2019 LABOR MARKET AND ECONOMIC REPORT

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Employment Security Department
WASHINGTON STATE

Labor Market and Economic Analysis
January 2020

2019 Labor Market and Economic Report

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Labor market fast facts

Fast facts 1. Labor force and unemployment, not seasonally adjusted
Washington state, annual data of selected years for the period from 1990 to September 2019
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Year	Labor force	Employed	Unemployed	Unemployment rate
1990	2,525,326	2,392,891	132,435	5.2%
1995	2,811,332	2,630,220	181,112	6.4%
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 January to September*	3,893,987	3,713,166	180,821	4.6%

*2019 data is averaged for nine months.

Fast facts 2. Labor force and unemployment, not seasonally adjusted
Washington state metropolitan areas, January to September 2019
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	**3,893,987**	**3,713,166**	**180,821**	**4.6%**
Bellingham	115,807	109,704	6,103	5.3%
Bremerton	127,114	120,764	6,350	5.0%
Kennewick-Pasco-Richland	146,565	137,943	8,622	5.9%
Longview-Kelso	46,990	43,934	3,056	6.5%
Mount Vernon-Anacortes	60,278	57,152	3,126	5.2%
Olympia	142,454	135,096	7,358	5.2%
Seattle-Bellevue-Everett MD*	1,726,266	1,670,435	55,831	3.2%
Spokane	276,713	260,497	16,216	5.9%
Tacoma MD* (Pierce)	424,137	402,190	21,947	5.2%
Wenatchee	69,131	65,476	3,655	5.3%
Yakima	133,342	123,454	9,888	7.4%

*Metropolitan Division

Fast facts 3. Projected industry average annual employment growth rates
Washington state, 2017 to 2027
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics

NAICS	Industry sector	2018 Q2 to 2020 Q2	2017 to 2022	2022 to 2027
	Total nonfarm	**1.65%**	**1.73%**	**1.30%**
22, 48, 49	Transportation, warehousing and utilities	1.66%	2.76%	1.51%
23	Construction	2.14%	2.71%	0.66%
31-33	Manufacturing	0.42%	0.41%	0.20%
42	Wholesale trade	0.95%	0.92%	0.60%
44-45	Retail trade	1.12%	0.98%	1.04%
51	Information	3.42%	3.57%	2.78%
52	Financial activities	1.23%	1.34%	0.76%
54-56	Professional and business services	2.48%	2.31%	1.92%
61-62	Education and health services	2.05%	2.26%	2.00%
71-72	Leisure and hospitality	1.97%	2.14%	1.24%
GOV	Government	1.20%	1.15%	1.05%

Fast facts 4. Wages and employment by industry
Washington state, 2018 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	**224,289**	**$223,139,778,688**	**3,372,944**	**$1,272**
11	Agriculture, forestry, fishing and hunting	7,028	$3,459,804,305	106,794	$623
21	Mining	142	$182,514,759	2,569	$1,366
22	Utilities	225	$502,128,951	5,034	$1,918
23	Construction	25,753	$12,882,880,828	199,975	$1,239
31-33	Manufacturing	7,488	$22,543,522,362	284,094	$1,526
42	Wholesale trade	12,769	$10,716,392,978	133,560	$1,543
44-45	Retail trade	14,302	$22,338,639,416	379,637	$1,132
48-49	Transportation & warehousing	4,589	$6,242,088,285	103,459	$1,160
51	Information	4,038	$25,922,674,702	133,091	$3,746
52	Finance and insurance	5,822	$8,978,196,580	94,497	$1,827
53	Real estate, rental and leasing	6,944	$2,945,611,895	53,451	$1,060
54	Professional, scientific and technical services	25,776	$20,403,581,182	201,638	$1,946
55	Management of companies and enterprises	631	$5,266,244,741	44,601	$2,271
56	Admin. and support and waste mgmt. and remediation svcs.	12,210	$8,485,408,746	168,627	$968
61	Educational services	3,327	$1,717,473,772	44,058	$750
62	Healthcare and social assistance	54,966	$22,210,675,385	421,679	$1,013
71	Arts, entertainment and recreation	2,830	$1,718,457,872	52,803	$626
72	Accommodation and food services	14,547	$6,792,129,709	282,931	$462
81	Other services (except public administration)	18,793	$3,997,856,092	99,103	$776
GOV	Government	2,111	$35,833,496,128	561,343	$1,228

Executive summary

U.S. economy and labor market

The national economy is on pace to grow at a slower rate in 2019 relative to 2018 based on measures of national output. The stimulus from federal fiscal policy introduced at the close of 2017 is beginning to fade, while problems arising from uncertain trade policy and a slower global economy are weighing down domestic growth. The current expansion is now in its eleventh year making it the longest on record. Job growth has remained strong through most of 2019, but has recently shown potential signs of softening. The U.S. unemployment rate reached a 50-year low of 3.5 percent in September 2019 showing that labor market conditions remain tight; wage growth has greatly accelerated in spite of this, as businesses have grown more cautious about raising wages in the current economic environment.

Total nonfarm employment in the United States reached 151.8 million in September 2019, up by 1.5 percent from September 2018. Since September 2018, the largest percentage of jobs gained by major industry sector has been in the health services component of the education and health services sector. Retail trade was the only industry sector to lose jobs over this period. The top two industries that added the most jobs over the year were education and health services, and professional and business services.

Washington's economy and labor market

The Washington state economy excelled in both 2017 and 2018. Using state gross domestic product as the comparison measure, Washington ranked first based on annual growth among all U.S. states and territories in 2017 and 2018. Its GDP expanded by 5.8 percent in 2018 which outpaced the 2.9 percent growth achieved by the nation. Trade issues and ongoing problems surrounding the 737 MAX commercial airliner look to be slowing the state's economic growth in 2019, although the economy still continues to perform well overall.

From second quarter 2018 to second quarter 2019, personal income in the state increased by 6.5 percent compared to 4.9 percent nationally.

Seasonally adjusted total nonfarm employment increased by 2.2 percent from September 2018 to September 2019 with gains occurring in every major nonfarm industry except for mining and logging. The industry with the largest percentage increase was information.

The state unemployment rate was 4.6 percent in September 2019 compared to the U.S. rate of 3.5 percent. After dropping for a prolonged period of time, the state unemployment rate leveled off since reaching a series low of 4.4 percent in September 2018.

Seasonal, structural and cyclical industry employment

An analysis of 97 industries in Washington state identified 18 industries as having high levels of seasonality. The analysis is based on historical data from January 1990 through December 2018. 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 24 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, food services and drinking places, software publishers and educational services. For 16 industries, the cyclical component accounts for more than half of the change in employment. Those most influenced by cyclical factors include scenic and sightseeing transportation, crop production and support activities for mining.

Unemployment

The seasonally adjusted unemployment rate in Washington was 4.6 percent in September 2019. The number of unemployment recipients was 42,593 in September 2019, up 4 percent as compared to the same month one year ago. The number of unemployed individuals exhausting unemployment benefits have continued to decline since May 2010 when 15,227 individuals exhausted their benefits. By September 2019, 3,091 people had used all of their available unemployment benefits. The manufacturing and construction industries accounted for the greatest portion of workers who exhausted unemployment benefits from October 2018 through September 2019. The manufacturing and construction industries accounted for the greatest portion of exhaustions at 22.3 percent from October 2018 through September 2019.

Employment projections

The 10-year average annual growth rate for total nonfarm employment for the 2017 to 2027 period is projected to be 1.51 percent. This is a decrease from the 1.59 percent average annual growth rate predicted last year for 2016 to 2026. The largest increase by share of employment is projected for the information sector. The largest employment shares in 2027, from largest to smallest, are projected for the office and administrative support occupations, sales and related occupations and food preparation and serving-related occupations.

Income and wages

Recently released data show the median household income measured in 2018 dollars in Washington rose by 15.5 percent from 2014 to 2018. The median Washington household income expanded more quickly than the median national household, which grew by 10.4 percent over the same time period. The Washington state median hourly wage increased by 2.5 percent in 2018. From 2017 to 2018, the number of occupied jobs increased in all hourly wage ranges, with the exception of jobs paying less than $12 per hour (4.3 percent of Washington's labor force). More jobs were added in the hourly pay range of $54.00 and above than were added in any middle and lower wage categories from 2017 to 2018. Washington state per capita income reached $62,026 in 2018, third among states. Income increased for the fifth straight year, and the rate of growth – 3.1 percent – was the third fastest in the country. Meanwhile, other data reveal that income inequality is also increasing, and other indicators of economic distress are rising or stubbornly remaining unmoved by the rising tide.

Chapter 1: U.S. economy and labor market

The U.S. economy entered the fourth quarter of 2018 with strong growth momentum. Expansive fiscal policy at the start of the year took what had become a modest upswing in U.S. real Gross Domestic Product (GDP) and to a greater increase. Preliminary releases of quarterly GDP growth had the economy expanding by 4.2 percent annualized in second quarter 2018, the strongest sequential growth rate in four years. The third quarter early estimate of GDP projected out somewhat less, but at 3.4 percent, still strong and above trend. With annual growth on pace to exceed 3 percent, the unemployment rate at a 48-year low, and inflation in check, 2018 looked set to go down as one of the best years of the expansion.

The Federal Reserve Board (Fed), entrusted to carry out its dual mandate of economic growth and price stability, felt good about the state of the economy. The Fed Chairman had announced the Fed's intention to be "data dependent" in response to its future monetary policy decisions. It had also begun to tighten policy by raising interest rates in 2018 in response to strong labor market reports and the increasing likelihood of strong economic growth would lead to greater inflation. All told, the Fed increased rates four times in 2018 with the last increase occurring in December.

By early 2019, the economic environment changed. Economic growth slowed, prompting the Fed to reverse course in July with monetary policy. What happened?

A partial government shutdown in early 2019 resulted in the delay of several key economic data releases that provide an advance glimpse of the state of the economy. The delay caused the Fed's read on the economy to be clouded, and the early warning signs of an impending economic moderation in 2019 appeared to be discounted in the Fed's late 2018 policy considerations. Economic growth began to be revised downward, and early reads of 2019 quarterly growth showed the economy to indeed be moderating.

In addition to previous monetary tightening, the moderating pace of GDP growth can be attributed to the following factors:

1. Fading effects from 2018 fiscal policy. The Tax Cuts and Jobs Act brought about substantial changes to the federal tax code that were designed to stimulate consumer spending and business fixed investment. The act lowered marginal income tax rates and increased incentives for business investment. The positive effects are projected to diminish over time as households and businesses adjust to the increase in their income and revenues and the incentives for investment wane.

2. Slowing global growth and a strong U.S. dollar. The global economy enjoyed a solid year of growth in 2018 as global GDP grew by an estimated 3.6 percent. It also marks a consistently steady period of expansion across recent years, with global growth registering within 3.4 to 3.8 percent over the past six years. Strong U.S. economic growth provided a boost to world growth even as the growth rate in some other important economic regions, like China and Europe were slowing. As the slowdown in the U.S. and abroad has continued, global growth in 2019 has retreated. The current forecast is for global GDP to grow by 3 percent in 2019, its slowest pace since the global financial crisis in 2007. Along with a strong dollar, lower U.S. exports and lower commodity prices have weakened momentum in manufacturing activity and in the energy sector.

3. Escalation of the U.S.-China trade dispute. The most visible threat to economic growth comes from the trade war between the U.S. and China. The imposition of tariffs on a wide variety of goods along with retaliatory tariffs on American products has created more uncertainty for consumers and business firms alike and weakened business investment. Some firms have to make decisions on whether to make longer-term adjustments to their supply chains if trade policies affect the cost of their operations.

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 an above-trend pace overall in 2018, expanding at an annual rate of 2.9 percent. Much of the boost to growth was a result in tax code changes helping to elevate household and business spending, along with increased levels of government spending. Despite the increasing likelihood of a growth slowdown in 2019 and growing foreign trade concerns, expectations were such that growth would remain strong at least through fourth quarter 2018.

The ongoing economic expansion gathered enough strength in recent years to motivate the Fed to begin raising interest rates. Beginning December 2015 and through 2018, interest rates were increased eight separate times, the last one occurring in December 2018.

Economic growth in terms of quarterly changes in GDP over the last three years are represented by *Figure 1-1*. Growth broke out beyond its 2 percent barrier starting in third quarter 2017 and maintained a stronger pace through much of 2018. The earliest read on third quarter GDP, or what is known as the "advanced estimate," showed GDP expanding by 4.2 percent, the first time since 2014 that the growth rate had exceeded 4 percent.

Figure 1-1. U.S. gross domestic product (chained 2012 dollars), quarterly percent change and three-month moving average, seasonally adjusted annualized rate
United States, third quarter 2016 through third quarter 2019
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income
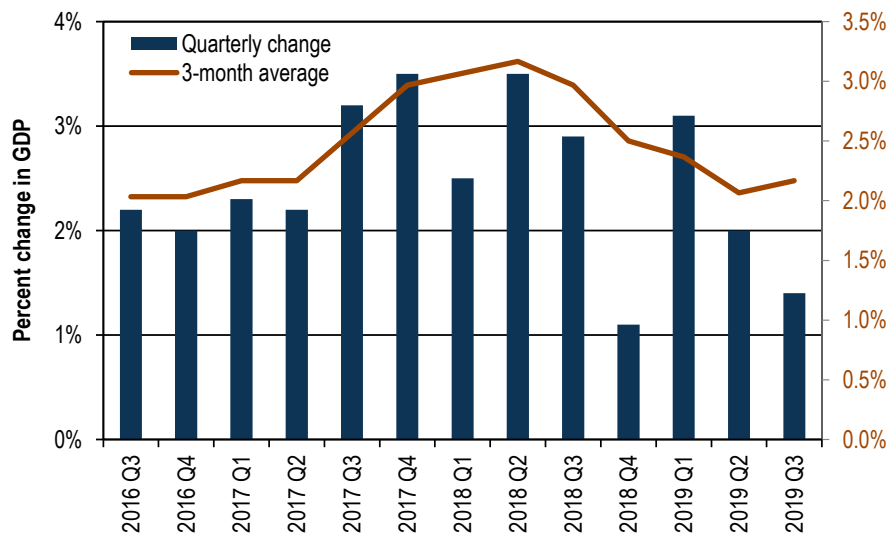
The rate of U.S. economic growth has been moderating over the last year.

Data on fourth quarter 2018 GDP became available at the end of February 2019, as the report was delayed by a government shutdown. It showed that real GDP grew at an annualized rate of 2.6 percent relative to the previous quarter. Although the fourth quarter growth rate represented a deceleration, it registered higher than many forecasters expected.

In July 2019, the U.S. Bureau of Economic Analysis provided annual revisions to five years of GDP data through 2018. The revisions impacting 2018 showed fourth quarter growth to be much weaker than originally anticipated. The new figure of 1.1 percent annualized growth tended to confirm suspicions that the economy had shifted into its moderation mode. Despite the revisions to the data, the real GDP growth rate for the whole year remained unchanged at 2.9 percent, making it the best year of growth since 2015. The revisions also showed consumer spending making a larger contribution to growth than what was previously thought. Business investment and net export contributions were revised downward while the contribution owing to government spending was revised modestly upward.

The slower fourth quarter in 2018 occurred primarily due to a pullback in consumer spending in December (*Figure 1-2*). Business fixed investment (BFI) spending grew after declining in the third quarter. The effects of the government shutdown, which started in December, also showed up in terms of subtracting from growth. Non-defense federal government spending fell off considerably as a result of the shutdown. Some inventory building added a bit to growth although net exports continued to weigh on the economy.

U.S. real GDP appeared to bounce back in first quarter 2019 as it grew at an annualized rate of 3.1 percent. However, the details of the report revealed an underlying weakness present. Growth was driven in part by higher inventories, especially in manufacturing, which added 0.5 percentage points to overall growth. Consumer spending rose only slightly in the first quarter so that its contribution to growth fell from the previous quarter. Given this modest increase in spending, some of the inventory buildup was most likely unintentional. Higher inventories also tend to foreshadow slower future growth as inventory accumulation falls back in subsequent quarters.

Net exports contributed 0.7 percentage points to growth, the first positive contribution in three quarters. Exports rose only slightly but imports fell by more, which turned net export contributions to growth positive. Much of the drop-off in imports appeared to be a correction factor for businesses stockpiling in advance of tariffs announced last year. Business spending softened as well with agricultural machinery and office furniture showing the largest declines.

GDP growth downshifted to 2 percent in second quarter 2019 even as consumer spending surged. The 3.03 percentage point contribution to growth made by the consumer was the strongest since fourth quarter 2017. Government spending, which grew 4 percent in the second quarter, was another significant area of strength. Much of the spending increase was supported from a 19.4 percent increase in non-defense federal spending, reflecting a rebound from the government shutdown in December and January. Other areas of the economy were notably weaker. Real exports fell and trade subtracted 0.68 percentage points off of growth. Lower inventory buildup removed another 0.91 percentage points as the contributions from net exports and inventories reversed course from the first quarter. Trade policy uncertainty likely weighed down business fixed investment. Total spending in this category declined in the second quarter causing it to subtract from overall growth.

Figure 1-2. Contributions to percent change in real GDP, seasonally adjusted annualized rate
United States, third quarter 2017 through third quarter 2019
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income

Contributions	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3
GDP percent change annual rate	3.2	3.5	2.5	3.5	2.9	1.1	3.1	2.0	1.9
Percentage contribution by factor									
Consumption expenditures	1.61	3.12	1.15	2.70	2.34	0.97	0.78	3.03	1.93
Fixed investment	0.25	1.45	0.94	0.89	0.13	0.46	0.60	-0.25	-0.22
Change in private inventories	1.00	-0.64	0.13	-1.20	2.14	0.07	0.53	-0.91	-0.05
Net exports of goods and services	0.35	-0.80	0.00	0.67	-2.05	-0.35	0.73	-0.68	-0.08
Government expenditures	-0.02	0.42	0.33	0.44	0.36	-0.07	0.50	0.82	0.35

Consumer expenditures have contributed the most to economic growth and have been carrying the economy as growth slows in 2019.

The U.S. economy grew at an annualized rate of 1.9 percent in third quarter 2019 based on the preliminary reading of GDP. The measure helped confirm the moderation to the pace of growth. The annual growth rate moderated to 2 percent in the third quarter from the 2.3 percent rate in the second quarter, which marks the slowest annual growth since fourth quarter 2016. The economy was supported primarily by consumers whose spending increased at a 2.9 percent annual rate, along with an assist from the government. In both sectors, the spending increase was less than what occurred the previous quarter. However, consumer expenditures had surged by 4.6 percent in the second quarter, a spending increase unlikely to be sustainable. Business fixed investment continued to decline into the third quarter. Nonresidential investment, one of the components, has weakened since the previous quarter as slower manufacturing activity

had dampened investment in equipment. Lower energy prices and a declining oil rig count have also weakened investment in structures. Net export growth came in slightly negative although the value of exports rose. The value of imports rose even faster during the period, perhaps indicating that prices of imports may not be affecting consumer purchases too greatly. The impact of inventory change was largely neutral after exerting significant downward pressure on growth the previous quarter.

Consumer spending still driving economic growth

The current economic expansion entered its 11th year in July 2019, making it the longest economic expansion in the history of the country. The economy owes most of its resiliency to the spending propensity of its consumers. Consumer spending makes up the greatest dollar-wise contribution to GDP, accounting for roughly 80 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 income, as well as the opportunity to earn income, which mostly comes from wages and salaries earned from employment. A strong pace of job growth and improving wages have been adding to consumers' ability to add to spending in recent years. The creation and filling of jobs over the period of the economic expansion has generated the expectation for rising wages to better support consumer spending. This expectation has heightened as the expansion has matured and labor markets have tightened.

Among measures that do not take employment benefits into account, average hourly earnings have risen slowly through much of the expansion. The average annual increase in earnings was 2.1 percent during the first five years of the expansion before rising to 2.8 percent by September 2018 (*Figure 1-3*). The tight labor market emerging in 2018 and continuing through 2019 elevated annual earnings growth to 3.4 percent in early 2019 before retreating during the second quarter, then stalling in September. At that point, average hourly earnings are up 2.9 percent over the year.

Similarly, the measure of wage growth computed by the Federal Reserve Bank of Atlanta that tracks median 12-month wage growth of individuals reporting to the current population surveys showed an increase of 3.6 percent in September. The pattern of wage growth using this measure gives rise to similarities displayed by the growth in hourly earnings. Readings on 2019 wage growth in both measures showed wages flattening and retreating in September; it appears

that wage growth remains stuck in its recent range. With economic growth moderating and many businesses contending with higher input costs, wage growth might not be expected to strengthen in a meaningful way in coming months.

Figure 1-3. Percent change in average hourly earnings of all private employees, seasonally adjusted annualized rate and percent change in median wage, annualized rate, three-month moving average
United States, September 2014 through September 2019
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics; Atlanta Federal Reserve Bank Wage Tracker
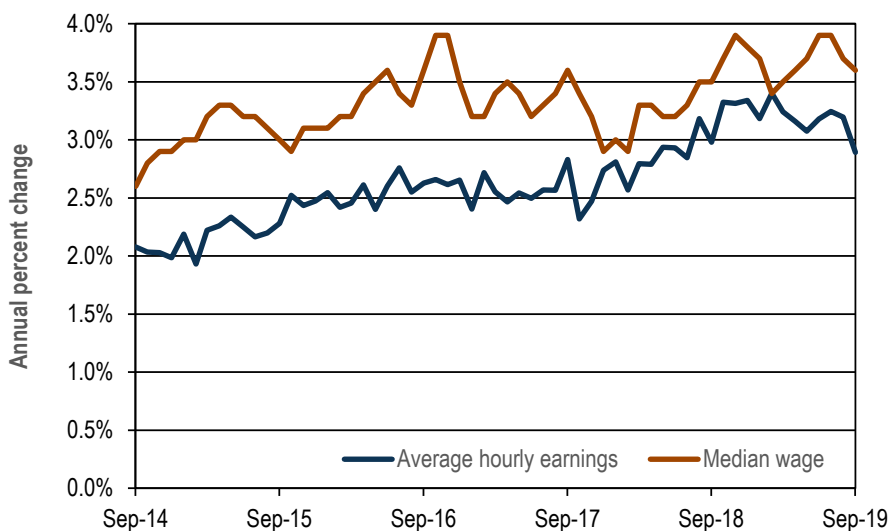
Wage growth had strengthened over the past two years but is lately showing signs of weakening.

Much of the willingness of consumers to spend a proportion of their incomes for consumption, sometimes referred to the marginal propensity to consume, depends upon other factors. They might include age and income levels, but may also include perceived wealth (wealth effect), future expectations about the economy and credit availability. The wealth effect can be influenced by housing and property prices (to the extent one is an owner) and financial equity prices (to the extent one is an investor). Price movements upward make those feel wealthier, as the assets owned increase in value, even though only a "paper gain" has occurred. Expectations about the future of the economy pertain to its performance. Good performance helps to build confidence that one will continue to stay employed, thereby earning income to support the purchase of immediate-type goods (nondurables) and services, and also items that are consumed over time (durables). Prime examples of these

latter items, also often called "big ticket" items, would be homes and automobiles. Both of these take up a larger proportion of current and future income, often require financing, and are expected to last and be consumed over successive years. Bad economic performance mostly pertains to economic recession, which puts into motion the converse of what was just mentioned. Consequently, when the economy is doing well, consumers feel more confident to purchase more, including big-ticket items. If expectations about the future of the economy start to shift downward, confidence wanes and purchases drop.

Real disposable 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 will 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.

Gains in DPI as the expansion has proceeded have helped fuel continued growth in consumer spending (*Figure 1-4*). The consumer-spending pattern has generally been strong. From 2015 to 2018, consumers were spending large proportions of their income gains and even spent in excess of income gained in the slower growth year (2016). Economic growth rebounded in 2017 and 2018. DPI increased accordingly while consumers were content to spend at a level proportionate to their income gains.

Figure 1-4. Personal change in real personal consumption expenditures and disposable personal income, seasonally adjusted annual rate
United States, 2015 through third quarter 2019
Source: U.S. Bureau of Economic Analysis, Personal Income and Outlays
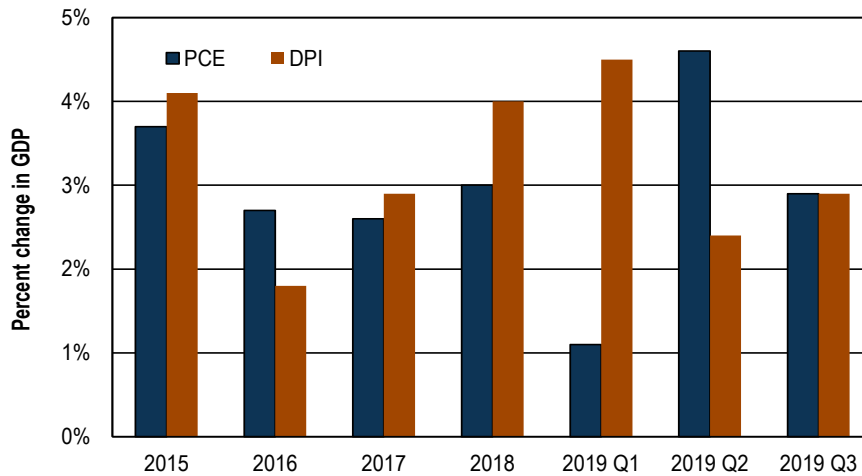
Consumption activity curiously plummeted during first quarter 2019, roared back in the second quarter, and was strong during the third quarter.

By December 2018, consumers looked ready to carry their spending momentum into the next year. Income was growing at an increasing rate, the economy seemed strong, and holiday retailers were looking forward to a banner month. Instead, the spending environment shifted. A stock market sell-off and the government shutdown appeared to shake the confidences of buyers. Retail sales fell by 2 percent over the month and worries about a retrenchment in spending arose.

Consumer confidence recovered quickly during the second quarter. With equity markets stabilizing and an end to the government shutdown, spending roared back in the second quarter. The 4.6 percent increase in spending compensated for the weak first quarter as it was bolstered by the strong income gain during the first quarter. Income growth moderated during the third quarter as did spending. The pullback in spending activity was not surprising since the pace set during the second quarter could not understandably be sustained.

The savings rate of consumers provides some insight into how spending decisions are being supported by income gains, previous savings, and borrowing. A drawdown in savings to support spending will result in a decrease in the savings rate and can sometimes provide an indication of consumer confidence. Higher savings rates give consumers more opportunity to increase future spending when consumers feel conditions warrant it. *Figure 1-5* shows how savings

rates have changed over the last four years. Savings rates drew down in 2016 as consumers used savings to bolster their spending levels when income growth declined. With income growth rebounding in 2017 and 2018, consumption rose but was primarily supported by income gains, and savings generally rose over this period. There looks to be some drawdown in savings during the holiday periods in fourth quarters when spending usually climbs.

The savings rate spiked to 8.8 percent in December 2018 when consumers pulled back spending when their nerves seemed rattled. Once they regained confidence, spending surged in second quarter 2019 with consumers outspending income and drawing down savings. The downward trend in savings stabilized midway through fourth quarter 2019, as spending increased in line with income gains.

Figure 1-5. Personal savings as a percentage of disposable income, seasonally adjusted annual rate
United States, September 2015 through September 2019
Source: U.S. Bureau of Economic Analysis, Personal Income and its Disposition

Consumers saved much more to start 2019, but then drew on them to support spending as the year progressed.

Retail sales data provide another measureable 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. Sales grew by 4.1 percent from September 2018 to September 2019, in line with the 4 percent pace established during the same period a year ago. Currently, sales are up 3.4 percent over the first nine months of 2019 compared with the same time period one year ago (*Figure 1-6*). Sales rose in nine of the 12 months from September 2018 to September 2019.

Figure 1-6. U.S. retail sales, month-over-month and year-over-year seasonally adjusted percent change
United States, September 2016 through September 2019
Source: U.S. Census Bureau, Monthly and Annual Retail Trade Report
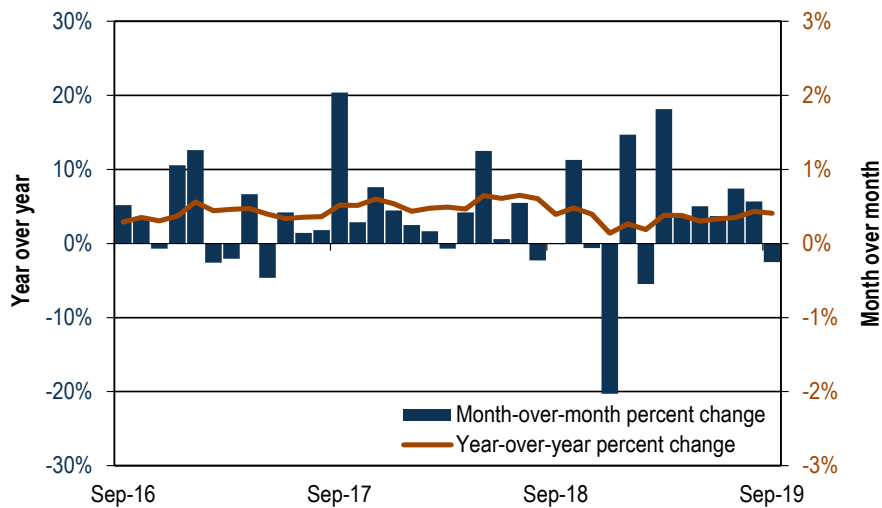
Increases in retail sales were choppy moving into 2019, but stabilized until this past September.

Monthly retail sales ended fourth quarter 2018 with a precipitous decline with consumers curtailing spending activity. The weakness in spending proved to be temporary. January and March 2019 were big bounce-back months as consumers started to regain their footing. The forward momentum continued into the year until September, which saw sales decline for the first time in seven months. The outlook for holiday season sales is upbeat and is expected to be better than last year. Given the December swoon of 2018, this says more about where consumers have been rather than where they are headed.

Figure 1-7 shows how retail sales grew by industry sector over the course of the year from September 2018 through September 2019. Compared with last year, retail sales are up 3.4 percent on a year to date basis through September. Non-store retailers, which mostly represents online merchants, or e-commerce, is the notable standout. Annual sales for this group increased by 15.6 percent over the course of the year. This is not too surprising given the trend toward online shopping to which roughly 90 percent of the non-store component is tied. Younger generations, who are more apt to be exposed to advertising through social media, tend to be more inclined to shop online. E-commerce has grown over time and leads in sales growth at a time when Millennials comprise the largest share of the U.S. working age population.

Other than health and personal care stores, no other major retail category has above-average sales. Sales at gasoline stations, which are very much tied to oil prices, retreated since last year. Oil prices fell sharply at the very end of 2018. They rebounded a bit in the first half of 2019 before stabilizing at what are currently lower prices. The price of West Texas Intermediate crude oil at the end of October was $54 per barrel. Electronics and appliance stores were one of two categories that experiences sales declines. Many store closings have occurred within this category due to poor sales.

Figure 1-7. Annual percent change in nominal retail sales by industry
United States, September 2018 through September 2019
Source: U.S. Census Bureau, Monthly Retail Trade Report

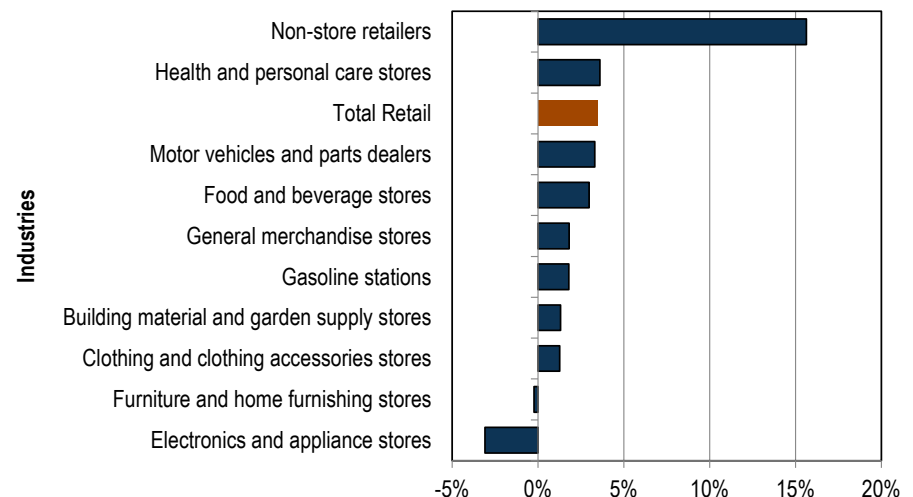*Retail sales increased the most in the non-store retailing segment involving e-commerce.*

Boost from business fixed investment spending fades

Business fixed investment 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.

The 2017 tax act was designed to increase incentives for business investment and carry the growing investment momentum in 2017 into 2018. As businesses were assessing the implications of the tax bill for investment, the U.S. government introduced additional uncertainty through a significant shift in trade policy. In early 2018, the U.S. and its trade partners began imposing higher trade barriers, mostly in the form of higher tariff rates. Eventually the dispute centered upon U.S.-China trade relations that moved back and forth between escalation and potential settlement up to the present time.

The tariffs implemented since January 2018 have altered the pattern of U.S. trade flows. U.S. exports of targeted products to China have fallen while U.S. exports of those same products to other trading partners have risen. The increased value of imports from other trading partners is partly attributable to the replacement of imports that would have come from China. However, the replacement imports generally come with higher prices and raise input costs to manufacturers. The rise in costs has had the effect of slowing manufacturing activity, and as such, done so at a global level due to the interconnectedness of supply chains. Moreover, tariffs on U.S. imports strengthen the U.S. dollar which raises the price of U.S. goods to foreign purchasers, thereby contributing to the global growth slowdown.

Changes in trade policies also have increased business uncertainty concerning future barriers to trade and raised perceptions of risk associated with investment spending. The inability to accurately measure the impacts on future costs curtails investment spending by causing businesses to delay investments or forego them entirely.

Trade uncertainty, a global slowdown and a strong U.S. dollar have all contributed to a slowing in business investment. Business spending fell in the second and third quarters of 2019 (*Figure 1-8*) when it subtracted from GDP growth. Most of the falloff occurred in equipment spending, including transportation equipment. Some of this might be somewhat overstated, as it was impacted by production cuts by the Boeing Company of its 737 MAX, and a third quarter General Motors strike of over 40,000 workers from 50 plants.

Figure 1-8. Real business fixed investment, quarterly and annual percent change, seasonally adjusted annual rate
United States, third quarter 2014 through third quarter 2019
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income
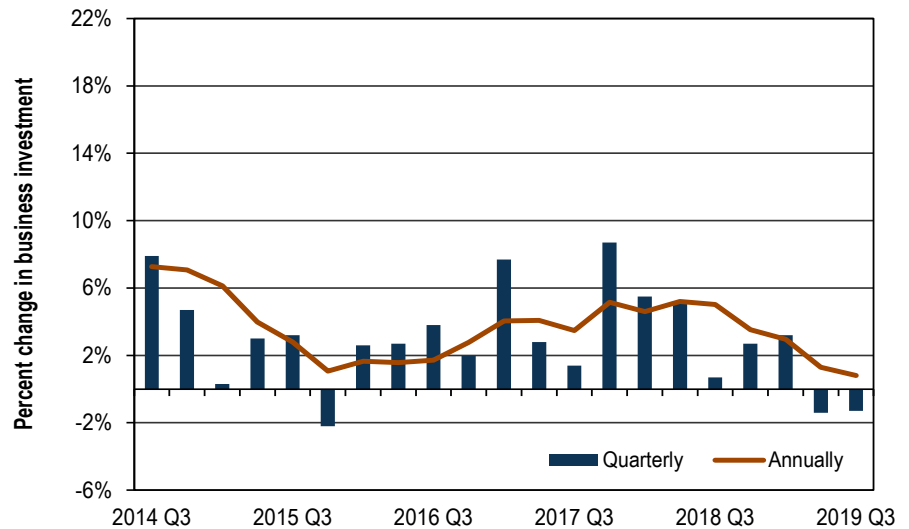
Business fixed investment has been growing before weakening in the second and third quarters of 2019.

Business fixed investment had been growing before weakening in the second and third quarters of 2019.

Decelerating global growth and trade uncertainty has had a more pronounced and direct effect on the manufacturing sector than the service sector, which has in turn slowed investment spending. Other goods-producing industries have also been affected. Agricultural products have been a prime target for retaliatory tariffs. Uncertainty has put pressure on major investments requiring new construction. The slower growth in global activity has helped push oil prices down, which in turn has reduced activity in the mining industry.

The impact to the much larger service sector is more difficult to ascertain. With manufacturing costs rising, the potential exists for prices to rise for finished products. To that end, higher-end product prices run the risk of diminishing consumption spending and negatively impacting future economic growth.

A way to obtain a read on the economic activity in both sectors is from the surveys conducted by the Institute of Supply Management (ISM). The ISM Manufacturing Index is based on a survey of purchasing managers at more than 300 manufacturing firms and, as such, is often referred to as the Purchasing Manager's Index (PMI). It

is conducted monthly. The PMI is a composite index of new orders, production, employment, supplier deliveries, and inventories. Each factor is equally weighted and seasonally adjusted. The ISM Non-Purchasing Index is constructed in analogous fashion, but focuses on the current and future direction of economic conditions facing the services sector.

The headline PMI is a number from 0 to 100. A number above 50 indicates business activity is growing. A PMI reading less than 50 represents a contraction, and a reading at 50 indicates no change. The direction of the trend in the PMI tends to precede changes in economic growth and therefore provides some indication of future economic conditions. Recent changes in the PMI readings are shown in *Figure 1-9.*

The PMI readings provide some confirmation that the economy slowed over the past year. They correlate with GDP growth figures. Manufacturing is now in contraction territory, and the weakness appears to have started spilling over to the consumer side of the economy. This presents a significant risk to the economic outlook, and has become the principal reason for the Fed to move to a more accommodating monetary policy.

Figure 1-9. Manufacturing and non-manufacturing composite index, seasonally adjusted annual rate
United States, September 2015 through September 2019
Source: U.S. Institute for Supply Management
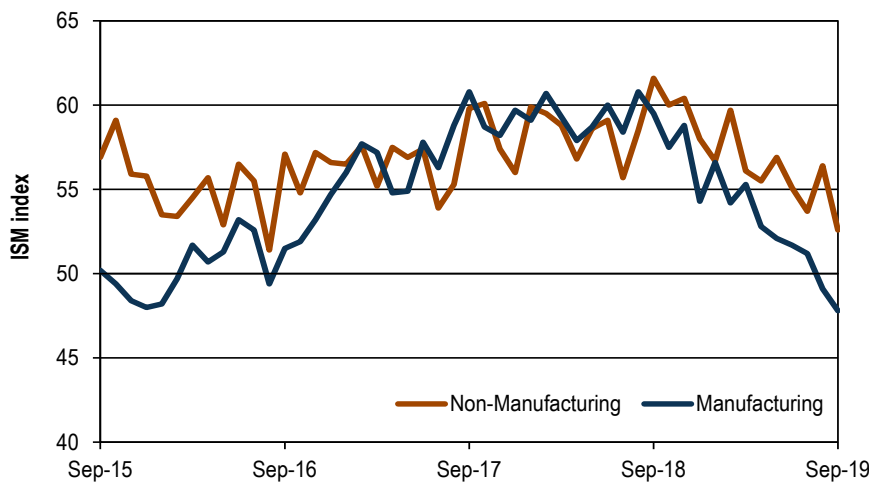
Business fixed investment has been recovering lately and contributing more to economic growth, but stumbled in third quarter 2018.

Construction spending moderates in total

An important category of private fixed investment is the construction of new residential and nonresidential structures. Total private construction spending outlays had been rebounding as the economic expansion strengthened. From September 2017 to September 2018, total construction spending rose by 3.9 percent overall (*Figure 1-10*). The moderation to economic growth that began with fourth quarter 2018 and continued through third quarter 2019 has weakened spending in the construction component of business investment. From September 2018 to September 2019, annual construction spending declined by 1.8 percent.

Figure 1-10. Value of total construction put in place, billions of dollars, seasonally adjusted annual rate
United States, September 2014 through September 2019
Source: U.S. Census Bureau, Construction Spending
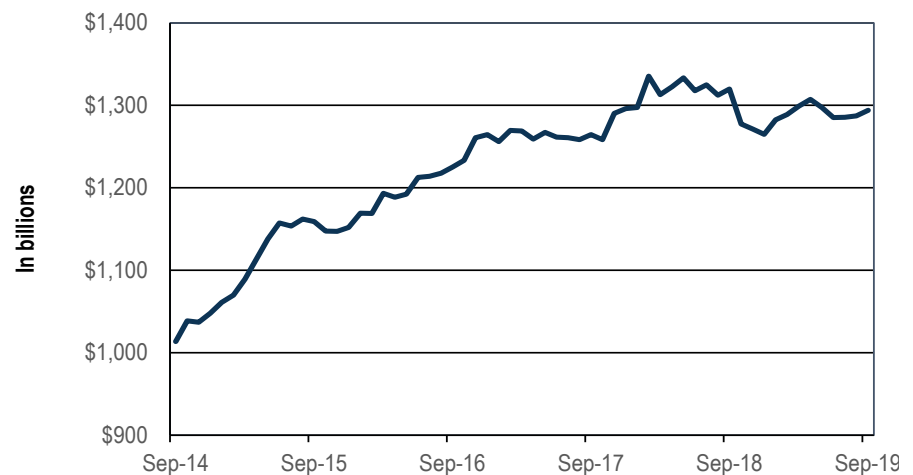
Total construction spending has softened in recent months.

Spending on nonresidential construction is more pronounced and occurs at a level roughly 40 percent higher than residential construction. Since fourth quarter 2018, the trend in spending in both sectors has reversed (*Figure 1-11*). Nonresidential outlays had positive momentum moving into 2019. Demand for nonresidential property was increasing as the economy grew at a strong rate and the Fed was increasing interest rates. Housing affordability had already been deteriorating with home prices rising faster than incomes. Higher mortgage rates, brought about in large part by the Fed's actions, accelerated the decline. Residential construction spending, which had largely been on the rise during the expansion, began to decline. Home sales began to slow, housing inventory

began to increase and residential building activity tailed off. By June, residential construction outlays had descended to its lowest level since December 2016.

Figure 1-11. Value of residential and nonresidential construction, millions of dollars, seasonally adjusted annualized rate
United States, September 2014 through September 2019
Source: U.S. Census Bureau, Construction Spending
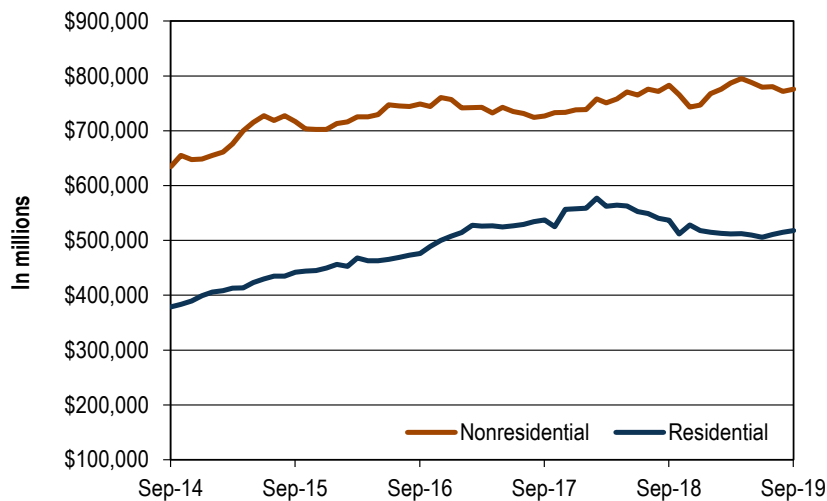
Nonresidential construction activity has strengthened recently while residential construction has weakened.

The slowing economy in 2019 reversed the recent spending trends in residential and nonresidential construction. Nonresidential construction outlays began to level off with slowing demand while residential construction spending began to rise with falling mortgage rates. The decline in economic activity encouraged the Fed to begin cutting rates in July. The rate cutting measures have served to move mortgages even lower, which has helped to re-stimulate housing sales (*Figure 1-12*).

Figure 1-12. Conventional 30-year mortgage rates and new home sales, thousands of units, seasonally adjusted annualized rate
United States, September 2015 through September 2019
Source: Federal Housing Finance Agency; U.S. Bureau of Economic Analysis, New Residential Sales
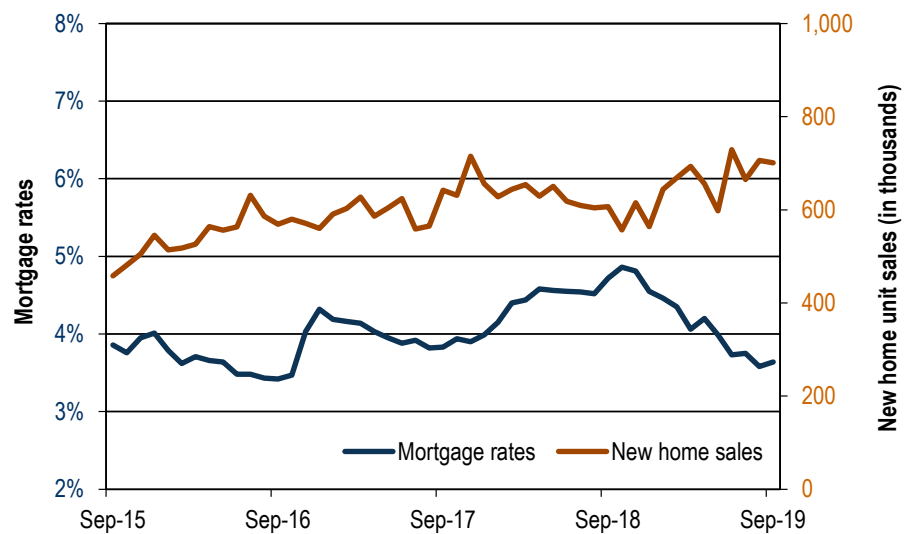
Sales of new homes in 2018 started slumping as mortgage rates begin to rise.

Foreign trade developments

Beginning in early 2018, tariffs were imposed by the United States on Chinese goods entering the United States, with China responding with retaliatory tariffs.

Both countries have agreed at times to meet and negotiate an agreement that would alter the economic partnership between them. To date, the negotiations have not been entirely productive. Concessions made by the U.S. have generally involved delaying deadlines for imposing tariffs, while Chinese concessions typically came in the form of offers to increase purchases of U.S. goods. The concessions look to have been made as good faith offers to continue the negotiation process. However, whenever negotiations have stalled, the U.S. has responded by implementing and increasing tariffs on a wider variety of Chines exports. As this has happened, Chinese officials have engaged in a process of countering with their own tariff measures.

The trade dispute comes at a cost to the economies of both nations. China had risen to become an important export destination for the U.S. with American exports to China increasing from $16 billion at

the turn of the century to over $120 billion in 2018. As such, China ranks as the third largest export market for the U.S., behind Canada ($289.7 billion) and Mexico ($265.4 billion). Still, China accounts for less than 8 percent of total American exports. On a value-added basis, American exports to China only amount to approximately 0.5 percent of the U.S. economy. This occurs due to the fact that the U.S. economy is largely services based and most services are not exported. Consequently, exports of U.S. goods contribute a much lesser percentage of value to the economy.

On the other end, China's exports to the U.S. totaled nearly $540 billion in 2018, according to the Census Bureau. This figure represented 18 percent of China's total exports. These exports accounted for an estimated 2 percent of total value added in China. The trade figures indicate China's economy to be more reliant on U.S. trade. In addition, since the service sector in China on a value added basis is not as important as it is in the U.S., it appears China has more to lose from escalating trade tensions. Although China's rate of economic growth had been slowing before the dispute, it has slowed even more during it. The 2019 second quarter growth rate estimate reached a 27-year low for China. China's projected economic growth, like the U.S., is expected to be even slower in 2020 than it is now. The impacts have also helped contribute to a slowdown in global growth due to the interconnectedness of the world economy in the manufacturing industry.

While the direct impact of the trade tensions to the U.S. economy is mostly minimal, the indirect effects it is having on American business investment, and potentially the consumer segment, have lately grown more significant. From an industry standpoint, U.S. producers of the majority of products China had been importing stand to lose more. Consequently, the business environment has become more challenging for establishments in the agricultural, civilian aircraft, motor vehicles and electronics industries. Of these, agriculture has the most significant exposure to China. In 2017, China was the largest export market for U.S. agricultural products. The value of these exports totaled nearly $24 billion, which accounted for over 17 percent of the industry's exports that year. The most prominent U.S. agricultural product imported by the Chinese are soybeans, which accounted for 52 percent of the export market for that commodity.

Soybean production is concentrated in the states of the Midwest and the Plains. The top ten soybean producing states together account for roughly 79 percent of total U.S. soybean production. Illinois is the leading producer with 14 percent of total production while Iowa is second with 13 percent. Farmers and farmworkers in these states are feeling the impact of the trade war most directly as China has levied

a 25 percent tariff on their product. Federal assistance payments will alleviate some of the pressure, but will not make up for losses to input supply industries downstream.

Government shutdown provided temporary delay to federal spending

Real government purchases by federal, state and local government branches, plus gross investment, made a substantial contribution to economic growth during fiscal year 2018. The fiscal year defines the time period for which the U.S. government's budget must be determined. It runs from October 1 of the budget's prior year through September 30 of the year being described. In February 2018, federal fiscal policymakers reached an agreement to increase discretionary spending at a much faster pace than had taken place over the past few years. A significant portion of the increase was allocated to defense spending which then grew at the fastest rate in a decade (*Figure 1-13*). The federal government spending increase was an important factor in lifting real GDP growth to 2.9 percent in 2018. The 2018 fiscal deal expired on September 30 that year. Federal fiscal year 2019 began on October 1, 2018. Lawmakers passed into law five of the 12 annual appropriation bills that provided funding to the five respective government agencies for 2019. The remaining seven were funded by short-term continuing resolutions (CR) that ran into December 2018. When Congress and the President could not come to agreement on whether to pass another CR or enact full-year appropriation bills, the remaining seven agencies were shut down on December 22.

The partial government shutdown left about 25 percent of discretionary spending unappropriated and interrupted the acceleration in spending. The impact of the delayed spending was felt in the nondefense sector since defense had been fully funded. Nondefense spending declined by 4.5 percent which helped pull total government spending negative. As such, this subtracted from economic growth in fourth quarter 2018.

The partial government shutdown did not end until January 25, 2019. Consequently, the weakness in nondefense spending carried over into the first quarter of the year. Strong defense spending counteracted the effect and moved total government spending positive, enabling it to contribute a half of a percentage point to GDP growth.

Government spending rose 4.8 percent in the second quarter as it rebounded from the shutdown. Nondefense federal spending surged 16.1 percent. Government spending continued to increase through the third quarter and spending is expected to grow into the fourth

quarter. Real purchases by state and local government are also projected to increase by about 2.5 percent this year, led by a surge in infrastructure investment.

Congress reached a budget deal that would modestly increase the discretionary budget caps in place over fiscal years 2020 and 2021. The next step will be for policymakers to appropriate the money to the various government programs and agencies. To buy more time for negotiations, Congress recently passed a continuing resolution (CR) to fund the government through November 21. Shortly before the impending deadline, Congress passed another CR intended to fund the government through late December. On December 17 the House passed a $1.37 trillion spending package that will go to the Senate for approval before being sent to the President for signing.

Figure 1-13. Government purchases and gross investment, trillions of dollars adjusted for inflation, seasonally adjusted annualized rate
United States, third quarter 2017 through third quarter 2019
Source: U.S. Bureau of Economic Analysis, Government Current Receipts and Expenditures

Expenditures	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3
Government expenditures percent change annual rate	-0.1	2.4	1.9	2.6	2.1	-0.4	2.9	4.8	2.0
Percentage change from preceding period									
Federal government expenditures	0.1	4.6	2.8	3.9	2.9	1.1	2.2	8.3	3.4
National defense	-1.6	4.5	0.6	7.5	3.0	5.2	7.7	3.3	2.2
Nondefense	2.6	4.8	6.0	-1.0	2.8	-4.5	-5.4	16.1	5.2
State and local government expenditures	-0.2	1.1	1.4	1.8	1.6	-1.2	3.3	2.7	1.1

Government spending growth resumed after declining during the federal government shutdown.

Labor market remains healthy but is cooling

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 looks at 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]

Strong demand for goods and services over the past several years boosted the demand for labor, resulting in steadily strengthening labor market conditions. Amidst emerging signs the economy is losing momentum in 2019, the labor market continues to hold up

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[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.

well. Recent minutes from the Fed's open market committee continue to characterize the U.S. labor market as "strong," with labor demand healthy and many firms still reporting difficulty finding workers to meet current demand. The underlying demand has proven to be fairly resilient. Job growth remains solid despite cutbacks in capital spending, disruption of supply chains, Boeing problems with the 737 MAX, and the recently settled strike at General Motors. The most recent employment data show the average gain in employment the past three months is a solid 188,000 (*Figure 1-14*).

There are other indicators that point to a healthy labor market. The number of initial claims for unemployment insurance remain historically low. Thus far, concerns over slowing global growth and elevated trade tensions have not impacted the pace of layoffs. Until the claims numbers show a sustained upward movement, the labor market expansion will most likely continue.

Although job growth through 2019 has been relatively strong, it has been slower than in 2018. Total nonfarm seasonally adjusted employment reached 151.8 million in September 2019, according to the establishment survey, and is up 1.5 percent from September 2018. Employment using this survey approach uses payroll information provided by employers and is usually referred to as payroll employment. Since the beginning of the 2019 calendar year, payroll employment in the nonfarm business sector grew by an average of 171,300 per month, a decrease that was below the average of 219,900 jobs gained per month in 2018.

The slowdown in hiring is not entirely surprising. While the level of many labor market measures remains strong, the rate of their improvement has cooled. Firms have been taking a more cautious approach to hiring and capital spending in the wake of increased economic anxiety. Job openings have declined modestly after reaching historic highs earlier in the year. The level of jobless claims has leveled off and stopped declining.

Figure 1-14. Total monthly nonfarm employment and three-month moving average, in thousands, seasonally adjusted
United States, September 2017 through September 2019
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics
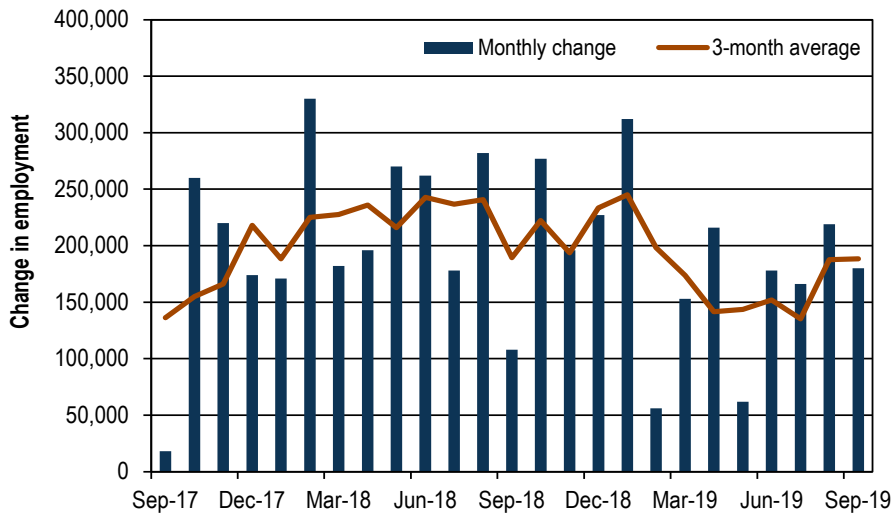
Payroll employment in 2019 has been strong but is starting to slow.

Job gains over the course of the year, from September 2018 to September 2019, have been widespread across major industry groups (*Figure 1-15*). Retail trade was the lone industry to report job losses on an annual basis. Notable strength in employment growth was seen in education and health services, leisure and hospitality, construction, professional and business services, transportation, warehousing and utilities, and other services (*Figure 1-15*), all of which grew more than average with respect to total nonfarm employment growth.

As trade tensions have escalated, employment in manufacturing has been weakening, though it remains in the positive range for now. Mining and logging employment growth surged last year. This year it is having a 2016 moment when sagging commodity prices, including oil, a strong dollar and moderating global demand restrained activity in this sector. The top two industries that added the most jobs over the year were education and health services, with 633,000 jobs added, and professional and business services which added 435,000 jobs.

Figure 1-15. Percent change in private sector employment by industry
United States, September 2018 through September 2019
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics
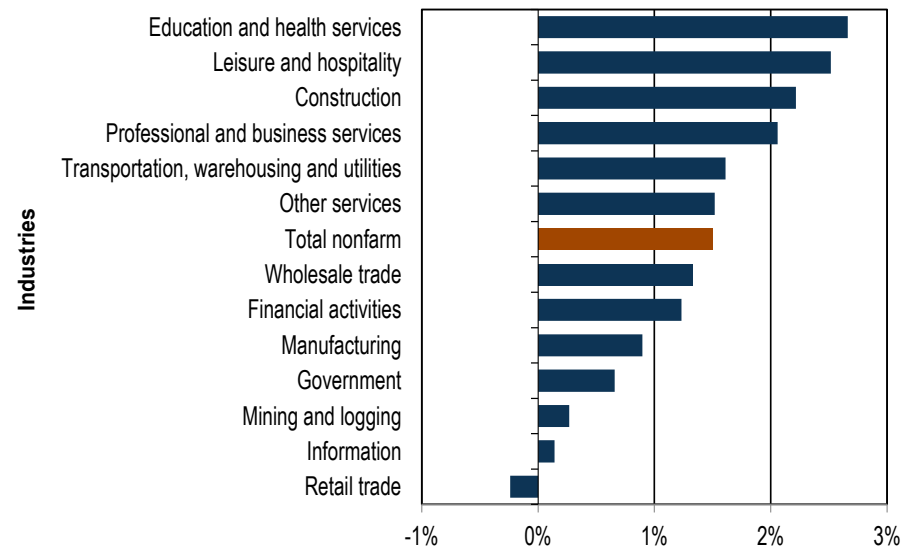
Private sector employment has expanded in all major industries but one in the past year.

Unemployment rates are bumping the bottom

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 descended to decades lows during 2018. Even with a slower hiring pace in recent months in 2019, the labor market remains tight. After a temporary small increase in the first quarter of 2019, mostly due to the five-week partial shutdown of the federal government, the unemployment rate resumed its downward trend in the second quarter this year. (*Figure 1-16*).

As of September 2019, the unemployment rate had fallen to 3.5 percent, a 50-year low. Annually, the unemployment rate is down only 0.2 percentage points from September 2017, but what's significant is that it has fallen at all given how low rates were in 2018. The best BLS measure of under-employment is the U-6 unemployment rate. It includes not only unemployed workers, but also marginally attached workers – those who are not looking for work now but have looked for it in the past 12 months – and workers employed part time for economic reasons. This rate fell to the lowest it has been since 2000.

Figure 1-16. Monthly unemployment rate, seasonally adjusted
United States, September 2011 through September 2019
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics
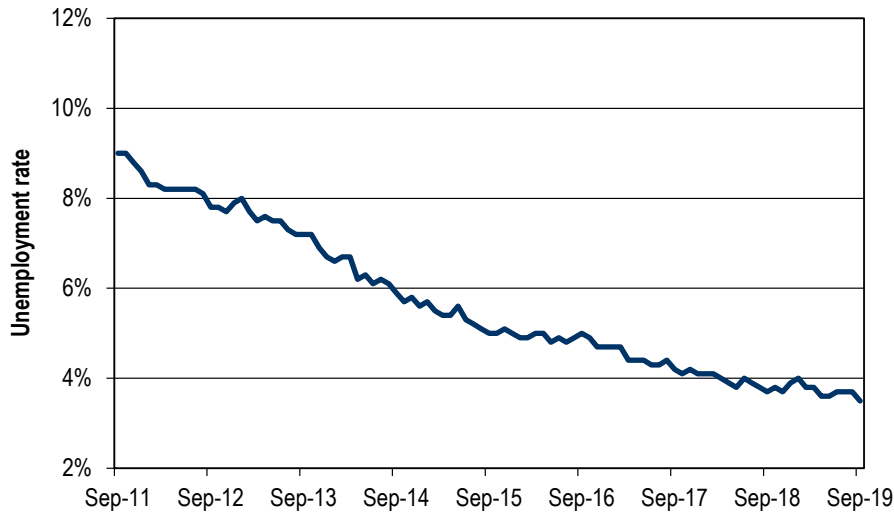
The national unemployment rate fell to a 50-year low in September 2019.

Monetary policy

The Fed moved to raise interest rates four times in 2018, with the last increase coming in December. The economy was coming off one of its best years growth-wise and had been given a big boost from expansionary fiscal policy. Against that backdrop, the Fed increasingly saw less need to accommodate the growth through its policies and appeared ready to raise rates further in 2019. Growing risks to economic growth began to manifest when consumers surprisingly pulled back on spending during the first quarter, and uncertainties surrounding international trade began to multiply. In response to this, the Fed cut the federal funds in July by a quarter of a percent, or 25 basis points. It marked the first time the Fed had reduced rates since 2008.

Two members of the Fed's open market committee dissented, a mostly rare occurrence which highlighted the Fed's limited ability to foresee how trade negotiations would play out. As such, the policy action could be described as an "insurance" rate cut that if erred would do so on the plus side. In defense of the action, the Fed's statement acknowledged signs of deceleration in business fixed investment and manufacturing.

By September, The Fed generally judged that downside risks to the outlook for economic activity had increased somewhat from their July meeting. The effects of slowing global growth and

trade uncertainty had become increasingly apparent in investment spending, manufacturing, and exports. The Fed again elected at their September meeting to cut rates and do what is necessary to prolong the economic expansion. By the Fed's own admission, it has no control over trade policy, but will look to offset the situation by helping ease financial conditions.

At its October meeting, the Fed made it three in a row for rate cuts. The Fed's statement cited moderate inflation and continued negative implications of global developments on the economic outlook. The Fed has one more meeting in 2019 scheduled in December. Recent remarks delivered to the Joint Economic Committee in November by Fed Chairman Powell hinted the Fed will be patient, and expressed confidence the three rate cuts would be sufficient for now to keep the economy pointed forward. Ongoing developments will continued to be monitored by the Fed and it will "act as appropriate" with respect to future policy decisions.

The interest rate moves by the Fed impact other rate measures throughout the financial sector (*Figure 1-17*). Mortgage rates were falling before the Fed's policy actions due to affordability issues in the housing market. The rates were given another downward push by the Fed. The average rate on a conventional 30-year mortgage fell to 3.6 percent in September 2019 from 4.8 percent roughly a year earlier.

Figure 1-17. Selected interest rates
United States, September 2015 through September 2019
Source: Federal Reserve Board, Federal Housing Finance Agency
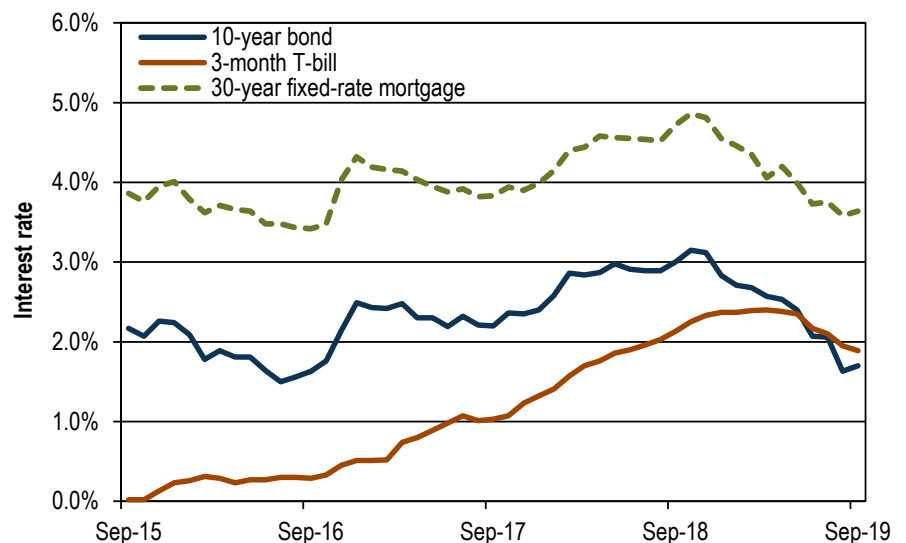
Federal Reserve Board policy measures are resulting in higher market interest rates.

Home mortgage rates tend to move with the bond market, and the rates on a 10-year Treasury note recently hit their highest level in seven years in 2018 before receding. Yields had been pricing in previous and expected future increases in short-term rates, as well as expectations about the future rate of inflation.

Since then, bond investors' views of future economic conditions have downgraded, and rates on ten-year treasuries have fallen even faster. The yield on the 3-month Treasury has occasionally risen higher than the rate on the ten-year bond, causing the yields to "invert." This inversion of the yield curve has caused some to believe a recession is rapidly approaching. However, as the Fed had been raising rates in 2018, other foreign banks were cutting and even posting negative rates. Investors flew to the 3-month bill which served to bid up its yield and lead to an inversion. Now that the Fed has cut the rate three times, the yield curve is likely to return to an upward slope and help quell fears of an imminent recession.

Although some cracks have appeared in the expansion, the economy still shows a variety of signs of strength. Consumers are still emboldened to continue their spending habits, particularly as the labor market stays strong and incomes grow. Homebuilding is gaining momentum and could produce some positive spill over into other areas of the economy. The Fed is poised to act on the economy's behalf. A measure of caution still has to be taken with respect to the trade situation and the impact any continued slowing in global economic growth could have on the U.S. economy. Economic growth should continue moderating in the coming year, but the economy is not expected to come off the rails.

Chapter 2: Washington's economy and labor market

Economic developments and policies that affect and shape the national economy have extended effects on state economies. States are connected economically through the free flow of commerce across state lines and through the mobility of labor. Consequently, national recessions and expansions are typically shared with all states, though the degree to which they are felt might differ between states.

Washington's economy has been very strong for much of the current economic expansion. Since 2010, the Washington economy has expanded almost 40 percent on a real basis. Over the last two years, the Washington economy arguably has outperformed nearly every state in the nation. The Seattle metropolitan area, which is home to just over half of the state's population and employment, has been accounting for the bulk of the economic activity. The area is home to Amazon and Microsoft, two of the world's five largest companies, and it is the largest production base for Boeing. Seattle's growth has been pushing outward to the north, south and even east as businesses and individuals search less expensive and less congested locations.

After sailing smoothly through 2017 and 2018, the state has been weathering some turbulence in 2019. The trade dispute with China has produced some challenges to Washington's export situation. Exports to China, which include commercial airliners, accounted for roughly 2.8 percent of state GDP in 2018 according to the Bureau of Economic Analysis (BEA) and the Census Bureau. The methodology likely overstates the exposure of states with large port complexes that export goods produced elsewhere. However, the ports of Seattle and Tacoma support an array of logistics and distribution jobs across the state that are likely being impacted. To date, Boeing's commercial airliners have not been subjected to tariffs, although they have been dealing with major concerns owing to the grounding of their 737 MAX models. Production of these planes was reduced modestly. The lower pace will likely hold until the MAX is cleared to fly and until deliveries and new orders pick up.

Washington state's GDP growth ranked first in 2018

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 5.8 percent in 2018 (*Figure 2-1*), which outpaced the 2.9 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 5.8 percentage points by which Washington's economy expanded in 2018. The second largest contributor was professional and business services. This industry accounted for 0.82 percentage points of the total growth in real GDP.

Based on current dollar value, Washington's GDP of $565,831 million in 2018 made it the nation's 11th largest state economy. The largest industry in Washington was financial activities. This industry accounted for 17.6 percent of Washington's GDP and had real growth of 4.2 percent. The second largest industry was information, which accounted for 12.7 percent of Washington GDP and had a real growth rate of 16.3 percent.

The state economy, much like the national economy, looks to be slowing in 2019 based on data from the first two quarters. The trade dispute with China together with the problems faced by Boeing are contributing to the slowdown and jeopardize the top ranking in economic growth the state has held the last two years, though progress appeared to be made on both fronts at the end of 2019.

Figure 2-1. Gross domestic product, (chained 2012 dollars), annual and quarterly percent changes, seasonally adjusted annualized rate
United States and Washington state, 2016 through second quarter 2019
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income
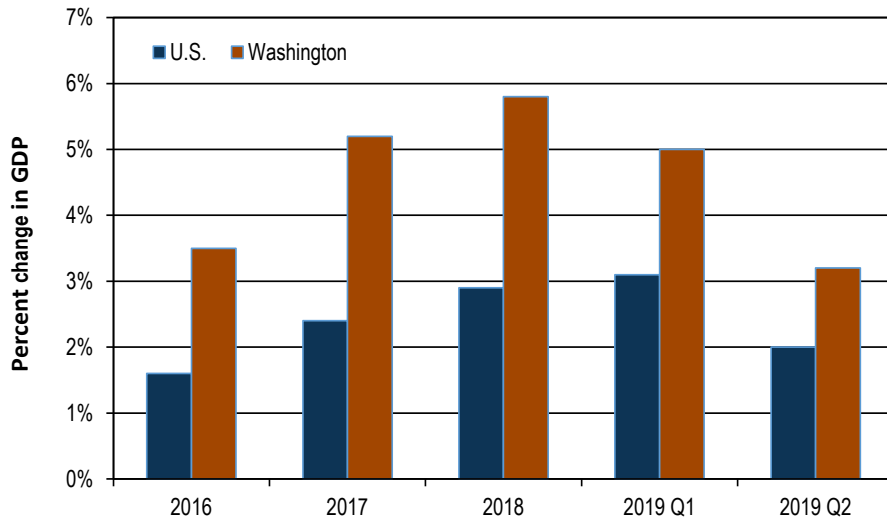
Washington's economy has grown faster than the national average through most of the current economic expansion.

Personal income grows as wages rise

The growth of Washington's GDP during the expansion has 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*. The period of increased income growth back to 2016 was temporarily broken in the second quarter of 2019. Although there is still another half of data to collect, the headwinds facing Washington's economy may scale back future income this year, breaking the annual streak the state has been on. In 2018, Washington had a personal income of $467,400 million ranking it 14th 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.

Figure 2-2. Personal income, (current dollars), annual and quarterly percent changes, seasonally adjusted annualized rate
United States and Washington state, 2016 through second quarter 2019
Source: U.S. Bureau of Economic Analysis, Personal Income and Outlays
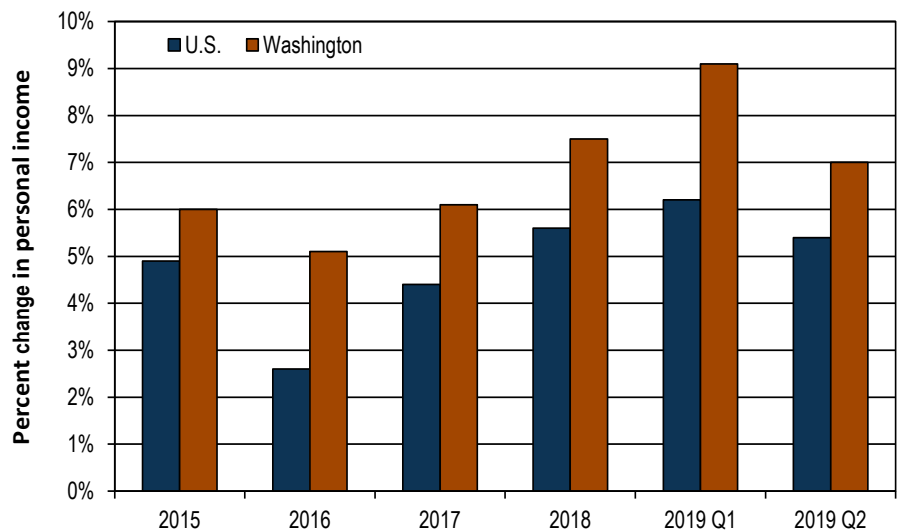
Washington's level of personal income has grown as the expansion has progressed.

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* alongside the growth in the average annual wage obtained from the state's Quarterly Census of Employment and Wages (QCEW). The wages are expressed in nominal terms, unadjusted for inflation. The gains are somewhat higher using BEA data than from the QCEW, although the pattern of gains is the same from year to year. Wage growth in 2018 correlated with the strong growth year for the Washington economy.

Figure 2-3. Percent change in wages, salaries (BEA) and the average annual wage (QCEW), current dollars
Washington state, 2014 through 2018
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages
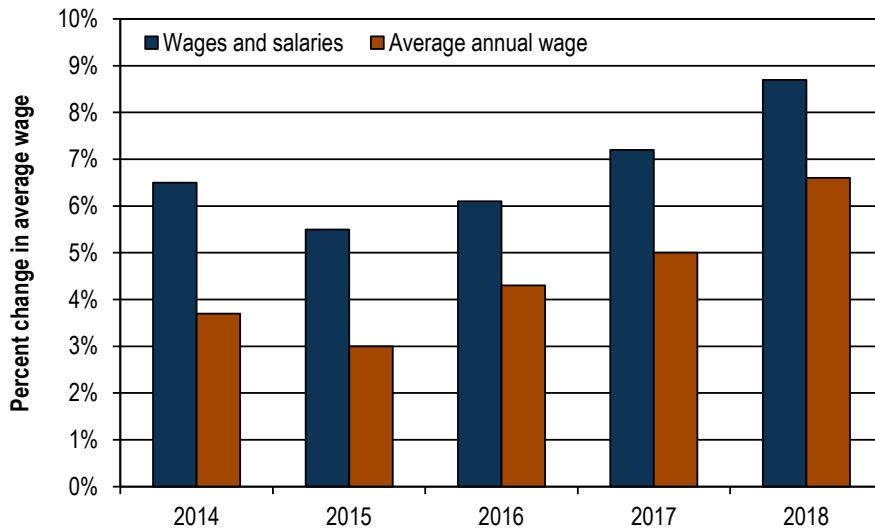
Wage growth in Washington state has increased each year since 2015.

Figure 2-4 shows on a percentage basis the manner by which nominal wages have grown by industry sector from 2017 through 2018 using QCEW data. Average annual wage growth in 2018 was 6.6 percent in Washington state and was largely supported by wage gains in retail trade and information. Retail trade contains wages earned by non-store retail employees, which have been increasing at a higher rate. Information has been growing rapidly and has contributed the most output value among Washington's industries. Average wages in the remaining industry sectors grew more slowly than the state's average wage.

The industry that paid the highest average rate in 2018, at $194,800, was the information sector. From 2017 through 2018, wages in this sector have grown by 8.2 percent. During the same time, wages within the industry with the lowest average wage in 2018, leisure and hospitality at $25,350, grew by 4.6 percent.

Figure 2-4. Percent change in average annual wage by industry
Washington state, 2017 through 2018
Source: Employment Security Department/LMEA, U.S. Bureau of Labor Statistics,
Quarterly Census of Employment and Wages
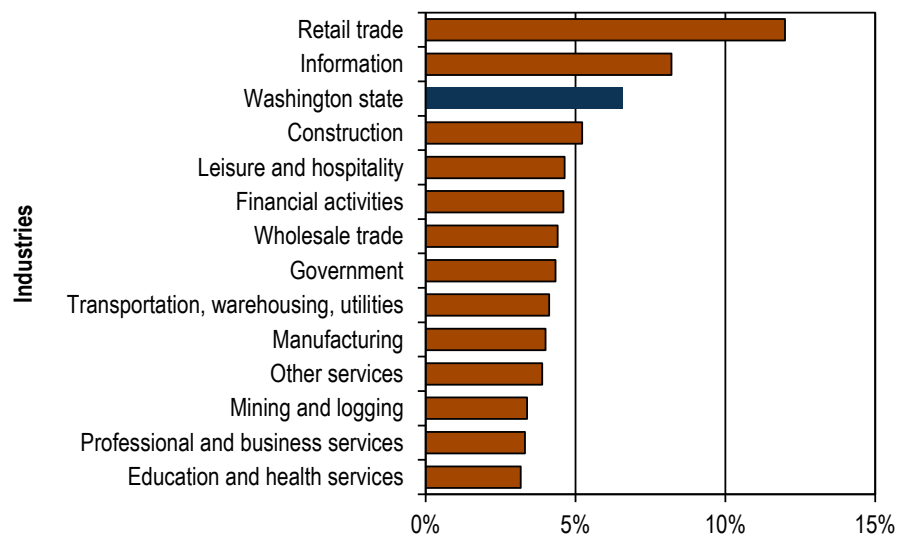
On a percentage basis, wages have grown the most in retail trade and information and the least in education and health services from 2017 to 2018.

Retail sales reach $170 billion in 2018

Income and wage growth are helping to promote greater spending on the part of Washington consumers. Local consumer spending patterns are reflected in taxable retail sales. *Figure 2-5* shows how taxable sales have risen annually from 2014 through 2018. Total spending by Washington consumers has increased each successive year. Since 2014, sales revenues have increased by $45.3 billion, an average of 8.1 percent per year. In 2018, taxable retail sales increased by $14.9 billion from 2017, which pushed total taxable retail sales to a record high of $170.2 billion.

Figure 2-5. Annual taxable retail sales, millions of dollars
Washington state, 2014 through 2018
Source: Washington State Department of Revenue
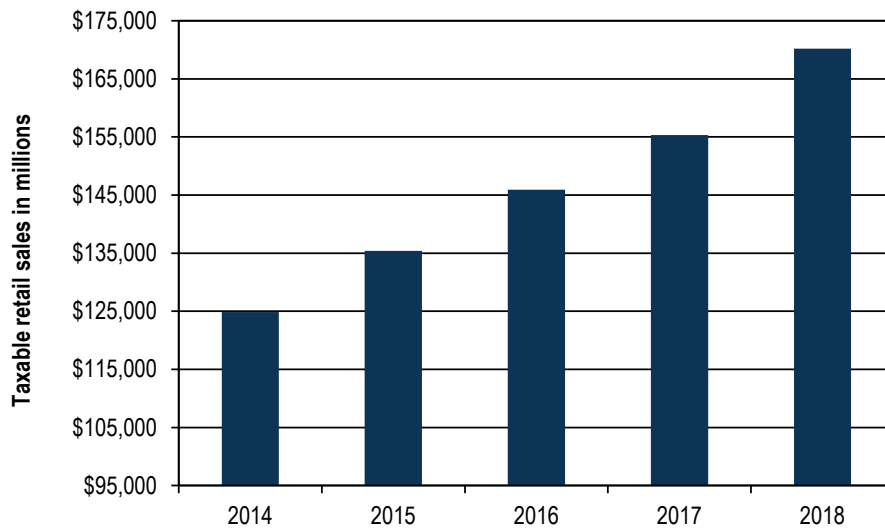
Retail sales have consistently grown during the expansion.

Figure 2-6 shows how sales were allocated among the major retail industries. Retail trade, a subset of all taxable retail sales, increased by 7.2 percent from 2017 to 2018. The retail industry with the greatest growth in sales volume in 2018 was non-store retailers. This was also the sales growth leader at the national level. This category involves online shopping outside of brick-and-mortar stores, and shows how the shopping patterns of buyers have shifted over the years away from these more traditional locations. Other categories whose sales volume grew above average included general merchandise stores and building material and garden supply stores. Sales at electronics and appliance stores grew significantly in Washington but declined at the national level. Perhaps the presence of Amazon and Costco in Washington, and the manner in which sales revenue data are gathered, account for the discrepancy between the state and national figures.

Figure 2-6. Percent change in retail sales by industry
Washington state, 2017 through 2018
Source: Washington State Department of Revenue
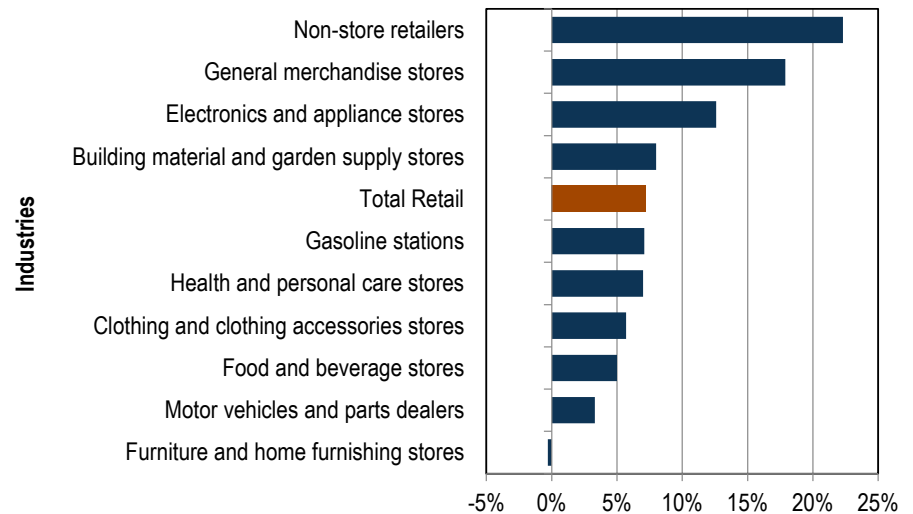
Non-store retailing sales kept growing at the fastest rate.

Washington housing starts cool as home price affordability weakens; Seattle area driving up regional home prices

Years of top-level economic growth have generated employment opportunity and have attracted job seekers from all over the country. Washington, which is the nation's 13th most populous state, has posted the sixth largest population gain since 2010. 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 and Portland, OR areas. The rapid population growth has accelerated the need for housing and pushed home prices in these areas sharply higher. Consequently, the growth has started to push more development into the central part of the state as businesses and individuals seek out less expensive and less congested locations.

Builders had been responding by moving to build more homes (*Figure 2-7*) until 2018 when the number of housing starts began to level off and then recede. Rising interest rates through that year and the higher costs of building materials pushed prices higher into 2018 and reduced buyer affordability. Demand for housing started to weaken under these conditions. Housing sales stated to decline, inventory began to rise, and housing starts moved down.

Based on the Washington House Price Index provided by the Federal Home Loan Mortgage Corporation (or Freddie Mac), the Washington state home price index surpassed its pre-recession peak in March 2016. Since then, the index had risen by 33.6 percent into and through September 2019. Home price appreciation began to slow with affordability concerns. Over the course of the year, the state's home price index in September 2019 is 3.7 percent higher than it was in September 2018. This compares with an 8.4 percent increase in the index that took place during the same period one year earlier.

Conditions affecting housing have altered course in 2019. Declining mortgage rates were given another downward push by the Fed when it cut interest rates three times during the second half of the year. Housing starts, which have only been rising at just over 2 percent annually the last two years from September to September, have shown some signs of breaking out in third quarter 2019. Starts are up 20 percent relative to third quarter 2018.

Figure 2-7. Housing price index and single-family housing starts, seasonally adjusted, December 2000 = 100
Washington state, September 2014 through September 2019
Source: Federal Home Loan Mortgage Corporation, U.S. Census Bureau
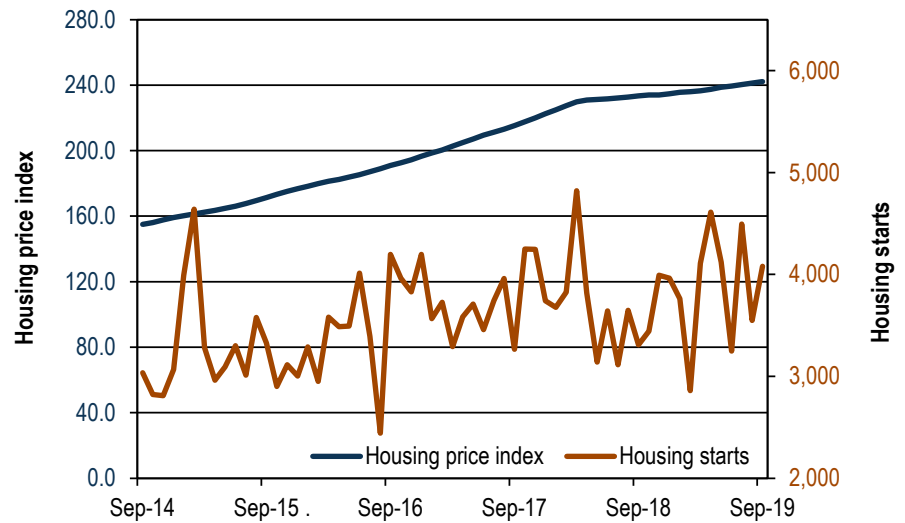
Affordability concerns appear to be impacting the demand for housing.

Residential building permits are the precursor to the start of housing projects, so it is generally expected for the level of permits to move in tandem with housing starts. Most residential activity has traditionally been aimed at construction of single-family units compared with multi-family residences (*Figure 2-8*). However, there has been a rebound in multi-family unit construction, including apartments and condominiums. Much of that shift has been driven by the expanding tech industry within the Seattle area attracting younger workers who seek to live near their employers in apartments and condominiums. Permits issued are on the rise for both categories during the second and third quarters, with renewed strength in single housing demand rising with falling interest rates, and a new high reached for multi-family permits.

Figure 2-8. Residential building permits by type of unit, three-month moving average
Washington state, third quarter 2014 through third quarter 2019
Source: U.S. Census Bureau, Building Permits Survey
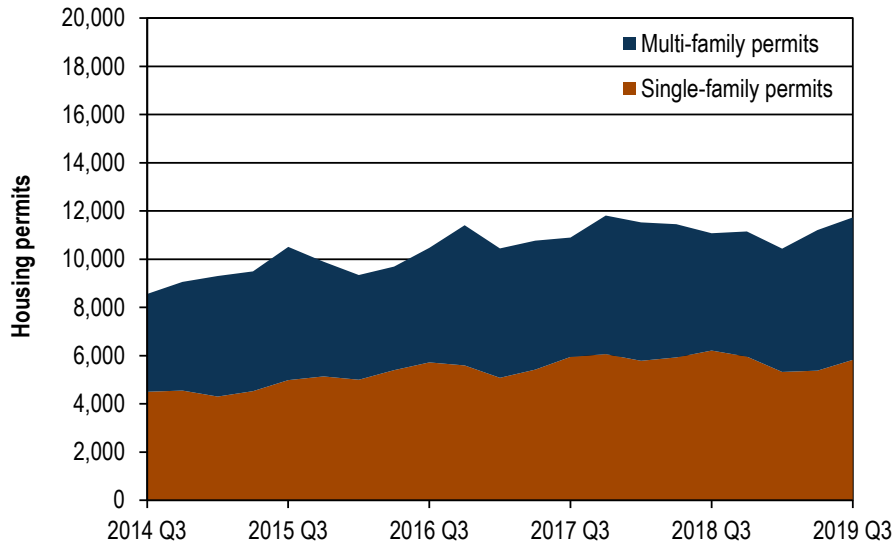
Permits to build more single-family housing units are on the rise.

Trade issues facing the state economy

Washington state tends to be one of the more trade reliant states.
Based on data furnished by the U.S. Census Bureau, net export
value accounted for about 4 percent of the state's GDP in 2018.
China has been Washington's leading export destination. It was
responsible for 20 percent of the total value of goods exported by
Washington to the world. Looking at exports to China as a percent
of state GDP, Washington has the most trade exposure of any state
at 2.8 percent. Oregon and South Carolina ranked second and third
respectively. The results are not too surprising given that all three
are home to large port complexes and host to a number of advanced
manufacturing firms. Texas leads all states exporting to China on a
dollar basis, followed by California and Washington.

The significance of these numbers, particularly for Washington,
gets diminished by the manner in which the numbers are derived.
Exports are based on the "origin of movement" which is where
goods are consolidated. The number one commodity Washington
shipped to China in 2018 were commercial airliners, whose value
made up more than 50 percent of the total value of exports to China.
Given Washington is the home to Boeing, this makes good sense.
However, the number two and three leading commodities were
corn and soybeans, very little of which are grown in Washington,
and much of which are grown in the Midwest and Plains states.

The agricultural products from the inland states are "consolidated" at a port and therefore are counted in the exports of the port state. Consequently, this has the effect of understating the export exposure of agriculturally focused states and overstating the exposure of states with ports.

U.S. agriculture and its farmers have been hit hard by retaliatory Chinese tariffs, particularly soybean farmers. As the trade dispute has escalated, China has seemingly moved back and forth between reducing their purchases of U.S. agricultural products to threatening to boycott U.S. farm products altogether. That impacts Washington state since agriculture is an important part of its economy. Washington ranked third in the nation for agricultural output in 2018. Apples and dairy products, including milk, were the state's leading agricultural commodities in 2018, accounting for 23 percent and 12 percent of total agricultural value respectively. Washington exports about one-third of its apple crop each year and represents 95 percent of American apple exports. Mexico is the leading importer of Washington apples, but China has recently ranked between fifth and sixth. About 3 percent of the state's overall sales of apples went to China and amounted to $13.5 million in 2018.

Mexico is also Washington's leading customer for milk sales. Last year in 2018, Mexico imported $1.4 billion of U.S. dairy products. China had also accounted for some portion of Washington's dairy product exports, but new orders have been dwindling. The current situation appears to be an opportunity lost for gaining inroads into China's markets. On the other hand, it would seem dairy as well as apple producers would have much to gain in the Mexican and Canadian markets if and when the USMC (United States Mexico Canada) trade agreement gets ratified.

Two other important Washington farm commodities that are exported are wheat and cherries. Wheat ranks third in total Washington farm receipts, accounting for over 8 percent of total farm value. Wheat exports amounted to $476.8 billion in 2018. China was the fifth largest recipient of exported wheat, but has been an inconsistent customer. About 75 percent of the exported wheat goes to Asia with the Philippines being the leading buyer. Washington's wheat growers have not done any business with China since 2018 and have been looking to other buyers to pick up the slack.

Washington's cherry farmers have also looked for China to be a market for their exports. China has typically accounted for about half of their exports abroad, or 10 percent of the total market. Since the fruit is highly perishable, however, 80 percent of Washington's cherry market is domestic. This makes the loss of or reduced access to Chinese markets important but not critical.

Employment has grown but gains could be slowing

Figure 2-9 shows the monthly change in nonfarm employment in the state over the last two years from September to September. Employment over the course of 2019 has grown on a par with the growth that occurred in 2018. Growth at the beginning of the year stayed strong but hit a snag in February due to snow problems that occurred. March was a strong rebound month. Since then, the pattern of employment gains have been similar to what occurred in 2018. The state lost jobs in September 2019, but then again, it also lost jobs in September 2018. Recent data and anecdotal evidence presented in this report suggest the September 2019 employment decline might be more than just a seasonal fluke. It is more likely that employment growth will decline during fourth quarter 2019 relative to 2018 as a result of headwinds facing the state and national economies. Annual benchmarking will be conducted at the beginning of next year by the U.S. Bureau of Labor Statistics and Washington state, which should provide a good measure with which to test this hypothesis.

Figure 2-9. Monthly employment change and three-month moving average, seasonally adjusted
Washington state, September 2017 through September 2019
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Current Employment Statistics
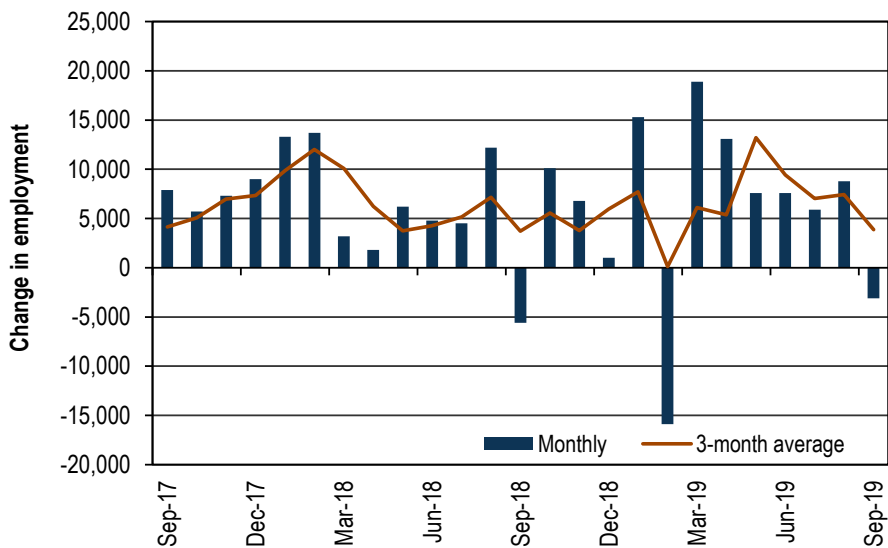
Employment has grown to new heights since the last recession.

Total nonfarm payroll employment expanded by 2.2 percent over the past 12 months ending in September 2019, with gains occurring in every major nonfarm industry but one (*Figure 2-10*). Information employment grew by the largest percentage, a testimony to the large tech presence primarily in the Seattle area. With annual employment growth of 6.9 percent in 2018, the state's information sector starkly contrasts with the national figure showing information employment little changed.

Figure 2-10. Percent change in nonfarm employment by industry sector
Washington state, September 2018 through September 2019
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Current Employment Statistics
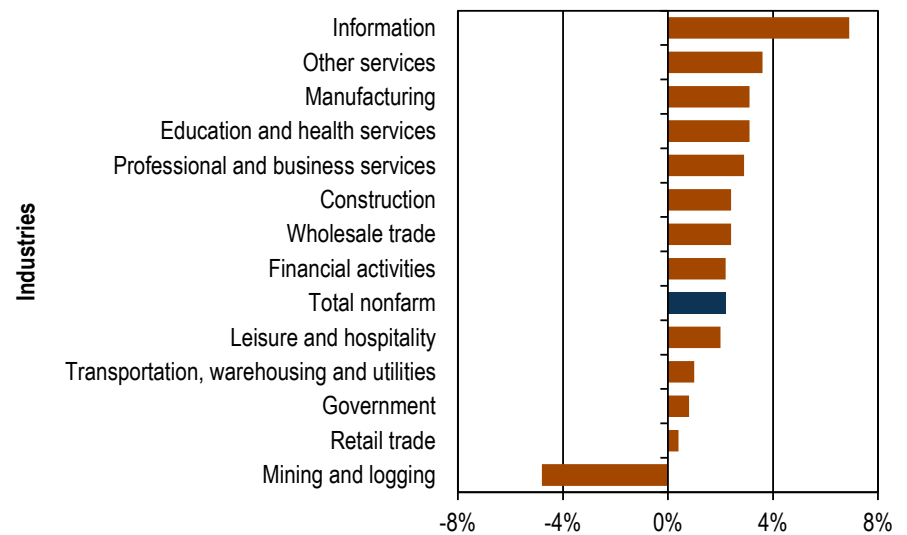
Employment increased in every major industry sector but one over the last year.

Seven of the thirteen industrial sectors showed employment growth above the state average. The financial activities sector grew at about the state average. Other sectors showing strong growth besides information included other services, manufacturing, the health services component of education and health services, and professional and business services. Manufacturing employment has been expanding throughout the year, thus far shrugging off the effects of trade and Boeing-related issues. Those issues appear to be manifesting more within transportation and warehousing where employment growth has been below average. Retail trade employment growth has been weak, as it has been throughout the nation. Mining and logging employment has declined due to weaker commodity prices.

The greatest numbers of jobs added occurred within health services and the professional and business services sectors. These sectors added 13,900 and 13,800 jobs respectively. Employment growth in mining and logging, which employs the fewest number of workers of the major industry sectors, saw its payroll numbers decline by 300 over the course of the year.

National, state and local unemployment rates remain low

Washington state's unemployment rate has tracked fairly close to the national unemployment rate for much of the expansion but has begun to deviate during the last few years (*Figure 2-11*). Part of the reason has to do with the higher rate of labor force growth in Washington compared with the nation as a whole. From September 2016 to September 2019, Washington's labor force has expanded at an average rate of 2.3 percent compared to just under 1 percent for the nation. Still, the rate of job growth in the state has been sufficient to reduce the unemployment rate from 5.1 percent to 4.6 percent during that time. The state unemployment rate has stopped falling and has been leveling off since reaching a series low of 4.4 percent in 2018.

The Seattle Metropolitan Division (MD) saw its unemployment rate fall from 3.9 percent in September 2016 to 3 percent in September 2019. Effective with the release of metropolitan area data for May 2011, the BLS program began to publish seasonally adjusted civilian labor force and unemployment estimates for all metropolitan areas and metropolitan divisions. The estimates range from January 1990 forward. The Seattle area September 2019 unemployment rate is currently at an historical low based on this series.

The unemployment rate for the U.S. dropped to 3.5 percent in September 2019, marking a 50-year low. At this point in the economic expansion, the unemployment rates for the state and nation are essentially bumping the bottom. Labor market conditions have tightened, and it is debatable how much more excess labor may be available to enter the job market. Hiring is expected to slow in 2020, but with fewer workers available, the unemployment rates might remain stable. If trade issues remain on their current path of uncertainty or worsen in 2020, the problems created might become visible in the labor market in the form of rising unemployment rates.

Figure 2-11. Monthly seasonally adjusted unemployment rates
United States, Washington state and Seattle MD, September 2011 through September 2019
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Local
Area Unemployment Statistics
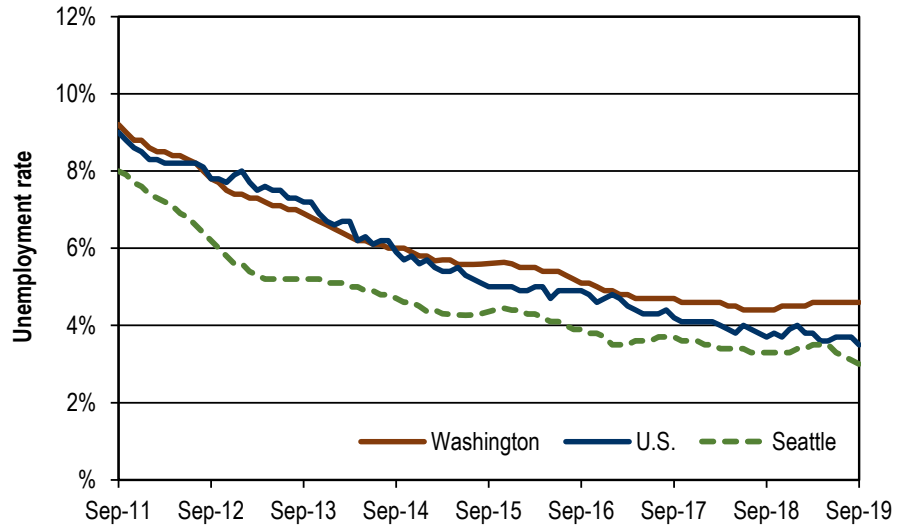
*The Washington state unemployment rate is still near its record low and is slightly above
the national rate, while the Seattle area unemployment rate has reached its record low.*

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 are important for both a better understanding of current employment trends and for practical applications such as job placement, unemployment insurance and training programs. Annually, for instance, industries with high levels of seasonality experience significant variation in monthly employment. With this monthly variation, short-term high job demand follows upon employment declines. For industries with high cyclical variation, periods of booming employment can be followed by periods of decline. Training programs should be developed in anticipation of such variation.

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

Our analysis is based on historical employment data from January 1990 through December 2018.[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.

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[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 with some 4-digit level detail (aerospace product and parts manufacturing, ship and boat building, software publishers and wired and wireless telecommunications carriers). Private and public education services employment data were combined under the education and health services industry category. Private and public employment data were also combined under the postal services and ship and boat-building industries. The remainder of public-sector employment was aggregated and categorized by ownership (federal, state and local government). Three industries were excluded from the analysis due to data limitations and/or significant code changes: oil and gas extraction, rail transportation and internet publishing and broadcasting. Altogether, the historical time series data included 97 industries and one series for total employment.

3. **Cyclical**: employment changes 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).

Seasonal industries

The analysis this year showed that of 97 industries in Washington state, 18 have high levels of seasonality with a seasonal factor[3] over 4 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, 1990 to 2018
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Seasonal factor
111	Crop production	36.3%
487	Scenic and sightseeing transportation	18.6%
115	Support activities for agriculture and forestry	15.4%
711	Performing arts, spectator sports, and related industries	9.2%
213	Support activities for mining	8.7%
237	Heavy and civil engineering construction	8.6%
114	Fishing, hunting and trapping	7.8%
814	Private households	6.5%
525	Funds, trusts and other financial vehicles	5.7%
721	Accommodation	5.7%
611	Educational services	4.8%
311	Food manufacturing	4.8%
492	Couriers and messengers	4.7%
312	Beverage and tobacco product manufacturing	4.6%
713	Amusement, gambling and recreation industries	4.6%
448	Clothing and clothing accessories stores	4.5%
512	Motion picture and sound recording industries	4.3%
316	Leather and allied product manufacturing	4.2%

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.

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

Structural and cyclical industries

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

For total covered employment, the trend component accounts for 78.4 percent of total employment changes (*Appendix figure A2-2*). There were 24 industries where the structural (trend) component accounted for at least two thirds of the change in employment (*Figure 3-2*). Ambulatory healthcare services, food services and drinking places, software publishers and educational services 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, 1990 to 2018
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	85.4%
722	Food services and drinking places	79.6%
5112	Software publishers	79.0%
611	Educational services	78.6%
453	Miscellaneous store retailers	77.6%
622	Hospitals	75.3%
312	Beverage and tobacco product manufacturing	75.0%
238	Specialty trade contractors	73.8%
532	Rental and leasing services	73.7%
812	Personal and laundry services	73.4%
903	Local government (other)	73.4%
531	Real estate	72.1%
425	Wholesale electronic markets and agents and brokers	71.6%
236	Construction of buildings	71.5%
541	Professional, scientific and technical services	70.1%
454	Nonstore retailers	70.1%
519	Other information services	69.7%
623	Nursing and residential care facilities	69.4%

NAICS	Industry	Structural factor
813	Religious, grantmaking, civic, professional and similar orgs.	68.7%
481	Air transportation	68.5%
423	Merchant wholesalers, durable goods	68.1%
511*	Other publishers	67.9%
444	Building material and garden equip. and supplies dealers	67.6%
441	Motor vehicle and parts dealers	67.2%

* Wild card symbol indicates the component of an economic subsector (3-digit NAICS) without the component of its industry groups (4-digit NAICS) that are listed separately in this figure.

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

For 16 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 accounts for 21.6 percent of total employment change. Scenic and sightseeing transportation, crop production and support activities for mining, 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, 1990 to 2018
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Cyclical factor
487	Scenic and sightseeing transportation	65.7%
111	Crop production	64.6%
213	Support activities for mining	60.1%
486	Pipeline transportation	59.4%
324	Petroleum and coal products manufacturing	58.1%
316	Leather and allied product manufacturing	57.8%
313	Textile mills	55.1%
446	Health and personal care stores	54.1%
515	Broadcasting (except Internet)	53.4%
443	Electronics and appliance stores	53.1%
112	Animal production	53.0%
521	Monetary authorities-Central Bank	51.7%
512	Motion picture and sound recording industries	51.2%
114	Fishing, hunting and trapping	50.7%
901	Federal government (other)	50.5%
221	Utilities	50.3%

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 figure A2-2* and *Appendix figure 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 two important indicators of Washington's labor market: unemployment benefits and unemployment rates.

Unemployment benefits

In September 2019, more than 42,593 people received unemployment benefits. *Figure 4-1* shows the number of monthly beneficiaries in Washington state from 2015 through September of 2019 that received at least one payment of Unemployment Insurance benefits. The number of beneficiaries in 2019 has been increasing modestly, with the number of claimants in September 2019 up 4 percent as compared to the same month one year ago. The increase in beneficiaries reflects factors including: individual beneficiaries not finding jobs and more people being laid off and needing to apply for benefits.

Figure 4-1. Unemployment benefit recipients by month, all benefits[4]
Washington state, January 2015 through September 2019
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
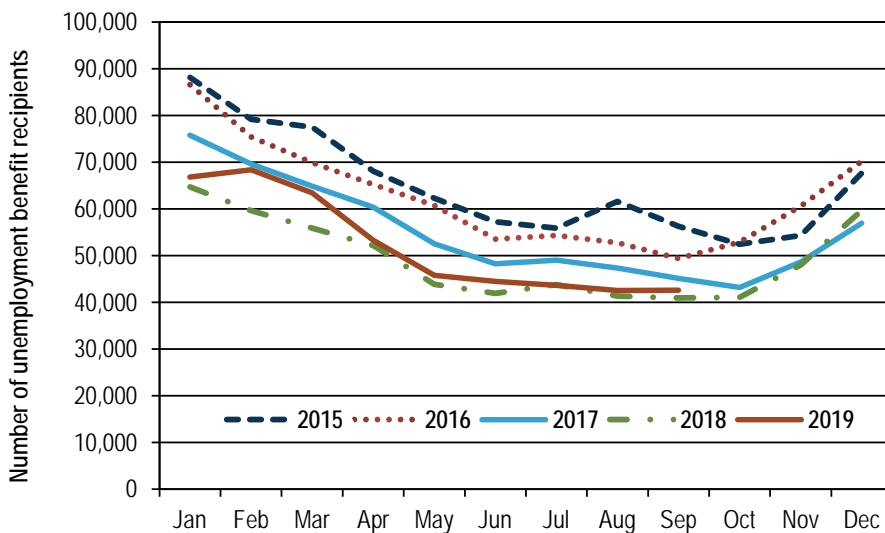
The number of Washingtonians receiving unemployment benefits in 2019 through September 2019 rose modestly as compared to 2018, but below the level of claims filed between 2015 and 2017.

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[4] All benefit programs include regular, emergency unemployment compensation (EUC) 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 unusually steep loss of jobs during the Great Recession, additional weeks of federally funded unemployment benefits were made available to unemployed workers after they used all of their regular unemployment benefits. At one point, claimants could receive up to a total of 99 weeks of benefits – 26 weeks of regular benefits, 53 weeks of emergency unemployment compensation (EUC) benefits and 20 weeks of extended benefits (EB). Federal extensions have been phased out during the recovery. Since 2013, claimants could receive up to 26 weeks of state benefits.

The impact of these additional weeks of benefits is evident in the average duration (number of weeks) of benefits received. *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*, including the EUC and EB.

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 2019, 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 2019.[5]

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[5]   Federal extensions have been phased out during the recovery. Since 2013, claimants could receive up to 26 weeks of state benefits.

Figure 4-2. Average duration of regular unemployment benefits compared to all benefits
Washington state, January 2000 through September 2019
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
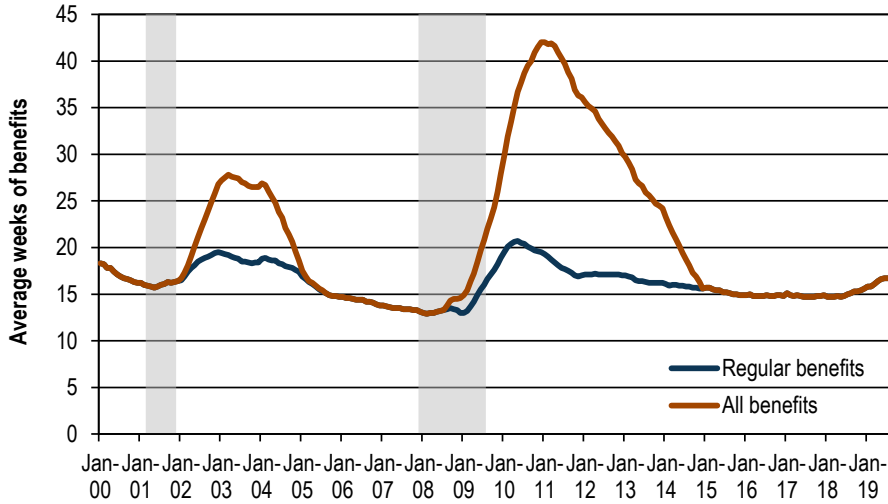
Shaded areas are U.S. recession periods.

The number of weeks claimants received benefits has decreased from the post-recession peak.

Benefit exhaustions continue to decline

Unemployed individuals exhaust their benefits when they have received all regular, EUC and EB available to them. In calendar 2019, only regular benefit entitlements were available. *Figure 4-3* shows the monthly exhaustions for Washington unemployment benefits. The level of exhaustions have continued to decline since May 2010 when 15,227 individuals exhausted their benefits. By September 2019, 3,091 people had used all of their available unemployment benefits.

Figure 4-3. Number of people exhausting all unemployment benefits
Washington state, January 2010 through September 2019
Source: Employment Security Department/LMEA, Unemployment Insurance Data
Warehouse
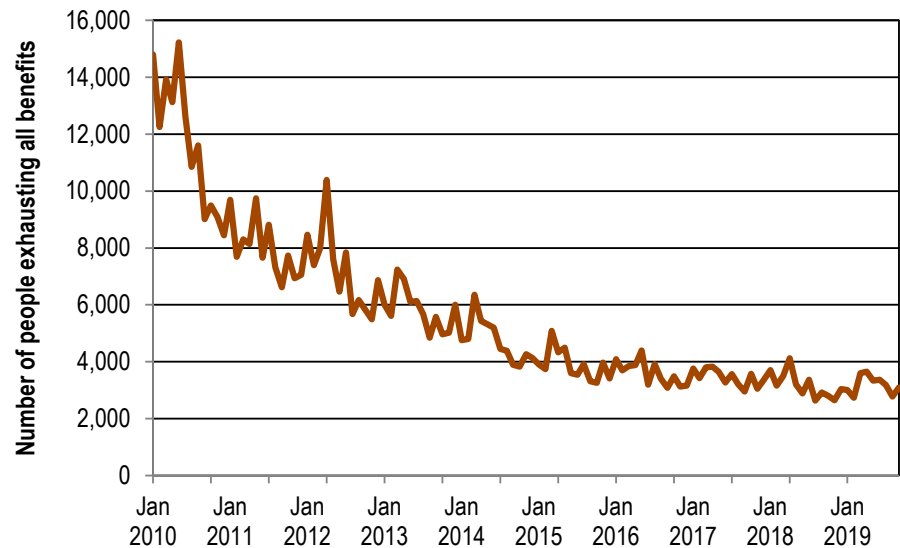
In September 2019, 3,091 people exhausted all of their unemployment benefits.

Benefit exhaustions by industry, occupation and area

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

Exhaustions by industry

Figure 4-4 presents exhaustions by industry for the 12 months ending in September 2019. 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. The larger the exhaustion-to-employment ratio, the more likely workers were to exhaust.

From October 2018 through September 2019, workers in the mining industry were most likely to exhaust unemployment benefits with an exhaustion-to-employment ratio of 3.7. Construction and agriculture, forestry, fishing and hunting followed as second and third most likely to exhaust (2.5 and 1.9, respectively).

The manufacturing and construction industries accounted for the greatest portion of exhaustions at 22.3 percent. The manufacturing and construction industry's share of total covered employment was 8.4 percent and 5.9 percent, respectively; the exhaustion-to-employment ratio was 1.3 and 2.5, respectively. Healthcare and social assistance represented 8.4 percent of exhaustions.

Figure 4-4. Unemployment benefit exhaustions by industry, all benefits
Washington state, October 2018 through September 2019
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse; U.S. Bureau of Labor Statistics, Current Employment Statistics

NAICS	Industry sector	Annual exhaustions, all types of benefits	Percent of all exhaustions	Industry share of nonfarm employment	Exhaustions-to-employment ratio
23	Construction	4,955	12.9%	5.9%	2.5
31 - 33	Manufacturing	3,597	9.4%	8.4%	1.3
44 - 45	Trade	3,249	8.5%	11.3%	0.9
56	Administrative and support and waste management and remediation services	3,244	8.4%	5.0%	1.9
62	Healthcare and social assistance	3,213	8.4%	12.5%	0.8
54	Professional, scientific and technical services	2,953	7.7%	6.0%	1.5
11	Agriculture, forestry, fishing and hunting	2,187	5.7%	3.2%	2.0
42	Wholesale trade	1,962	5.1%	4.0%	1.5
72	Accommodation and food services	1,654	4.3%	8.4%	0.6
51	Information	1,403	3.7%	3.9%	1.1
52	Finance and insurance	1,241	3.2%	2.8%	1.3
48 - 49	Transportation and warehousing	1,150	3.0%	3.1%	1.1
81	Other Services	980	2.6%	2.9%	1.0
GOV	Government	948	2.5%	16.6%	0.2
61	Educational services	798	2.1%	1.3%	1.8
53	Real estate, rental and leasing	789	2.1%	1.6%	1.5
71	Arts, entertainment and recreation	529	1.4%	1.6%	1.0
55	Management of companies and enterprises	103	0.3%	1.3%	0.2
21	Mining	94	0.2%	0.1%	3.7
22	Utilities	74	0.2%	0.1%	1.5
	Unknown	3,280	8.5%	N/A	N/A
	Total	**38,403**	**4.1%**	**100.0%**	

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.

Mining and Construction workers were most likely to exhaust unemployment benefits from October 2018 through September 2019 (3.7 and 2.5) exhaustion-to-employment ratio, respectively.

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, all benefits
Washington state, October 2018 through September 2019
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse

SOC	Major occupational group	Annual exhaustions, all types of benefits	Percent of all exhaustions
11	Management	6,558	17.1%
47	Construction and extraction	5,033	13.1%
43	Office and administrative support	4,381	11.4%
51	Production	2,671	7.0%
41	Sales and related	2,296	6.0%
53	Transportation and material moving	2,029	5.3%
45	Farming, fishing and forestry	1,955	5.1%
15	Computer and mathematical	1,818	4.7%
13	Business and financial operations	1,790	4.7%
35	Food preparation and serving related	1,321	3.4%
49	Installation, maintenance and repair	1,320	3.4%
37	Building and grounds cleaning and maintenance	903	2.4%
31	Healthcare support	867	2.3%
27	Arts, design, entertainment, sports and media	775	2.0%
17	Architecture and engineering	753	2.0%
39	Personal care and service	692	1.8%
29	Healthcare practitioners and technical	632	1.6%
33	Protective service	556	1.4%
19	Life, physical and social science	456	1.2%
21	Community and social services	396	1.0%
25	Education, training and library	396	1.0%
23	Legal	210	0.5%
55	Military specific	165	0.4%
	Unknown	430	1.1%
	Total	**38,403**	**100.0%**

Unemployed workers in management, construction and extraction, and office and administrative support occupations accounted for 41.6 percent of all individuals to exhaust unemployment benefits from October 2018 through September 2019.

Exhaustions by workforce development area

Figure 4-6 presents exhaustions by workforce development area (WDA) for October 2018 through September 2019. To provide further context, the figure also includes each industry's percent of total nonfarm employment[6] and exhaustion-to-employment ratio. The exhaustion-to-employment ratio can be used to identify areas characterized by long-term unemployment and that continue to struggle in their recovery after the last recession. The larger the exhaustion-to-employment ratio, the more likely workers were to exhaust.

From October 2018 through September 2019, workers in the South Central Washington WDA were most likely to exhaust unemployment benefits with an exhaustion-to-employment ratio of 1.9. Pierce County and North Central was next most likely to exhaust (1.4).

Seattle-King County and Pierce County accounted for more than one-third of exhaustions at 23.2 and 11.4 percent, respectively. Seattle-King County and Pierce County's share of total covered employment was 41.5 percent and 9.3 percent, respectively; the exhaustion-to-employment ratio was 0.6 and 1.4, respectively.

Seattle-King County accounted for the largest share of exhaustions and employment but was least likely to exhaust based on the exhaustion-to-employment ratio (0.6).

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

Figure 4-6. Unemployment benefit exhaustions by workforce development area, all benefits
Washington state, October 2018 through September 2019
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, all types of benefits	Percent of exhaustions	2018 industry share of nonfarm employment	Exhaustions to employment ratio
Seattle-King County	8,903	23.2%	41.5%	0.6
Out of state	4,718	12.3%	N/A	N/A
Pierce County	4,369	11.4%	9.3%	1.4
Snohomish County	3,214	8.4%	8.6%	1.1
Pacific Mountain	2,497	6.5%	5.6%	1.3
Spokane County	2,507	6.5%	6.7%	1.1
South Central WA	2,664	6.9%	4.2%	1.9
Southwest WA	2,258	5.9%	6.0%	1.1
Northwest WA	1,784	4.6%	4.9%	1.1
North Central WA	1,728	4.5%	3.7%	1.4
Benton-Franklin	1,588	4.1%	3.7%	1.3
Olympic	1,386	3.6%	3.6%	1.1
Eastern WA	787	2.0%	2.2%	1.1
Total	**38,403**	**100.0%**	**100.0%**	

Seattle-King County accounted for the largest share of exhaustions and employment but was least likely to exhaust based on the exhaustion-to-employment ratio (0.6).

Unemployment rate

The overall unemployment rate is a ratio of the estimated number of unemployed individuals looking for work divided by the civilian labor force. The labor force is made up of individuals who are employed or who are actively seeking work. This is the most familiar unemployment rate and includes both workers covered by unemployment insurance and those who are not.[7]

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

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[7] 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.

Figure 4-7 compares the overall and insured unemployment rates for Washington. The rates have basically moved in tandem, with the insured rate historically about half the overall unemployment rate. In late 2008, both measures of unemployment began a dramatic rise, with rates peaking during the first quarter 2010. However, since early 2009, the gap between the overall and insured unemployment rates widened. This means there were increasing numbers of unemployed workers not 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 2019
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics
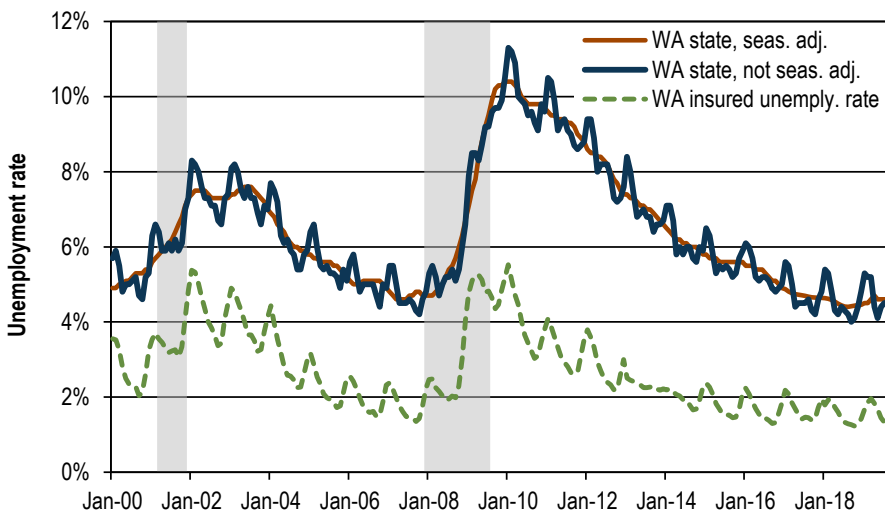
Shaded areas are U.S. recession periods.

The gap between unemployed workers who are eligible for unemployment benefits and those who are not widened following the recent recessions, but have since narrowed to pre-recession levels.

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 first quarter 2010. 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 before rising above the nation in September 2014 at 6 percent. For 2017 through September of 2019, the state remained above the national rate. By September 2019, the state and national rates were at 4.6 and 3.5 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. From July 2012 through September 2019, the unemployment rate for the Seattle MD declined by 3.6 percentage points. For comparison, the balance of the state declined by 3.6 percentage points over the same period. The national rate dropped by 4.7 percentage points.

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
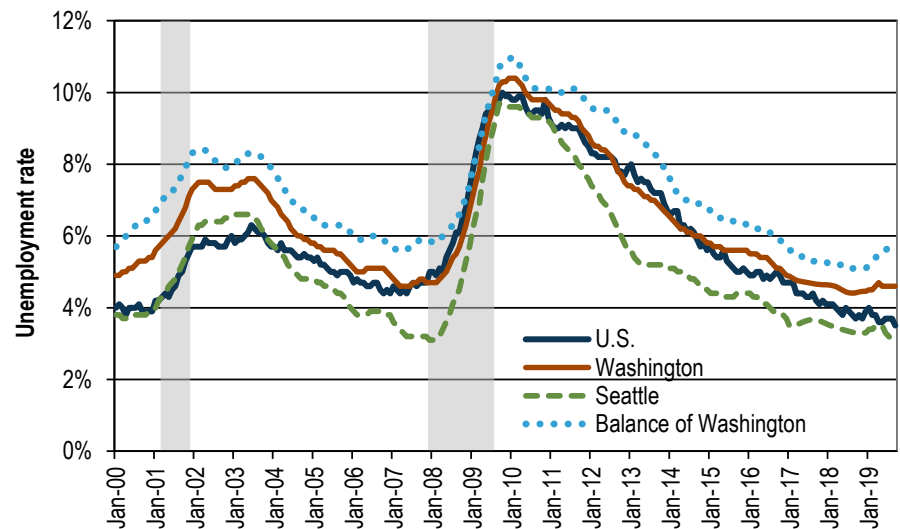
Shaded areas are U.S. recession periods.

National and state unemployment rates tracked closely during the recent recession. From July 2012 through September 2019, the Seattle unemployment rate declined more rapidly than the Washington state unemployment rate.

Other measures of unemployment

Other measures of unemployment include alternative unemployment rates and the labor force participation rate.

Alternative unemployment rates

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

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

In response to criticism, the BLS has made available alternative measurements that are progressively more inclusive than the commonly reported unemployment rate. The standard measurement (U-3), along with three 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-5 – Unemployed plus discouraged workers, as a percent of the labor force plus discouraged workers, plus all other marginally attached workers, as a percent of the civilian labor force plus all marginally attached 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 recent 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 fourth quarter 2011 through third quarter 2012, the Washington state rate decreased to 9.1 percent while the nation's rate decreased to 8.8 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 fourth quarter 2018 through the third quarter 2019, is now 5 percent and the U.S. rate is 4 percent.

Figure 4-9. U-4 unemployment rate (includes discouraged workers), four-quarter moving average
United States and Washington state, third quarter 2009 through third quarter 2019
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics
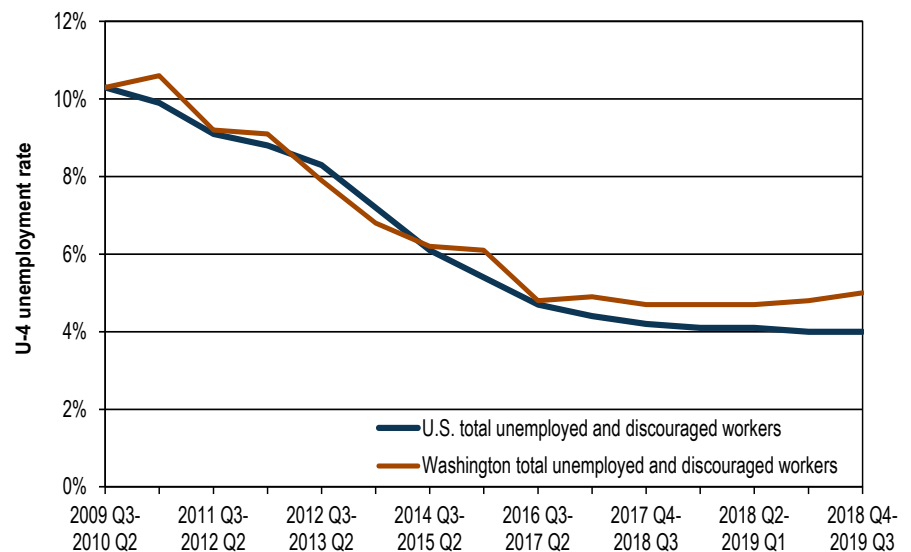
The U-4 measure of unemployment has been declining throughout the recovery. As of September 2019, Washington's U-4 rate is currently 5 percent and the U.S. is at 4 percent.

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 the majority of underutilized workers are in the employed part time for economic reasons category. Washington's U-6 four-quarter moving average remained higher than the nation's from second quarter 2009 until fourth quarter 2013. Most recently, Washington's U-6 rate remains 0.80 percentage points above the national rolling average from fourth quarter 2018 through third quarter 2019.

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 third quarter 2019
Source: U.S. Bureau of Labor Statistics, Current Population Survey, Local Area Unemployment Statistics
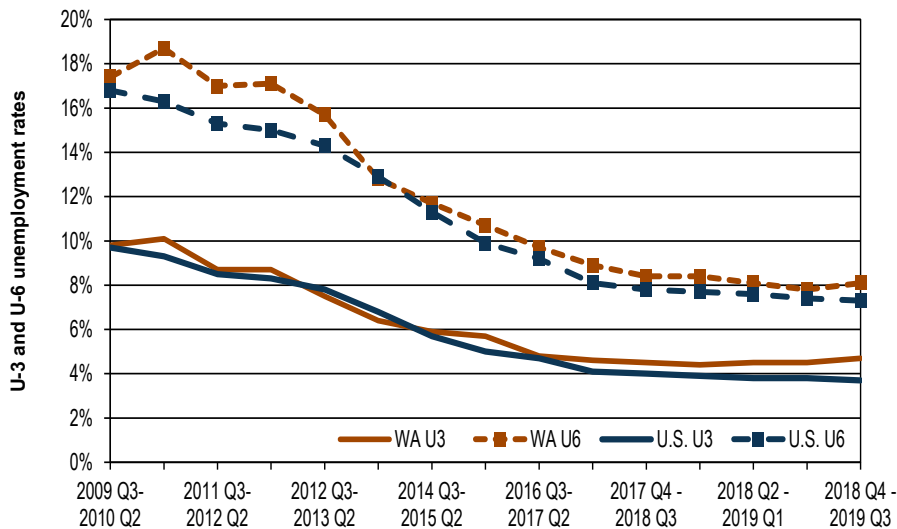
The most broadly defined U-6 measure of unemployment for Washington remains above the national rolling average.

Chapter 5: Employment projections

About the employment, industry and occupational projections

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

On an annual basis, the Employment Security Department (ESD) produces industry employment projections for two, five, and 10 years from a base period. For this annual report, the base period for the two-year (short-term) projections is second quarter 2018. The base period for the five-year (medium-term) and 10-year (long-term) projections is 2017.

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

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

Data sets used to develop projections

The following data sets are used to produce projections:

1. Historical employment time series, consisting of U.S. Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW) data.

2. Employment not covered by the unemployment insurance system from the U.S. Bureau of Labor Statistics' Current Employment Statistics (CES) program.

3. Occupational employment by industries (staffing patterns) based on an OES survey.

4. National data for self-employed ratios, change factors, etc.

5. Independent variables (predictive indicators), which help to project the future direction of the economy, from IHS Global Insight's national forecast.

Use of employment projections

Employment projections are used to identify in-demand industries and occupations for career guidance to plan employment, education and training, and economic development programs, and as supporting documentation to apply for federal grants. Employment projections are not used as the basis for budget or revenue projections, or for immediate corrective actions within the labor market.

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

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

This chapter highlights findings on specific aspects of Washington's employment outlook. In the first section, industry projections results, we describe changes in employment by industry from 2017 to 2027. In the next section, occupational projections results, we look at::

- Major occupational groups
- Specific occupations

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

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

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

Key findings

The 10-year average annual growth rate for total nonfarm employment for the 2017 to 2027 period is projected to be 1.51 percent. This is a decrease from the 1.59 percent average annual growth rate predicted last year for 2016 to 2026.[8]

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[9] See: "*2018 Employment Projections*," Washington State Employment Security Department, Workforce Information and Technology Services, *Figure 2*, page 6. Also, please note that all tables contain values that are calculated and then rounded. As a result, details might not always add up to totals.

Industry projections

- The largest increase by share of employment is projected for the information sector.

- The largest decreases by shares of employment are projected for the natural resources and mining 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 production occupations.

- The largest employment shares in 2027, 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 does 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 both methods, the combined food preparation and serving workers, including fast food occupations, are projected to have the largest number of average annual total openings.

- Last year, in only one *separations'* occupation, chiropractors, growth openings exceeded turnover openings. However, this year for both *separations* and *alternative* occupations, no growth openings exceeded turnover openings.

- Totals of job openings caused by *alternative* turnover are about 23 times greater than openings due to growth, while totals of job openings caused by *separations* turnover are about eight times greater than openings due to growth.

2019 industry projections results

Figure 5-1 presents 2017 estimated employment, 2017, 2022 and 2027 employment shares, and changes in employment shares from 2017 to 2022, 2022 to 2027 and 2017 to 2027 by industry for Washington state.

Through 2027, the three industry sectors with the largest increases in employment shares are projected to be professional and business services, health services and social assistance and information.[9]

For this same time period, the industry sector with the largest decrease in employment shares is manufacturing. The second and third largest decreases are retail trade and state and local government (including education).

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

Figure 5-1. Base and projected nonfarm industry employment
Washington state, 2017, 2022 and 2027
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Industry sector*	WA state est. empl. 2017	WA state est. empl. shares 2017	WA state proj. empl. shares 2022	WA state proj. empl. shares 2027	WA state percentage point change in empl. shares 2017-2022	WA state percentage point change in empl. shares 2022-2027	WA state percentage point change in empl. shares 2017-2027
Natural resources and mining	6,200	0.19%	0.17%	0.16%	-0.02%	-0.01%	-0.03%
Construction	199,700	6.02%	6.31%	6.12%	0.30%	-0.20%	0.10%
Manufacturing	283,700	8.55%	8.01%	7.58%	-0.54%	-0.42%	-0.97%
Wholesale trade	134,400	4.05%	3.89%	3.76%	-0.16%	-0.13%	-0.29%
Retail trade	384,400	11.58%	11.16%	11.02%	-0.42%	-0.14%	-0.56%
Utilities	4,800	0.14%	0.14%	0.13%	0.00%	-0.01%	-0.01%
Transportation and warehousing	102,000	3.07%	3.24%	3.29%	0.17%	0.04%	0.21%
Information	126,300	3.81%	4.16%	4.48%	0.36%	0.31%	0.67%
Financial activities	152,800	4.60%	4.52%	4.40%	-0.09%	-0.12%	-0.21%
Professional and business svcs.	414,400	12.49%	12.85%	13.25%	0.36%	0.40%	0.76%
Education services	59,900	1.80%	1.86%	1.93%	0.06%	0.07%	0.13%
Health services and social assist.	414,500	12.49%	12.81%	13.25%	0.32%	0.45%	0.76%
Leisure and hospitality	331,300	9.98%	10.19%	10.16%	0.20%	-0.03%	0.18%
Other services	120,200	3.62%	3.58%	3.58%	-0.05%	0.00%	-0.05%
Federal government	74,800	2.25%	2.07%	1.96%	-0.18%	-0.12%	-0.30%
State and local gov. (incl. educ.)	509,200	15.34%	15.03%	14.94%	-0.31%	-0.10%	-0.41%

*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.

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 2017-2027 column.

Four of the 12 WDAs have projected growth rates greater than the previous 10 years' growth, and eight have projected growth less than the previous 10 years' growth. Seattle-King County has the highest projected growth rate of 1.83 percent with Statewide coming in second at 1.51 percent. The statewide projected growth rate is 0.19 percentage points less than the historical growth rate.

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

As was the case last year, the largest positive difference between historical growth rates and projected growth rates is in the Olympic WDA. For this area, the difference between the historical and projected rates is 0.43 percentage points. Spokane came in second place with a positive increase of 0.36 percentage points.

Even though Benton-Franklin has the largest negative difference between projected and historical rates, of all WDAs and the state, it has the fifth highest projected growth rate of 1.36 percent.

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

Figure 5-2. Historical and projected total nonfarm employment growth
Washington state and workforce development areas, 1990 to 2017 and 2017 to 2027
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] 2007-2017	Projected growth rate 2017-2027	Historical trend line growth rate[3] 1990-2017
Seattle-King County	2.01%	1.83%	1.30%
Statewide	**1.70%**	**1.51%**	**1.48%**
Pierce County	1.58%	1.40%	1.73%
Southwest Washington	1.86%	1.39%	1.80%
Benton-Franklin	2.75%	1.36%	2.28%
Northwest	1.12%	1.35%	1.76%
Pacific Mountain	1.17%	1.34%	1.31%
Spokane	0.93%	1.28%	1.27%
North Central	1.60%	1.27%	1.38%
Snohomish County	1.68%	1.14%	2.15%
Olympic Consortium	0.68%	1.11%	1.12%
South Central	1.36%	1.10%	0.88%
Eastern Washington	1.18%	0.82%	0.99%

[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.

Eight of the 12 WDAs have projected growth less than the previous 10 years' growth.

2019 occupational projections results

The number of publishable occupations varies from year to year due to survey, reporting and statistical processing. This year the detailed state level occupational projections cover 794 occupations, 782 which are publishable. In addition, at the state level, twelve occupations were suppressed due to confidentiality or due to one of the employment estimations being less than 10. This publication however, provides only a summary of the top occupations. For a complete list of occupations and projected employment, see the 2019 Employment Projections data files available at: **https://esd.wa.gov/labormarketinfo/projections**.

Major occupational groups

Figure 5-3 shows occupational 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 2017 to 2027. Computer and mathematical occupations are projected to increase employment shares by 0.71 percentage points. The next highest increase in shares is projected for personal care and service occupations, with an increase of 0.28 percentage points.

The three largest decreases in employment shares at the state level are: sales and related occupations, 0.52 percentage points, production occupations, 0.49 percentage points and office and administrative support, 0.38 percentage points.

By 2027, the top three state occupational groups for shares of employment are projected to be:

1. Office and administrative support occupations (11.61 percent)

2. Sales and related occupations (8.88 percent)

3. Food preparation and serving related occupations (7.99 percent)

By 2027, combined, these three major groups are projected to represent nearly 28.48 percent of total employment shares for the state.

Figure 5-3. Base and projected occupational employment
Washington state, 2017 to 2027
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	WA state est. empl. 2017	WA state est. empl. shares 2017	WA state proj. empl. shares 2022	WA state proj. empl. shares 2027	WA state percentage point change in empl. shares 2017-2022	WA state percentage point change in empl. shares 2022-2027
11-0000	Management	224,350	5.95%	6.07%	6.21%	0.12%	0.13%
13-0000	Business and financial operations	241,139	6.40%	6.48%	6.63%	0.09%	0.15%
15-0000	Computer and mathematical	187,884	4.98%	5.33%	5.69%	0.35%	0.35%
17-0000	Architecture and engineering	82,113	2.18%	2.09%	2.02%	-0.09%	-0.07%
19-0000	Life, physical and social sciences	39,770	1.06%	1.05%	1.05%	0.00%	0.00%
21-0000	Community and social services	57,591	1.53%	1.52%	1.52%	-0.01%	0.00%
23-0000	Legal	28,769	0.76%	0.74%	0.72%	-0.03%	-0.01%
25-0000	Education, training and library	221,855	5.89%	5.87%	5.93%	-0.02%	0.07%
27-0000	Arts, design, entertain., sports and media	68,631	1.82%	1.81%	1.82%	0.01%	0.01%
29-0000	Healthcare practitioners and tech.	176,137	4.67%	4.76%	4.92%	0.08%	0.16%
31-0000	Healthcare support	95,546	2.53%	2.59%	2.69%	0.05%	0.10%
33-0000	Protective service	68,347	1.81%	1.79%	1.78%	-0.02%	-0.01%
35-0000	Food preparation and serving related	298,128	7.91%	8.01%	7.99%	0.10%	-0.02%
37-0000	Bldg. and grounds cleaning and maint.	118,787	3.15%	3.18%	3.22%	0.02%	0.04%
39-0000	Personal care and service	160,464	4.26%	4.38%	4.54%	0.12%	0.15%
41-0000	Sales and related	354,334	9.40%	9.08%	8.88%	-0.32%	-0.20%
43-0000	Office and administrative support	451,914	11.99%	11.77%	11.61%	-0.22%	-0.16%
45-0000	Farming, fishing and forestry	97,092	2.58%	2.55%	2.47%	-0.03%	-0.07%
47-0000	Construction and extraction	230,106	6.10%	6.32%	6.13%	0.22%	-0.19%
49-0000	Installation, maintenance and repair	145,177	3.85%	3.75%	3.65%	-0.10%	-0.10%
51-0000	Production	184,298	4.89%	4.62%	4.40%	-0.27%	-0.22%
53-0000	Transportation and material moving	236,870	6.28%	6.25%	6.13%	-0.03%	-0.12%

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

The projected average annual growth rates for the major occupational groups in Washington state are presented in *Figure 5-4*. Computer and mathematical occupations (2.85 percent), personal care and service occupations (2.15 percent) and health support occupations (2.11 percent) are projected to grow faster than other occupational groups from 2017 to 2027.

In the long term, five occupational groups are projected to fall below a 1.00 percent average annual growth rate: production (0.44 percent), architecture and engineering (0.75 percent), sales and related (0.93 percent), legal (0.94 percent) and installation, maintenance and repair (0.97 percent). Only installation, maintenance and repair was not in the bottom five last year. Last year it was the sixth lowest.

Figure 5-4. Projected average annual growth rates for major occupational groups
Washington state, 2017 to 2027
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics
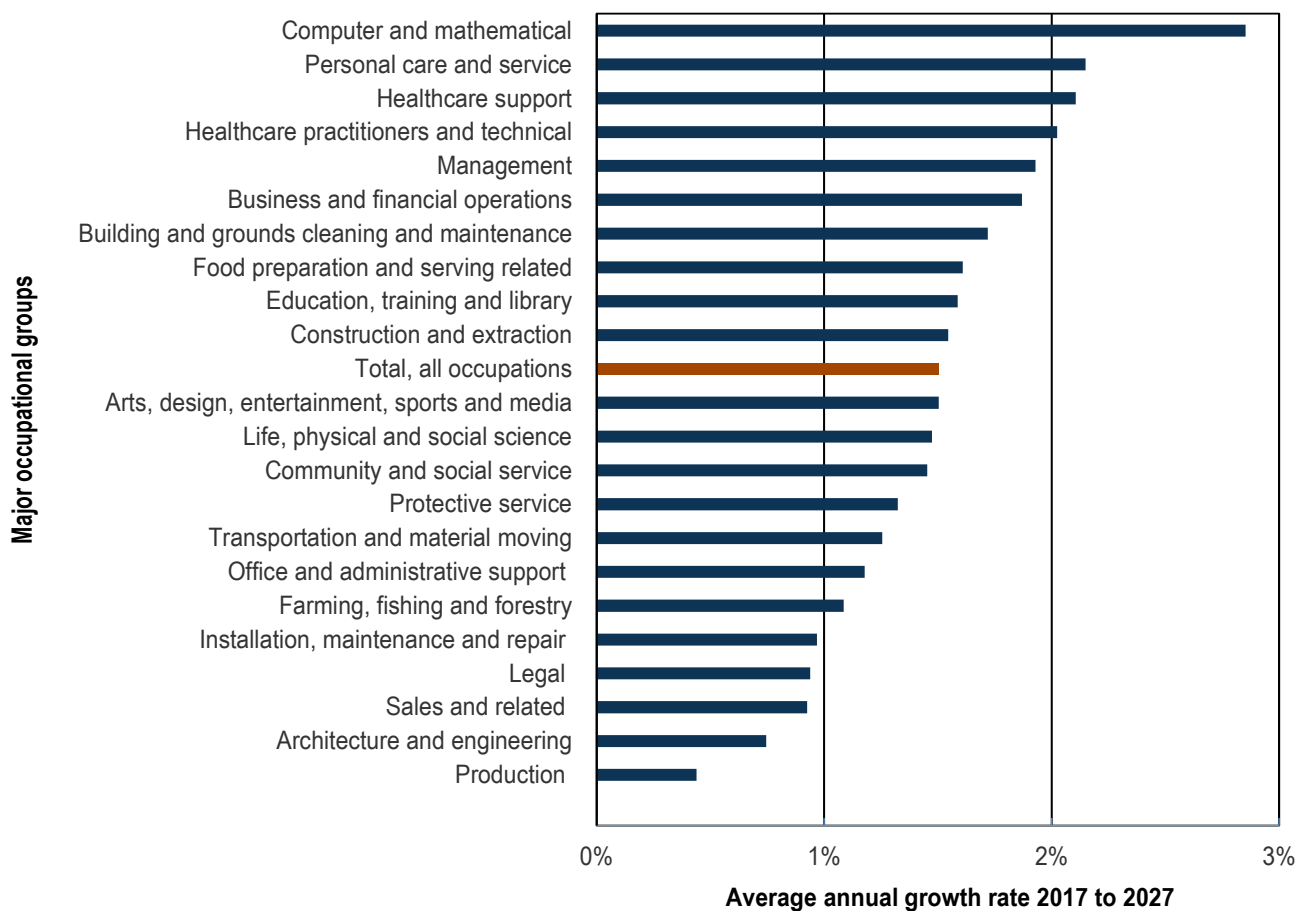
Computer and mathematical, personal care and service and health support occupations are projected to experience the largest growth rates from 2017 to 2027 (2.85, 2.15 and 2.11 percent, respectively).

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 2.56. 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 (3.48), healthcare practitioners and
technical (3.46) and legal (3.23) occupations.

Figure 5-5. Comparison of alternative and separations methodologies on total openings
Washington state, 2017 and 2027
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. 2017	Est. empl. 2027	Alternative average annual total openings 2017-2027	Separations average annual total openings 2017-2027	Ratio alternative to separations
11-0000	Management	82,113	88,446	86,630	28,373	3.05
13-0000	Business and financial operations	68,631	79,680	82,514	33,275	2.48
15-0000	Computer and mathematical	118,787	140,859	72,084	26,296	2.74
17-0000	Architecture and engineering	241,139	290,196	20,023	7,216	2.77
19-0000	Life, physical and social science	57,591	66,531	11,464	5,001	2.29
21-0000	Community and social service	187,884	248,896	18,976	8,379	2.26
23-0000	Legal	230,106	268,250	7,712	2,391	3.23
25-0000	Education, training and library	221,855	259,663	58,121	28,799	2.02
27-0000	Arts, design, entertain., sports and media	97,092	108,156	25,835	9,321	2.77
29-0000	Healthcare practitioners and technical	298,128	349,738	61,551	17,777	3.46
31-0000	Healthcare support	176,137	215,201	41,270	16,297	2.53
33-0000	Protective service	95,546	117,687	20,850	9,899	2.11
35-0000	Food preparation and serving related	145,177	159,858	147,459	65,804	2.24
37-0000	Building and grounds cleaning and maint.	28,769	31,585	53,927	20,547	2.62
39-0000	Personal care and service	39,770	46,035	77,837	33,193	2.34
41-0000	Sales and related	224,350	271,558	131,147	56,040	2.34
43-0000	Office and administrative support	451,914	508,074	157,893	65,142	2.42
45-0000	Farming, fishing and forestry	160,464	198,474	50,515	17,308	2.92
47-0000	Construction and extraction	184,298	192,552	112,706	32,431	3.48
49-0000	Installation, maintenance and repair	68,347	77,947	50,680	17,179	2.95
51-0000	Production	354,334	388,517	52,419	22,614	2.32
53-0000	Transportation and material moving	236,870	268,343	94,725	37,144	2.55
00-0000	**Totals**	**3,769,302**	**4,376,246**	**1,436,338**	**560,426**	**2.56**

On average, alternative openings are more than two and a half 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 both methodologies, the combined food preparation and serving workers, including the fast food occupation, is projected to have the largest number of total openings. Seventeen of the top 20 specific occupations are the same in both methods.

Figure 5-6. Top 20 specific occupations by average annual total openings, *separations* methodology
Washington state, 2017 to 2027
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics
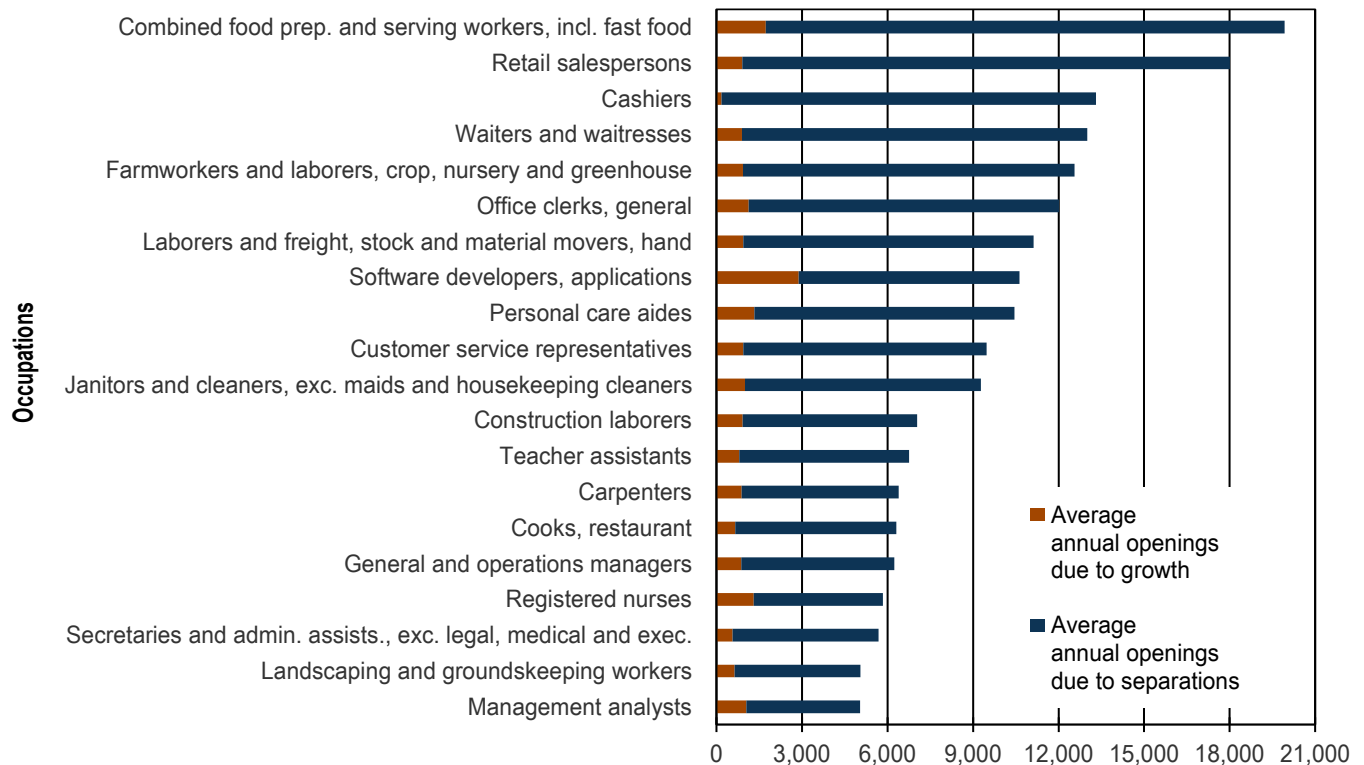
In the separations methodology, the number of openings due to job growth did not exceed openings due to job turnover in any occupations.

Figure 5-7. Top 20 specific occupations by average annual total openings, *alternative* methodology
Washington state, 2017 to 2027
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics
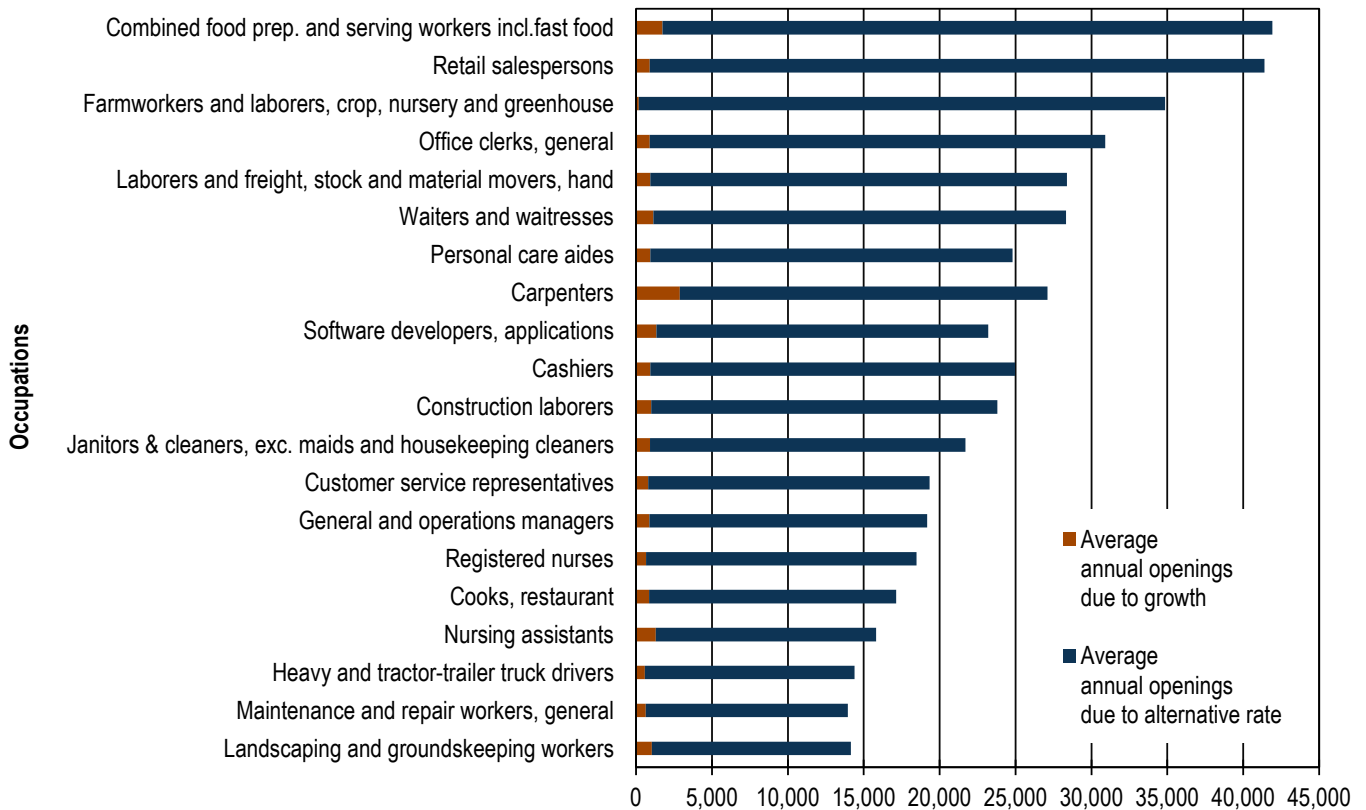
In the alternative methodology, the number of openings due to job growth did not exceed openings due to job turnover in any occupations.

Chapter 6: Income and wages

On the surface, wage and income data over the past several years tell a story of rising aggregate prosperity, as median household income and wage measurements continue to creep upward. Meanwhile, other data reveal that income inequality is also increasing and other indicators of economic distress are rising or stubbornly remaining unmoved by the rising tide. This chapter explores several data elements that provide different windows into the many stories of wages and income in Washington.

All income and wage data in this chapter have been adjusted for inflation to 2018 dollars. Data from previous annual reports will differ from figures for corresponding years in this report because of that adjustment.

Household[10] and family income

The Great Recession was characterized in Washington state and the nation by deep employment losses over the course of two years, from 2008 to 2010. Employment in Washington began to recover in 2010 and has continued to grow over the past several years, with some variation by industry and geography. Employment tallies tell important stories about industrial change and regional transformation, but the translation of employment into quality of life requires further investigation; specifically, investigation into the value we assign to work. This chapter explores measures related to household incomes and wages earned by Washington workers.

The first part of 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.

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[10] 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[11] median[12] household income in Washington state declined by $4,369 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 (2014 to 2018), the median household income for Washington households increased by a total of $9,926 or 15.5 percent.

The median Washington household income expanded more quickly than the median national household, which grew by $5,849 or 10.4 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 474,000 new residents[13] over that time period, and that high employment growth rates have been observed in some of Washington's noted high-wage industries including information, professional and business services, and online retail trade.

Beneath the surface, the median income for family households[14] expanded by $10,097 or 13 percent, while the median income for non-family households[15] increased by $6,937 or 17.4 percent.

Figure 6-1. Median household income in 2018 dollars
United States and Washington state, 2014 through 2018
Source: U.S. Census Bureau, American Community Survey

Household type	2014	2015	2016	2017	2018	Change, 2014 to 2018
All households, U.S.	$56,088	$57,585	$58,554	$60,336	$61,937	10.4%
All households, Washington	$64,147	$66,210	$68,197	$70,979	$74,073	15.5%
Family households	$77,555	$79,451	$82,555	$84,594	$87,652	13.0%
Non-family households	$39,855	$41,498	$42,188	$44,213	$46,792	17.4%

Real median household income increased by 15.5 percent in Washington state from 2014 to 2018.

[11] Adjusted for inflation using the PCE deflator.

[12] The median is the statistical midpoint. In this case, half of Washington households have lower incomes and half have higher incomes.'

[13] According to the U.S. Census Bureau, American Community Survey, Washington's population in 2014 was 7,061,530 and the population in 2018 was 7,535,591.

[14] 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."

[15] 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[16] for Washington individuals increased from a pre-recession rate of 11.3 percent in 2008 to 14.1 percent in 2014, the highest observed rate during this time period. As of 2018, the poverty rate was 10.3 percent.

Within that estimate, it is worth noting that children tend to have higher poverty rates than the general population. In 2018, 12.5 percent of children residing in Washington were living beneath the poverty threshold. The peak rate of childhood poverty was 18.8 percent, observed in 2013.

Household earnings

The share of households reporting earnings from wage employment never reached the pre-recession share of 81.3 percent. During the course of the recession, the share of households reporting earnings dropped to a low of 78.5 percent (observed in 2013 and 2015). As of 2018, 79 percent of Washington households reported earnings from a job.

Despite a minor relative drop in the portion of households reporting earnings from a job, average household earnings have increased over time. As of 2018, the average household earnings from a job was $101,370, a statistically significant increase over the previous year.

The unit of measure is important to consider. 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[17]

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 availability of work shifted somewhat during the recession. Prior to the recession, 61.6 percent of workers reported working full time

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

[17] Includes "gig" work such as independent contractors.

(more than 35 hours per week). By 2011, this proportion had shifted to only 55.7 percent. As of 2018, the portion of workers reporting full-time employment was 63.9 percent.

On the flip side, part-time workers (workers reporting fewer than 35 hours per week) increased from 19 percent in 2007 to 19.9 percent in 2011. As of 2018, the portion of workers reporting part-time employment was 18.5.

Overall, one of the ways that the ongoing recovery has been showing up in employment statistics is as an increase in the proportion of workers reporting full-time employment, and a decrease of the number reporting part-time hours. The data includes "gig work" such as independent contractors

Earnings from a job or self-employment

Median earnings for all workers has increased every year since 2014 on an adjusted basis. From 2017 to 2018, median earnings increased from $39,241 to $40,286, an increase of $1,045 or 2.7 percent. The increase in earnings for full-time/year-round workers increased by $1,094 or 2 percent over the year, raising the median to $56,182.

Comparing median earnings for male versus female full-time/year-round workers reveals an ongoing earnings gap, with women's median earnings ($48,706 in 2018) equal to 79 percent of median earnings for men ($61,666). From 2014 to 2018, the median earnings for both female and male workers increased. Women's median earnings increased by $4,227 (9.5 percent) while men's median earnings increased by $4,039 (7 percent). This data includes self-employment workers.

Despite proliferation of employment-related apps such as ride sharing and the like, the proportion of people reporting self-employment has remained statistically unchanged over the past several years. In 2018, 6 percent of workers reported that they were self-employed in their own non-incorporated business.

Income other than from earnings

Income includes a number of components other than, or in addition to, earnings. This section explores information about transfer payments and retirement income.

With Baby Boomers (a particularly large generation) reaching retirement age, the proportion of households reporting Social Security and pension payments has increased gradually over the past several years. As of 2018, 29.7 percent of Washington households

received Social Security payments, and 19.6 percent received private pension payments. For perspective, the comparable figures for 2014 were 28.5 percent and 18.6 percent respectively.

The average annual payout for households collecting from private pensions in 2018 was $28,324, translating to an average monthly payment of $2,360. Compare to the adjusted average monthly payment of $2,184 in 2014, when Washington was emerging from the recent recession.

Supplemental Security Income (SSI) is a federal program that pays benefits to disabled adults and children who have limited income and resources, as well as people 65 years and older without disabilities who meet financial limits. In 2018, 4.6 percent of all Washington households received SSI during the year. This proportion has stayed fairly consistent over the past several years, but dropped slightly since 2015. The average monthly payment for households receiving SSI was $868 in 2018.

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 2018, 2.9 percent of Washington households received welfare cash payments. The average monthly payout for welfare recipients was $224, up from $208 per month in 2017, but down from $368 (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.[18] As of 2018, 11.1 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 11 percent of households. In 2015, 15.1 percent of households received food stamps. The proportion has decreased each year since then.

Health insurance

In 2008, the Census Bureau began asking households about health insurance coverage. 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 medically uninsured households dropped from 14 percent to 9.2 percent. By 2016, the proportion had dropped to 6 percent, but has begun to reverse after policy changes at the federal level. As of 2018, 6.4 percent of Washington residents (477,284 individuals) reported that they had no health coverage.

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[18] Information about SNAP eligibility available at https://www.dshs.wa.gov/esa/community-services-offices/basic-food

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 fairly steady – usually hovering around 70 percent since this question has been asked of respondents. In 2018, 70.6 percent of Washington residents were covered by private insurance. Residents relying solely on public health insurance has climbed over time. Notably, the proportion jumped from 17.2 percent to 20.1 percent in 2013. In 2018, 20.7 percent of Washington residents relied solely on the public market for health insurance.

Homeownership and rent

The homeownership rate in Washington state plummeted from 66.1 percent in 2007 to 61.7 percent in 2014. Since 2014, the rate has increased slightly. As of 2018, the rate was 62.8 – 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 different standards of living depending on whether you are residing in Bellevue versus 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. This is up from 45.2 percent in 2017, and slightly lower than the portion reported during the depths of the recession (48.4 renters paid over 30 percent of income on housing in 2010).

The percent of Washington households in economic distress due to high housing costs rose in the first few years of the economic downturn, 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, that proportion decreased to 45.2 percent. Last year, the downward trend reversed. In 2018, 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 shifted downward, in part due to an overall decline of homeownership. By 2018, the proportion was 29.1 percent, well below pre-recession levels. 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, 2014 through 2018
Source: U.S. Census Bureau, American Community Survey

Household statistic	2014	2015	2016	2017	2018
Median household income	$64,728	$67,844	$70,030	$72,591	$74,073
Median family income	$78,613	$81,560	$84,607	$86,648	$87,652
Poverty rate, all individuals	13.2%	12.2%	11.3%	11.0%	10.3%
Poverty rate, children under 18	17.5%	15.5%	13.7%	14.3%	12.5%
Households with earnings from a job[1]	78.6%	78.5%	78.8%	79.1%	79.0%
Average household earnings from a job[2]	$87,518	$92,178	$96,189	$98,254	$101,370
Full-time workers, percent of population aged 16-64[3]	57.6%	58.2%	59.5%	60.5%	63.9%
Part-time workers, percent of population aged 16-64	19.1%	18.8%	18.7%	18.5%	18.5%
Median earnings for all workers	$35,246	$36,621	$37,498	$39,241	$40,286
Median earnings for full-time, year-round workers	$52,435	$52,866	$52,825	$55,088	$56,182
Median earnings for male full-time, year-round workers	$57,627	$58,984	$61,465	$61,524	$61,666
Median earnings for female full-time, year-round workers	$44,479	$46,994	$46,383	$48,576	$48,706
Percent of workers who are self-employed	5.9%	5.9%	5.8%	5.7%	6.0%
Households receiving Social Security	28.5%	29.0%	29.6%	29.4%	29.7%
Households receiving private pension payments	18.6%	19.2%	19.7%	19.1%	19.6%
Avg. mo. payout for households receiving private pensions	$2,184	$2,200	$2,329	$2,318	$2,360
Households receiving Supplemental Security Income (SSI)[1]	4.9%	4.9%	4.8%	4.8%	4.6%
Average monthly payout for those receiving SSI	$841	$864	$872	$859	$868
Households receiving welfare cash payments)[1]	3.6%	3.5%	3.1%	3.0%	2.9%
Average monthly payout for welfare recipients	$244	$244	$240	$208	$224
Households receiving food stamps)[1]	14.1%	13.4%	12.6%	12.3%	11.1%
Residents without health insurance	9.2%	6.6%	6.0%	6.1%	6.4%
Number of residents without health insurance	642,654	467,967	428,092	446,106	477,284
Residents with private health insurance	70.3%	71.1%	71.4%	70.8%	70.6%
Residents relying solely on public health insurance	20.1%	19.9%	20.3%	20.7%	20.7%
Renters paying more than 30 percent of income for housing	47.1%	45.4%	44.9%	45.2%	47.7%
Homeownership rate	61.7%	62.4%	62.5%	62.8%	62.8%
Homeowners with a mortgage paying more than 30 percent of income for housing	31.5%	29.5%	29.2%	28.8%	29.1%

[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 2018, a number of indicators about the well-being of households in Washington showed continued improvement.

Income inequality

Many of the metrics presented to this point in the chapter describe a long economic recovery that has managed to gain momentum in the past couple of years. 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 2018 dollars. Examining household income ranges allows for a more nuanced view of how the economic recovery has varied socioeconomically.

Over the past five years, the proportion of households with $35,000 or less annual income has steadily decreased. Households with income ranges less than $35,000 accounted for about 26 percent of all households in 2014. By 2018, the share was closer to 22 percent.

Middle income households declined slightly at the lower end and remained fairly steady at the upper end. Overall, this is the household income range that experienced the least change proportionally. From 2014 to 2017, the share of households with incomes between $35,000 and $100,000 per year barely changed, decreasing from about 44 percent in 2014 to just under 43 percent in 2018.

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 2014 through 2018. Over that time period, the share of households with incomes exceeding $100,000 per year expanded from about 30 percent in 2014 to 36 percent in 2018.

Figure 6-3. Percent of households by income range, 2018 dollars
Washington state, 2014 through 2018
Source: U.S. Census Bureau, American Community Survey
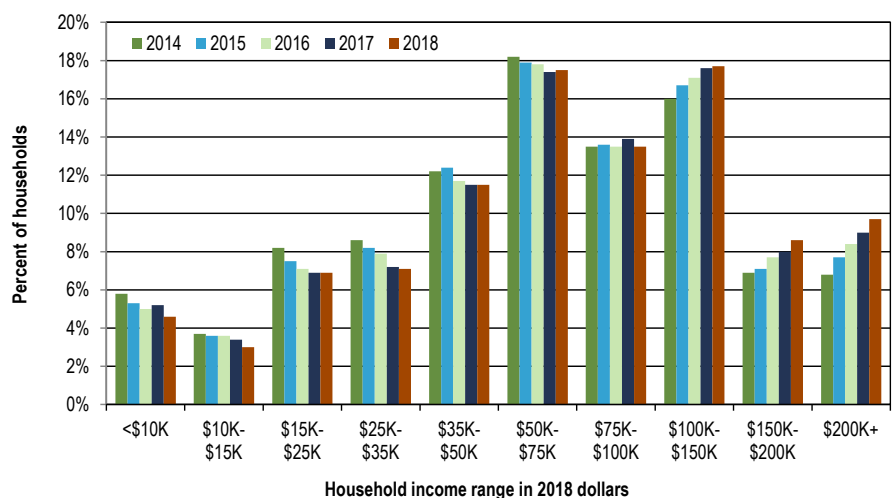
The share of households in upper income brackets continued to rise in 2018, while the proportion of lower income households decreased proportionally.

While incomes have increased in the state, income inequality has grown as well. *Figure 6-4* compares state and national trends for average income by quintile, where a quintile represents 20 percent of households.

- Average incomes in the state have been higher than for the nation. For example, the average income for the lowest-income 20 percent of households in Washington was $17,662 in 2018, compared with $13,593 for the U.S. The same was true for all the other quintiles and was also true in 2006 (the first year this data was available).

- Income disparity declined for the lowest-income quintile in 2018. Average income increased by a sizable 6.4 percent, more than any other quintile. Low unemployment and higher wages at the bottom end of the pay scale (see next section on wages) likely had a major role in this improvement. However, the increase for the three middle quintiles, while positive, was still less than for the highest quintile and for the top 5 percent of households

- Income disparity has increased over the long run. The average income for the lowest quintile rose by 14.1 percent from 2006 to 2018, compared with 23.7 percent for the highest quintile. The higher the income, the larger the increase over time.

- Still, the state fared better than the nation, where the average income for the lowest quintile barely changed at all over the 2006 to 2018 period. The gap between the average income for the highest quintile to the lowest quintile was wider nationally than statewide.

Figure 6-4. Average household income by quintile and top 5 percent of households, in 2018 dollars
United States, 2006 and 2018, and Washington state, 2006, 2007 and 2018
Source: U.S. Census Bureau, American Community Survey

Year	U.S. 2006	U.S. 2018	Percent change	WA state 2006	WA state 2017	WA state 2018	Percent change 2017-2018	Percent change 2006-2018 employment
Lowest quintile	$13,495	$13,593	0.7%	$15,476	$16,607	$17,662	6.4%	14.1%
Second quintile	$35,229	$36,680	4.1%	$39,781	$42,232	$45,700	3.3%	14.9%
Third quintile	$58,891	$62,416	6.0%	$64,172	$72,468	$74,360	2.6%	15.9%
Fourth quintile	$91,266	$98,969	8.4%	$99,727	$110,893	$114,074	2.9%	18.2%
Highest quintile	$198,446	$227,663	14.7%	$207,219	$237,139	$247,013	4.2%	23.7%
Top 5 percent	$351,017	$413,188	17.7%	$362,197	$412,310	$433,074	5.0%	24.8%

Income inequality has increased in Washington, but not to the same extent as in the U.S.

Lower-income households still remain under considerable pressure due to the higher cost of living in the state, particularly housing. According to a recent state Department of Commerce report, Washington has the fifth highest prevalence of homelessness in the nation, driven by rapid rent increases. As noted above, almost half of all renter households were considered to be in income distress due to high rent. A previous report from the same department documented the substantial shortage of affordable housing in every county in the state.

The pressure on low-income households was also reflected in the falling but still high percentage of households receiving basic food assistance, either SNAP (formerly known as food stamps) or state food aid to legal immigrants. As shown in *Figure 6-5*, while the percent of state residents receiving government food assistance has declined, it still remained higher than in 2009.

Figure 6-5. Average monthly basic food participants as a percent of state population Washington state, state fiscal year (SFY) 2009 through 2018
Source: Washington Department of Social and Health Services
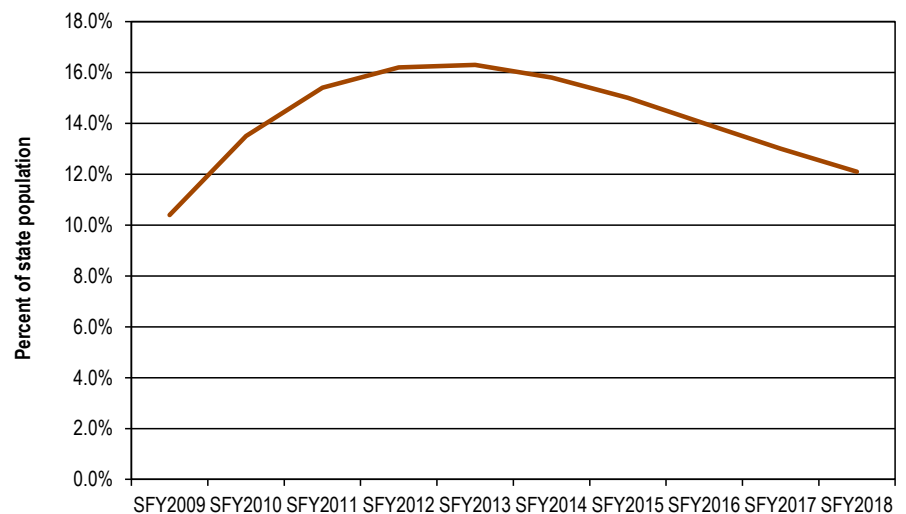
The percent of Washington residents receiving government food assistance has declined, but remained higher than in 2009.

Wages

All data in this section has been adjusted for inflation to 2018 constant dollars, except where explicitly noted.

In this section, we'll examine wage trends in Washington along a number of different measures, and in the process touch on some key contemporary economic issues.

Before looking at wages, let's take a look at employment and hours worked. For the state, 2018 was yet another good year for job growth, although at a slower pace. The total number of jobs covered by unemployment insurance (with the exclusions noted in *Figure 6-6*) increased by 2.4 percent. This measure is based on average monthly counts of jobs, with full-time and part-time work getting equal weight. When jobs were weighted by the number of hours worked (full-time equivalent, or FTE, jobs[19]), job growth was slightly slower (2 percent), indicating a small decrease in the average work week. Over time, there has been little change in the ratio of FTE employment to monthly average employment – outside of a dip during the Great Recession – indicating that the average work week has been stable for more than a decade.

Figure 6-6. Covered employment vs. FTE employment – Federal employment, NAICS 814 and DSHS/COPES employment excluded
Washington state, 2007 through 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse

Year	Covered employment	Change from previous year	FTE employment	Change from previous year	Ratio of FTE to covered employment
2007	2,837,174	2.7%	2,308,857	3.8%	81.4%
2008	2,858,677	0.8%	2,323,831	0.6%	81.3%
2009	2,736,052	-4.3%	2,206,818	-5.0%	80.7%
2010	2,695,387	-1.5%	2,163,882	-1.9%	80.3%
2011	2,733,039	1.4%	2,214,431	2.3%	81.0%
2012	2,782,831	1.8%	2,265,153	2.3%	81.4%
2013	2,849,725	2.4%	2,316,485	2.3%	81.3%
2014	2,929,089	2.8%	2,380,649	2.8%	81.3%
2015	3,017,784	3.0%	2,457,393	3.2%	81.4%
2016	3,111,763	2.8%	2,528,274	2.9%	81.2%
2017	3,180,537	2.2%	2,603,441	3.0%	81.9%
2018	3,257,880	2.4%	2,654,978	2.0%	81.5%

FTE employment has been stable as a percent of total covered employment, indicating average hours per job has little changed.

[19] In this analysis, jobs are weighted by the number of hours worked, with one full-time equivalent (FTE) job equaling 2,080 hours of work in a typical year. A job that lasts 208 hours, for example, would be counted as 0.1 FTE.

Figure 6-7 shows the most recently available data on national and state hourly wages from three different sources.

1. Every month, the Bureau of Labor Statistics (BLS) publishes the average hourly wage for nonfarm private sector employers, based on the average wage for all employers in their monthly survey. Data is available for the nation, states and territories and metropolitan areas.

2. Averages can be heavily influenced by what's happening at the top of the wage scale, so at the national (but not the state) level, BLS tracks the average hourly wage for production and nonsupervisory workers – those who aren't supervisors or managers.

3. The state's quarterly wage files include hours worked and wages earned for any worker covered by the state unemployment insurance system. There are well over three million records for each quarter. In this analysis, records were weighted by the number of hours worked and converted to full-time equivalent, or FTE, jobs.[20]

According to BLS, the average hourly wage in Washington has consistently been about 20 percent higher than the comparable national figure over the past decade. The average for nonsupervisory workers has been 16 percent lower than the one for all workers, but has generally followed the same trend.

Using the same industry base – private sector nonfarm employment – the statewide average hourly wage calculated from the wage file was substantially higher than from the BLS survey. The state median hourly wage (again using the private nonfarm definition) was closer to the BLS average for nonsupervisory workers, and trended closely to that measure from 2007 through 2015. This makes sense, since if the average for all workers has been pushed up by more rapid gains among managers, excluding them will make the remainder more similar to the median.

What *Figure 6-7* does tell us is, first, that regardless of the measure, Washington jobs on average have paid significantly more than jobs nationally. Second, while hourly wages began to pick up nationally and in Washington in 2015, gains have been more rapid here through 2018. From December 2013 to December 2018, the U.S. all-employees average rose by 6.8 percent, while the state average doubled that pace at 13.9 percent. The U.S. nonsupervisory employee average was up by 6.5 percent, while the state median calculated from the quarterly wage files increased by 13 percent.

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[20] In most years, one full-time equivalent (FTE) job equals 2,080 hours of work. A job that lasted 208 hours, for example, would be counted as 0.1 FTE.

From December 2018 to September 2019, however, the state all-employees average declined slightly (-0.8 percent), while nationally, wages rose by 0.8 percent. There is other, more compelling evidence that wage growth has continued to be strong in 2019 (*Figure 6-7*).

Figure 6-7. Average hourly wage, all private sector nonfarm employees, in 2018 dollars U.S. and Washington state, January 2007 through September 2019
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse; U.S. Bureau of Labor Statistics
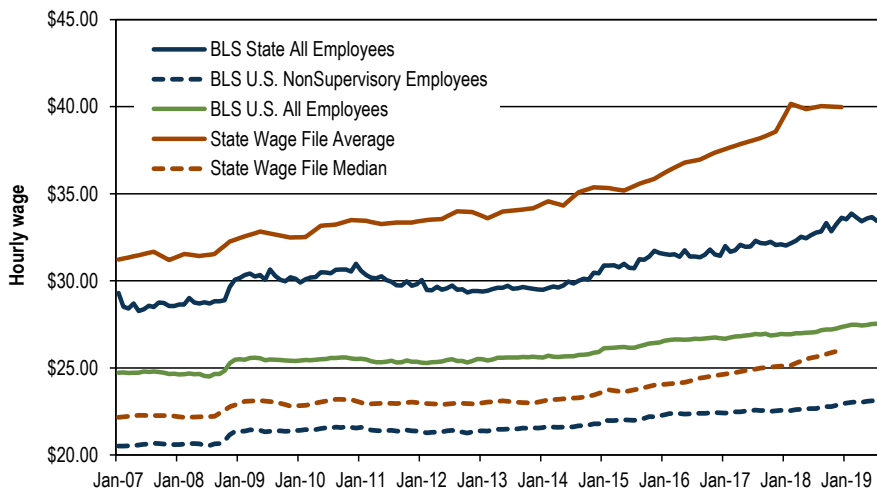
According to the BLS, inflation-adjusted hourly wages were considerably higher in the state of Washington than nationally, and increased at a faster rate through 2018.

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

The Federal Reserve Bank of Atlanta's Wage Growth Tracker[21] measures the median over-the-year change in hourly wages for nonfarm workers. According to their analysis, the median increase for individual full-time workers' wages accelerated from 3.3 percent in the beginning of the year to 4 percent at the end, and continued at a

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

3.8 percent clip in the first half of 2019 – not adjusted for inflation.[22] Using a similar set of workers – individuals who worked at least 1,560 hours (the equivalent of three-quarters of the year) – the figure for Washington was substantially higher, fluctuating around 5.6 percent (3.7 percent if adjusted for inflation). As the Atlanta Fed notes, the individuals in their national data set were somewhat older, more educated, and more likely to work as a professional than the general population, due to the requirement for continuous employment; those same characteristics were likely true for the comparable state dataset.

Figure 6-8. Median year-over-year increase in hourly wage for full-time workers, not adjusted for inflation
U.S. and Washington state, 1997 through 2019
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse; Atlanta Federal Reserve Bank
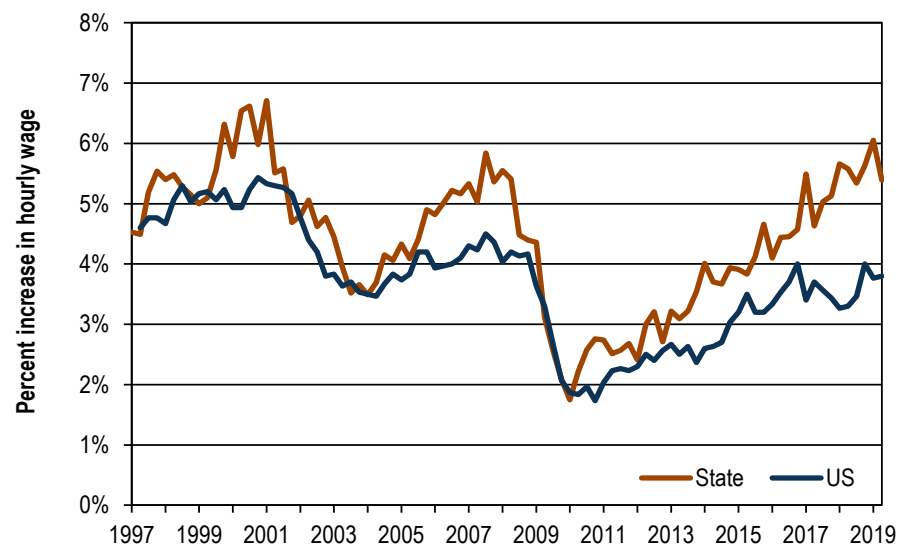
Incumbent Washington workers have usually enjoyed larger increases in hourly wages than their counterparts around the nation.

Now that we've established that on both a jobs and worker basis, average wage gains were higher in Washington than the nation, let's take a deeper dive to see how equitable those gains were. For this part of the analysis, agricultural employment will be included, along with state and local government, while household employers (NAICS 814) and state-reimbursed home healthcare (part of NAICS 624120) were excluded due to data quality issues.

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

The median hourly wage is the hourly wage for which half of all hours worked were paid less, and half paid more. The average hourly wages is simply total payroll divided by total hours worked. Because the distribution of wages is unequal, the average will always be higher than the median. As *Figure 6-9* shows, the median hourly wage has increased for six consecutive years. In 2018, the median rose 63 cents (2.5 percent after adjustment for inflation) to $26.03. It was the fourth year in a row that the percentage change was right around 2.5 percent. The average hourly wage was $38.70, up 4.7 percent over 2017.

Figure 6-9 also shows that while both the median and average have been trending upward over the past three decades, the gap between the two has widened considerably. In 1990, the median was 81 percent of the average; by 2018 it was only 67 percent. The widening gap indicates that wage inequality has been increasing. Note that during the 1998 to 2002 period, stock options were included as part of wages and heavily influenced the average.

Figure 6-9. Median and average hourly wage, in 2018 dollars
Washington state, 1990 through 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
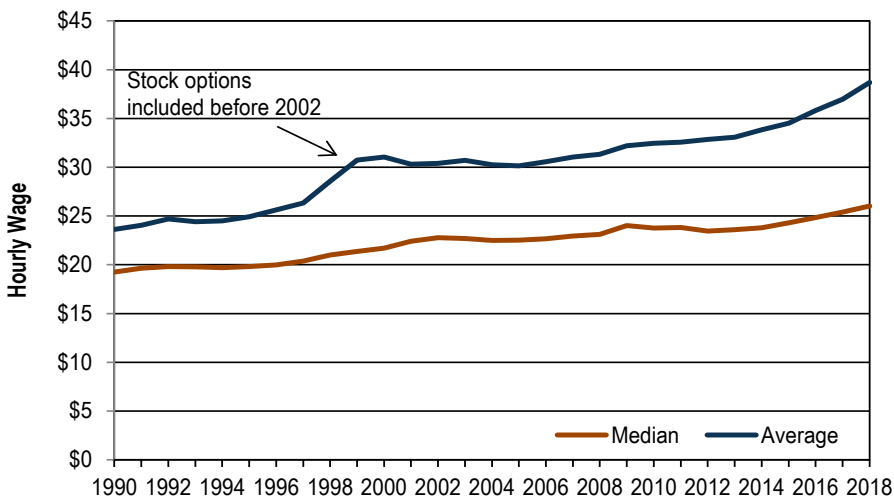
The median hourly wage increased by 2.5 percent in 2018, reaching an all-time high; the average hourly wage increased at 4.7 percent, a faster rate, indicating an increase in wage inequality.

Hourly wages increased across the spectrum in 2018, in something of a U-shape (*Figure 6-10*). The average for the bottom decile increased by 4.1 percent, while the average for the next-lowest decile rose by 3.5 percent. The averages for the next seven deciles were up between 2.5 and 3 percent. The top decile had the largest increase in average, at 7.8 percent.

Figure 6-10. Measuring the wage gap, 2018 dollars
Washington state, 2001 through 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse

Wages	2001	2007	2010	2016	2017	2018	Percent change 2017-2018
Median hourly wage	$22.41	$22.94	$23.76	$24.83	$25.40	$26.03	2.5%
Average hourly wage for:							
All jobs	$30.31	$31.05	$32.45	$35.82	$36.98	$38.70	4.7%
Lowest-paid 10 percent of jobs	$9.69	$9.93	$10.13	$10.68	$11.51	$11.98	4.1%
Second-lowest 10 percent of jobs	$12.33	$12.38	$12.57	$13.55	$14.23	$14.73	3.5%
Third-lowest-paid 10 percent of jobs	$14.96	$15.08	$15.47	$16.19	$16.70	$17.17	2.8%
Fourth-lowest-paid 10 percent of jobs	$17.75	$18.02	$18.55	$19.17	$19.65	$20.14	2.5%
Fifth-lowest-paid 10 percent of jobs	$20.78	$21.21	$21.93	$22.71	$23.28	$23.88	2.6%
Fifth-highest 10 percent of jobs	$24.22	$24.95	$26.01	$27.20	$27.80	$28.59	2.9%
Fourth-highest 10 percent of jobs	$28.54	$29.88	$31.42	$33.20	$33.91	$34.93	3.0%
Third-highest 10 percent of jobs	$34.47	$36.80	$39.21	$41.64	$42.47	$43.76	3.0%
Second-highest 10 percent of jobs	$42.99	$47.02	$50.27	$54.35	$55.51	$57.46	3.5%
Highest-paid 10 percent of jobs	$97.77*	$95.43	$100.92	$120.00	$125.02	$134.79	7.8%
Ratio of highest 10 to lowest 10	10.1	9.6	10.0	11.2	10.9	11.2	NA
Ratio of highest 10 to median	4.4	4.2	4.2	4.8	4.9	5.2	NA
Ratio of median to lowest 10	2.3	2.3	2.3	2.3	2.2	2.2	NA
*Boosted by stock options. Without stock options, the average would have been about $84.00.							

The gap between the highest- and lowest-paid jobs increased from 2017 to 2018.

One way to quantify the widening inequality is to compare the average wage for the top 10 percent of jobs to the average wage for the lowest 10 percent of jobs. That ratio was 7.7 in 1990, climbed to 10.0 in 2010 and reached 11.2 in 2018.[23]

The U-shaped pattern of wage increases for 2018 occurred over the long term, as shown in *Figure 6-11*. From 1990 to 2018, the average hourly wage for the lowest-paid decile was up 48 percent, while the average for the best-paid decile more than doubled at 116 percent.

[23] The upper 10 percent paying jobs does not include many corporate officers (generally the highest-paid employees) and wages do not include income from capital gains nor, since 2002, stock options.

Percent increase in the average hourly wage by decile and median, 2018 dollars
Washington state, 1990 to 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
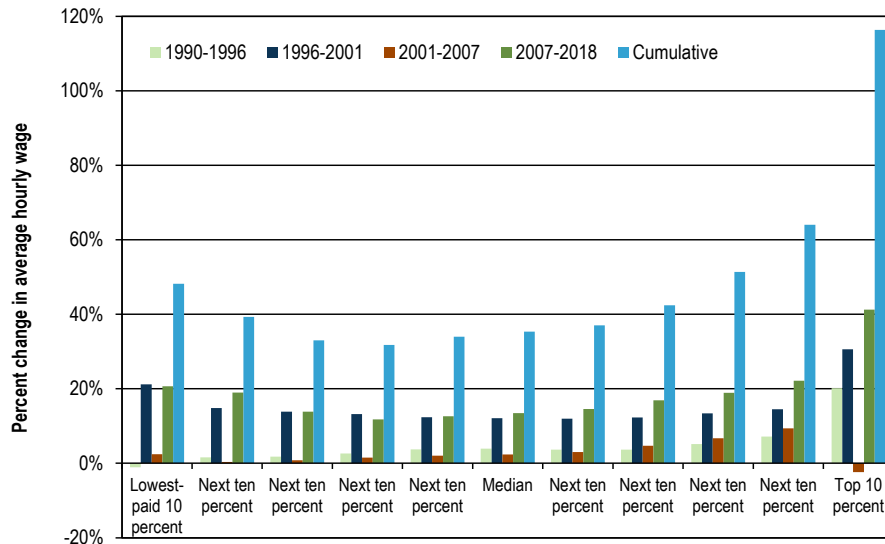
Wage gains were low in the 2001 to 2007 period; for 1990 to 2018, the average for the top 10 percent of jobs more than doubled.

Since 1990, the state has experienced a long expansion in the 1990s, a relatively mild recession in 2001 followed by a short bubble-fueled expansion from 2002 to 2007, a deep recession and the long recovery and expansion that began in 2010. *Figure 6-11* shows the distribution of wage gains during the past three business cycles, with the first long expansion broken into two phases – 1990 to 1996, when the labor market still had some slack, and 1996 to 2001 when things tightened. From 1990 to 1996, wage increases subdued, except for the highest-paid decile. In fact, wages at the low end declined slightly. From 1996 to 2001, unemployment declined, bottoming out at 4 percent in 2000. In addition, voters approved an increase in the minimum wage from $4.90 in 1998 to $5.70 in 1999 and $6.50 in 2000, with the rate indexed to inflation in following years. Finally, this was also the golden era of stock options. The result was a substantial increase in wages across the spectrum, with higher than average gains at the top and bottom. The median hourly wage, which had only increased by 4 percent from 1990 to 1996, rose by 12 percent over the next five years. The bottom decile almost doubled that with a 22 percent gain, while the top decile was up 31 percent.

During the 2001 to 2007 cycle, wages were stagnant in the bottom half of the spectrum, with the median wage increasing by only 2.4 percent over the five-year period. The lowest decile, supported by the minimum wage, matched that, but between the bottom and the middle gains were considerably less. Wage gains were larger on the upper third of the distribution – except that stock options were removed from the database after 2002, leading to a decline in average wages for the top decile. The next-highest 10 percent of jobs had a 9 percent increase, so it is likely that outside of stock options, the top decile rose as well.

The most recent recovery and expansion more closely resembles the late 1990s, especially as the labor market has tightened over the past four years. Since 2007, the average hourly wage for the two lowest-paid deciles rose by 21 percent and 19 percent, respectively. The next five deciles were in the 12 to 17 percent range. Gains accelerated from there: 19 percent, 22 percent, and then 41 percent for the top decile.

From the longer-term (1990 to 2018) perspective, wages in the state have generally moved upward, but much more so at the upper end. The median hourly wage increased by 35 percent, and the lower-middle six deciles within the wage spectrum was close to that (32 to 42 percent). Wages at the bottom rose faster (48 percent). Wages at the upper end grew more rapidly, with the average wage for the top 10 percent of jobs more than doubling (116 percent), and wages in the second-highest tier increased by 64 percent.

From another angle, the bottom 20 percent of FTE jobs took home 7 percent of total payroll in 2017 – less than the top 1 percent, which captured 12 percent of total wages. As shown in *Figure 6-12*, the top 20 percent of jobs accrued half of total payroll. The share garnered by the top 1 percent increased by 5 percent from 1990 to 2018, and the next 19 percent gained by 4 percentage points. When looking at the higher end of the wage scale, it's important to remember that the unemployment insurance data set does not include many of the highest paid salaries in the state, since tens of thousands of corporate officers have opted out of the unemployment insurance system.

Figure 6-12. Share of total payroll earned by quintile of FTE jobs, 2018 dollars
Washington state, 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
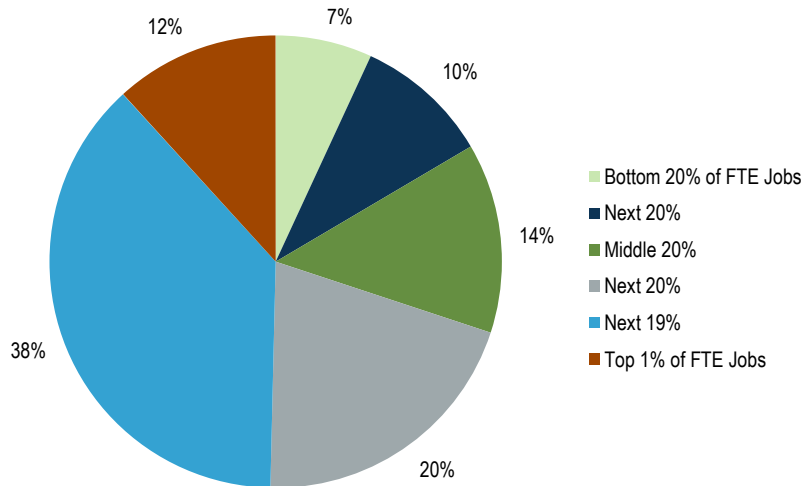
*The best-paid 1 percent of FTE jobs were paid more than the lowest-paid 20 percent, and
the best-paid 20 percent of FTE jobs earned half the total payroll in the state in 2018.*

A different way of presenting wage data – jobs grouped by the
range of hourly wage paid in 2018 – is shown in *Figure 6-13*, with
the wage spectrum being divided into nine wage ranges; the first
three wage ranges contain the majority of jobs: 4 percent paid below
$12.00 per hour, 24 percent paid from $12.00 to $17.99 per hour and
17 percent paid from $18.00 to $23.99 per hour. Almost 17 percent
paid $54.00 per hour or more.

Figure 6-13 FTE jobs by hourly wage range, 2018 dollars
Washington state, 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
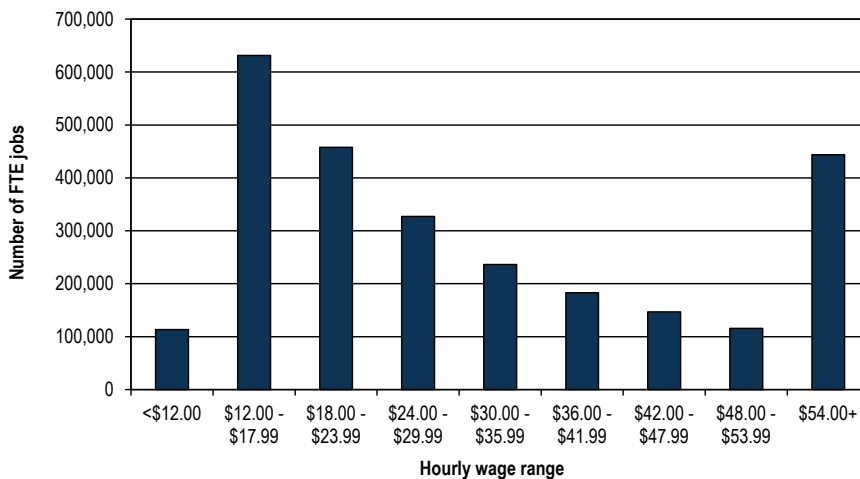
Over 400,000 jobs had annualized pay in at least six figures in 2018, on an FTE basis.

Figure 6-14 shows some of the stark differences between wages in different industries. Over 27 percent of all jobs in limited-service eating places (which includes "fast-food" restaurants, coffee bars, buffets) paid below $12.00 per hour – and 44 percent paid below $13.00 per hour. The low wages in childcare services, where one fifth of jobs paid below $12.00 (and a third paid under $13.00), bring up a significant policy issue as the minimum wage continues to increase in the coming years. Meanwhile, four of the top five high-wage industries were tech-related, with 84 percent of jobs in software publishing paying in the highest wage category. In terms of numbers, four industries accounted for a third of high-wage jobs: software publishing (12 percent), aerospace (8 percent), electronic shopping (8 percent) and computer systems design (5 percent).

Figure 6-14. High-wage and low-wage industries with at least 10,000 FTE jobs
Washington state, 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse

NAICS	Industry	FTE jobs	Median wage	Percent of FTE jobs paying below $12.00	Percent of FTE jobs paying $54.00 or greater
All industries		**2,654,978**	**$26.03**	**4.3%**	**16.7%**
Lower-wage industries:					
722513-15	Limited-service eating places	65,076	$13.58	27.5%	0.4%
448	Clothing and clothing accessories stores	12,623	$15.51	22.8%	2.2%
6244	Child daycare services	13,957	$14.64	19.0%	0.4%
453	Miscellaneous store retailers	17,651	$15.62	14.6%	2.2%
713	Amusement, gambling and recreation	18,114	$17.54	14.6%	2.9%
721	Accommodations	26,283	$16.10	13.9%	2.1%
445	Food and beverage stores	48,536	$16.45	12.6%	2.3%
623	Nursing and residential care facilities	52,226	$16.02	11.6%	1.8%
115	Support activities for agriculture and forestry	23,988	$14.18	10.2%	1.4%
Higher-wage industries					
5112	Software publishers	64,097	$83.67	0.1%	84.3%
4541	Electronic shopping and mail-order houses	46,427	$72.93	0.2%	74.4%
519	Other information services	18,615	$73.57	0.2%	70.7%
518	Internet service providers (ISPs)	10,287	$50.97	1.0%	46.7%
5415	Computer systems design and related services	53,321	$48.27	0.6%	42.1%
523	Securities, commodity contracts, investments	11,423	$44.10	0.6%	40.0%
5417	Scientific research and development	18,101	$46.57	0.8%	39.5%
3364	Aerospace manufacturing	85,452	$49.21	0.1%	39.4%

Over 84 percent of software publishing jobs paid $54.00 or more, while almost 28 percent of FTE jobs in limited-service eating places paid below $12.00 per hour.

Job growth by hourly wage for 2018 in terms of total jobs added is shown in *Figure 6-15*. Overall, there was faster job growth in higher-wage categories in 2018.

- The number of jobs paying below $12.00 per hour declined again by a large amount (-45,905 or -29 percent). Again, the higher minimum wage and a tight labor market played a role.

- In the next seven wage ranges stretching from $12.00 to $17.99 per hour to $48.00 to $53.99 per hour), the number of jobs grew between 1.9 percent and 4.6 percent.

- At the top of the wage distribution, jobs paying $54.00 or more increased by over 39,000 (10 percent). Every major industry added high-wage jobs. Also for the third year in a row, e-commerce was the single largest source of higher-wage jobs, with information services (which includes software publishing and ISP providers) a close second.

Figure 6-15. Change in FTE jobs by hourly wage range, 2018 dollars
Washington state, 2017 to 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
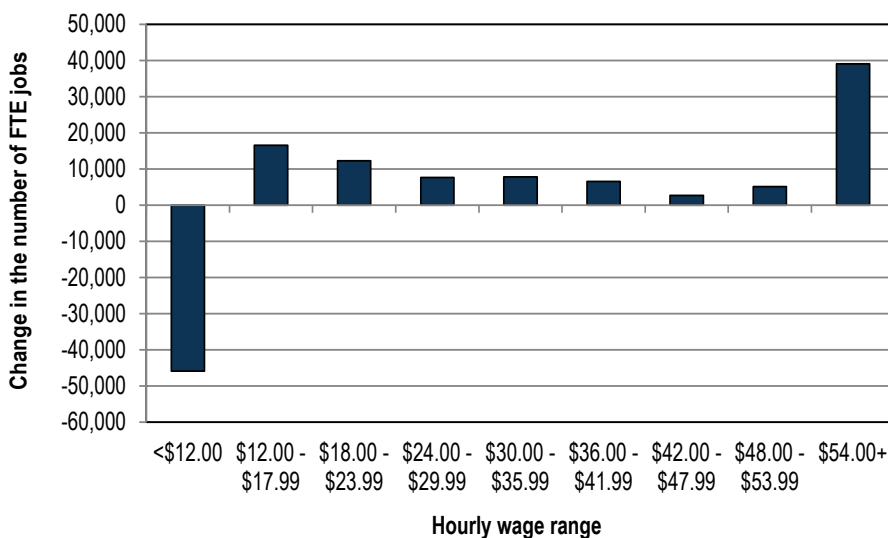
Job gains were largest in two wage ranges in 2017: the highest and the next to lowest.

Figures 6-16 and *6-17* provide a longer-term look at the total change and percentage change in jobs in the nine wage ranges going back to 2001. During that time, the number of high-wage jobs ($54.00 and higher) grew by 183 percent. While many of these net new jobs were in industries well-known for higher-wage jobs (e.g., software, healthcare, electronic shopping, aerospace and computer systems design), other industries like information services excluding software, K-12 education, local government excluding education and wholesale trade were also major sources.

In summary, wages improved in 2018 with across-the-board gains and continued to grow faster than the national average. The median hourly wage hit an all-time high. Wage gains were more pronounced at the higher and lower end. The result was an increase in wage inequality. Since 2001, there has been a marked shift towards more higher-wage jobs. While total FTE employment grew by 29 percent, the number of jobs paying below $42.00 per hour increased at by 12 percent, while jobs paying above that mark grew much faster at 118 percent.

A final note: the median hourly wage increased in all but four counties in 2018. Nine counties saw their median increase by at least 3 percent (up from five in 2017): Kittitas (4.9 percent), King (4.7 percent), Klickitat (4.7 percent), Garfield (4.4 percent), Lewis (4.4 percent), Cowlitz (4.2 percent), Thurston (4.1 percent), Stevens (3 percent) and Asotin (3 percent). Only Skamania (-0.6 percent), Ferry (-0.6 percent), Benton (-1.3 percent) and Adams (-1.5 percent) suffered a decline. County median wages ranged from King ($33.26 per hour) to Okanogan ($16.50 per hour). Over the longer term, since 2007, Klickitat had the largest increase in the median wage (+27 percent). All counties had an increase over that time period, as shown in *Figure 6-18*.

Figure 6-16. Change in FTE employment by hourly wage range, 2018 dollars
Washington state, 2001 to 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
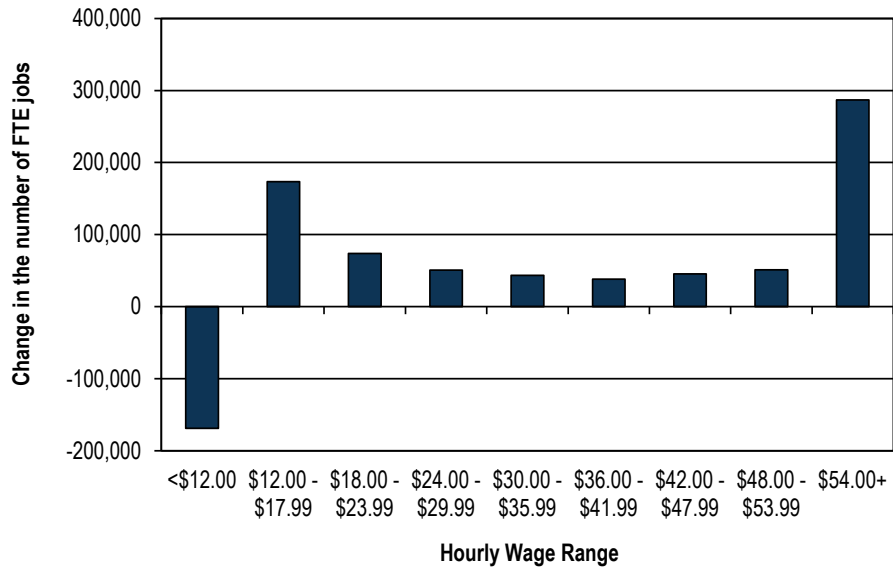
Employment growth over the past sixteen years was heavily weighted on the higher end of the wage scale.

Figure 6-17. Percent change in FTE employment by hourly wage range, 2018 dollars
Washington state, 2001 to 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
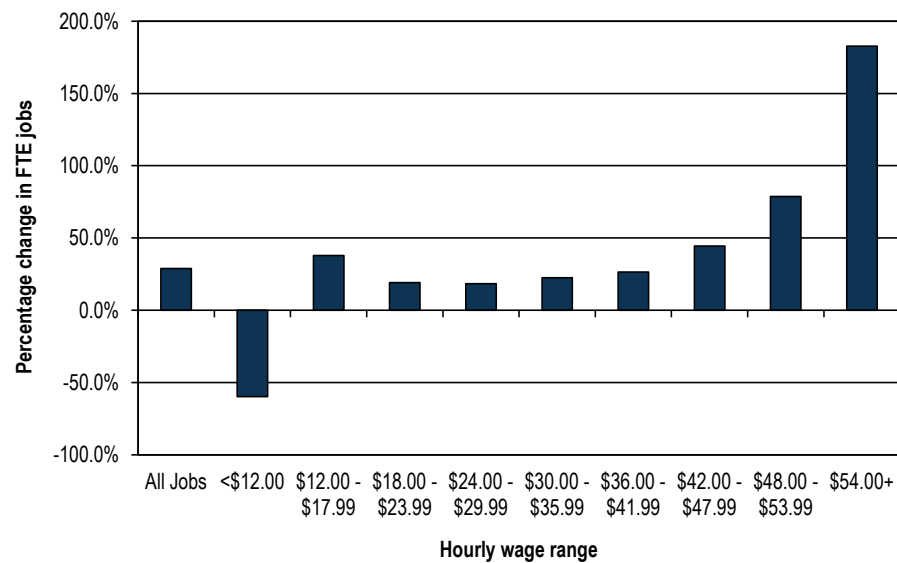
The number of high-wage jobs almost tripled from 2001 to 2018.

Figure 6-18. Change in median hourly wage range, 2018 dollars
Washington state, 2001 to 2018
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse
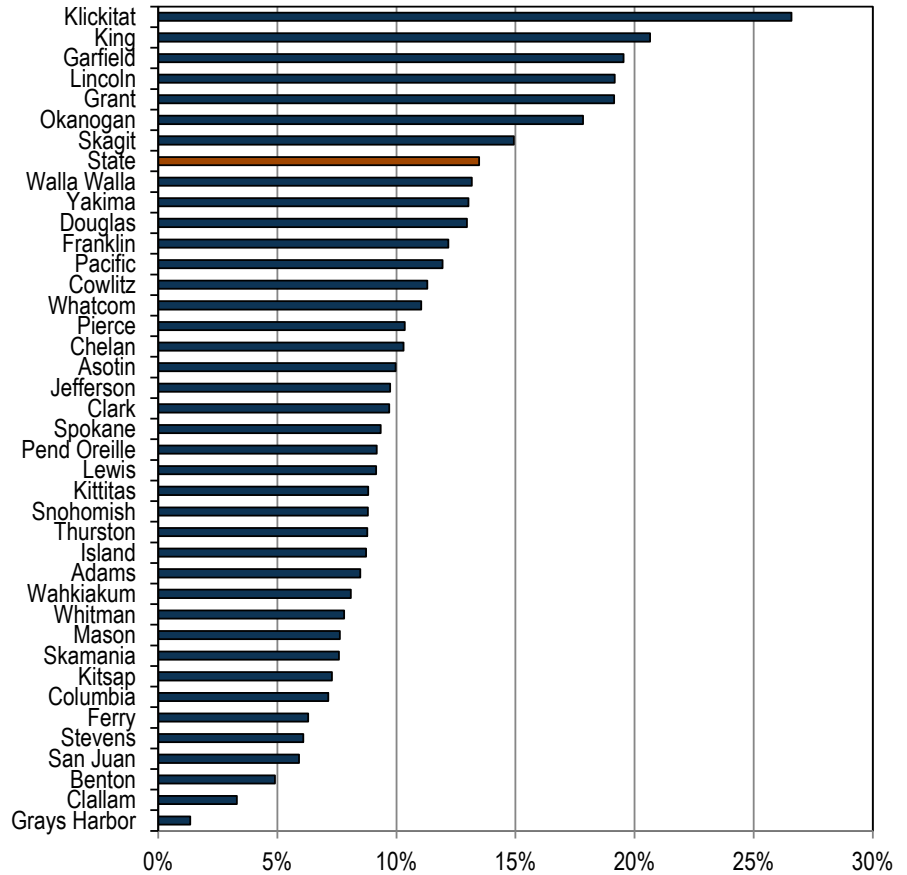
The median hourly wage increased in every county from 2007 to 2018. Only six counties exceeded the state's gain of 13.5 percent, led by Klickitat County.

Personal and per capita income[24]

Personal income is the sum of earned income (from owning a business or holding a job), investment income and transfer payments chiefly from government programs such as Social Security, Medicare and Medicaid, welfare, food stamps, Supplemental Security Income (SSI) and unemployment benefits. Per capita personal income is the total personal income of an area divided by the population of the area. Since per capita income is an average, it is influenced by factors such as relative concentration of high-income households, family size and the number of retirees in an area.

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[24] All data on personal and per capita income are produced by the U.S. Bureau of Economic Analysis; inflation adjustment provided by Employment Security Department/LMEA.

Per capita income, as shown in *Figure 6-19*, reached $62,026 in 2018, third among states. Income increased for the fifth straight year, and the rate of growth – 3.1 percent – was the third fastest in the country. Historically, the state's per capita income has been 5 to 8 percent above the U.S., but the margin has widened over the past five years from 7.6 percent to 13.9 percent in 2018.

Total personal income was estimated at $467 billion in 2018, up 5.3 percent from 2017. Changes in income over the past few years can be clarified by disaggregating income into its three major components.

First, total *earned income*, which makes up almost two thirds of total income, rose by 5.8 percent in 2018, the fifth year in a row of strong growth. Growth of per capita earnings accelerated from 2016's 2.8 percent to 3.5 percent in 2017 and 3.9 percent in 2018, with the total reaching $38,723. Earned income accounted for 70 percent of total personal income in 2000, but since then its share has declined to 62 percent. It will likely continue to ebb over the next decade due in large part to the aging population.

Investment income correlates strongly with the stock market and secondarily with interest rates. It usually drops sharply in recessions (as it did in 2009 and 2010) and then stages strong recoveries before moderating during economic expansions. Thus, there was double-digit growth in 2011 and 2012, a slight decline in 2013, boom years in 2014 and 2015, and moderation the next three years. In 2018, investment income was just shy of $110 billion, which worked out to $14,564 on a per capita basis. However, investment income is highly concentrated in upper income households.[25]

From 1982 to 2007, total *transfer payments* grew along with the economy, consistently comprising about 13 percent of personal income. That share rose to 18 percent during the depths of the recession, as income maintenance payments and unemployment benefits increased, fell to 15 percent during the recovery, and has slipped to 14 percent despite the increase in Medicaid payments under the ACA

Figure 6-20 shows how transfer payments have changed over the long run, and since the depths of the recession in 2010. First, transfer payments have grown almost twice as fast as total personal income overall. Second, this has primarily been due to the increase in medical benefits – Medicare and Medicaid now comprise 40 percent of transfer payments, more than Social Security's 34 percent. Third, the growth in unemployment insurance benefits and family assistance (TANF) payments has been relatively modest over time. Both, along with Supplemental Nutrition Assistance (a.k.a. food stamps) expanded during the recession and contracted sharply during the recovery.

[25] According to the Federal Reserve Bank's 2016 Survey of Consumer Finances, the top 10 percent of families own two-thirds of the financial assets controlled by families, and the bottom 60 percent own less than 10 percent.

Figure 6-19. Personal income including transfer payments, in 2018 dollars
Washington state, selected years, 1990 to 2018
Source: Employment Security Department/LMEA; U.S. Bureau of Economic Analysis

Type of income	1990	2001	2007	2013	2014	2015	2016	2017	2018
Total personal income (billions)	**$169.24**	**$270.17**	**$329.60**	**$358.89**	**$382.10**	**$404.77**	**$423.52**	**$443.85**	**$467.40**
Earned income	$112.14	$183.63	$215.46	$230.27	$238.89	$251.69	$262.68	$276.72	$291.80
Investment income	$37.22	$52.47	$72.75	$74.26	$84.71	$93.11	$97.62	$103.09	$109.75
Transfer payments	$19.88	$34.06	$41.39	$54.36	$58.50	$59.97	$63.22	$64.04	$65.85
Social Security	$7.91	$11.43	$14.21	$18.64	$19.35	$20.36	$20.91	$21.39	$22.15
Other selected retirement and disability*	$2.03	$2.10	$2.42	$2.51	$2.56	$2.62	$2.59	$2.52	$2.44
Medical benefits	$5.32	$12.26	$15.99	$19.77	$23.54	$22.96	$25.28	$25.89	$26.96
Medicare	$2.87	$5.27	$8.45	$10.85	$11.32	$12.06	$12.58	$13.01	$13.62
Medicaid	$2.23	$6.69	$7.01	$8.25	$11.61	$10.32	$12.10	$12.25	$12.70
Other medical	$0.23	$0.30	$0.53	$0.67	$0.61	$0.58	$0.60	$0.62	$0.64
Income maintenance	$1.77	$2.63	$4.09	$5.77	$5.64	$6.16	$6.46	$6.36	$6.10
Supplemental Security Income (SSI)	$0.36	$0.71	$0.83	$1.06	$1.06	$1.07	$1.06	$1.04	$1.03
Earned Income Tax Credit	$0.15	$0.59	$0.74	$1.04	$1.08	$1.07	$1.07	$1.04	$1.00
Supplemental Nutrition Assist. (food stamps)	$0.33	$0.37	$0.73	$1.76	$1.58	$1.61	$1.42	$1.40	$1.23
Family assistance (AFDC/TANF)	$0.76	$0.59	$0.47	$0.39	$0.38	$0.37	$0.40	$0.40	$0.40
Other income assistance	$0.17	$0.38	$1.32	$1.52	$1.54	$2.03	$2.52	$2.49	$2.44
Unemployment benefits	$0.78	$1.90	$0.92	$1.94	$1.17	$1.07	$1.07	$1.07	$1.03
Veterans' benefits	$0.68	$1.10	$1.45	$2.39	$2.49	$2.78	$2.83	$3.00	$3.10
All other transfer payments	$1.39	$2.63	$2.31	$3.35	$3.76	$4.02	$4.09	$3.80	$4.07
Per capita personal income (dollars)	**$34,518**	**$45,135**	**$51,010**	**$51,544**	**$54,180**	**$56,504**	**$58,059**	**$59,774**	**$62,026**
Earned income	$22,872	$30,678	$33,345	$33,071	$33,873	$35,134	$36,010	$37,266	$38,723
Investment income	$7,592	$8,766	$11,259	$10,665	$12,011	$12,998	$13,383	$13,883	$14,564
Transfer payments	$4,054	$5,691	$6,405	$7,807	$8,296	$8,372	$8,667	$8,625	$8,738
Social Security	$1,614	$1,910	$2,199	$2,677	$2,743	$2,842	$2,866	$2,881	$2,940
Other selected retirement and disability*	$414	$352	$374	$361	$363	$366	$355	$340	$324
Medical benefits	$1,086	$2,049	$2,475	$2,839	$3,338	$3,205	$3,465	$3,486	$3,577
Medicare	$585	$880	$1,308	$1,558	$1,604	$1,683	$1,724	$1,752	$1,807
Medicaid	$454	$1,118	$1,085	$1,185	$1,647	$1,440	$1,659	$1,650	$1,685
Other medical	$46	$51	$82	$96	$87	$81	$82	$84	$85
Income maintenance	$361	$440	$633	$829	$799	$860	$886	$857	$809
Supplemental Security Income (SSI)	$73	$118	$129	$152	$151	$150	$145	$140	$137
Earned Income Tax Credit	$30	$98	$114	$150	$152	$150	$147	$140	$133
Supplemental Nutrition Assist. (food stamps)	$68	$62	$112	$253	$224	$225	$194	$188	$163
Family assistance (AFDC/TANF)	$155	$98	$73	$55	$54	$52	$54	$54	$52
Other income assistance	$34	$63	$205	$218	$218	$284	$345	$335	$324
Unemployment benefits	$158	$318	$142	$279	$166	$150	$146	$144	$137
Veterans' benefits	$139	$183	$225	$343	$353	$388	$387	$405	$412
All other transfer payments	$283	$439	$357	$480	$533	$561	$561	$512	$540

*Includes railroad retirement and disability benefits, workers' compensation benefits, and other government retirement and disability benefits. Does not include private pension benefits.

Earned income has shown strong growth over the past four years.

Figure 6-20. Per capita transfer payments in 2018 constant dollars, and components as a percent of total
Washington state, 1969, 2010 and 2018
Source: U.S. Bureau of Economic Analysis; inflation adjustment by Employment Security Department/LMEA

Type of transfer payment	1969	2010	2018	1969	2010	2018
Total transfer payments (billions)	**$5.8**	**$56.7**	**$65.8**	**-**	**-**	**-**
Percent of total personal income	8%	17%	14%	-	-	-
Total per capita transfer payments	$1,741	$8,409	$8,738	100%	100%	100%
Social Security	$709	$2,461	$2,940	41%	29%	34%
Other selected retirement and disability*	$134	$388	$324	8%	5%	4%
Medical benefits	$285	$2,795	$3,577	16%	33%	41%
Medicare	$165	$1,495	$1,807	9%	18%	21%
Medicaid	$0	$1,195	$1,685	0%	14%	19%
Other medical	$119	$105	$85	7%	1%	1%
Income maintenance	$182	$979	$809	10%	12%	9%
Supplemental Security Income (SSI)	$52	$148	$137	3%	2%	2%
Earned Income Tax Credit	$0	$148	$133	0%	2%	2%
Supplemental Nutritiopn Assist. (food stamps)	$14	$242	$163	1%	3%	2%
Family assistant (AFDC/TANF)	$91	$149	$52	5%	2%	1%
Other income assistance	$25	$293	$324	1%	3%	4%
Unemployment benefits	$96	$723	$137	6%	9%	2%
Veterans' benefits	$196	$282	$412	11%	3%	5%
All other transfer payments	$140	$780	$540	8%	9%	6%

*Includes railroad retirement and disability benefits, workers' compensation benefits, and other government retirement and disability benefits. Does not include private pension benefits.

Over the past 49 years, the dollar amount and share of transfer payments going to medical benefits has exploded, while the share going to Social Security, family assistance, unemployment insurance benefits and veterans' benefits has declined.

Chapter 7: Economic comparisons with other states

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

- *Figure 7-1* shows the growth of the minimum wage in Washington state compared to other states. Currently, Washington state has the second highest minimum wage of $12.00 per hour with only the District of Columbia with a higher rate of $14.00.

- *Figure 7-2* depicts the unemployment rate for Washington compared to ot¬her states and the nation. In 2018, Washington state was in 42nd place.

- *Figure 7-3* shows the average annual job growth rate of each state. As of 2018, Washington state had an average annual job growth rate of 1.20 percent, placing eighth in the nation.

- *Figure 7-4* ranks annual exports for each state. In 2018, Washington continues to maintain fourth place with over $77 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 2008 and 2018. Washington ranks ninth for income and third for growth.

- *Figure 7-6* shows the number of building permits for 2008 and 2018. Washington ranked seventh in 2008 and sixth in 2018.

- *Figure 7-7* shows median single-family house prices in metropolitan statistical areas (MSAs) as well as the rate of change between 2016 and 2018. 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 $501,400 and a 21 percent rate of change between 2016 and 2018. The Kennewick-Richland MSA, Spokane-Spokane Valley MSA and Yakima MSA were in 43rd, 61st, and 71st 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, 2009, 2014 and 2019
Source: U.S. Department of Labor

Rank	State	2009	2014	2019
	United States	$5.85	$7.25	$7.25
1	District of Columbia	$7.55	$9.50	$14.00
2	Massachusetts	$8.00	$8.00	$12.00
2	Washington	$8.55	$9.32	$12.00
3	Oregon	$8.40	$9.10	$11.25
4	Colorado	$7.28	$8.00	$11.10
4	New York	$7.15	$8.00	$11.10
5	Arizona	$7.25	$7.90	$11.00
5	California	$8.00	$9.00	$11.00
5	Maine	$7.25	$7.50	$11.00
6	Vermont	$8.06	$8.73	$10.78
7	Rhode Island	$7.40	$8.00	$10.50
8	Connecticut	$8.00	$8.70	$10.10
8	Hawaii	$7.25	$7.25	$10.10
8	Maryland	$6.55	$7.25	$10.10
9	New Jersey	$7.15	$8.25	$10.00
10	Alaska	$7.15	$7.75	$9.89
11	Minnesota	$6.15	$8.00	$9.86
12	Michigan	$7.40	$8.15	$9.45
13	Arkansas	6.25	$6.25	$9.25
14	South Dakota	$6.55	$7.25	$9.10
15	Nebraska	$6.55	$7.25	$9.00
16	Delaware	$7.15	$7.75	$8.75
16	West Virginia	$7.25	$7.25	$8.75
17	Missouri	$7.05	$7.50	$8.60
18	Ohio	$7.30	$7.95	$8.55
19	Montana	$6.90	$7.90	$8.50
20	Florida	$7.21	$7.93	$8.46
21	Illinois	$8.00	$8.25	$8.25
21	Nevada	$6.85	$8.25	$8.25
22	New Mexico	$7.50	$7.50	$7.50

Figure 7-2. Highest and lowest state unemployment rates, not seasonally adjusted, based on 2018 ranking
United States and Washington state, 2008, 2013 and 2018
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Unemployment Rates

Rank	State	2008	2013	2018
	United States	$5.8%	$7.4%	$3.9
1	Hawaii	4.3%	4.9%	2.4%
2	Iowa	4.2%	4.7%	2.5%
2	New Hampshire	3.9%	5.1%	2.5%
4	North Dakota	3.2%	2.9%	2.6%
5	Vermont	4.7%	4.4%	2.7%
6	Idaho	5.1%	6.1%	2.8%
6	Nebraska	3.3%	3.8%	2.8%
8	Minnesota	5.4%	5.0%	2.9%
9	South Dakota	3.1%	3.8%	3.0%
9	Virginia	3.9%	5.7%	3.0%
9	Wisconsin	4.9%	6.7%	3.0%
12	Utah	3.6%	4.6%	3.1%
31	Connecticut	5.7%	7.8%	4.1%
31	Michigan	8.0%	8.8%	4.1%
31	New Jersey	5.3%	8.2%	4.1%
31	New York	5.4%	7.7%	4.1%
31	Rhode Island	7.8%	9.3%	4.1%
31	Wyoming	3.1%	4.7%	4.1%
37	California	7.3%	8.9%	4.2%
37	Oregon	6.5%	7.9%	4.2%
39	Illinois	6.3%	9.0%	4.3%
39	Kentucky	6.4%	8.0%	4.3%
39	Pennsylvania	5.3%	7.4%	4.3%
42	**Washington**	**5.4%**	**7.0%**	**4.5%**
43	Nevada	6.7%	9.6%	4.6%
43	Ohio	6.4%	7.5%	4.6%
45	Arizona	6.2%	7.7%	4.8%
45	Mississippi	6.6%	8.5%	4.8%
47	Louisiana	4.9%	6.7%	4.9%
47	New Mexico	4.5%	6.9%	4.9%
49	West Virginia	4.3%	6.8%	5.3%
50	District of Columbia	6.5%	8.5%	5.6%
51	Alaska	6.7%	7.0%	6.6%

Figure 7-3. Highest and lowest state average annual job growth rates, nonfarm employment
United States and Washington state, 2000 to 2018
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

Nonfarm Employment

Rank	State	Average annual growth rate
	United States	**0.72%**
1	Utah	1.93%
2	Nevada	1.68%
3	North Dakota	1.57%
4	Texas	1.56%
5	Idaho	1.54%
6	Arizona	1.35%
7	Florida	1.22%
8	**Washington**	**1.20%**
9	Colorado	1.16%
10	Montana	1.11%
11	Dist. of Columbia	1.10%
38	Kansas	0.28%
39	Missouri	0.27%
40	Wisconsin	0.27%
41	Indiana	0.25%
42	Maine	0.23%
43	Rhode Island	0.22%
44	New Jersey	0.22%
45	Louisiana	0.18%
46	Illinois	0.07%
47	Mississippi	0.00%
48	Connecticut	-0.01%
49	Ohio	-0.06%
50	West Virginia	-0.07%
51	Michigan	-0.31%

Figure 7-4. Highest and lowest state annual exports,* based on 2018 ranking
United States and Washington state, 2008, 2013 and 2018
Source: U.S. Department of Commerce, Office of Trade and Economic Analysis

Rank	State	2008	2013	2018
	United States	$1,287,441,996,730	$1,578,516,879,950	$1,665,992,031,822
1	Texas	$192,221,780,916	$277,715,515,839	$315,938,509,210
2	California	$144,805,748,349	$168,191,551,560	$178,181,052,789
3	New York	$81,385,735,231	$86,407,154,917	$84,683,200,233
4	Washington	$54,498,049,919	$81,629,977,930	$77,968,221,479
5	Louisiana	$41,908,136,496	$63,247,023,570	$67,297,074,920
6	Illinois	$53,677,477,963	$66,212,888,783	$65,491,406,440
7	Michigan	$45,135,506,345	$59,399,808,175	$58,034,773,175
8	Florida	$54,238,239,529	$60,482,238,924	$57,236,644,391
9	Ohio	$45,627,982,845	$51,048,198,341	$54,403,829,149
10	Pennsylvania	$34,648,502,042	$41,180,765,931	$41,192,635,837
42	Idaho	$5,005,251,812	$5,789,446,916	$4,021,659,326
43	New Mexico	$2,782,906,663	$2,726,138,754	$3,656,825,525
44	Vermont	$3,697,411,932	$4,026,539,545	$2,919,968,390
45	Maine	$3,016,395,471	$2,686,755,180	$2,836,567,855
46	District of Columbia	$1,195,906,725	$2,707,702,081	$2,724,645,751
47	Rhode Island	$1,974,431,973	$2,164,107,517	$2,406,562,366
48	Montana	$1,394,600,906	$1,505,796,258	$1,666,403,163
49	South Dakota	$1,653,712,654	$1,582,153,214	$1,436,683,296
50	Wyoming	$1,081,014,094	$1,350,619,355	$1,356,922,150
51	Hawaii	$959,607,734	$598,738,461	$659,774,596

*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.

Annual Exports

Figure 7-5. Highest and lowest state per capita personal income,* in 2018 dollars, based on 2018 ranking
United States and Washington state, 2008 and 2018
Source: U.S. Bureau of Economic Analysis

Personal Income

Rank	State	2008	2018	Average annual growth rate
	United States	**$40,904**	**$54,446**	**2.7%**
1	California	$43,890	$63,557	3.5%
2	New York	$48,328	$68,668	3.6%
3	**Washington**	**$44,558**	**$62,026**	**3.1%**
4	Massachusetts	$51,916	$71,683	3.0%
5	North Dakota	$40,384	$55,452	2.8%
6	Oregon	$37,067	$50,843	3.0%
7	Colorado	$42,689	$58,456	2.9%
8	Utah	$33,857	$46,320	2.9%
9	Michigan	$35,700	$48,423	2.9%
10	Pennsylvania	$41,512	$56,225	2.8%
42	Kansas	$40,791	$51,471	2.0%
43	Connecticut	$61,165	$76,456	2.0%
44	Arizona	$35,563	$44,329	2.0%
45	Alaska	$47,749	$59,420	2.2%
46	New Mexico	$33,443	$41,609	2.1%
47	Wyoming	$48,593	$60,361	2.2%
48	Mississippi	$30,479	$37,834	2.2%
49	North Carolina	$37,687	$46,117	1.9%
50	Louisiana	$37,891	$46,242	1.9%
51	Oklahoma	$38,568	$46,233	1.8%

* Per capita personal income is total personal income divided by total mid-year population.
 Note – All dollar estimates are in current dollars (not adjusted for inflation). Calculations are
 performed on unrounded data.
Last updated: September 24, 2019 -- revised statistics for 1998-2018.

Figure 7-6. Highest and lowest states in number of authorized privately owned building permits, based on 2008 ranking
United States and Washington state, 2008 and 2018
Source: U.S. Census Bureau

Rank	State	2008 building permits	2018 building permits	Percent change 2008 to 2018
	United States	905,359	1,328,827	46.8%
1	Texas	129,523	192,878	48.9%
2	California	62,681	113,502	81.1%
3	**Florida**	**61,042**	**144,427**	**136.6%**
4	North Carolina	54,652	71,691	31.2%
5	New York	51,637	37,778	-26.8%
6	Georgia	35,368	59,315	67.7%
7	**Washington**	**28,919**	**47,746**	**65.10%**
8	Virginia	27,577	31,977	16.0%
9	Arizona	26,082	41,664	59.7%
10	South Carolina	25,918	35,487	36.9%
42	West Virginia	3,481	2,887	-17.1%
43	Delaware	3,346	6,003	79.4%
44	New Hampshire	3,234	4,445	37.4%
45	North Dakota	2,833	3,211	13.3%
46	Wyoming	2,669	1,812	-32.1%
47	Montana	2,376	5,099	114.6%
48	Vermont	1,444	2,080	44.0%
49	Rhode Island	1,058	1,294	22.3%
50	Alaska	901	1,677	86.1%
51	District of Columbia	536	4,615	761.0%

Building Permits

Home Prices

Figure 7-7. Median single-family house prices in thousands, based on 2018 ranking
Selected U.S. metropolitan areas, 2016 and 2018
Source: National Association of Realtors

Rank	Metropolitan area	2016	2018	Percent change 2016 to 2018
	United States	**$235,500**	**$261,600**	**11.1%**
1	San Jose-Sunnyvale-Santa Clara, CA	$1,020,500	$1,340,000	31.3%
2	San Francisco-Oakland-Hayward, CA	$828,000	$987,500	19.3%
3	Anaheim-Santa Ana-Irvine, CA	$735,000	$820,000	11.6%
4	Urban Honolulu, HI	$733,500	$802,700	9.4%
5	San Diego-Carlsbad, CA	$559,000	$634,000	13.4%
6	Boulder, CO	$511,700	$607,400	18.7%
7	Los Angeles-Long Beach-Glendale, CA	$509,000	$590,800	16.1%
8	**Seattle-Tacoma-Bellevue, WA**	**$414,500**	**$501,400**	**21.0%**
9	Boston-Cambridge-Newton, MA-NH	$421,100	$477,400	13.4%
10	Nassau County-Suffolk County, NY	$437,500	$476,900	9.0%
17	Portland-Vancouver-Hillsboro, OR-WA	$351,200	$395,700	12.7%
29	Salem, OR	$237,200	$294,800	24.3%
43	**Kennewick-Richland, WA**	**$222,700**	**$276,900**	**24.3%**
61	**Spokane-Spokane Valley, WA**	**$207,200**	**$239,500**	**15.6%**
71	**Yakima, WA**	**$188,600**	**$226,800**	**20.3%**
172	Binghamton, NY	$108,400	$121,100	11.7%
173	Wichita Falls, TX	$111,800	$120,000	7.3%
174	Erie, PA	$114,900	$118,700	3.3%
175	Elmira, NY	$116,100	$111,200	-4.2%
176	Cumberland, MD-WV	$88,800	$100,500	13.2%
177	Youngstown-Warren-Boardman, OH-PA	$84,400	$94,000	11.4%
178	Decatur, IL	$93,300	$90,800	-2.7%

Appendices

Appendix 1. Washington's workforce development areas

Appendix figure A1-1. Washington state workforce development aeas (WDAs)
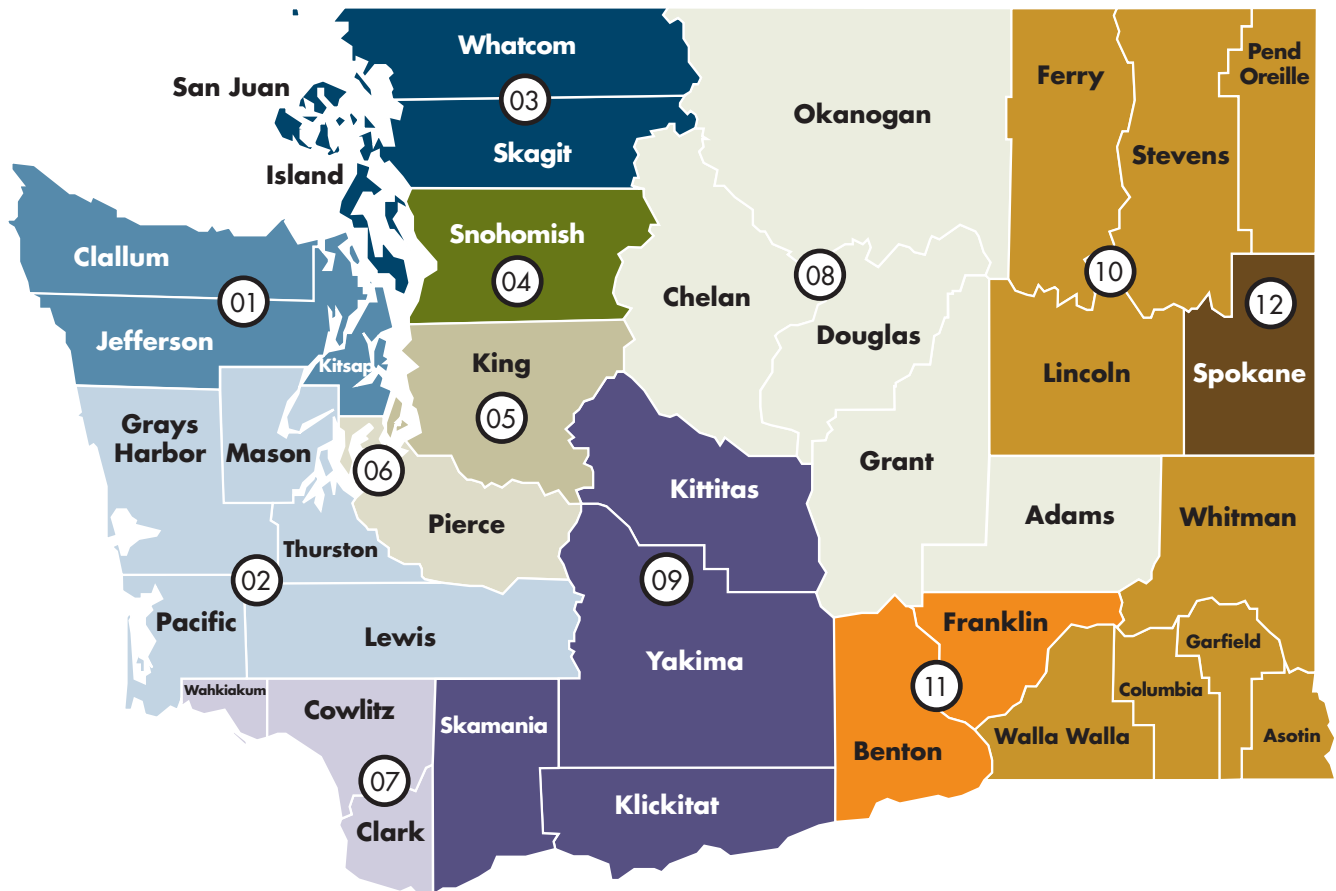
WDA 1 – Olympic Consortium

WDA 2 – Pacific Mountain

WDA 3 – Northwest Washington

WDA 4 – Snohomish

WDA 5 – Seattle-King

WDA 6 – Tacoma-Pierce

WDA 7 – Southwest Washington

WDA 8 – North Central Washington

WDA 9 – South Central Washington

WDA 10 – Eastern Washington

WDA 11 – Benton-Franklin

WDA 12 – Spokane

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, 1990 to 2018
Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics,
Quarterly Census of Employment and Wages
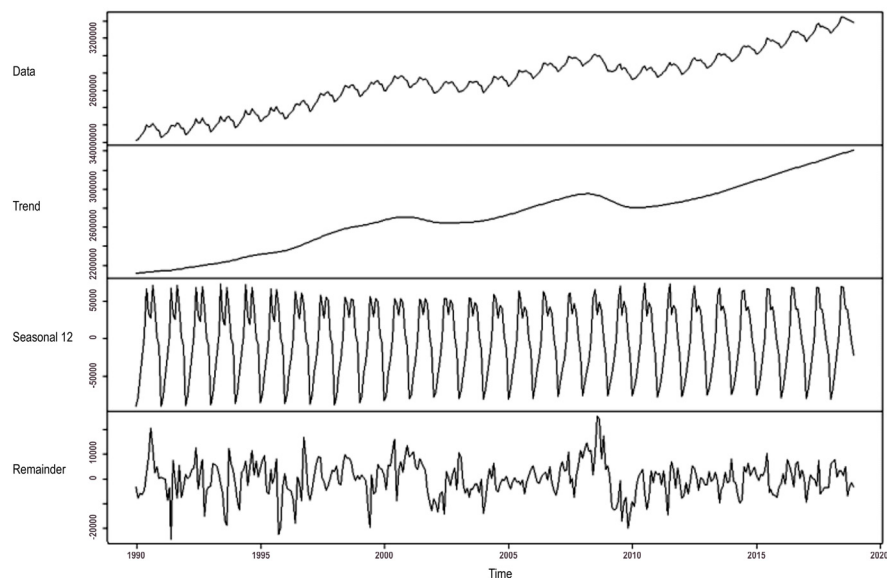
We used a state space model with auto selection of model variations (types of error, trend and seasonality). Model variations can be additive, multiplicative, none, etc. The software also includes the choice of 30 exponential smoothing variations. The main advantage of this type of approach lies in the 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)[26] and multiplying by 1,600. For our purpose, for all series regardless of the model selected, the HP filter chooses s to minimize:

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

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 (14.6 percent) was ambulatory healthcare services, while scenic and sightseeing transportation had the highest cyclical component contribution (65.7 percent). The structural component (trend) accounted for the dominant share of change in total employment (77.4 percent), while the cyclical component accounted for the residual (21.6 percent).

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[26]　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, 1990 to 2018
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**	**1.51%**	**Low**	**4,269**	**1,176**	**78.4%**	**21.6%**
111	Crop production	36.27%	High	89	163	35.4%	64.6%
112	Animal production	2.88%	Moderate	7	8	47.0%	53.0%
113	Forestry and logging	3.08%	Moderate	20	12	61.3%	38.7%
114	Fishing, hunting and trapping	7.79%	High	6	6	49.3%	50.7%
115	Support activities for agriculture and forestry	15.43%	High	56	48	53.8%	46.2%
212	Mining (except oil and gas)	3.73%	Moderate	9	6	61.7%	38.3%
213	Support activities for mining	8.67%	High	1	2	39.9%	60.1%
221	Utilities	1.17%	Low	9	9	49.7%	50.3%
236	Construction of buildings	3.26%	Moderate	166	66	71.5%	28.5%
237	Heavy and civil engineering construction	8.63%	High	49	27	64.2%	35.8%
238	Specialty trade contractors	3.64%	Moderate	418	148	73.8%	26.2%
311	Food manufacturing	4.77%	High	41	29	58.6%	41.4%
312	Beverage and tobacco product manufacturing	4.58%	High	23	8	75.0%	25.0%
313	Textile mills	1.77%	Low	2	2	44.9%	55.1%
314	Textile product mills	1.51%	Low	7	5	57.7%	42.3%
315	Apparel manufacturing	2.32%	Moderate	14	10	59.3%	40.7%
316	Leather and allied product manufacturing	4.17%	High	1	2	42.2%	57.8%
321	Wood product manufacturing	1.26%	Low	50	37	57.5%	42.5%
322	Paper manufacturing	0.93%	Not seasonal	28	14	66.3%	33.7%
323	Printing and related support activities	0.78%	Not seasonal	27	13	66.7%	33.3%
324	Petroleum and coal products manufacturing	1.91%	Low	4	6	41.9%	58.1%
325	Chemical manufacturing	0.70%	Not seasonal	15	10	60.1%	39.9%
326	Plastics and rubber products manufacturing	1.14%	Low	24	14	62.8%	37.2%
327	Nonmetallic mineral product manufacturing	2.46%	Moderate	19	11	62.3%	37.7%
331	Primary metal manufacturing	0.74%	Not seasonal	37	19	65.6%	34.4%
332	Fabricated metal product manufacturing	0.99%	Not seasonal	44	31	58.8%	41.2%
333	Machinery manufacturing	0.71%	Not seasonal	46	31	59.4%	40.6%
334	Computer and electronic product manufacturing	0.47%	Not seasonal	81	55	59.6%	40.4%
335	Electrical equipment, appliance and component manufacturing	1.25%	Low	27	23	53.9%	46.1%
3364	Aerospace product and parts manufacturing	0.97%	Not seasonal	376	303	55.4%	44.6%
3366	Ship and boat building	0.63%	Not seasonal	43	24	63.9%	36.1%
336*	Other transportation equipment manufacturing	1.00%	Not seasonal	24	23	51.8%	48.2%
337	Furniture and related product manufacturing	1.33%	Low	23	13	63.1%	36.9%
339	Miscellaneous manufacturing	1.20%	Low	20	13	60.4%	39.6%

NAICS	Industry	Seasonal factor	Level of seasonality	Trend (average number)	Cycle (average number)	Trend (percent)	Cycle (percent)
423	Merchant wholesalers, durable goods	0.54%	Not seasonal	121	57	68.1%	31.9%
424	Merchant wholesalers, nondurable goods	1.77%	Low	46	28	62.1%	37.9%
425	Wholesale electronic markets and agents and brokers	1.17%	Low	68	27	71.6%	28.4%
441	Motor vehicle and parts dealers	1.15%	Low	71	35	67.2%	32.8%
442	Furniture and home furnishings stores	1.82%	Low	22	18	55.0%	45.0%
443	Electronics and appliance stores	2.50%	Moderate	21	24	46.9%	53.1%
444	Building material and garden equip. and supplies dealers	3.66%	Moderate	57	27	67.6%	32.4%
445	Food and beverage stores	1.54%	Low	69	64	51.8%	48.2%
446	Health and personal care stores	1.30%	Low	14	16	45.9%	54.1%
447	Gasoline stations	1.86%	Low	16	13	55.1%	44.9%
448	Clothing and clothing accessories stores	4.52%	High	52	50	50.6%	49.4%
451	Sporting goods, hobby, book and music stores	3.65%	Moderate	32	23	58.0%	42.0%
452	General merchandise stores	3.66%	Moderate	143	72	66.5%	33.5%
453	Miscellaneous store retailers	1.89%	Low	56	16	77.6%	22.4%
454	Nonstore retailers	1.91%	Low	161	69	70.1%	29.9%
481	Air transportation	0.91%	Not seasonal	41	19	68.5%	31.5%
483	Water transportation	3.57%	Moderate	5	5	52.2%	47.8%
484	Truck transportation	2.39%	Moderate	36	23	61.4%	38.6%
485	Transit and ground passenger transportation	3.09%	Moderate	11	9	57.0%	43.0%
486	Pipeline transportation	1.60%	Low	1	1	40.6%	59.4%
487	Scenic and sightseeing transportation	18.57%	High	3	5	34.3%	65.7%
488	Support activities for transportation	1.01%	Low	35	28	55.3%	44.7%
491	Postal service	0.95%	Not seasonal	24	12	66.1%	33.9%
492	Couriers and messengers	4.74%	High	42	28	59.9%	40.1%
493	Warehousing and storage	3.33%	Moderate	44	35	55.5%	44.5%
5112	Software publishers	0.97%	Not seasonal	173	46	79.0%	21.0%
511*	Other publishers	0.65%	Not seasonal	36	17	67.9%	32.1%
512	Motion picture and sound recording industries	4.34%	High	12	13	48.8%	51.2%
515	Broadcasting (except Internet)	0.96%	Not seasonal	7	8	46.6%	53.4%
5171	Wired telecommunications carriers	0.92%	Not seasonal	44	28	60.9%	39.1%
5172	Wireless telecommunications carriers (except satellite)	1.77%	Low	46	27	62.9%	37.1%
517*	Other telecommunications	2.84%	Moderate	26	18	59.0%	41.0%
518	Data processing, hosting and related services	1.49%	Low	41	31	57.0%	43.0%
519	Other information services	3.74%	Moderate	65	28	69.7%	30.3%
521	Monetary Authorities-Central Bank	1.02%	Low	1	1	48.3%	51.7%
522	Credit intermediation and related activities	0.31%	Not seasonal	99	75	56.7%	43.3%
523	Securities, commodity contracts, and other financial investments and related activities	0.50%	Not seasonal	26	18	58.6%	41.4%
524	Insurance carriers and related activities	0.41%	Not seasonal	50	35	58.6%	41.4%
525	Funds, trusts, and other financial vehicles	5.70%	High	5	5	51.4%	48.6%

NAICS	Industry	Seasonal factor	Level of seasonality	Trend (average number)	Cycle (average number)	Trend (percent)	Cycle (percent)
531	Real estate	1.43%	Low	63	24	72.1%	27.9%
532	Rental and leasing services	2.51%	Moderate	34	12	73.7%	26.3%
533	Lessors of nonfinancial intangible assets (except copyrighted works)	3.38%	Moderate	3	2	57.0%	43.0%
541	Professional, scientific and technical services	0.41%	Not seasonal	341	146	70.1%	29.9%
551	Management of companies and enterprises	0.49%	Not seasonal	91	46	66.3%	33.7%
561	Administrative and support services	3.14%	Moderate	376	186	66.9%	33.1%
562	Waste management and remediation services	0.91%	Not seasonal	32	28	52.9%	47.1%
611	Educational services	4.85%	High	347	94	78.6%	21.4%
621	Ambulatory healthcare services	0.34%	Not seasonal	254	43	85.4%	14.6%
622	Hospitals	0.32%	Not seasonal	186	61	75.3%	24.7%
623	Nursing and residential care facilities	0.39%	Not seasonal	70	31	69.4%	30.6%
624	Social Assistance	1.15%	Low	276	221	55.5%	44.5%
711	Performing arts, spectator sports and related Industries	9.17%	High	22	16	56.9%	43.1%
712	Museums, historical sites, and similar institutions	3.72%	Moderate	7	6	55.4%	44.6%
713	Amusement, gambling and recreation industries	4.55%	High	80	50	61.2%	38.8%
721	Accommodation	5.68%	High	46	35	57.3%	42.7%
722	Food services and drinking places	2.05%	Moderate	366	94	79.6%	20.4%
811	Repair and maintenance	1.03%	Low	34	22	60.4%	39.6%
812	Personal and laundry services	1.12%	Low	42	15	73.4%	26.6%
813	Religious, grantmaking, civic, professional and similar organizations	2.23%	Moderate	41	19	68.7%	31.3%
814	Private households	6.50%	High	320	227	58.5%	41.5%
901	Federal government (other)	1.58%	Low	56	57	49.5%	50.5%
902	State government (other)	1.06%	Low	58	48	54.4%	45.6%
903	Local government (other)	2.11%	Moderate	212	77	73.4%	26.6%

* Wild card symbol indicates the component of an economic subsector (3-digit NAICS) without the component of its industry groups (4-digit NAICS) that are listed separately in this figure.

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

Appendix figure A2-3 represents an attempt to connect employment time series for specific industries with time series of total covered employment. The third column represents correlations of series of monthly employment between industries and total employment, while the fourth column represents correlations of the first differences (monthly changes) for the same series.

The fifth column 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 sixth 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 only 9 of 97 industries have the indicator "yes." This year, 23 of 97 industries have an indicator of "yes." The difference in the number of industries is due to the fact that last year we analyzed original series, while this year we analyzed the trend-cycle components of the series.

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 chemical manufacturing; fabricated metal product manufacturing; machinery manufacturing; merchant wholesalers, durable goods; motor vehicles and parts dealers; building material and garden equipment and supplies dealers; miscellaneous store retailers and personal and laundry services.

Appendix figure A2-3. Relationships between industry and total employment
Washington state, 1990 to 2018
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	Signficant one-way impact
000	**Total covered employment**	**100.0%**	**100.0%**	**NA**	**NA**	**NA**
111	Crop production	71.6%	5.9%	81.17	0	Yes
112	Animal production	89.5%	10.5%	118.74	0	No
113	Forestry and logging	-89.8%	36.1%	31.38	0	Yes
114	Fishing, hunting and trapping	-95.6%	-7.5%	7.48	0.01	Yes
115	Support activities for agriculture and forestry	96.6%	19.7%	21.23	0	Yes
212	Mining (except oil and gas)	-61.6%	67.5%	8.63	0	No
213	Support activities for mining	-22.6%	19.3%	18.27	0	No
221	Utilities	-62.1%	12.4%	0.84	0.36	No
236	Construction of buildings	67.8%	86.8%	0.01	0.92	No
237	Heavy and civil engineering construction	45.8%	78.4%	0.28	0.6	No
238	Specialty trade contractors	89.3%	90.5%	9.53	0	No
311	Food manufacturing	-29.4%	34.5%	54.9	0	No
312	Beverage and tobacco product manufacturing	83.4%	40.0%	49.5	0	No

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
313	Textile mills	-85.5%	23.8%	21.46	0	No
314	Textile product mills	-68.8%	33.2%	19.57	0	No
315	Apparel manufacturing	-82.8%	37.5%	67.92	0	No
316	Leather and allied product manufacturing	-86.3%	-7.9%	81.06	0	No
321	Wood product manufacturing	-84.3%	64.9%	32.68	0	No
322	Paper manufacturing	-91.1%	39.0%	3.47	0.06	No
323	Printing and related support activities	-84.1%	52.5%	10.69	0	No
324	Petroleum and coal products manufacturing	69.2%	4.0%	0.67	0.41	No
325	Chemical manufacturing	71.0%	64.0%	32.63	0	Yes
326	Plastics and rubber products manufacturing	22.0%	67.4%	4.81	0.03	No
327	Nonmetallic mineral product manufacturing	79.5%	79.8%	0.3	0.58	No
331	Primary metal manufacturing	-80.8%	58.8%	33.88	0	Yes
332	Fabricated metal product manufacturing	85.5%	78.6%	32.22	0	Yes
333	Machinery manufacturing	79.1%	78.7%	28.14	0	Yes
334	Computer and electronic product manufacturing	-62.2%	67.9%	0.62	0.43	No
335	Electrical equipment, appliance, and component manufacturing	93.5%	33.6%	44.49	0	No
3364	Aerospace product and parts manufacturing	-40.6%	32.2%	10.96	0	No
3366	Ship and boat building	31.2%	30.6%	12.88	0	No
336*	Other transportation equipment manufacturing	-41.4%	39.5%	81.95	0	No
337	Furniture and related product manufacturing	-44.2%	85.5%	0.05	0.82	No
339	Miscellaneous manufacturing	60.7%	59.0%	4.1	0.04	No
423	Merchant wholesalers, durable goods	78.2%	89.9%	16.55	0	Yes
424	Merchant wholesalers, nondurable goods	83.0%	75.1%	6.58	0.01	No
425	Wholesale electronic markets and agents and brokers	78.5%	-29.9%	11.82	0	Yes
441	Motor vehicle and parts dealers	80.3%	76.6%	9.12	0	Yes
442	Furniture and home furnishings stores	48.8%	64.2%	9.99	0	No
443	Electronics and appliance stores	68.6%	46.8%	1.07	0.3	No
444	Building material and garden equipment and supplies dealers	95.6%	70.9%	8.02	0	Yes
445	Food and beverage stores	57.6%	9.1%	24.2	0	Yes
446	Health and personal care stores	93.8%	40.0%	2.31	0.13	No
447	Gasoline stations	-69.5%	38.3%	6.35	0.01	No
448	Clothing and clothing accessories stores	4.8%	69.6%	18.32	0	Yes
451	Sporting goods, hobby, book, and music stores	39.2%	44.4%	12.02	0	No
452	General merchandise stores	93.5%	1.5%	12.25	0	No
453	Miscellaneous store retailers	64.9%	69.3%	16.62	0	Yes

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
454	Nonstore retailers	84.2%	42.4%	39.87	0	No
481	Air transportation	-1.1%	57.8%	3.99	0.05	No
483	Water transportation	61.5%	19.2%	79.22	0	Yes
484	Truck transportation	86.4%	71.4%	0.01	0.94	No
485	Transit and ground passenger transportation	96.6%	11.2%	80.17	0	No
486	Pipeline transportation	-51.3%	5.0%	36.31	0	No
487	Scenic and sightseeing transportation	-42.7%	12.2%	96.21	0	Yes
488	Support activities for transportation	97.7%	47.1%	24.77	0	No
491	Postal service	-44.9%	58.5%	10.07	0	No
492	Couriers and messengers	78.4%	60.4%	1	0.32	No
493	Warehousing and storage	34.3%	25.6%	11.57	0	No
5112	Software publishers	97.3%	43.8%	70.9	0	No
511*	Other publishers	-65.8%	45.7%	6.22	0.01	No
512	Motion picture and sound recording industries	90.1%	51.9%	3.39	0.07	No
515	Broadcasting (except internet)	-89.8%	35.5%	1.08	0.3	No
5171	Wired telecommunications carriers	-59.6%	37.3%	7.41	0.01	No
5172	Wireless telecommunications carriers (except satellite)	71.7%	7.3%	85.81	0	No
517*	Other telecommunications	-46.9%	-5.6%	0	0.95	No
518	Data processing, hosting and related services	74.6%	43.2%	14.56	0	No
519	Other information services	87.5%	44.8%	29.92	0	Yes
521	Monetary Authorities-Central Bank	-75.8%	52.9%	2.72	0.1	No
522	Credit intermediation and related activities	25.3%	31.2%	14.33	0	No
523	Securities, commodity contracts, and other financial investments and related activities	95.1%	48.5%	103.55	0	No
524	Insurance carriers and related activities	80.8%	42.7%	7.39	0.01	Yes
525	Funds, trusts, and other financial vehicles	-92.9%	2.3%	0.16	0.69	No
531	Real estate	97.8%	56.3%	14.55	0	No
532	Rental and leasing services	-21.1%	64.7%	19.9	0	No
533	Lessors of nonfinancial intangible assets (except copyrighted works)	6.4%	57.6%	45.11	0	Yes
541	Professional, scientific, and technical services	98.0%	77.2%	9.09	0	No
551	Management of companies and enterprises	90.2%	33.8%	58.52	0	No
561	Administrative and support services	98.0%	80.3%	36.82	0	No
562	Waste management and remediation services	45.0%	-7.6%	12.05	0	No
611	Educational services	97.9%	20.9%	23.01	0	No
621	Ambulatory health care services	96.1%	-0.3%	0.68	0.41	No
622	Hospitals	97.0%	-8.4%	4.46	0.04	No

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
623	Nursing and residential care facilities	95.4%	-24.0%	4.85	0.03	No
624	Social assistance	91.2%	14.5%	38.67	0	Yes
711	Performing arts, spectator sports, and related industries	58.0%	23.5%	1.05	0.31	No
712	Museums, historical sites, and similar institutions	97.5%	41.9%	90.03	0	No
713	Amusement, gambling, and recreation industries	94.1%	48.2%	11.27	0	Yes
721	Accommodation	97.9%	79.1%	20.11	0	No
722	Food services and drinking places	98.4%	86.9%	114.22	0	No
811	Repair and maintenance	66.9%	72.7%	1.36	0.25	No
812	Personal and laundry services	95.4%	68.7%	16.75	0	Yes
813	Religious, grantmaking, civic, professional, and similar organizations	98.0%	32.0%	22.91	0	No
814	Private households	15.6%	-24.9%	74.06	0	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.

* Wild card symbol indicates the component of an economic subsector (3-digit NAICS) without the component of its industry groups (4-digit NAICS) that are listed separately in this figure.

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*). 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:

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

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[27] 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*.

In this year's projections cycle, we used the 2010 SOC (one 2018 SOC was used - 53-1049 - First-Line Supervisors of Transportation Workers, All Other). The U.S. Bureau of Labor Statistics cautions on using Office of Management and Budget (OMB) 2010 and 2018 classifications (the warning is the same in both versions): "The 2010 SOC was designed solely for statistical purposes. Although it is likely that the 2010 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 2010 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 2010 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."[28]

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.

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

Appendix 4. Occupations in Demand (OID) methodology

Employment projections are the basis of the Occupations in Demand (OID) list covering Washington's 12 workforce development areas 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 2019 list is based on projections with state specific alternative rates used for turnover openings:

- Five-year projections for 2017-2022, using average annual growth rates and total job openings.

- Ten-year projections for 2017-2027, using average annual growth rates and total job openings.

- A combination of two-year (second quarter 2018 to second quarter 2020) and ten-year (2017-2027) projections, using average annual growth rates and total job openings.

All of these time frames use unsuppressed occupations with employment in a base year (2017), 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 2018 to May 2019.

- Demand data: annual counts of job announcements from Help Wanted OnLine (HWOL) mid-monthly time series for the period June 2018 to May 2019.

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 WANTED Analytics. The downloaded files represent extracted hard skills for each occupation from online job announcements, posted in the last three years (from July 2015 to June 2018).[29] 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 two percent of base year employment.

3. Estimated employment for second quarter 2018 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.

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

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

The conversion size of occupational employment to skills employment, calculated on base year employment (second quarter 2018), varies between 95.72 percent for the Tacoma-Pierce WDA to a low of 81.63 percent for the South Central WDA. The combined ratio for all WDAs is 91.95 percent and for the state is 90.02 percent.

Some results

A uniform skills 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 3,631 for Washington state, followed by the Seattle-King County WDA at 3,114. The lowest number was for Eastern Washington at 1,257 skills.

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 2018 to second quarter 2020, 2017-2022 and 2022-2027), with base year in second quarter 2018, 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: **Food preparation**, **Microsoft Office**, **Bilingual**, **Quality Assurance**, **Forklifts**, **Mathematics**. This year **Microsoft Office** replaced last year's **Freight+** in the top six skills. The stability among areas is no surprise since the same statewide matrix was used for all areas. The combined top six skills represent 16.83 percent of total openings for the state.

For the state and Seattle-King County, the fastest skill growth, for all periods, is projected for skills related to information technology (IT). The IT skills are very specific, vary from area to area, and the majority, individually, are not large in terms of employment and job openings.

The top 32 skills at the state level, with annual openings of at least 100, with the largest average annual growth rates, from 2017 to 2027 are related to IT. The top six of these IT skills are: **Docker, Amazon Elastic Compute Cloud**, **RESTful Web Services**, **JavaScript Object Notation**, **Scala** and **Asynchronous JavaScript and XML**.

However, for all WDAs and the state, the combined totals for these fastest growing six detailed occupations represents an insignificant share, less than 0.1 percent of total openings represented in the skill projections.

At the state level only, these fastest growing top 32 skills (all IT related) combined, represent 0.82 percent of total state skill-forecast openings. For all areas and for total job openings, more than 23 percent have IT skills as the primary skill.

The top 20 detailed skills for Washington state based on a combined (average) rank of average annual openings and growth rates for 2017 to 2027 are presented in *Appendix figure A5-1*.

Appendix figure A5-1. Top 20 skills ranked by combined average annual openings and growth
Washington state, 2017 to 2027
Source: Employment Security Department/LMEA; WANTED Analytics

Combined rank	Hard skill titles	Estimated hard skill employment numbers 2017	Projected hard skill employment numbers 2027	Average annual growth rate 2017-2027	Total average annual openings
1	Java	7,876	10,503	2.92%	2,940
2	Amazon Web Services	3,331	4,567	3.21%	1,319
2	JavaScript	3,734	5,058	3.08%	1,441
4	Software development	11,817	15,226	2.57%	4,394
5	C#	4,359	5,806	2.91%	1,609
6	Web services	7,259	9,355	2.57%	2,832
7	Python	7,584	9,781	2.58%	2,675
8	Big Data	4,326	5,693	2.79%	1,673
8	C/C++	5,238	6,853	2.72%	1,846
10	Linux	5,365	6,983	2.67%	1,976
11	Agile Software Development	3,705	4,895	2.83%	1,461
11	Structured query language	18,249	23,146	2.41%	6,704
13	Distributed system	2,251	3,110	3.28%	886
14	Systems Development Life Cycle	3,492	4,643	2.89%	1,351
15	Scrum agile methodology	2,782	3,739	3.00%	1,126
16	Catheters	10,930	13,827	2.38%	5,431
17	Tableau Software	5,911	7,569	2.50%	2,225
18	Cloud Computing	7,071	8,987	2.43%	2,759
19	Machine learning techniques	4,146	5,367	2.61%	1,553
19	Bedpans	6,806	8,586	2.35%	3,489

Eighteen of the top 20 skills are related to information technology.

The top 20 occupations represent 3.9 percent of total openings in the skills forecast. Fifteen of the top 20 skills are identical to last year.

The majority of skills, especially related to information technology (IT) and high-tech, are very specific and their numbers are dispersed among all occupations. As a result, these detailed skills normally do not represent a significant share of total numbers.

Information technology

In the skills forecast, at the state level and for all but one WDA, the largest group of skills, based on job openings only, are IT related. Only the North Central WDA had production skills in first place with IT in second place.

At the state level, IT skills represent 23.63 percent of average annual total openings for the period 2017 to 2027 and have the second highest growth rate of 1.78 percent. Healthcare came in first place with a growth rate of 1.84 percent.

It is interesting to note that out of a total of 661 occupations converted to skills at the state level, IT skills are present in 614 occupations. For 336 of these occupations, IT skills comprise more than one quarter of total numbers and for 73 they comprise more than one-half of total numbers.

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*. New to the top 15 this year are: **Bailiffs**; **Life Scientists, All Other**; **Social Scientists and Related Workers, All Other**; **Media and Communication Workers, All Other**; and **Prepress Technicians and Workers**.

Appendix figure A5-2. Occupations, not primarily computer related, with the largest shares of computer skill requirements
Washington state, 2018 second quarter occupational estimations (June 2015 to June 2018 sample, skills/occupations matrices)
Source: Employment Security Department/LMEA; WANTED Analytics

SOC	Occupation	Share of skills that are IT
333011	Bailiffs	0.857
191099	Life Scientists, All Other	0.846
193099	Social Scientists and Related Workers, All Other	0.845
439111	Statistical Assistants	0.815
271022	Fashion Designers	0.803
273099	Media and Communication Workers, All Other	0.800
271014	Multimedia Artists and Animators	0.789
193011	Economists	0.770
515111	Prepress Technicians and Workers	0.750
152011	Actuaries	0.746
191029	Biological Scientists, All Other	0.744
271024	Graphic Designers	0.729
152031	Operations Research Analysts	0.722
152041	Statisticians	0.721
131111	Management Analysts	0.707

Ten of the current 15 occupations are 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 3 in column B you would see the sorted list of related occupations (row 2 will be the same occupation as selected). To restore the original sort-configuration, sort the key-column (column A) from smallest to largest.

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

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

Appendix figure A5-3. Top 15 occupations related to software developers, applications
Washington state, 2019
Source: Employment Security Department/LMEA; WANTED Analytics

SOC	151132-Software Developers, Applications
151131-Computer Programmers	0.802
151199-Computer Occupations, All Other	0.771
151134-Web Developers	0.669
151133-Software Developers, Systems Software	0.639
151111-Computer and Information Research Scientists	0.582
151121-Computer Systems Analysts	0.559
113021-Computer and Information Systems Managers	0.525
251021-Computer Science Teachers, Postsecondary	0.524
439111-Statistical Assistants	0.492
191029-Biological Scientists, All Other	0.457
151142-Network and Computer Systems Administrators	0.393
119041-Architectural and Engineering Managers	0.391
151141-Database Administrators	0.382
172061-Computer Hardware Engineers	0.356
152021-Mathematicians	0.322

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.

As was noted in last year's report, some skills with large projected numbers of openings are well defined and can be linked to various levels of training. Skills with the largest numbers of projected openings are: **Food preparation**, **Microsoft Office**, **Bilingual**, **Quality Assurance**, **Forklifts**, **Mathematics**, etc.

It is also still true that skills like **Quality Assurance**, **Quality control**, **Risk assessment**, **Lean Manufacturing**, **Lean Six Sigma** and different engineering skills require significant skill acquisition related to information technology. These types of skills are much more dispersed than the first group. Creating training programs for this second skill group presents a more complex challenge for educators.

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.