42	Kentucky	10.3%	6.5%	4.3%
42	**Washington**	**9.2%**	**6.1%**	**4.3%**
44	Pennsylvania	8.0%	5.9%	4.4%
45	Arizona	9.9%	6.8%	4.7%
46	Louisiana	6.8%	6.4%	4.8%
47	New Mexico	7.5%	6.7%	4.9%
47	West Virginia	7.7%	6.6%	4.9%
49	**Mississippi**	**9.5%**	**7.5%**	**5.4%**
50	District of Columbia	9.3%	7.8%	5.5%
51	Alaska	7.7%	6.9%	6.1%

Nonfarm employment

Figure 7-3. Highest and lowest state average annual job growth rates, nonfarm employment
United States and Washington state, 2000 to 2019
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

Rank	State	Average annual growth rate
	United States	**0.72%**
1	Utah	1.98%
2	Nevada	1.71%
3	Idaho	1.62%
4	Texas	1.60%
5	North Dakota	1.55%
6	Arizona	1.43%
7	Florida	1.26%
8	**Washington**	**1.24%**
9	Colorado	1.22%
10	Montana	1.12%
11	Dist. of Columbia	1.09%
12	Wyoming	1.01%
40	Missouri	0.28%
41	Indiana	0.28%
42	Maine	0.27%
43	Wisconsin	0.27%
44	New Jersey	0.26%
45	Louisiana	0.19%
46	Illinois	0.07%
47	Mississippi	0.02%
48	Connecticut	-0.02%
49	Ohio	-0.04%
50	West Virginia	-0.12%
51	Michigan	-0.28%

Figure 7-4. Highest and lowest state annual exports,* based on 2019 ranking
United States and Washington state, 2009, 2014 and 2019
Source: U.S. Department of Commerce, Office of Trade and Economic Analysis

Annual exports

Rank	State	2009	2014	2019
	United States	$1,056,042,963,028	$1,621,873,792,910	$1,643,160,852,937
1	Texas	$162,994,740,450	$285,559,318,623	$328,863,813,668
2	California	$120,079,965,765	$173,868,587,862	$174,026,007,377
3	New York	$58,743,030,056	$88,834,326,287	$75,653,310,649
4	Louisiana	$32,616,451,452	$64,770,099,653	$63,699,991,096
5	Washington	$51,850,856,743	$90,558,268,785	$60,309,651,239
6	Illinois	$41,626,110,699	$68,394,004,251	$59,723,534,413
7	Florida	$46,888,006,761	$58,438,831,859	$55,995,357,602
8	Michigan	$32,655,333,884	$57,573,110,364	$55,802,054,729
9	Ohio	$34,104,484,238	$52,641,380,990	$53,229,254,204
10	Pennsylvania	$28,381,102,168	$40,410,834,695	$42,722,413,031
42	Delaware	$4,311,773,339	$5,267,417,899	$4,407,150,210
43	District of Columbia	$1,090,543,044	$940,230,516	$3,690,001,612
44	Idaho	$3,877,389,493	$5,137,755,733	$3,433,920,401
45	Vermont	$3,219,270,656	$3,669,605,649	$3,021,350,506
46	Maine	$2,231,142,502	$2,811,060,491	$2,723,661,201
47	Rhode Island	$1,495,522,447	$2,388,479,292	$2,675,361,663
48	Montana	$1,053,312,395	$1,544,908,682	$1,684,788,208
49	Wyoming	$926,141,589	$1,757,262,877	$1,366,651,503
50	South Dakota	$1,010,960,601	$1,577,588,645	$1,357,038,063
51	Hawaii	$563,059,688	$1,447,489,746	$453,799,650

*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 2019 dollars,[2] based on 2019 ranking
United States and Washington state, 2009 and 2019
Source: U.S. Bureau of Economic Analysis

Rank	State	2009	2019	Average annual growth rate[3]
	United States	**$39,376**	**$56,490**	**3.7%**
1	District of Columbia	$59,998	$83,406	3.3%
2	Connecticut	$60,428	$77,289	2.5%
3	Massachusetts	$51,412	$74,187	3.7%
4	New York	$46,916	$71,717	4.3%
5	New Jersey	$50,567	$70,471	3.4%
6	California	$42,224	$66,619	4.7%
7	**Washington**	**$41,844**	**$64,758**	**4.46%**
8	Maryland	$48,845	$64,640	2.8%
9	New Hampshire	$45,742	$63,502	3.3%
10	Alaska	$46,834	$62,806	3.0%
42	Oklahoma	$34,920	$47,341	3.1%
43	Arizona	$33,746	$46,058	3.2%
44	Idaho	$31,436	$45,968	3.9%
45	South Carolina	$31,635	$45,438	3.7%
46	Arkansas	$31,372	$44,629	3.6%
47	Alabama	$32,685	$44,145	3.1%
48	Kentucky	$32,304	$43,770	3.1%
49	New Mexico	$32,523	$43,326	2.9%
50	West Virginia	$31,412	$42,315	3.0%
51	Mississippi	$29,801	$38,914	2.7%

[1] Per capita personal income is total personal income divided by total mid-year population.
[2] Note – All dollar estimates are millions of current dollars (not adjusted for inflation). Calculations are performed on unrounded data.
[3] Last updated: September 24, 2020 -- revised statistics for 2013 to 2019.

Figure 7-6. Highest and lowest states in number of authorized privately owned building permits, based on 2019 ranking
United States and Washington state, 2009 and 2019
Source: U.S. Census Bureau

Rank	State	2009 building permits	2019 building permits	Percent change 2009 to 2019
	United States	**582,963**	**1,386,048**	**137.8%**
1	Texas	84,440	209,895	148.6%
2	Florida	35,329	154,302	336.8%
3	California	35,069	110,197	214.2%
4	North Carolina	33,800	71,307	111.0%
5	Georgia	18,228	53,823	195.3%
6	**Washington**	**17,011**	**48,424**	**184.66%**
7	Arizona	14,474	46,580	221.8%
8	New York	18,344	45,219	146.5%
9	Tennessee	15,005	41,361	175.6%
10	Colorado	9,355	38,633	313.0%
41	Montana	1,686	4,776	183.3%
42	Maine	3,121	4,760	52.5%
43	New Hampshire	2,287	4,743	107.4%
44	South Dakota	3,691	4,415	19.6%
45	Hawaii	2,617	4,093	56.4%
46	West Virginia	2,235	3,010	34.7%
47	North Dakota	3,195	2,495	-21.9%
48	Vermont	1,367	1,801	31.7%
49	Wyoming	2,294	1,708	-25.5%
50	Alaska	916	1,680	83.4%
51	Rhode Island	961	1,400	45.7%

Building permits

Home prices

Figure 7-7. Median single-family house prices, based on 2019 ranking
Selected U.S. metropolitan areas, 2017 and 2019
Source: National Association of Realtors

Rank	Metropolitan area	2017	2019	Percent change 2017 to 2019
	United States	**$248,800**	**$274,600**	**10.4%**
1	San Jose-Sunnyvale-Santa Clara, CA	$1,180,000	$1,265,000	7.2%
2	San Francisco-Oakland-Hayward, CA	$900,000	$988,000	9.8%
3	Anaheim-Santa Ana-Irvine, CA	$780,000	$825,000	5.8%
4	Urban Honolulu, HI	$757,300	$802,500	6.0%
5	San Diego-Carlsbad, CA	$599,000	$645,000	7.7%
6	Boulder, CO	$566,100	$618,600	9.3%
7	Los Angeles-Long Beach-Glendale, CA	$550,800	$611,200	11.0%
8	**Seattle-Tacoma-Bellevue, WA**	**$465,800**	**$524,700**	**12.6%**
9	Boston-Cambridge-Newton, MA-NH	$452,900	$491,900	8.6%
10	Nassau County-Suffolk County, NY	$462,000	$491,600	6.4%
11	Denver-Aurora-Lakewood, CO	$414,700	$462,100	11.4%
17	Portland-Vancouver-Hillsboro, OR-WA	$381,800	$409,300	7.2%
29	Salem, OR	$265,500	$310,700	17.0%
30	Eugene, OR	$264,600	$308,600	16.6%
36	**Kennewick-Richland, WA**	**$243,600**	**$299,800**	**23.1%**
54	**Spokane-Spokane Valley, WA**	**$223,400**	**$265,300**	**18.8%**
63	**Yakima, WA**	**$204,100**	**$248,900**	**22.0%**
173	Rockford, IL	$117,800	$128,300	8.9%
174	Wichita Falls, TX	$114,900	$125,900	9.6%
175	Erie, PA	$115,700	$125,300	8.3%
176	Peoria, IL	$122,600	$120,700	-1.5%
177	Binghamton, NY	$109,600	$119,400	8.9%
178	Elmira, NY	$110,400	$112,500	1.9%
179	Cumberland, MD-WV	$90,700	$106,700	17.6%
180	Youngstown-Warren-Boardman, OH-PA	$86,100	$102,600	19.2%
181	Decatur, IL	$94,400	$96,500	2.2%

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

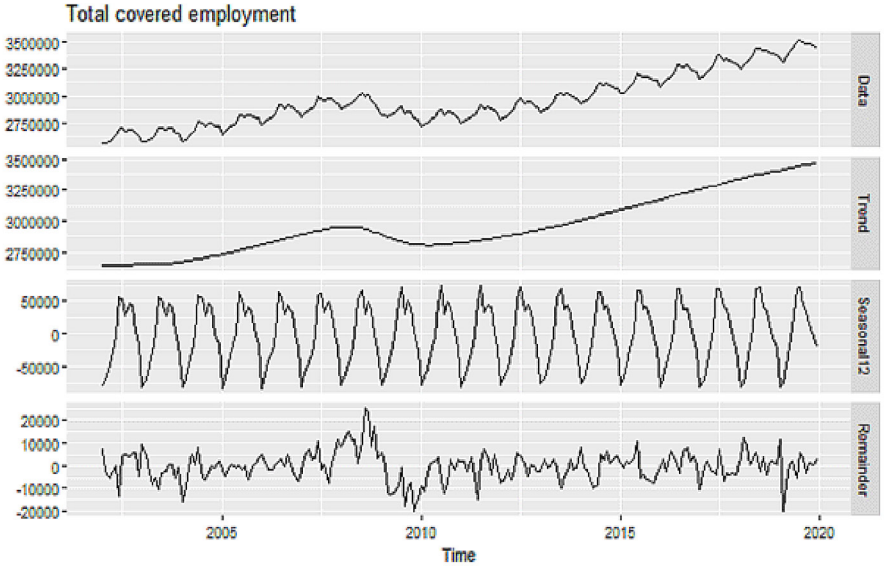
Within the decomposed employment components, trends are a result of structural changes.

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 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 processing steps later in the decomposition process.

Appendix figure A2-1. Total nonfarm employment time series and its main components
Washington state, 2002 to 2019
Source: Employment Security Department/LMEA; 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 lies in the fact 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 the new 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 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 $\lambda=\infty$, 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)[17] and multiplying by 1,600. For our purpose, for all series regardless of the model selected, the HP filter chooses *s* to minimize:

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

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.

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 healthcare 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).

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

Appendix figure A2-2. Employment decomposition components
Washington state, 2002 to 2019
Source: Employment Security Department/LMEA; 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**	**1.35%**	**Low**	**4,651**	**1,182**	**79.73%**	**20.27%**
111	Crop production	31.61%	High	118	139	45.80%	54.20%
112	Animal production and aquaculture	2.31%	Moderate	6	5	52.10%	47.90%
113	Forestry and logging	2.37%	Moderate	16	8	67.27%	32.73%
114	Fishing, hunting and trapping	5.71%	High	4	5	44.64%	55.36%
115	Support activities for agriculture and forestry	17.09%	High	72	60	54.42%	45.58%
212	Mining (except oil and gas)	3.46%	Moderate	10	6	62.92%	37.08%
213	Support activities for mining	11.85%	High	1	3	32.81%	67.19%
221	Utilities	0.73%	No seasonality	7	6	52.60%	47.40%
236	Construction of buildings	2.47%	Moderate	236	88	72.97%	27.03%
237	Heavy and civil engineering construction	7.38%	High	69	31	69.26%	30.74%
238	Specialty trade contractors	3.11%	Moderate	574	190	75.17%	24.83%
311	Food manufacturing	4.40%	High	36	16	69.43%	30.57%
312	Beverage and tobacco product manufacturing	5.08%	High	34	8	81.33%	18.67%
313	Textile mills	1.24%	Low	1	1	54.84%	45.16%
314	Textile product mills	1.03%	Low	5	4	53.94%	46.06%
315	Apparel manufacturing	1.29%	Low	6	7	44.69%	55.31%
316	Leather and allied product manufacturing	5.27%	High	1	2	45.40%	54.60%
321	Wood product manufacturing	1.10%	Low	49	29	62.55%	37.45%
322	Paper manufacturing	0.62%	No seasonality	27	13	66.90%	33.10%
323	Printing and related support activities	0.76%	No seasonality	21	12	62.80%	37.20%
324	Petroleum and coal products manufacturing	1.78%	Low	5	6	45.33%	54.67%
325	Chemical manufacturing	0.57%	No seasonality	16	11	59.94%	40.06%
326	Plastics and rubber products manufacturing	0.77%	No seasonality	19	16	54.70%	45.30%
327	Nonmetallic mineral product manufacturing	2.03%	Moderate	23	14	63.05%	36.95%
331	Primary metal manufacturing	0.69%	No seasonality	19	17	52.09%	47.91%
332	Fabricated metal product manufacturing	0.82%	No seasonality	44	34	55.95%	44.05%
333	Machinery manufacturing	0.81%	No seasonality	39	40	49.49%	50.51%
334	Computer and electronic product manufacturing	0.33%	No seasonality	37	33	53.12%	46.88%
335	Electrical equipment, appliance, and component manufacturing	0.54%	No seasonality	10	8	54.97%	45.03%
336	Transportation equipment manufacturing	0.59%	No seasonality	237	204	53.74%	46.26%
337	Furniture and related product manufacturing	1.04%	Low	28	13	68.22%	31.78%
339	Miscellaneous manufacturing	0.80%	No seasonality	13	11	53.30%	46.70%
423	Merchant wholesalers, durable goods	0.47%	No seasonality	122	68	64.28%	35.72%
424	Merchant wholesalers, nondurable goods	1.36%	Low	46	28	62.03%	37.97%

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	1.00%	Low	105	32	76.39%	23.61%
441	Motor vehicle and parts dealers	1.07%	Low	77	42	64.72%	35.28%
442	Furniture and home furnishings stores	1.87%	Low	21	18	53.66%	46.34%
443	Electronics and appliance stores	2.64%	Moderate	22	26	45.62%	54.38%
444	Building material and garden equip. and supplies dealers	3.57%	Moderate	67	27	71.63%	28.37%
445	Food and beverage stores	1.38%	Low	47	45	50.89%	49.11%
446	Health and personal care stores	1.13%	Low	16	11	58.67%	41.33%
447	Gasoline stations	1.63%	Low	11	9	55.56%	44.44%
448	Clothing and clothing accessories stores	4.28%	High	64	63	50.34%	49.66%
451	Sporting goods, hobby, musical instrument, and book stores	3.34%	Moderate	24	18	56.62%	43.38%
452	General merchandise stores	3.08%	Moderate	136	61	68.89%	31.11%
453	Miscellaneous store retailers	1.84%	Low	47	16	74.71%	25.29%
454	Nonstore retailers	1.58%	Low	250	92	73.09%	26.91%
481	Air transportation	0.62%	No seasonality	43	19	69.94%	30.06%
483	Water transportation	3.19%	Moderate	5	5	53.70%	46.30%
484	Truck transportation	2.12%	Moderate	36	24	60.17%	39.83%
485	Transit and ground passenger transportation	2.24%	Moderate	9	8	52.81%	47.19%
486	Pipeline transportation	1.53%	Low	1	1	39.63%	60.37%
487	Scenic and sightseeing transportation	20.37%	High	3	4	39.60%	60.40%
488	Support activities for transportation	1.03%	Low	39	24	61.91%	38.09%
491	Postal service	3.96%	Moderate	1	1	46.04%	53.96%
492	Couriers and messengers	5.30%	High	37	22	62.84%	37.16%
493	Warehousing and storage	2.14%	Moderate	51	46	52.45%	47.55%
511	Publishing industries (except internet)	0.99%	No seasonality	138	50	73.27%	26.73%
512	Motion picture and sound recording industries	4.12%	High	11	9	53.42%	46.58%
515	Broadcasting (except internet)	0.72%	No seasonality	6	5	56.35%	43.65%
517	Telecommunications	0.41%	No seasonality	49	29	62.30%	37.70%
518	Data processing, hosting, and related services	1.67%	Low	56	33	63.10%	36.90%
519	Other information services	5.17%	High	126	37	77.15%	22.85%
521	Monetary authorities-central bank	0.80%	No seasonality	1	0	61.85%	38.15%
522	Credit intermediation and related activities	0.22%	No seasonality	115	59	66.15%	33.85%
523	Securities, commodity contracts, and other financial investments and related activities	0.36%	No seasonality	19	15	55.28%	44.72%
524	Insurance carriers and related activities	0.34%	No seasonality	38	27	58.24%	41.76%
525	Funds, trusts, and other financial vehicles	14.23%	High	2	3	42.23%	57.77%
531	Real estate	1.27%	Low	83	25	76.75%	23.25%
532	Rental and leasing services	2.96%	Moderate	37	13	74.60%	25.40%
533	Lessors of nonfinancial intangible assets (except copyrighted works)	3.92%	Moderate	4	3	60.77%	39.23%
541	Professional, scientific, and technical services	0.41%	No seasonality	383	133	74.26%	25.74%

NAICS	Industry	Seasonal factor	Level of seasonality	Trend (average number)	Cycle (average number)	Trend (percent)	Cycle (percent)
551	Management of companies and enterprises	0.32%	No seasonality	89	38	70.12%	29.88%
561	Administrative and support services	3.01%	Moderate	393	172	69.62%	30.38%
562	Waste management and remediation services	0.84%	No seasonality	29	30	49.12%	50.88%
611	Educational services	3.36%	Moderate	92	19	82.58%	17.42%
621	Ambulatory healthcare services	0.29%	No seasonality	287	27	91.41%	8.59%
622	Hospitals	0.32%	No seasonality	148	55	72.78%	27.22%
623	Nursing and residential care facilities	0.28%	No seasonality	54	30	63.87%	36.13%
624	Social assistance	1.44%	Low	356	321	52.62%	47.38%
711	Performing arts, spectator sports, and related industries	10.56%	High	17	12	58.67%	41.33%
712	Museums, historical sites, and similar institutions	3.83%	Moderate	7	5	59.11%	40.89%
713	Amusement, gambling, and recreation industries	4.25%	High	55	34	61.80%	38.20%
721	Accommodation	5.35%	High	59	32	65.08%	34.92%
722	Food services and drinking places	1.95%	Low	443	123	78.31%	21.69%
811	Repair and maintenance	1.00%	Low	31	19	62.08%	37.92%
812	Personal and laundry services	0.98%	No seasonality	57	16	78.06%	21.94%
813	Religious, grantmaking, civic, professional, and similar organizations	2.25%	Moderate	49	20	70.61%	29.39%
814	Private households	6.55%	High	345	312	52.49%	47.51%
901	Federal government (other)	0.99%	No seasonality	57	55	50.79%	49.21%
902	State government (other)	1.62%	Low	73	59	55.64%	44.36%
903	Local government (other)	1.66%	Low	335	70	82.71%	17.29%

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 23 industries have the indicator "yes." This year 17 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 beverage and tobacco product manufacturing; machinery manufacturing; motor vehicle and parts dealers; truck transportation and motion picture and sound recording industries.

Appendix figure A2-3. Relationships between industry and total employment
Washington state, 2002 to 2019
Source: Employment Security Department/LMEA; Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Significant one-way impact
000	**Total covered employment**	**100.0%**	**100.0%**	**NA**	**NA**	**NA**
111	Crop production	83.8%	-20.4%	2.71	0.10	No
112	Animal production and aquaculture	92.1%	7.9%	35.17	0.00	No
113	Forestry and logging	-73.7%	62.5%	17.19	0.00	No
114	Fishing, hunting and trapping	-89.7%	-3.0%	0.38	0.54	No
115	Support activities for agriculture and forestry	97.1%	19.5%	5.16	0.02	No
211	Oil and gas extraction	78.1%	5.8%	12.67	0.00	Yes
212	Mining (except oil and gas)	-50.3%	55.6%	9.12	0.00	No
213	Support activities for mining	55.4%	27.7%	0.11	0.74	No
221	Utilities	66.0%	11.9%	161.81	0.00	No
236	Construction of buildings	60.7%	95.7%	0.25	0.61	No
237	Heavy and civil engineering construction	21.0%	81.8%	0.78	0.38	No
238	Specialty trade contractors	73.9%	95.7%	3.31	0.07	No
311	Food manufacturing	89.5%	48.1%	6.64	0.01	No
312	Beverage and tobacco product manufacturing	96.2%	54.1%	11.74	0.00	Yes
313	Textile mills	-47.0%	48.4%	5.14	0.02	No
314	Textile product mills	-23.7%	39.0%	44.87	0.00	No
315	Apparel manufacturing	-58.4%	48.4%	9.04	0.00	Yes
316	Leather and allied product manufacturing	-50.3%	-27.7%	44.64	0.00	Yes
321	Wood product manufacturing	-58.3%	69.2%	12.18	0.00	Yes
322	Paper manufacturing	-80.7%	34.0%	1.13	0.29	No
323	Printing and related support activities	-72.6%	75.6%	0.64	0.43	No
324	Petroleum and coal products manufacturing	65.6%	37.4%	0.01	0.91	No
325	Chemical manufacturing	95.4%	65.5%	0.00	0.96	No
326	Plastics and rubber products manufacturing	-29.2%	73.2%	11.84	0.00	No
327	Nonmetallic mineral product manufacturing	37.0%	78.9%	0.34	0.56	No
331	Primary metal manufacturing	-14.8%	49.7%	3.98	0.05	No
332	Fabricated metal product manufacturing	88.4%	83.7%	1.10	0.30	No
333	Machinery manufacturing	80.2%	74.0%	23.62	0.00	Yes
334	Computer and electronic product manufacturing	-60.5%	71.1%	0.01	0.92	No

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Significant one-way impact
335	Electrical equipment, appliance, and component manufacturing	91.1%	38.9%	121.32	0.00	No
336	Transportation equipment manufacturing	59.0%	33.0%	1.10	0.29	No
337	Furniture and related product manufacturing	-36.2%	86.3%	2.16	0.14	No
339	Miscellaneous manufacturing	64.3%	61.7%	10.44	0.00	No
423	Merchant wholesalers, durable goods	54.7%	94.2%	4.91	0.03	No
424	Merchant wholesalers, nondurable goods	84.9%	84.1%	0.00	0.96	No
425	Wholesale electronic markets and agents and brokers	66.6%	-40.2%	3.44	0.06	No
441	Motor vehicle and parts dealers	59.1%	78.9%	23.71	0.00	Yes
442	Furniture and home furnishings stores	-33.8%	75.0%	8.84	0.00	Yes
443	Electronics and appliance stores	25.5%	43.2%	18.14	0.00	Yes
444	Building material and garden equipment and supplies dealers	86.7%	76.1%	4.95	0.03	No
445	Food and beverage stores	91.2%	39.4%	3.81	0.05	No
446	Health and personal care stores	90.4%	28.2%	10.43	0.00	No
447	Gasoline stations	-67.3%	4.7%	11.26	0.00	Yes
448	Clothing and clothing accessories stores	-24.9%	76.0%	1.03	0.31	No
451	Sporting goods, hobby, musical instrument, and book stores	-66.0%	66.1%	0.43	0.51	No
452	General merchandise stores	75.8%	-43.0%	0.00	0.99	No
453	Miscellaneous store retailers	79.2%	71.5%	7.42	0.01	No
454	Nonstore retailers	95.7%	47.0%	12.35	0.00	No
481	Air transportation	63.6%	49.0%	3.16	0.08	No
482	Rail transportation	-0.5%	-52.7%	0.02	0.88	No
483	Water transportation	84.0%	34.2%	1.37	0.24	No
484	Truck transportation	63.3%	76.9%	10.30	0.00	Yes
485	Transit and ground passenger transportation	89.2%	25.5%	34.13	0.00	No
486	Pipeline transportation	85.2%	16.4%	46.24	0.00	No
487	Scenic and sightseeing transportation	75.8%	23.8%	47.75	0.00	No
488	Support activities for transportation	97.9%	65.1%	44.78	0.00	No
491	Postal service	54.6%	17.8%	9.68	0.00	No
492	Couriers and messengers	81.8%	61.1%	0.07	0.79	No
493	Warehousing and storage	92.5%	37.9%	9.82	0.00	No
511	Publishing industries (except internet)	95.1%	59.5%	87.83	0.00	No
512	Motion picture and sound recording industries	93.9%	52.2%	14.79	0.00	Yes
515	Broadcasting (except internet)	-83.9%	55.5%	10.31	0.00	No
517	Telecommunications	-88.7%	14.9%	46.20	0.00	Yes

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Significant one-way impact
518	Data processing, hosting, and related services	93.0%	40.1%	7.42	0.01	No
519	Other information services	96.3%	45.1%	0.00	0.95	No
521	Monetary authorities-central bank	-58.7%	73.7%	1.65	0.20	No
522	Credit intermediation and related activities	-56.7%	42.6%	0.84	0.36	No
523	Securities, commodity contracts, and other financial investments and related activities	94.1%	63.2%	0.07	0.79	No
524	Insurance carriers and related activities	53.4%	56.7%	10.09	0.00	No
525	Funds, trusts, and other financial vehicles	-83.2%	8.3%	33.91	0.00	No
531	Real estate	98.4%	74.7%	12.28	0.00	No
532	Rental and leasing services	-53.1%	73.2%	4.46	0.04	No
533	Lessors of nonfinancial intangible assets (except copyrighted works)	-12.6%	72.8%	31.36	0.00	Yes
541	Professional, scientific, and technical services	96.5%	78.0%	7.72	0.01	No
551	Management of companies and enterprises	96.2%	62.1%	128.90	0.00	No
561	Administrative and support services	95.4%	80.4%	110.57	0.00	No
562	Waste management and remediation services	67.9%	-3.6%	43.53	0.00	No
611	Educational services	95.6%	60.7%	0.21	0.65	No
621	Ambulatory health care services	95.2%	18.4%	2.08	0.15	No
622	Hospitals	92.7%	-8.0%	3.10	0.08	No
623	Nursing and residential care facilities	81.9%	-29.8%	1.04	0.31	No
624	Social assistance	93.7%	22.6%	11.88	0.00	Yes
711	Performing arts, spectator sports, and related industries	96.4%	37.2%	11.74	0.00	Yes
712	Museums, historical sites, and similar institutions	97.1%	45.5%	3.40	0.07	No
713	Amusement, gambling, and recreation industries	96.3%	69.3%	62.40	0.00	No
721	Accommodation	99.2%	85.2%	62.40	0.00	No
722	Food services and drinking places	99.7%	93.1%	114.66	0.00	No
811	Repair and maintenance	34.3%	86.8%	2.84	0.09	No
812	Personal and laundry services	97.1%	79.2%	1.09	0.30	No
813	Religious, grantmaking, civic, professional, and similar organizations	95.3%	32.4%	16.73	0.00	No
814	Private households	-83.7%	-43.3%	16.08	0.00	Yes
901	Federal government (other)	68.7%	-54.3%	8.71	0.00	No
902	State government (other)	88.5%	14.2%	110.97	0.00	No
903	Local government (other)	97.0%	45.1%	104.76	0.00	No
901	Federal government (other)	45.8%	-47.0%	7.07	0.01	No
902	State government (other)	87.9%	17.5%	113.98	0	No
903	Local government (other)	95.0%	2.5%	108.23	0	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*).[18] 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-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:

[18] 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 skill shortages, there is a higher probability that this will cause an oversupply in those occupations and skill sets.[19]

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."[20]

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.

[19] 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

[20] See: https://www.bls.gov/soc/2018/soc_2018_user_guide.pdf, page 24.

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 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 2020 list is based on projections with state specific *alternative* rates used for turnover openings:

- Five-year projections for 2018 to 2023, using average annual growth rates and total job openings.
- Ten-year projections for 2018 to 2028, using average annual growth rates and total job openings.
- A combination of two-year (second quarter 2019 to second quarter 2021) and ten-year (2018 to 2028) projections, using average annual growth rates and total job openings.

All of these time frames use unsuppressed occupations with employment in a base year (2018), consisting of 50 or more employees, for the state and workforce development areas (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 2019 to May 2020.
- Demand data: annual counts of job announcements from The Conference Board, Help Wanted OnLine mid-monthly time series for the period June 2019 to May 2020.

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 **balanced**.
- 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 2017 to 2027.
- 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 Labor Market and Economic Analysis 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 the top 100 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 2017 to June 2019).[21] Only a maximum of 100 skills are available for each occupation. Each skill is displayed with the number of job announcements from which it was extracted. The extracted skill numbers constitute a vector, up to a size of 100, for each occupation. 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.

[21] In last year's projections report we used a sample for the period July 2015 to June 2018.

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 3,422 for Washington state, followed by the Seattle-King County WDA at 2,917. The lowest number was for Eastern Washington at 1,218 skills.

The conversion size of occupational employment to skills employment, calculated on base year employment (second quarter 2019), varies between 86.07 percent for the Eastern WDA to a low of 61.15 percent for the Washington state WDA. The combined ratio for all WDAs is 77.91 percent and for the state is 61.15 percent.

Some results

The top six detailed hard skills for the state and all areas, based on projected numbers of total openings, for all time periods (second quarter 2019 to second quarter 2021, 2018 to 2023 and 2023 to 2028), with base year in second quarter 2019, are relatively stable between areas (order may vary). The top six skills based on projected numbers of job openings for all time periods for the state are: **Microsoft Office, Food preparation, Bilingual, Quality Assurance, Microsoft PowerPoint and Quality control**. The combined top six skills represent 16.89 percent of total openings for the state.

Last year in 2019, for the state and Seattle-King County, the top 32 skills with annual openings of at least 100, with the largest average annual growth rates from 2017 to 2027, for all periods, was projected for skills related to information technology (IT). This year however, for the period 2018 to 2028, other skill groups edged out IT as the sole skill category. This year, for the state and Seattle-King County , IT made up 66 percent of categorized skills. Five other skill categories, from Arts and Entertainment to Sales and Marketing and Maintenance made it into the top skill categories. Skills such as **Online Advertising, Digital marketing** and **Athletic training** made it into the top skill lists.

The top six skills at the state level: **Athletic training, Eloqua, Marketo, Google Ads, Google Analytics** and **Backpack blowers**.

In Seattle-King County the top six skills: **Athletic training, Group counseling, Eloqua, Google Docs, Marketo** and **Google Ads**.

The top 20 detailed skills for Washington state based on a combined (average) rank of average annual openings and growth rates for 2018 to 2028 are presented in *Appendix figure A5-1*.

Appendix figure A5-1. Top 20 skills ranked by combined average annual openings and growth
Washington state, 2018 to 2028
Source: Employment Security Department/LMEA; The Conference Board, Help Wanted OnLine job announcements

Combined rank	Hard skill titles	Estimated hard skill employment numbers 2018	Projected hard skill employment numbers 2028	Average annual growth rate 2018-2028	Total average annual openings
1	Athletic training	1,830	2,635	3.71%	924
2	Microsoft Active Directory	3,054	4,074	2.92%	1,248
3	Linux	6,817	8,757	2.54%	2,500
4	Firewall	2,995	3,954	2.82%	1,114
5	VMware	2,602	3,464	2.90%	1,005
6	Transmission Control Protocol	2,757	3,651	2.85%	1,064
7	Network routers	2,859	3,773	2.81%	1,073
8	Local Area Network	2,564	3,403	2.87%	996
9	Wide Area Network	2,734	3,619	2.84%	1,021
10	Virtualization	2,867	3,756	2.74%	1,097
10	Digital marketing	5,128	6,549	2.48%	2,246
12	Windows servers	2,360	3,144	2.91%	909
13	Cloud Computing	5,928	7,523	2.41%	2,344
14	Amazon Web Services	2,906	3,752	2.59%	1,070
14	Web services	5,173	6,548	2.38%	2,096
16	Structured query language	17,019	21,123	2.18%	6,332
17	Tableau Software	6,315	7,920	2.29%	2,429
18	Virtual Private Network	2,053	2,695	2.76%	792
19	Marketing communications	1,372	1,838	2.96%	645
20	Search Engine Optimization	1,852	2,418	2.70%	820

A non-information technology skill ranked number 1 in the list of top ranks for openings and growth.

The top 20 occupations represent 3.73 percent of total openings in the skills forecast.

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 top 15 occupations with high computer skill requirements based on IT shares, are presented in *Appendix figure A5-2*. Management Analysts and Operations Research Analysts were in both the 2019 and 2020 table. All other occupations are new to the top 15 this year.

Appendix figure A5-2. Occupations, not primarily computer related, with the largest shares of computer skill requirements Washington state, 2019 second quarter occupational estimations (June 2016 to June 2019 sample, skills/occupations matrices) Source: Employment Security Department/LMEA; The Conference Board, Help Wanted OnLine job announcements

SOC	Occupation	Share of skills that are IT
396012	Concierges	0.915
152021	Mathematicians	0.842
435053	Postal Service Mail Sorters, Processors, and Processing Machine Operators	0.821
192012	Physicists	0.810
194041	Geological and Petroleum Technicians	0.800
393092	Costume Attendants	0.792
271023	Floral Designers	0.777
152031	Operations Research Analysts	0.729
271026	Merchandise Displayers and Window Trimmers	0.729
271029	Designers, All Other	0.722
439051	Mail Clerks and Mail Machine Operators, Except Postal Service	0.721
251032	Engineering Teachers, Postsecondary	0.705
171011	Architects, Except Landscape and Naval	0.693
191032	Foresters	0.686
131111	Management Analysts	0.672

Only two of the current 15 occupations is the same as in last year's report.

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, **reloccup_skills_2019.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 purchasing managers
Washington state, 2020
Source: Employment Security Department/LMEA; The Conference Board, Help Wanted OnLine job announcements

SOC	151132-Software Developers, Applications
131081-Logisticians	0.749
152051-Data Scientists	0.729
113071-Transportation, Storage, and Distribution Managers	0.689
111021-General and Operations Managers	0.677
119199-Managers, All Other	0.645
131199-Business Operations Specialists, All Other	0.544
439051-Mail Clerks and Mail Machine Operators, Except Postal Service	0.508
439021-Data Entry Keyers	0.500
439081-Proofreaders and Copy Markers	0.497
433051-Payroll and Timekeeping Clerks	0.482
131121-Meeting, Convention, and Event Planners	0.480
435041-Meter Readers, Utilities	0.475
131151-Training and Development Specialists	0.470
151211-Computer Systems Analysts	0.470
119041-Architectural and Engineering Managers	0.443

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.

Some specific skills, like those in *Appendix figure A5-1*, are important and help graduates enter the labor market or move to higher paid jobs. However, in the long run, it might be worth giving priority to foundational academic subjects like math and formal logic, multidimensional design, and foundational concepts in object-oriented programing. In other words, foundational abilities to learn, develop and implement new knowledge and technology in the long run should take priority for career preparation.

Future possibilities

Skill forecasts continue to be in an experimental phase. Improvements in skill extraction and clustering techniques would allow us to improve our skills products. As always, it will also continue to be important to establish a direct connection between specific skills required by employers and education and training programs.

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 2010 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.