2017 LABOR MARKET AND ECONOMIC REPORT

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Employment Security Department
WASHINGTON STATE

2017 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 2017
Source: Employment Security Department/WITS; 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	3,462,202	3,218,571	243,631	7.0%
2014	3,490,445	3,276,706	213,739	6.1%
2015	3,545,672	3,345,835	199,837	5.6%
2016	3,643,881	3,445,880	198,001	5.4%
2017 January through September*	3,709,097	3,536,068	173,029	4.7%

*2017 data is averaged for nine months.

Fast facts 2. Labor force and unemployment, not seasonally adjusted
Washington state metropolitan areas, January through September 2017
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Metropolitan area	Labor force	Employed	Unemployed	Unemployment rate
Washington state	**3,709,097**	**3,536,068**	**173,029**	**4.7%**
Bellingham	109,873	104,322	5,551	5.1%
Bremerton	118,901	112,964	5,937	5.0%
Kennewick-Pasco-Richland	136,815	128,879	7,936	5.8%
Longview-Kelso	45,151	42,359	2,792	6.2%
Mount Vernon-Anacortes	58,138	54,193	3,945	6.8%
Olympia	133,757	127,099	6,658	5.0%
Seattle-Bellevue-Everett MD*	1,648,970	1,590,732	58,238	3.5%
Spokane	260,017	245,271	14,746	5.7%
Tacoma MD* (Pierce)	405,717	380,255	25,462	6.3%
Wenatchee	66,249	62,832	3,417	5.2%
Yakima	129,079	120,264	8,815	6.8%

*Metropolitan Division

Fast facts 3. Projected industry average annual growth rates
Washington state, 2015 to 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics

NAICS	Industry sector	2016 Q2 to 2018 Q2	2015 to 2020	2020 to 2025
	Total nonfarm	**1.78%**	**1.84%**	**1.25%**
22, 48, 49	Transportation, warehousing and utilities	1.49%	1.55%	0.76%
23	Construction	3.14%	3.40%	1.76%
31-33	Manufacturing	-1.09%	-0.53%	-0.11%
42	Wholesale trade	0.90%	0.71%	0.55%
44-45	Retail trade	1.87%	2.06%	1.08%
51	Information	3.77%	3.60%	1.99%
52	Financial activities	1.06%	0.96%	0.45%
54-56	Professional and business services	3.32%	2.96%	2.25%
61-62	Education and health services	2.29%	2.22%	2.00%
71-72	Leisure and hospitality	1.70%	2.06%	0.68%
GOV	Government	1.31%	1.42%	1.15%

Fast facts 4. Wages and employment by industry
Washington state, 2016 annual averages (revised)
Source: Employment Security Department/WITS; 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	**216,668**	**$189,958,148,888**	**3,214,722**	**$1,136**
11	Agriculture, forestry, fishing and hunting	7,335	$3,137,085,643	104,700	$576
21	Mining	160	$160,051,303	2,375	$1,296
22	Utilities	223	$402,966,507	4,563	$1,698
23	Construction	23,945	$10,279,241,432	174,695	$1,132
31-33	Manufacturing	7,296	$21,364,977,177	286,272	$1,435
42	Wholesale trade	13,185	$9,630,944,255	130,238	$1,422
44-45	Retail trade	14,711	$16,677,148,764	363,319	$883
48-49	Transportation and warehousing	4,531	$5,271,152,956	93,829	$1,080
51	Information	3,496	$19,139,201,316	119,982	$3,068
52	Finance and insurance	5,650	$8,207,298,237	92,852	$1,700
53	Real estate, rental and leasing	6,672	$2,413,009,866	48,861	$950
54	Professional, scientific and technical services	23,964	$16,862,702,198	189,804	$1,709
55	Management of companies and enterprises	633	$4,723,271,061	43,111	$2,107
56	Admin. and support and waste mgmt. and remediation svcs.	11,676	$7,553,665,469	160,573	$905
61	Educational services	3,164	$1,545,876,175	41,192	$722
62	Healthcare and social assistance	52,925	$19,574,943,851	399,684	$942
71	Arts, entertainment and recreation	2,762	$1,568,445,615	49,806	$606
72	Accommodation and food services	14,050	$5,711,812,866	268,229	$410
81	Other services (except public administration)	18,167	$3,576,440,090	94,922	$725
GOV	Government	2,121	$32,157,914,107	545,714	$1,133

Executive summary

U.S. economy and labor market

The national economy continues to grow. The current expansion has entered its ninth year making it the third longest on record. Slower labor force growth and lower productivity levels relative to previous expansions have kept the pace of economic growth modest. Even still, it has been sufficient to generate enough jobs to push the unemployment rate down to 4.2 percent in September 2017, a level that is at or near what is considered as full employment.

Total nonfarm employment in the United States reached 146.7 million in September 2017, up by 1.3 percent from September 2016. Private sector job growth was up 1.5 percent. Since September 2010, the largest percentage of jobs gained by major private industry sectors has been in professional and business services. The smallest percentage gain over this period occurred in the information sector. Public sector hiring has been more subdued, rising by 0.2 percent from September 2016 to September 2017.

Washington's economy and labor market

Using state gross domestic product as the comparison measure, economic growth in Washington expanded by 4.2 percent in 2016, the highest growth rate of any state, and well above the 1.5 percent growth achieved by the nation. From third quarter 2016 to third quarter 2017, personal income in the state increased an average of 3.2 percent per quarter annualized compared to 1.2 percent nationally, adjusted for inflation. Consistent with that, total nonfarm employment increased during the same period.

Seasonally adjusted total nonfarm employment increased by 2.1 percent from September 2016 to September 2017 with the addition of 68,800 jobs. The private sector accounted for the majority of the jobs added, with 57,100 added to private payrolls while government added 11,700 jobs. From September 2010 to September 2017, total nonfarm employment increased by 17.5 percent, with the largest percentage increase in employment occurring in the construction industry sector. The state unemployment rate was 4.5 percent in September 2017 compared to the U.S. rate of 4.2 percent. Washington's unemployment rate of 4.5 percent is considered an historical low for the state based on statistical series maintained by the Bureau of Labor Statistics dating back to 1976.

Seasonal, structural and cyclical industry employment

An analysis of 97 industries in Washington state identified 18 as having high levels of seasonality. 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 27 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, education services and software publishing. For 16 industries, the cyclical component accounts for the most change in employment. Those most influenced by cyclical factors include support activities for mining, scenic and sightseeing transportation and crop production.

Unemployment

The seasonally adjusted unemployment rate in Washington fell to 4.2 percent in September 2017, 0.7 percentage points below the September 2016 rate of 4.9 percent. The number of unemployment recipients was just over 45,000 in September 2017, down from a peak of just over 300,000 in January 2010. The number of unemployed individuals exhausting unemployment benefits has declined from 15,227 in May 2010 to 2,956 in September 2017. The manufacturing and construction industries accounted for the greatest portion of workers who exhausted unemployment benefits from October 2016 through September 2017.

Employment projections

Total nonfarm employment in Washington state is expected to grow at an average annual rate of 1.84 percent to 2020. Total nonfarm industry employment is projected to reach about 3.45 million jobs by 2020 and about 3.67 million jobs by 2025. Computer and mathematical occupations and construction and extraction occupations are projected to grow faster than other occupational groups from 2015 to 2025.

Income and wages

Recently released data show the median household income measured in 2016 dollars in Washington rose by 11.6 percent from 2012 to 2016. The median hourly wage increased by 2.2 percent in 2016. From 2015 to 2016, the number of occupied jobs increased in all hourly wage ranges, with the exception of jobs paying less than $12 per hour. Job gains were greatest in occupations that paid between $12.00 and $17.99 per hour. From 2001 to 2016, jobs paying higher wages have been growing faster than jobs in middle and lower wage categories.

Chapter 1: U.S. economy and labor market

The current expansion of the U.S. economy entered into its ninth year midway through 2017 and is now the third longest on record. The average length of an expansion in the post-war economy is approximately five years (58.4 months).[1] The longest expansion in American history was a 10-year period that began in 1991.

Although the duration of the expansion has been impressive, the pace of it has been unusually slow. U.S. Gross Domestic Product (GDP), the measure of the output of goods and services in the economy, has grown at an annualized rate of 2.1 percent through 2016 since the end of the last recession. Compared with the average growth rate of all other recoveries, the economy has grown only about half as fast.

What this current expansion has lacked in strength, however, it has partially made up for in length. On a cumulative basis, this expansion ranks sixth out of the last 10 recoveries with respect to total GDP growth. The slow rate of growth also stands in stark contrast to the recovery in the labor market. The expansion has created 17 million nonfarm jobs through September 2017 since the low point of employment in February 2010. Nonfarm employment has increased for a record 85 consecutive months through October 2017. The streak can just as easily be considered 92 months long if the impact from hires and layoffs of temporary census workers, mostly in 2010, is removed. The unemployment rate has decreased from a peak of 10 percent in October 2009 to 4.1 percent in October 2017. As such, the decline in the unemployment rate ranks as the largest drop of all post WWII recoveries.

The rate of growth in terms of GDP is accounted for quarterly. Its rate of progress is shown in *Figure 1-1*.

[1] National Bureau of Economic Research, Business Cycle Dating Committee.

Figure 1-1. U.S. gross domestic product (chained 2009 dollars), quarterly percent change, seasonally adjusted annualized rate
United States, third quarter 2010 through third quarter 2017
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income
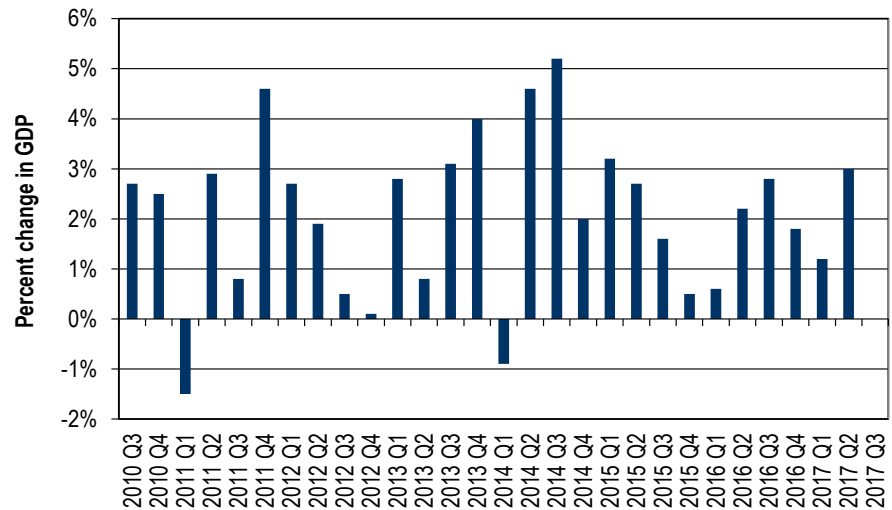
The U.S. economy has grown slowly on average since the recession ended in June 2009.

Tracking GDP growth by quarter is useful for analyzing short-term shifts in business activities and conditions, but is not all that useful for accounting for the notably slow pace of the expansion over the last eight plus years. Over the long run, an economy's rate of growth is driven by its capacity to produce. To that end, structural changes have recently altered the economy's productive capacity resulting in weaker but steady growth. These changes have impacted labor force growth along with the growth in the productivity of these workers, two primary factors that determine the sustainable growth rate for the economy. Potential GDP depends not only on the economy's use of labor, but also on the degree of capital provided in the form of business investment, and the broad interaction that combines labor and capital in the production process. To that end, potential GDP also decelerated as both labor force growth and labor productivity slowed and business investment for the most part was restrained.

Population is the single most important factor in the size and composition of the labor force. The population has been growing more slowly than in previous decades and is getting older. In addition, the fertility rate in the U.S. in 2016 was the lowest it has ever been.[2] Because of the aging population, the labor force has grown at an annual rate of 0.6 percent over the last decade compared with an annual rate of 1 percent for the civilian institutional population. Workers in the 55-year and older group have increased as a share of the labor force at the expense of younger workers, and have lower participation rates than those in the prime age group of 15 to 54 years of age.

[2] National Center for Health Statistics.

The growth gap narrows considerably if the number of people in the labor force is accounted for.[3] The assumption of a faster growing labor force in line with previous expansions has an effect of producing a higher level of GDP. Instead of the recovery growing at about half the pace of the average of past recoveries, the gap narrows to 83 percent of the average. When adjusting for the size of the labor force, the pace of the current recovery looks to be in line with other recoveries. GDP per number of people in the labor force has grown at an annualized 1.9 percent in this recovery, compared with an average of 2.3 percent in past recoveries.

Labor productivity statistics, as calculated by the Bureau of Labor Statistics (BLS), are defined as output per hour worked. It follows naturally that productivity growth is the change in that ratio over time.[4] *Figure 1-2* shows that labor productivity has been particularly weak for most of the period since 2011, although it has turned up in recent quarters. From 2011 through 2016, nonfarm output per hour grew by only 0.6 percent per year on average. In 2016, annual productivity declined by a 0.2 percent rate, the first time this has happened since 2009. Productivity increased by 3 percent in third quarter 2017, the most in three years. This lifts the year-to-year rate (September 2016 to September 2017) up to a still modest 1.5 percent.

Figure 1-2 Nonfarm labor productivity, annual and quarterly percent change, seasonally adjusted annualized rate
United States, third quarter 2010 through third quarter 2017
Source: U.S. Bureau of Labor Statistics, Labor Productivity and Costs
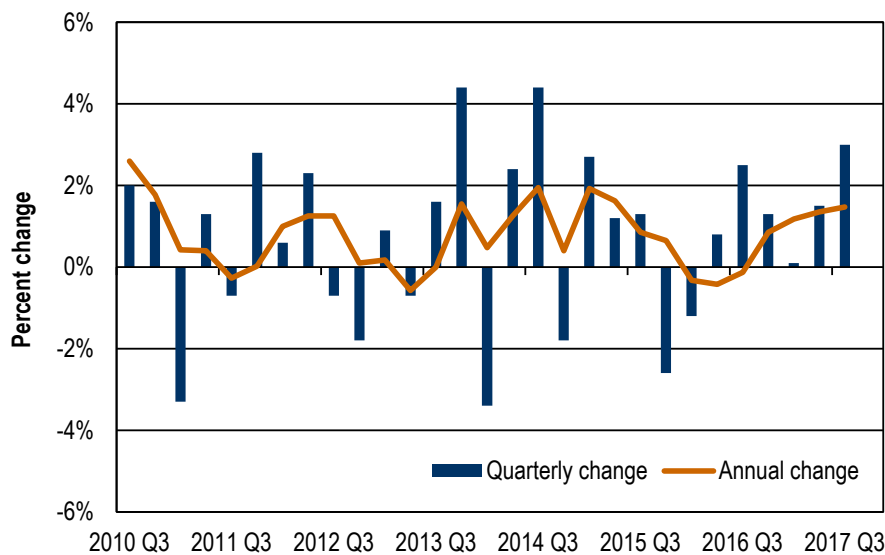
Productivity has mostly been weak in the current economic cycle.

[3] Jay Shambaugh, "How should we think about this recovery?" Macroeconomic Advisors' 26th Annual Policy Seminar. Washington, D.C., September 14, 2016.
[4] Shawn Sprague, "What can labor productivity tell us about the U.S. economy?" Beyond the Numbers: Productivity, vol. 3, no. 12 (U.S. Bureau of Labor Statistics, May 2014).

Weak productivity numbers have also limited the gains in nominal wage growth for most of the expansion, despite there being broad-based strength in employment growth. Indicators of hourly compensation suggest that wage growth had been proceeding roughly at a modest 2 percent pace, but has recently shown signs of improvement. As hiring has continued over the expansion, the degree of excess unemployment has diminished and has left employers with a smaller pool of workers from which to choose. As firms must compete harder for both employed and unemployed workers, growth in hourly compensation starts to rise. *Figure 1-3* shows that the improvement in hourly earnings rates for all employees has occurred primarily over the last three years.

This wage improvement is reflected in both the average hourly earnings data and the Atlanta Federal Bank Wage Tracker (WGT). This series tracks median 12-month wage growth of individuals reporting to the Current Population Survey. By looking at workers who were employed a year ago, the WGT controls for compositional change in the workforce, thereby removing bias should there be, for instance, cases when low-skilled workers enter employment at a faster rate than high-skilled workers.

Wage growth as measured by the WGT is up by 3.6 percent in September 2017. Average hourly earnings have risen 2.9 percent since September 2016, matching its previous cycle high achieved in April 2017. Taken together, the pickup in earnings are consistent with recent reports of a tightening labor market and employers having more difficulty finding qualified workers.

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 2010 through September 2017
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics; Atlanta Federal Reserve Bank Wage Tracker
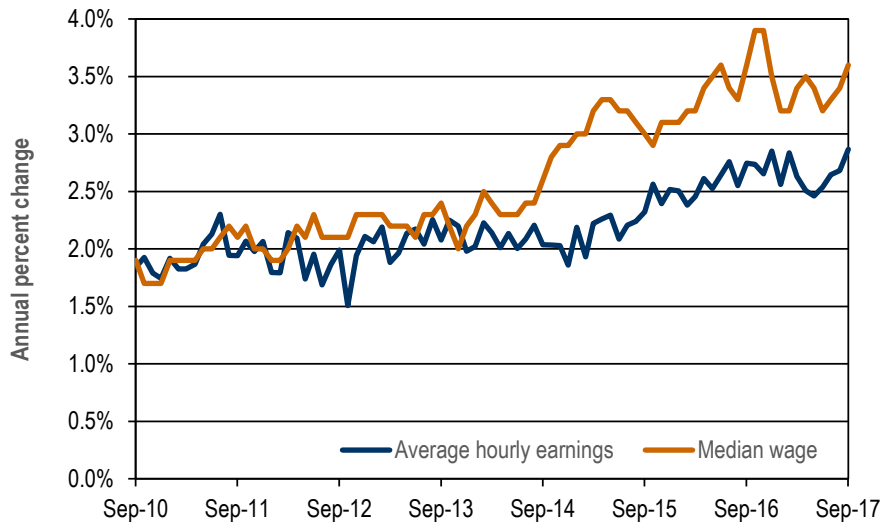
Wage growth has strengthened the last couple of years.

Recent changes in GDP

Tracking quarterly changes in GDP over the past couple of years allows one to see how growth has been changing on a short-run basis. It also shows how spending by economic sectors, namely domestic and foreign consumers, businesses and government contribute to economic growth (*Figure 1-4*). Real GDP growth in the U.S. slowed to 1.8 percent in fourth quarter 2016 to end the year. International trade weighed heavily against the economic growth, subtracting 1.61 basis points from the total. Part of the reason for the negative contribution was the rebalancing of exports in the quarter after an unusual surge in soybean sales the previous quarter had boosted export growth. Within other sectors of the economy, growth continues to rely more heavily on the strength of consumer spending, which contributed nearly 2 percent to headline growth. Spending is being supported by solid job growth, increased household wealth, higher confidence, and improving wage compensation.

Business fixed investment spending has been gaining momentum, and made its largest contribution in 2016 after languishing earlier on. The inventory drawdown that had played out since the beginning of 2016 showed signs of reversing in the second half of the year, with substantial rebuilding taking place in the fourth quarter. Government spending continued to plod along. For the year, the solid domestic

consumer spending was somewhat offset by weak business spending and the weight of the inventory drawdown. Full year growth was 1.5 percent in 2016, making it the slowest year of growth in the recovery.

Economic growth retreated at the start of 2017. First quarter GDP growth registered 1.2 percent as weather again played a factor, much like it did in first quarter 2016. This time, it was not a result of severe winter weather, but rather due to milder than normal winter weather that impacted much of the country during the first two months of the year. Consumers were able to cut down on utility use but did not transfer those savings into other types of spending. The lull in consumer spending growth dragged GDP growth down compared to the previous quarter. Also to the detriment of overall growth, inventories gave back all of its fourth quarter 2016 contribution and then some, slicing almost 1.5 percentage points off of the top figure. On the positive side, spending by businesses surged, paced by investments in equipment along with residential construction.

Real GDP growth bounced back in second quarter 2017 to 3.1 percent, the largest quarterly gain in over two years. Consumers escalated their earlier spending behavior, pushing their contribution to GDP growth to over 2 percent. Spending on business equipment also contributed to growth at a more modest pace. The acceleration in real GDP in the second quarter also reflected an upturn in private inventory investment, along with a positive contribution from exports. Only the government component, which saw a downturn in state and local government spending, subtracted from GDP growth.

The economy grew at a solid rate once more during the third quarter. GDP rose at an annualized rate of 3 percent. It marks the first time in three years that growth has measured at least 3 percent for two consecutive quarters. The rise in GDP occurred despite the impact of hurricanes that struck the country in late summer. Every component of GDP contributed to growth with the exception of the government sector. Consumer spending growth slowed to a trend-like 2.4 percent in the third quarter after expanding at a rapid pace of 3.3 percent the previous quarter, so its contribution to third quarter GDP growth dipped relative to the previous quarter. The slowdown was partially offset by a strong 8.6 percent gain in business investment in equipment and an increase in the rebuilding of inventories. The initial estimate for trade is that net exports added 0.41 percentage points to GDP growth as exports rose by 2.3 percent while imports fell by 0.8 percent during the quarterr.

Figure 1-4. Contributions to percent change in real GDP, seasonally adjusted annualized rate
United States, third quarter 2015 through third quarter 2017
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income

Contributions	2015 Q3	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3
GDP percent change annual rate	1.6	0.5	0.6	2.2	2.8	1.8	1.2	3.1	3.0
Percentage contribution by factor									
Consumption expenditures	1.86	1.80	1.23	2.57	1.92	1.99	1.32	2.24	1.62
Fixed investment	0.55	-0.41	-0.05	0.22	0.25	0.28	1.27	0.53	0.25
Change in private inventories	-0.22	-0.68	-0.64	-0.67	0.16	1.06	-1.46	0.12	0.73
Net exports of goods and services	-0.77	-0.28	-0.28	0.28	0.36	-1.61	0.22	0.21	0.41
Government expenditures	0.21	0.05	0.32	-0.16	0.09	0.03	-0.11	-0.03	-0.02

Consumer expenditures have contributed the most to economic growth.

Consumer spending is driving economic growth

Consumer spending makes up the greatest dollar-wise contribution to GDP, accounting for over two-thirds of total output value annually. It has been the main contributor to real GDP growth over the past three years. The continuing pace of job growth and improved wages has supported gains in real disposable personal income (DPI), a measure of income after accounting for taxes and adjusting for inflation. This in turn has helped fuel continued growth in real consumer spending (*Figure 1-5*). All told, consumer spending increased at an annual rate of 2.7 percent from September 2016 to September 2017, while DPI advanced at an annual rate of 1.3 percent.

Beyond real DPI, other factors have been contributing to consumers' sense of economic well-being. Gains in the stock market and in home prices over the course of the year have boosted household net worth. This in turn has improved households' creditworthiness and access to credit, allowing households greater capacity to borrow for major purchases. Consumers' optimism regarding their financial situation consequently has improved, as measured by consumer sentiment surveys, confirming both a willingness and an ability to spend.

Despite the brighter picture, consumers have not always spent evenly throughout. Personal consumption expenditures (PCE) closed out fourth quarter 2016 by increasing $80.4 billion. After real DPI grew by $89.5 billion in first quarter 2017, and with warmer weather conditions on average, consumers spent less on utilities and other goods, allowing purchases to rise by $55.9 billion over the quarter. Consumer spending bounced back in second quarter 2017. Following a quarter where real DPI rose by $102.9 billion, real PCE increased by $94.9 billion. Real PCE closed out the third quarter by rising $98.2 billion in September 2017, strong enough to bring real PCE up by

$69.2 billion during the third quarter. However real DPI was flat in September. Growth in real DPI moved back down to $17.8 billion in the third quarter, meaning that consumers have relied more on savings to bridge the gap in income growth.

Figure 1-5. Inflation-adjusted disposable income and personal consumption expenditures, seasonally adjusted
United States, September 2010 through September 2017
Source: U.S. Bureau of Economic Analysis, Personal Income and Outlays
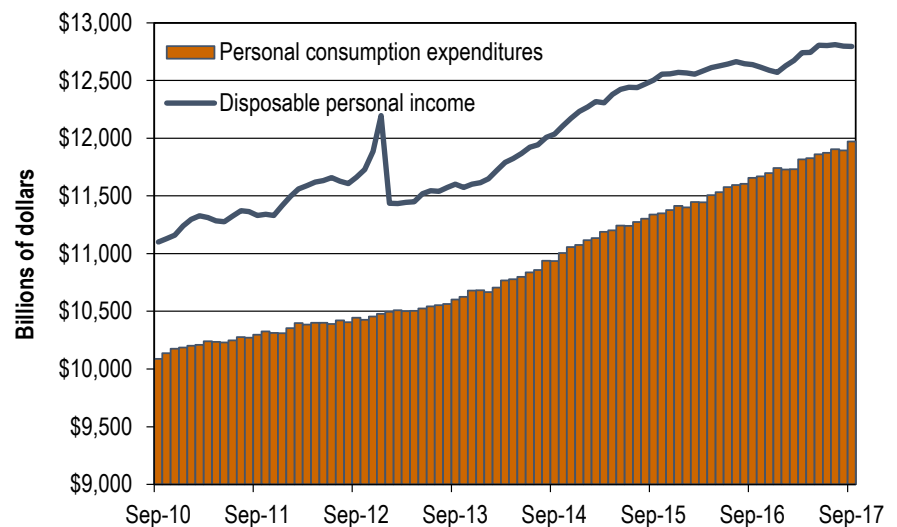
Consumption activity has been steady even if income gains were not.

Retail sales are a component of personal consumption expenditures. Retail sales are reported in nominal dollars, so 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 4.4 percent from September 2016 to September 2017 and are currently up 3.7 percent over the first nine months of 2017 on an annualized basis (*Figure 1-6*). Sales rose in nine of the 12 months from September 2016 to September 2017.

Monthly retail sales at the end of 2016 closed strong due to December holiday sales. Retail sales increased 0.9 percent over the month. Automobile sales grew the most, up 2.4 percent in December and closing the year up 6.8 percent. Retail sales started 2017 strong as they rose by 0.5 percent in January. Gasoline sales led the way but the rest of the retail sectors, with the exception of automobile sales, posted strong results. The forward momentum faded over the next two months, with overall sales declining in February and just inching up in March. The weak results were largely due to lackluster auto sales. Sales were also likely affected by unusual weather patterns, which impacted the timing of purchases at home and garden stores.

Second quarter 2017 sales remained subdued with June showing broad-based declines in retail sectors, and a .01 percent decline in sales overall. Lower gasoline prices contributed to the decline, but other sectors including electronics stores, department stores, and eating and drinking places experienced sales declines.

The third quarter began stronger as retail sales rebounded in July. Retail and food posted a strong 0.6 percent gain to push overall sales up to a 0.5 percent gain. Sales contracted again in August by .01 percent overall. Much of that can largely be traced to the impact of hurricane Harvey, as most store categories showed steep declines. September closed out the quarter by seeing sales rise by 1.6 percent. Much of this was the response Houston and Florida had to the major storms they experienced. Gasoline sales rose strongly due to price increases, while sales by building material, garden equipment and supplies dealers were up 2.1 percent during the month.

Figure 1-6. U.S. retail sales, month-over-month and year-over-year percent change
United States, September 2010 through September 2017
Source: U.S. Census Bureau, Monthly and Annual Retail Trade Report
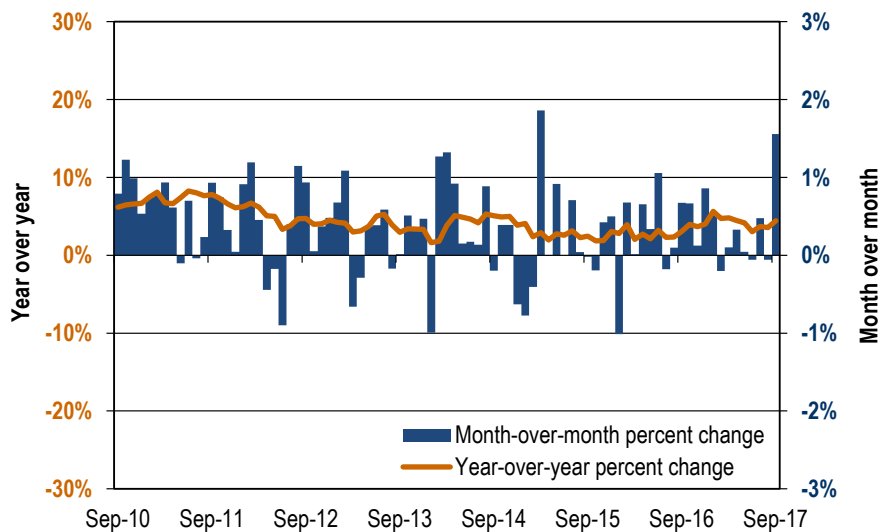
Increases in retail sales have been uneven but are still indicative of strong domestic consumption.

Federal Reserve accelerates interest rate hikes

With signs of an improved job market and a drop in the unemployment rate to a post-recession low, the Federal Reserve Board (Fed) closed out 2016 in anticipatory fashion by raising the short-term interest rate. This was only the second rate hike in a decade, but provided a signal that more interest rate adjustments would likely take place in 2017.

The Fed did indeed raise rates two more times in 2017, in March and in June, with a growing likelihood of a third in December (*Figure 1-7*). Information collected by the Fed showed that the labor market continued to strengthen and that economic activity had been rising moderately. Minutes from the September meeting of the policy-making Federal Open Market Committee indicated members expect the level of inflation to reach the 2 percent target it believes is consistent with healthy economic growth. That should be sufficient for the Fed to initiate another hike in interest rates, although the realized and expected condition of the economy will still need to be assessed at that time. For now, interest rates are still low enough to stimulate the economy, which supports some further strengthening of the labor market and a movement toward a 2 percent inflation rate.

Figure 1-7. Selected interest rates
United States, September 2007 through September 2017
Source: Federal Reserve Board
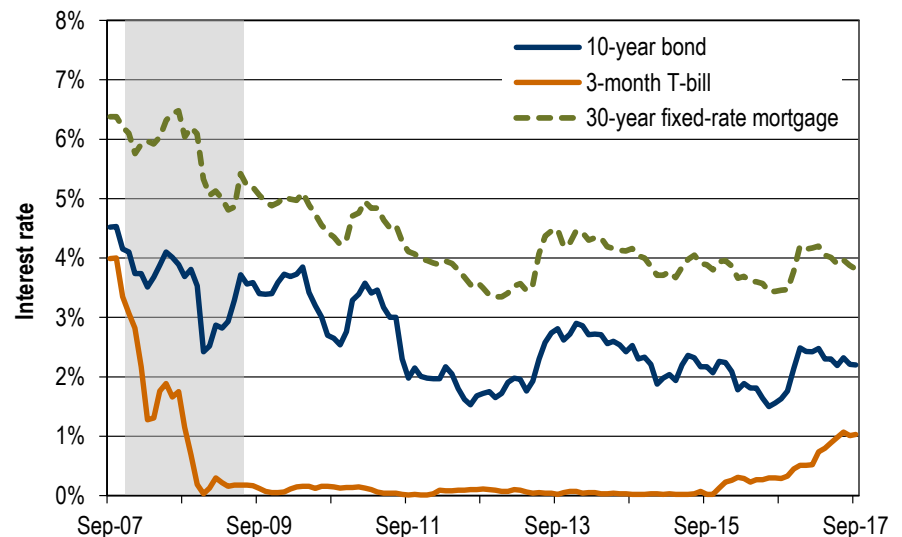
Shaded area is a U.S. recession period.

Federal Reserve Board policy measures recently have started raising short-term interest rates.

Business fixed investment and global economic considerations

The longer-term softness in economic growth tends to be partly attributable to a sharp pullback in business fixed investment during the most recent recession, and the relatively modest rebound that followed. Business fixed investment entails spending by businesses on structures, equipment and 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.

Business fixed investment, particularly involving equipment spending, had been a key driver of economic growth at the beginning of the current expansion. Growth rates for business investment through 2011 (*Figure 1-8*) were largely supported by large increases in equipment spending, which grew as fast as anytime within the past 40 years. Spending on equipment tailed off considerably beginning at the end of 2014, declining by 11.8 percent and dragging down business fixed investment by 2.3 percent. By 2015 and 2016, equipment spending fell four straight quarters. Except during periods of recession, previously, there had not been more than two consecutive declines in equipment spending.

Figure 1-8. Real business fixed investment, quarterly and annual percent change, seasonally adjusted annual rate
United States, third quarter 2010 through third quarter 2017
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income
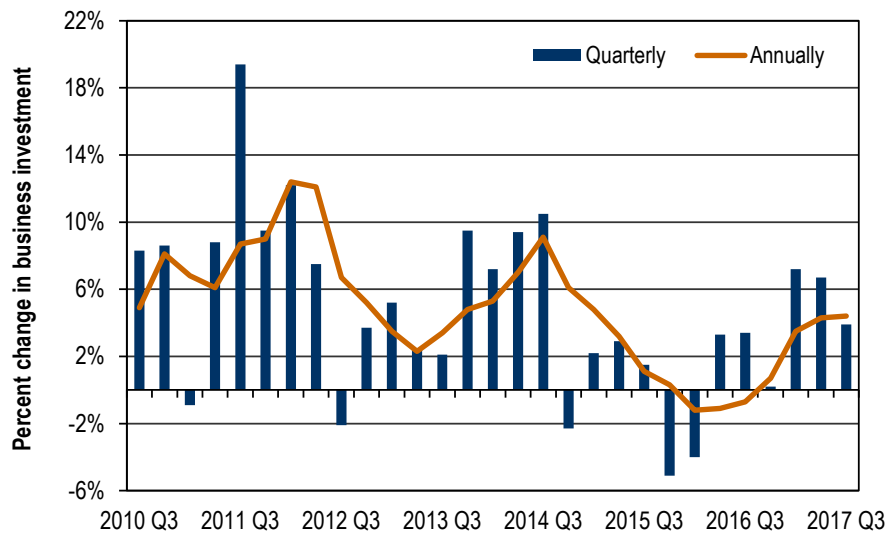
Business fixed investment has been recovering lately and contributing more to economic growth.

From the end of the recession in the summer of 2009 until oil prices peaked in the summer of 2014, energy-related spending surged to finance the exploration and extraction of crude oil and natural gas, as well as its transportation and delivery. Oil prices then declined, resulting in a huge fall off in spending. The number of oil rigs employed in the exploration and extraction of oil fell from over 1,600 in the U.S. in 2014 to just over 300 in 2016 (*Figure 1-9*). This served as the primary driver of low business investment during 2016.

Over-production and weak global growth were mostly responsible for the oil price decline. Domestic oil production had been increasing as shale oil producers entered the market attracted by high oil prices. OPEC responded by boosting production and flooding the world with excess oil in order to drive down prices and push shale oil firms out of the market. The ensuing oil glut sent prices tumbling down from over $100 per barrel in August 2014 to $30 in January 2016. Prices began to recover during 2016 and got a major boost when OPEC decided to reverse course and agree to production cuts, the first in eight years. The OPEC agreement also was joined by other major non-OPEC producers, most notably Russia. With prices stabilizing and world economic growth beginning to rebound,[5] newly efficient shale oil producers were lured back into the market. The total number of active oil rigs increased to over 500 by the beginning of 2017 and reached 750 by the end of September 2017.

World demand for oil has continued to increase in 2017, as has domestic oil production with more producers entering the market. Oil prices have leveled off and have mostly moved in the $45-$55 range, despite the decision by OPEC to extend its production cuts through early 2018. Rig counts continued to rise before leveling off in August. Business equipment spending posted three solid quarters of growth to start 2017, rising by 4.4, 8.8 and 8.6 percent respectively in each of the first three quarters. The resulting stronger business investment growth helped to boost overall GDP growth in 2017.

Figure 1-9. West Texas intermediate crude oil prices, dollars per barrel and Baker Hughes oil rig count
United States, August 2014 through September 2017
Source: U.S. Energy Information Administration
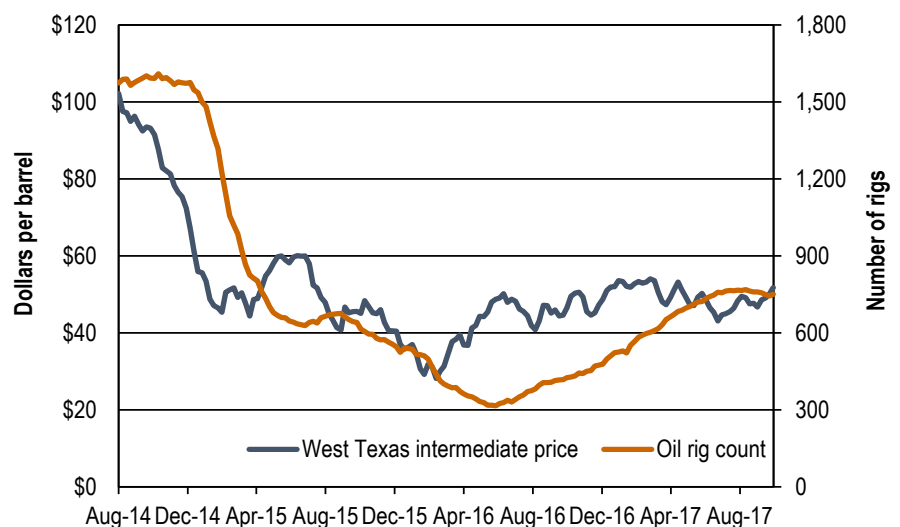
Oil prices have stabilized recently to help employ more rigs used in the industry.

[5] International Monetary Fund Blog, "A Firming Recovery," July 2017.

The previous two years have been characterized by weak global economic growth, a strong dollar and falling commodity prices. The collapse in commodity prices depressed the value of industrial exports. The slowdown in global growth curtailed the value of other categories of exports, while the stronger dollar reduced the incentive for countries to import U.S. products as they became more expensive. Net exports struggled to contribute to domestic growth, often subtracting from it instead.

During 2017, all these factors have reversed. The value of the dollar has begun to depreciate (*Figure 1-10*), commodity prices have stabilized (*Figure 1-11*) and stronger economic growth in many of the nation's major trading partners is providing a boost to the value of American exports.

The pattern of world economic growth has become broader based, with China being less of a driving force than what it had been prior to 2015. Real GDP growth in China has been stable, growing between 6.5 and 7 percent for the past two years, and is on course to achieve a comparable outcome in 2017.[6] The most recent forecast by the International Monetary Fund is for the world economy to grow at 3.5 percent in 2017, up from 3.2 percent in 2016. Although the rate is not as robust as what occurred earlier this century, it will still help to improve almost all economies across the globe.

On a trade-weighted basis, the U.S. dollar has been trending upward since the middle of 2011. Since reaching a 14-year peak late last year, the trade-weighted value has depreciated nearly 8 percent. The weaker dollar is helping to boost U.S. exports by reducing the foreign currency price of American goods and services. As prospects for global growth improve, further depreciation in the dollar is likely to continue and should support domestic export growth for the remainder of 2017 and into 2018.

Net exports have generally exerted a modest negative effect on overall GDP growth since the last recession ended in 2009. They made a positive contribution to economic growth in the middle of 2016 as agricultural exports surged during that time. The firming global growth environment and weaker dollar in 2017 have enabled net exports to again add positively to growth, boosting real GDP by 0.4 percentage points in the third quarter. Net exports have added to growth in all three quarters of 2017 thus far, the first three-quarter consecutive streak in five years.

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[6] National Bureau of Statistics of China.

Figure 1-10. Trade weighted dollar index, January 1997 = 100, not seasonally adjusted
United States, September 2009 through September 2017
Source: Board of Governors of the Federal Reserve System

The recent run-up in the value of the U.S. dollar in comparison to foreign currency value looks to be over now.

Commodity prices stabilized last year and have since risen, a direct result of both the dollar depreciation and the supply disruptions of some commodities, especially industrial supplies and metals. China tends to be a large market for commodities. Although its economy has slowed recently, economic growth in other developed economies has been sufficient to keep prices strong when compared with what they were right after the most recent recession. The recent stabilization of energy and commodity prices should benefit investment in related equipment and nonresidential construction for the remainder of the year and into 2018.

Figure 1-11. Commodity Research Bureau Commodities Index, 1967 = 100, not seasonally adjusted
United States, September 2009 through September 2017
Source: Thomson Reuters Corporation

Prices of leading commodities retreated to a six-year low in late 2015 before starting to rebound.

Construction spending growth slows

An important category of private fixed investment is the construction of new residential and nonresidential structures. Total construction spending momentum continues to build (*Figure 1-12*). Total private construction spending outlays throughout the first nine months of 2017 are up 7 percent overall from the same time period in 2016. The annual rate of growth has been slowing however. From September to September, expenditures grew at an annual rate of 3.1 percent in 2017 compared with a rate of 8.6 percent in 2016. This continues the growth rate's three-year downward trend.

To a large extent, this result is not too surprising given the later stages of an economic cycle. Rising material costs, shortages of skilled labor, limited listed housing inventories, and the recent weakness in manufacturing have all contributed to the slower rate. Spending on private residential construction remains the bright spot. It has risen by 9.2 percent from September 2016 to 2017, up from 8.4 percent during the same time period one year earlier. Much of the increase is in home improvements and construction of single-family units although the pace of spending in the multi-family sector has been slower.

Private nonresidential construction has grown persistently weaker, having declined on a monthly basis in 2017 in all months but one. Reduced spending on manufacturing projects accounts for much of the slide, particularly in the construction of new petrochemical facilities.

Figure 1-12. Value of private construction, millions of dollars, seasonally adjusted annualized rate
United States, September 2010 through September 2017
Source: U.S. Census Bureau, Construction Spending
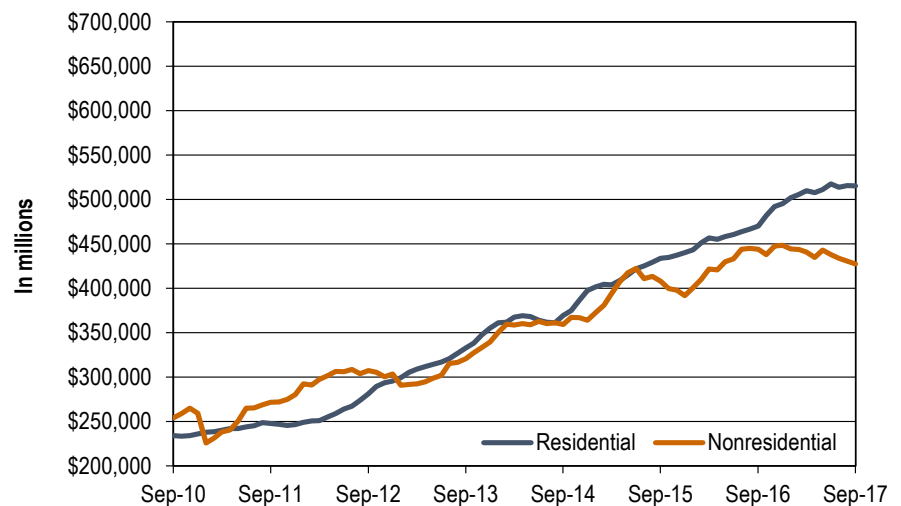
Nonresidential construction activity has weakened recently while residential construction has been slowly growing.

A modest recovery in the housing market

Monthly data on new home sales can be quite variable, so tracking sales over longer time periods provides a better indication of the overall trend. New home sales remain on a steady upward trend (*Figure 1-13*). Sales rose by 11.5 percent over the course of 2016, and are up 9 percent on an annualized basis over the first nine months of 2017.

The healthy job market continues to support strong housing demand and a continued recovery in household finances. Demographic factors are also beginning to change and favor homeownership. However, tighter lending standards, reduced affordability from rising home prices and a lack of availability of new housing in desirable markets have limited sales. This has resulted in a very gradual recovery, mainly benefiting the high end of the market where builders are able to secure a greater profit margin. Although sales have trended upward since the last recession, new home sales are unlikely to approach the high marks reached during the pre-recession housing boom anytime soon.

Figure 1-13. Conventional 30-year mortgage rates and new home sales, thousands of units, seasonally adjusted annualized rate
United States, September 2010 through September 2017
Source: Federal Housing Finance Agency; U.S. Bureau of Economic Analysis, New Residential Sales
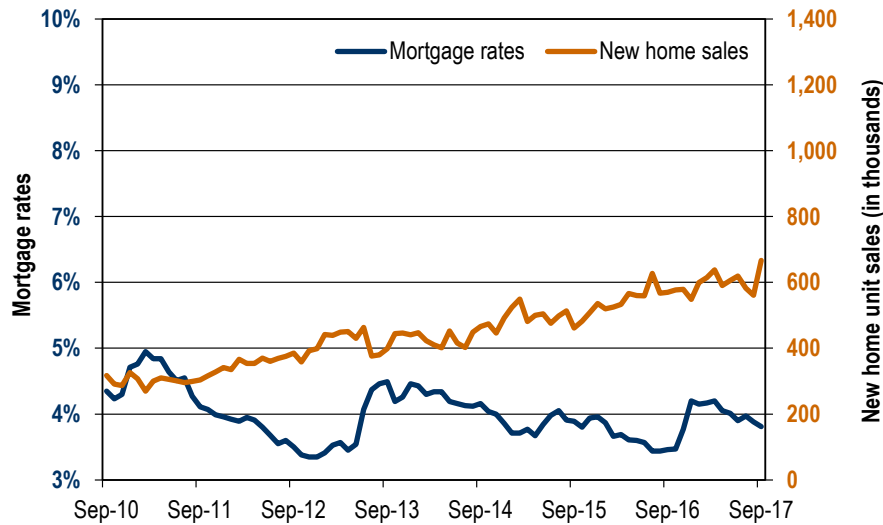
Sales of new homes continue to gradually improve into 2017.

Government (public sector) spending held the line

A steady level of government expenditures roughly characterizes federal fiscal years 2016 and 2017 (October 2015 through September 2016 and October 2016 through September 2017, respectively). Total real outlays per quarter in 2016 and 2017 were about $2.9 trillion (*Figure 1-14*). Real federal spending through 2017 was slightly up, increasing by 1.2 percent and in line with the modest increase to the budget cap imposed under the Budget Control Act of 2011. The largest component of government spending, state and local, showed a modest decline to offset the spending increase at the federal level. More modest revenue growth, along with growing pressure from unfunded pension liabilities and costs associated with the expansion of the Medicaid program, limited the budget to support other concerns.

Government spending has provided a net negative contribution to GDP growth in fiscal year 2017. Early indications of government outlays for 2018 suggest that spending will increase. Greater procurement to support the military along with a hurricane Harvey relief package, allocations to FEMA's Disaster Relief Fund and the National Flood Insurance Program have either been agreed upon or appear likely to take place. As such, these would help raise government's contribution to real GDP growth in future quarters.

Figure 1-14. Government purchases and gross investment, trillions of dollars adjusted for inflation, seasonally adjusted annualized rate
United States, third quarter 2010 through third quarter 2017
Source: U.S. Bureau of Economic Analysis, Government Current Receipts and Expenditures
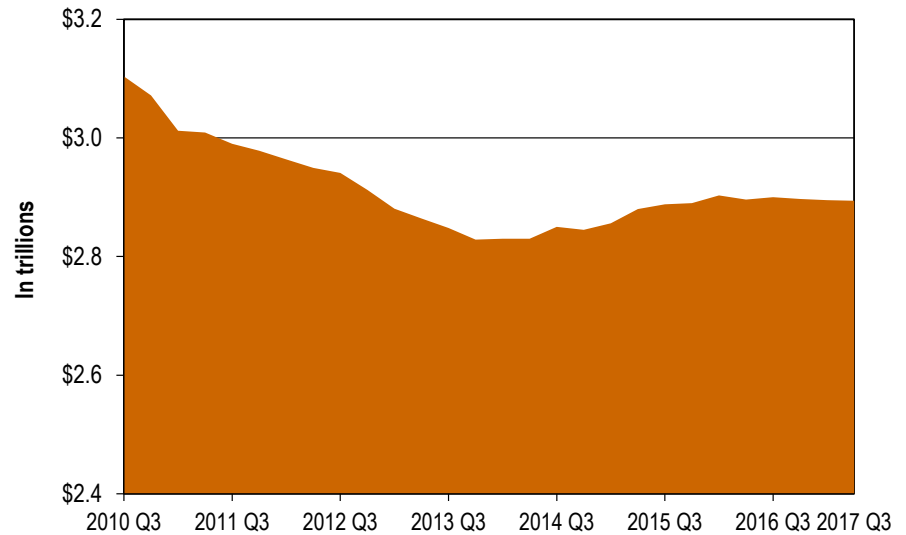
Government spending has been maintained at roughly the same level the last of couple years.

Public and private sector employment growth

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.[7]

According to the establishment survey, total nonfarm seasonally adjusted employment reached 146.7 million in September 2017, up 1.3 percent from September 2016. This growth is slightly less than 2016's 1.8 percent employment increase. Employment using this survey approach uses payroll information provided by employers and is usually referred to as payroll employment. The slower growth rate in 2017 is not surprising, as the pool of job seekers will shrink when an economic expansion matures. The economy has been adding an average of 176,000 jobs per month in 2017 from January through August. September's job gains were estimated to be only 18,000 due to the impact of hurricanes.

[7] 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.

Figure 1-15 shows how employment has been trending in both the private and public sectors since September 2010. Although private sector employment has continued to grow, public sector growth is relatively stagnant. Public sector hiring was slow to recover after the last recession but began improving in 2013, rising by 0.3 percent from September 2013 to September 2014, and by 0.7 and 1.2 percent over the same months in 2015 and 2016. Since then, public sector employment has only risen by 0.2 percent through September 2017. State and local government employment makes up 87 percent of total government employment, so fiscal conditions in the states guide much of the hiring in the public sector.

Private sector employment has continued to increase. Job gains have been remarkably steady through 2016, averaging just over 2 percent year over year. Employment growth in the private sector began to slow in 2017, rising 1.5 percent from September 2016 to September 2017.

Figure 1-15. Total private and public nonfarm employment, in thousands, seasonally adjusted
United States, September 2010 through September 2017
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics
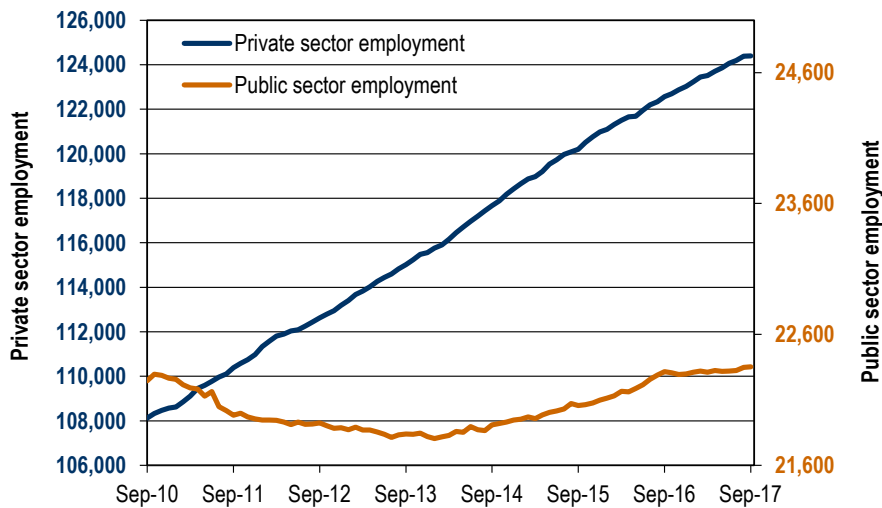
Private sector employment has been steadily expanding while public sector employment growth trailed off the past two years.

Private job growth has been most prevalent in professional and business services, leisure and hospitality, construction, transportation, warehousing and utilities, and education and health services. (*Figure 1-16*), all of which grew more than average with respect to total private nonfarm employment growth. The top two industries that added the most jobs over the seven-year period were professional and business services, with 3,418,000 jobs added, and education and health services, which added 3,125,000 jobs.

In contrast, employment growth has been weakest in information and in mining and logging. The below-average growth occurring in information encompasses many jobs considered to be high technology, a sector that is not widespread across the nation. Negative growth in mining and logging is consistent with the previous moderation in the global economy and the strength of the dollar, but recently this industry's employment has begun to grow.

Figure 1-16. Percent change in private sector employment by industry
United States, September 2010 through September 2017
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics
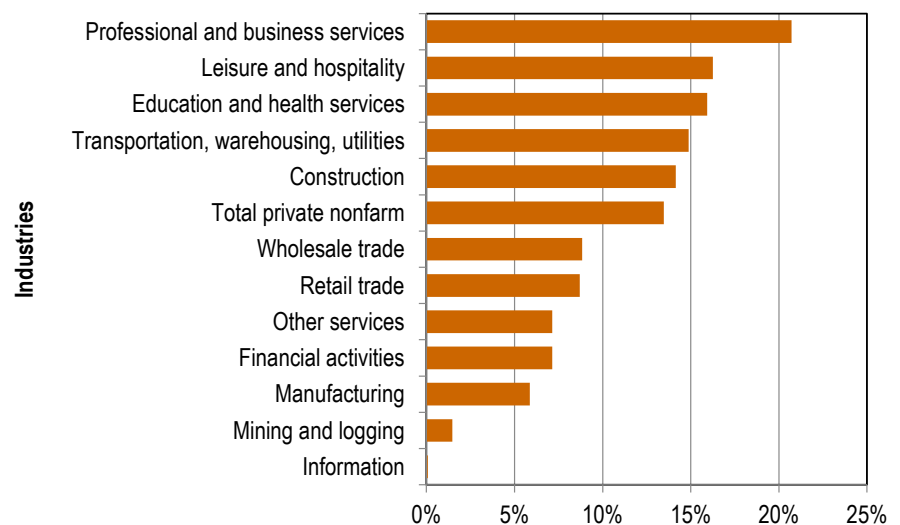
Private sector employment has expanded in all major industries during the current economic expansion.

The unemployment rate may have reached its lowest limit

The unemployment rate is based on the national household survey and is perhaps the most widely used measure of the labor market. As of September 2017, the unemployment rate was 4.2 percent, down 0.7 percentage points from September 2016, but significantly less than its recession peak of 10 percent in October 2009 (Figure 1-17). The last time the rate was this low was February 2001. This drop in the unemployment rate has corresponded with an impressive monthly string of job gains. The last time there was a reported loss of jobs from one month to the next occurred during September 2010 when census workers' temporary employment ended.

The past seven years of employment growth has gradually thinned the number of available workers who were initially unemployed thanks to the recession. Coupled with slow growth in labor force numbers, the unemployment rate has subsequently been pushed

down to a level that economists refer to as full employment. At this point, an excess availability of jobs with respect to job seekers increases the possibility of rising inflation within the economy. To reduce this likelihood, the Fed is expected to raise interest rates to manage this event, which will have the effect of putting upward pressure on the unemployment rate.

Figure 1-17. Monthly unemployment rate, seasonally adjusted
United States, September 2010 through September 2017
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics
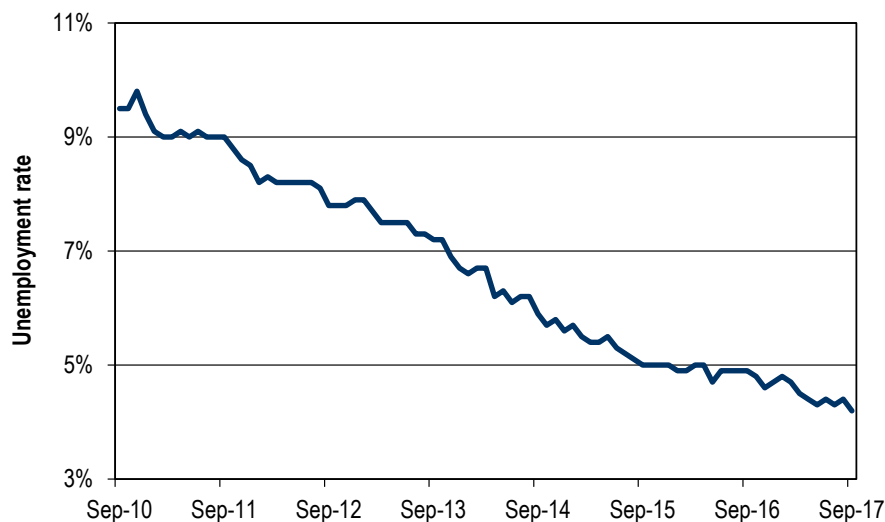
The unemployment rate might be at its cyclical bottom.

The sustained level of job growth has put more people to work and has contributed to a mild rebound in the labor force participation rate the last couple of years (*Figure 1-18*). This has occurred amidst a backdrop of a declining longer-run trend owing to the aging population and other related factors. The increase suggests that the level of cyclical unemployment had continued to diminish.

Despite labor force participation remaining near multi-decade lows, the employment situation facing workers has improved. The employment-to-population ratio, which is a measure of the number of people employed relative to the total number of working age people in the population, has risen to new cycle highs. Given the limited prospects for a rise in the participation rate based on demographic factors, full employment for the economy appears to be at hand.

Figure 1-18. Labor force participation rate and employment-to-population ratio, seasonally adjusted annualized rate
United States, September 2010 through September 2017
Source: U.S. Bureau of Labor Statistics, Current Population Survey
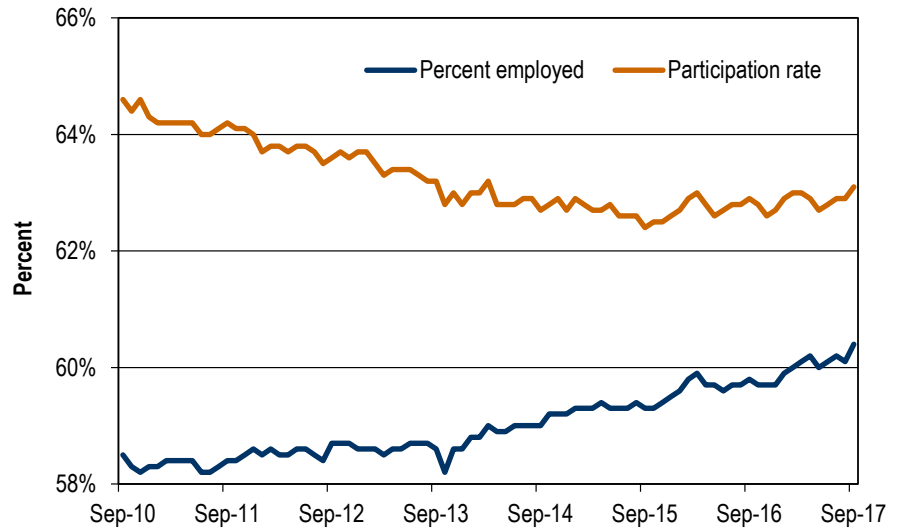
With more of the working age population employed, the downward trend in participation has temporarily halted.

Chapter 2: Washington's economy and labor market

Economic events and policies that affect and shape the national economy have very similar 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 experienced by all states, though the degree to which they are felt might differ between states.

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 computes state GDP annually. 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 GDP growth ranked first

Washington state's economy, in terms of GDP growth, ranked first among all U.S. states and territories in 2016. Its GDP expanded by 4.2 percent in 2016 (*Figure 2-1*), which outpaced the 1.5 percent growth achieved by the nation.

Washington's economy has grown at a faster pace than the nation as a whole beginning in 2012. The continued development of the state's technology sector has had much to do with this. Technology is largely manifested within the information services industry and in professional and business services. Information services, which includes software development, contributed 1.15 percentage points out of the 4.2 percentage points by which Washington's economy expanded in 2016. Retail trade output also rose significantly, climbing at an 11.5 percent annual rate and contributing .87 percentage points to total state GDP growth during the year. For the first half of 2017 where preliminary data is available, GDP growth in Washington is continuing, but so far at a more modest pace of 2.7 percent.

Figure 2-1. Gross domestic product, (chained 2009 dollars), annual percent change, seasonally adjusted annualized rate
United States and Washington state, 2010 through 2016
Source: U.S. Bureau of Economic Analysis, Domestic Product and Income
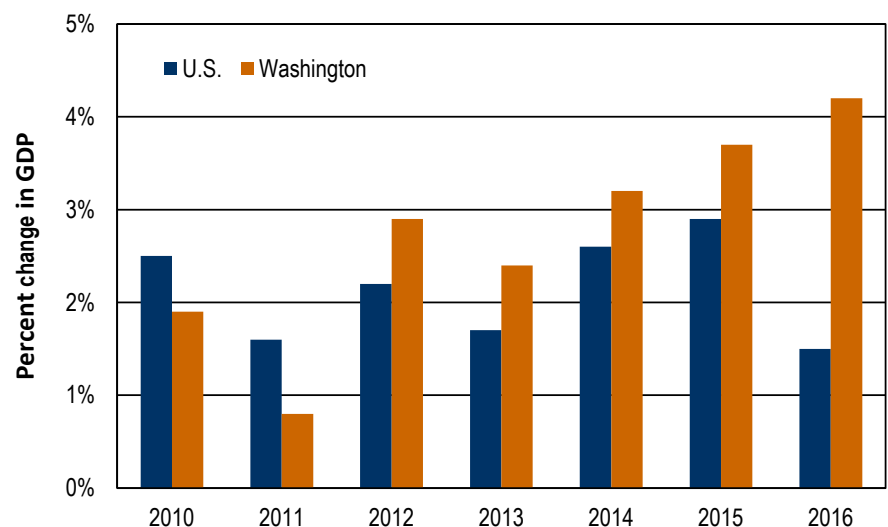
Washington's economy has grown faster than the national average through most of the current economic expansion.

Personal income gains supported with wage growth

Washington's GDP has expanded annually going into its eighth year in 2017. The higher levels of economic activity have contributed to greater employment and income for the state's residents. *Figure 2-2* shows how personal income growth in Washington compares with the U.S. Income growth in Washington has been somewhat greater than the U.S. rate of gain due to the larger degree of economic growth. From third quarter 2016 to third quarter 2017, the level of personal income in Washington grew by $111 billion (3.2 percent per quarter on an annualized basis), while U.S. personal income grew by $157 trillion (1.2 percent).

Figure 2-2. Personal income, adjusted for inflation
United States and Washington state, third quarter 2010 through third quarter 2017
Source: U.S. Bureau of Economic Analysis, Personal Income and Outlays
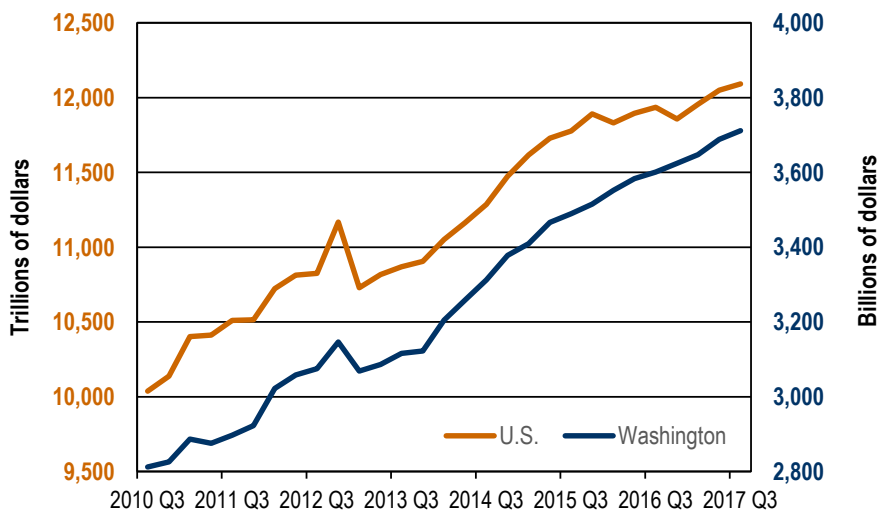
Washington's level of income has grown due to greater economic activity as the expansion has progressed.

Wages are a component of personal income, so as income rises, so should wages. The annual growth in wages for Washington state is shown in *Figure 2-3*. The wages are expressed in nominal terms, unadjusted for inflation. The figure also shows the disparity in wages owing to King County, where Seattle is located, and the rest of the state. King County is the most populated, has the highest levels of business representation and employment, and has the largest technology economy in the state. During the period from 2010 through 2016, the average annual wage in King County grew by $16,100, or 4 percent per year on average, while average annual wages throughout the rest of the state grew by $9,700, or 2.5 percent. Most of the wage effect resulting from the large increase in the state's GDP in 2016 accrued to King County. Wages there rose by 6 percent compared with 2.3 percent for the remainder of the state.

Figure 2-3. Average annual wage
King County and balance of Washington state, 2010 through 2016
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages
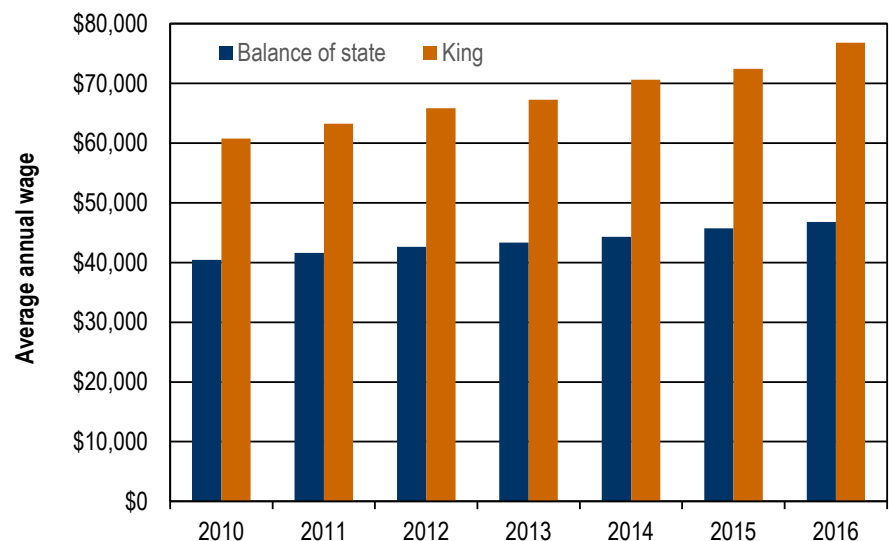
Wage growth has been most prominent in King County and is gradually progressing across the remainder of the state.

Figure 2-4 shows on a percentage basis, the manner in which nominal wages have grown by industry sector from 2010 through 2016. Average wages in six of the state's 13 major industrial sectors grew faster than the state average wage, which grew by 21.8 percent. These included other services (which contains repair, maintenance and personal services), retail trade, information, financial activities, mining and logging and leisure and hospitality. Average wages in the remaining seven industry sectors grew slower than the state's average wage. The two industries showing the highest percentage wage growth, other services and retail trade, pay an average wage less than the state average.

The industry that paid the highest average rate in 2016, at $159,500, was the information sector. From 2010 through 2016, wages in this sector have grown by 45.3 percent. During the same time, wages within the industry with the lowest average wage in 2016 at $26,400, leisure and hospitality, grew by 23.5 percent.

Figure 2-4. Percent change in average annual wage
Washington state, 2010 through 2016
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages
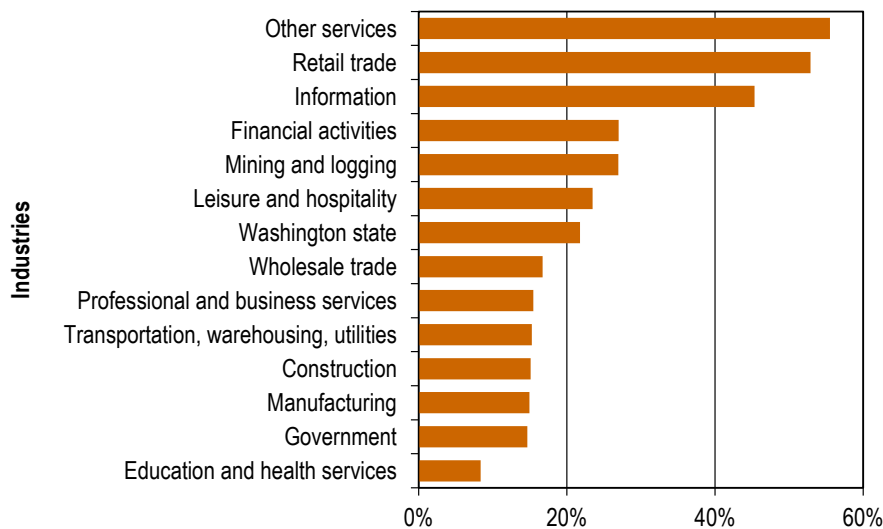
On a percentage basis, wages have grown the most in other services and the least in education and health services in the past six years.

Income and wage growth supports greater spending

Local consumer spending patterns are reflected in taxable retail sales. *Figure 2-5* shows how taxable sales have risen annually from 2010 through 2016. Spending by Washington consumers has increased throughout, reflecting higher total income earned over the period. Since 2011, sales revenues have increased by $45.1 million, an average of 7.5 percent per year. In 2016, taxable retail sales increased by $10.5 million from 2015, roughly equivalent to the increase from 2014 to 2015.

Figure 2-5. Annual taxable retail sales, millions of dollars
Washington state, 2010 through 2016
Source: Washington State Department of Revenue
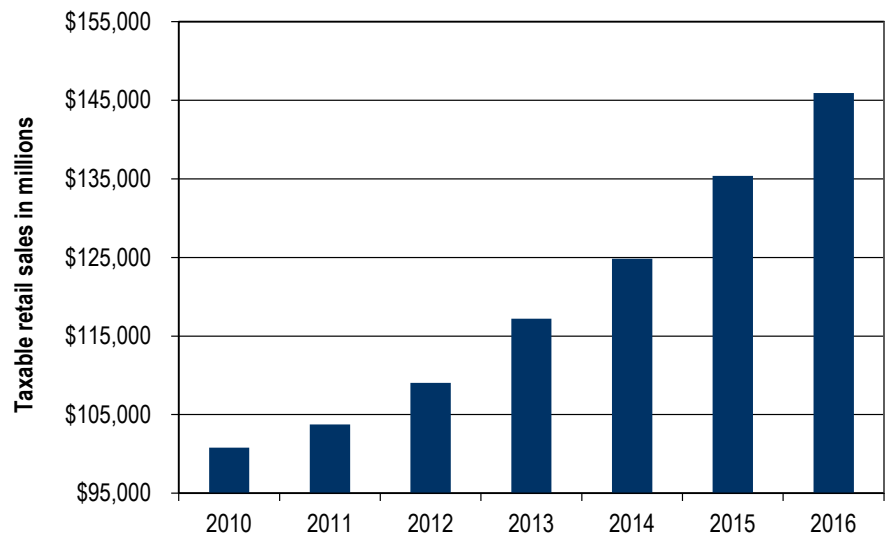
Retail sales have grown each year since 2010, but grew fastest in 2015.

Washington housing market strong, Seattle area driving up regional home prices

Low interest rates, population growth and improving employment conditions continue to bolster the demand for housing throughout the state. This has pushed home prices in the state to new levels surpassing their pre-recession peak, and prompted builders to respond by building more homes (*Figure 2-6*). 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 has risen by 19.7 percent into and through September 2017. Over the course of the year, the state's home price index in September 2017 is 12.8 percent higher than it was in September 2016.

Much of the increase in local home prices has been taking place in the Seattle area. The area's vibrant tech sector has fueled economic growth and increased population inflows. In addition, developable land is being placed at a premium as many of the tech companies have recently moved to develop office space in downtown Seattle and nearby areas. Median home prices in King County have risen by 73 percent from third quarter 2012 to third quarter 2017.[8]

Home price appreciation is taking place across most of the state as well. From September 2016 to 2017, median home prices rose in all of the state's 17 metropolitan counties except for Walla Walla which declined by a modest 0.4 percent. During the same period, Klickitat County recorded the highest increase of 33.1 percent, followed by Pierce County at 18.5 percent. Median prices were lower in only two counties, with prices in Columbia County decreasing by 6.5 percent.

Housing starts have been moving to keep pace with the rise in home prices. Housing starts from September 2016 to September 2017 were 44,274 and are up by 11.4 percent over the same period one year prior. Despite the weaker September 2017 rate, starts in the third quarter were 10,663, up by 8.8 percent compared with third quarter September 2016.

Figure 2-6. Housing price index and single-family housing starts, seasonally adjusted, December 2000 = 100
Washington state, September 2010 through September 2017
Source: Federal Home Loan Mortgage Corporation
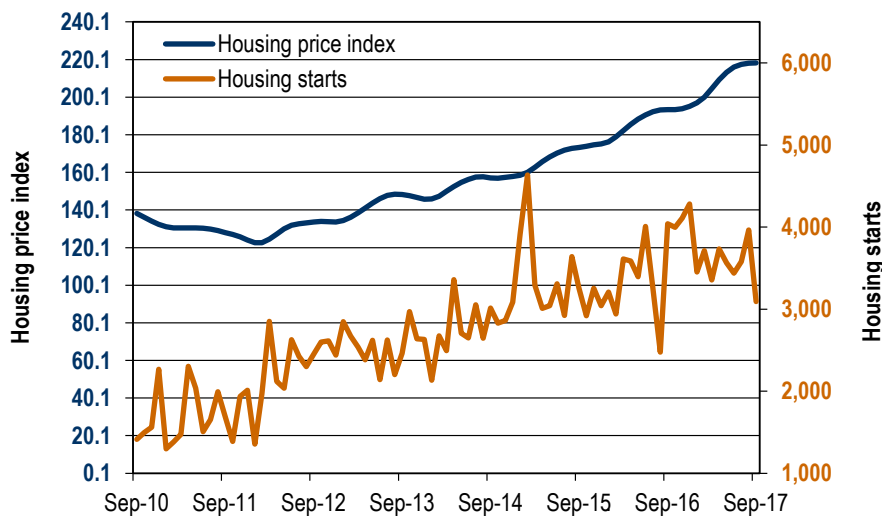
Home price appreciation is currently outpacing builders' attempts to expand the housing inventory.

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[8] Runstad Center for Real Estate Studies, University of Washington.

Residential building permits are the precursor to the start of housing projects, so it is no surprise to see the level of permits rising in tandem with housing starts. Most residential activity has traditionally been aimed at construction of single-family units compared with multi-family residences (*Figure 2-7*). 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. The number of multi-family permits issued between the third quarters of 2016 and 2017 exceeded the number of permits for single-family housing in three of the four quarters.

Figure 2-7. Residential building permits by type of unit, three-month moving average Washington state, third quarter 2010 through third quarter 2017
Source: U.S. Census Bureau, Building Permits Survey
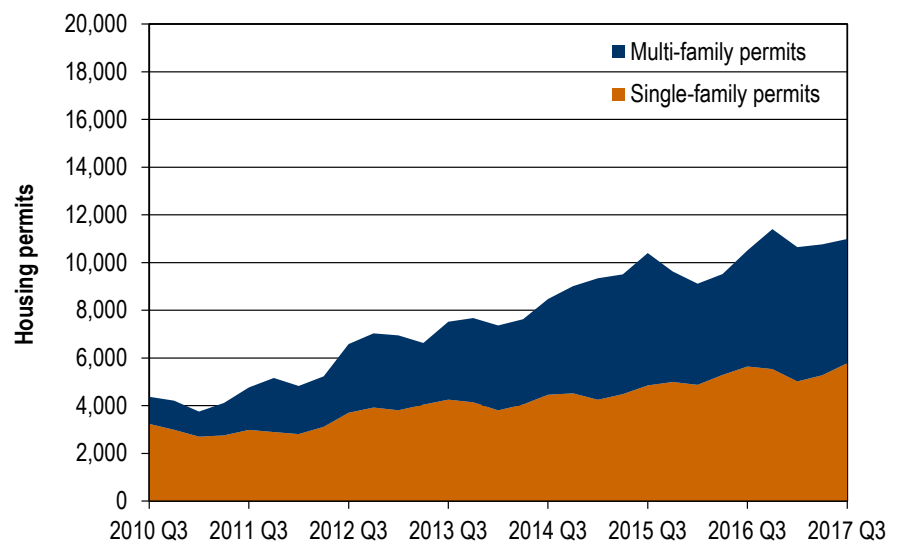
Permits issued for multi-family units have mostly been outnumbering single family permits in Washington.

International trade, an important part of the state economy

Washington was the third-largest exporting state in the country in 2016 based on total export value, a position it has held since 2013. The state has maintained a positive trade balance, with the value of exports exceeding imports.[9] Transportation equipment, particularly commercial aircraft, made up the dominant share of the state's exports in terms of value, and accounted for 2.5 times the combined total value of the next four top export commodities.

[9] United States Census Bureau, State Trade Data.

The total value of Washington state exports had been trending upward until 2015. A weaker global economy coupled with a rise in the value of the dollar versus foreign currencies helped reduce the value of Washington's exports to 86.4 billion dollars in 2015 from 90.6 billion dollars in 2014. Washington's export value continued declining into 2016, totaling 79.6 billion dollars for the year. A healthier global economy along with the recent decline in the value of the dollar is providing a more optimistic appraisal for 2017.

China largest destination for Washington state exports

Washington's geographic orientation toward the Asian Pacific Rim, along with its coastal ports, provides a strong basis for international trade with that region. Washington also shares a border with Canada and engages in a significant amount of trade with its northern neighbor. China continues to be Washington's largest export destination, despite the total value of exports to China declining in 2015 and 2016 (*Figure 2-8*).

Figure 2-8. Top 10 destination countries for Washington state exports, millions of dollars, based on 2016 ranking
Washington state, 2013 through 2016
Source: U.S. Census Bureau, State Trade Data

Country	2013	2014	2015	2016	Percent share 2016	Percent change 2015 to 2016
China	$16,711	$20,693	$19,485	$16,130	20.3%	-17.2%
Japan	$7,037	$7,366	$6,001	$7,134	9.0%	18.9%
Canada	$8,993	$9,298	$7,362	$7,035	8.8%	-12.3%
United Arab Emirates	$3,870	$3,272	$3,211	$4,158	5.2%	29.5%
South Korea	$2,712	$2,752	$4,287	$4,155	5.2%	-3.1%
United Kingdom	$2,702	$2,951	$2,541	$3,566	4.5%	40.3%
Taiwan	$1,443	$2,474	$2,758	$3,103	3.9%	12.5%
Saudi Arabia	$1,661	$811	$1,876	$2,666	3.4%	42.1%
Netherlands	$831	$890	$1,679	$2,173	2.7%	29.4%
Turkey	$548	$1,340	$1,922	$2,168	2.7%	12.8%

China has consistently been the top trade destination for Washington exports.

Public and private sector employment growth

Figure 2-9 shows how nonfarm employment in the state has changed in both the private and public sectors over the past seven years. Both sectors continued to add jobs over the course of the year from September 2016 to September 2017. Total nonfarm employment increased by 2.1 percent during that time as employers throughout the state added 68,800 jobs. The private sector accounted for the majority of the jobs added, with 57,100 added to private payrolls while government added 11,700 jobs.

State and local government employment made up over 86 percent of total government employment in September 2017. State and local governments also accounted for nearly all of the total government jobs added from September 2016 to September 2017, contributing 11,400 out of the 11,700 jobs added. From September 2013 through September 2017, hiring in the public sector has increased annually at roughly 2.1 percent per year.

Figure 2-9. Total private and public sector nonfarm employment, seasonally adjusted
Washington state, September 2010 through September 2017
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Current Employment Statistics
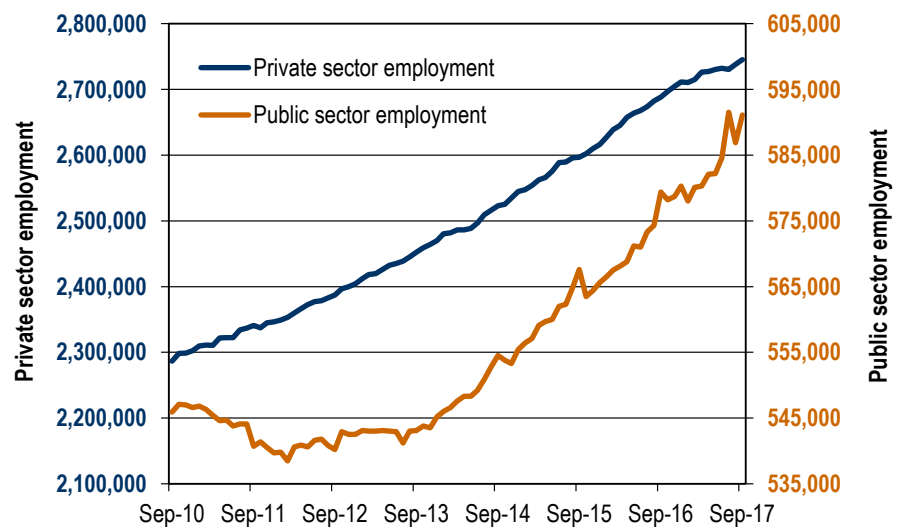
Employment growth has been fairly consistent in both the private and public sectors the past four years.

Figure 2-10 shows how the percentage gain in total nonfarm employment over the last seven years, from September 2010 through September 2017, has been distributed among the major industrial groups making up the state economy.

Employment gains across industries has been broad-based, with every major industrial group now showing increases in employment. The distribution of industries with employment growth considered to be above average and below average with respect to the state total was evenly mixed. Six private industry sectors had employment gains above the state average, while seven fell below. Construction employment expanded by the largest margin, 38.5 percent. Mining and logging, which employs the fewest number of workers of the major industrial groups but had been under some duress before recovering in 2017, posted the lowest percentage employment growth over the seven-year period at 7.9 percent.

Figure 2-10. Percent change in employment by industry
Washington state, September 2010 through September 2017
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Current Employment Statistics
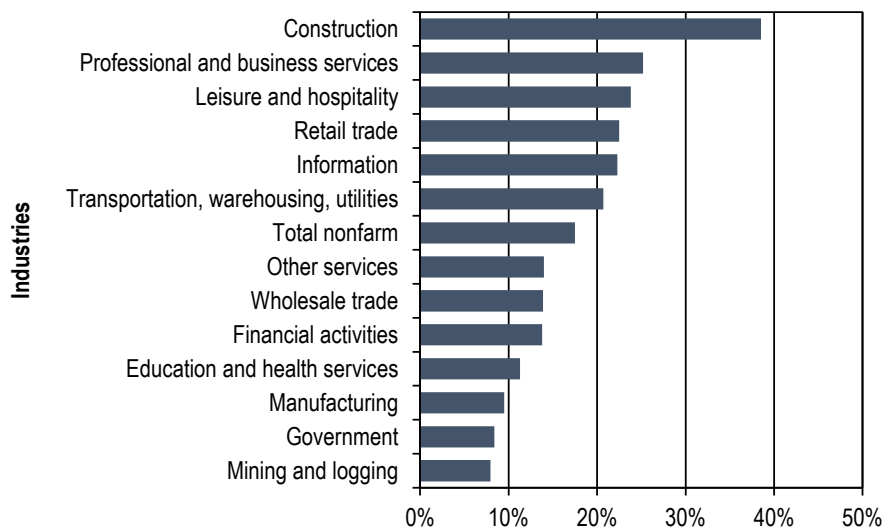
Employment has increased in every major industry group over the last seven years.

Seattle metro area creating the most jobs in the state

Figures 2-11 and *2-12* illustrate the extent to which the Seattle-Bellevue-Everett (Seattle) Metropolitan Division (King and Snohomish counties) has served as a major center for job creation during the past seven years. This Metropolitan Division (MD) had lost a greater number of jobs during the recession than the rest of the state as a whole. Since September 2010, however, nonfarm employment in the Seattle MD grew by 294,900 through September 2017, or by 21.1 percent. By contrast, the rest of the state has added 209,200 jobs and has increased employment by 14.6 percent during the same period.

Total employment in the Seattle MD has been larger than the balance of the state since September 2012. The difference in total nonfarm employment between the two areas widened to 61,400 in March 2017, but by September 2017 had narrowed to 48,100.

Figure 2-11. Total nonfarm employment change, seasonally adjusted
Washington state, Seattle-Bellevue-Everett Metropolitan Division and balance of state, September 2010 through September 2017
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Current Employment Statistics

Area	Total employment change September 2010 to September 2017	Percent employment change September 2010 to September 2017
Seattle-Bellevue-Everett Metropolitan Division	294,900	21.1%
Balance of state	209,200	14.6%
Total for state	**504,100**	**17.8%**

The Seattle-Bellevue-Everett Metropolitan Division continues to lead in job creation.

Figure 2-12. Monthly total nonfarm employment, in thousands, seasonally adjusted
Seattle-Bellevue-Everett Metropolitan Division and balance of Washington state, September 2010 through September 2017
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Current Employment Statistics
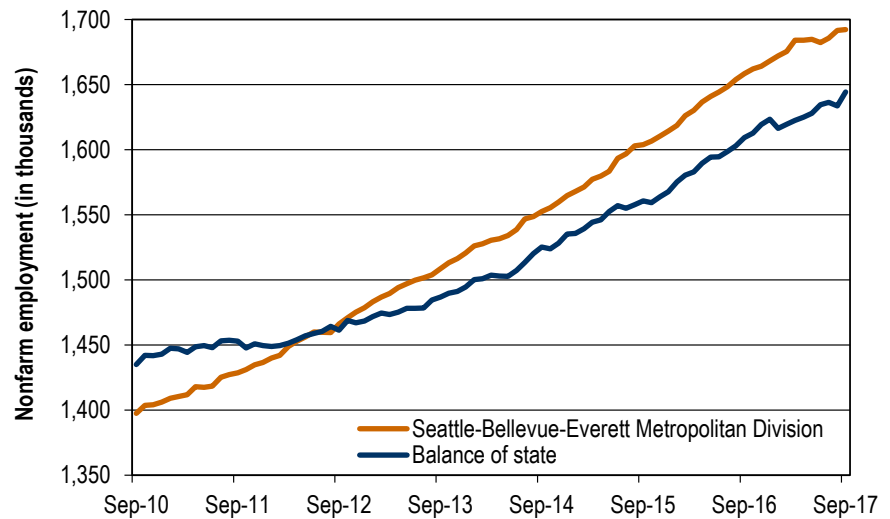
Employment is growing, with the Seattle-Bellevue-Everett Metropolitan Division area continuing to lead the way.

Washington state and U.S. unemployment rates decrease as employment growth increases

Washington state's unemployment rate has tracked fairly close with the national unemployment rate during the last seven years. (*Figure 2-13*). The downward trend in the unemployment rate for the state and nation reflect the employment growth that has ensued over time. From September 2010 to September 2017, the unemployment rate for Washington has declined by 5.1 percentage points while the national rate declined by 5.3 percentage points. Washington's September unemployment rate of 4.6 percent is just above its record low of 4.5 percent, reached during May and June of that same year. The September unemployment rate for the U.S. stood at 4.2 percent. This was the lowest point reached since February 2001. At this point in the economic expansion, the unemployment rates for the state and nation are widely considered to be at full employment level, a point at which any unemployment resulting from the last recession is at or near zero.

Figure 2-13. Monthly seasonally adjusted annualized unemployment rates
United States and Washington state, September 2010 through September 2017
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics,
Local Area Unemployment Statistics
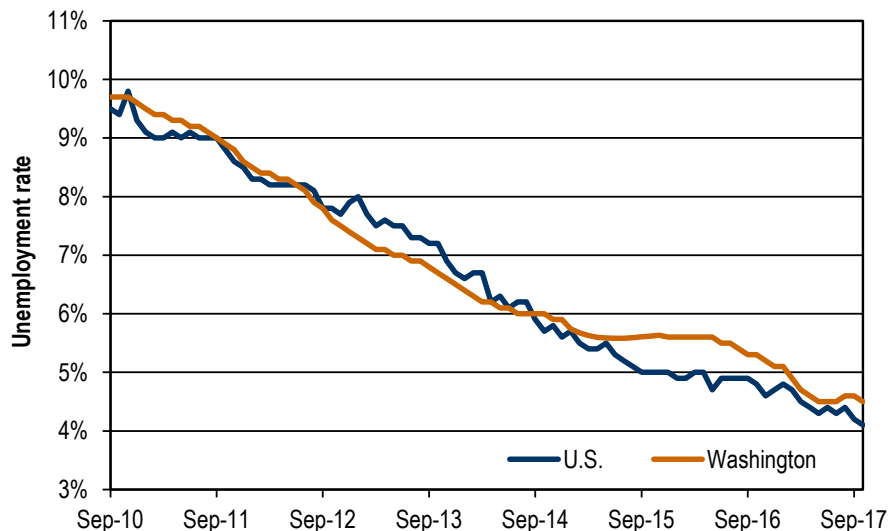
The Washington state unemployment rate has descended to a record low and is slightly above the national rate.

Sustained job growth in Washington produced enough momentum by September 2014 to employ a larger percentage of the working age population and attract a larger percentage of job seekers into the labor force. The effects these have had are reflected in terms of the labor force participation rate and the employment-to-population ratio (percent employed) in *Figure 2-14*. Given the belief that

there are increasingly fewer available workers to hire, other than through normal increases in the population and labor force, the employment-to-population ratio is likely to level off soon. Labor force participation has been naturally declining, mostly due to an aging and retiring workforce, and the long-term downward trend is likely to resume in coming years.

Figure 2-14. Labor force participation rate and employment-to-population ratio, seasonally adjusted annual rate
Washington state, September 2010 through September 2017
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics
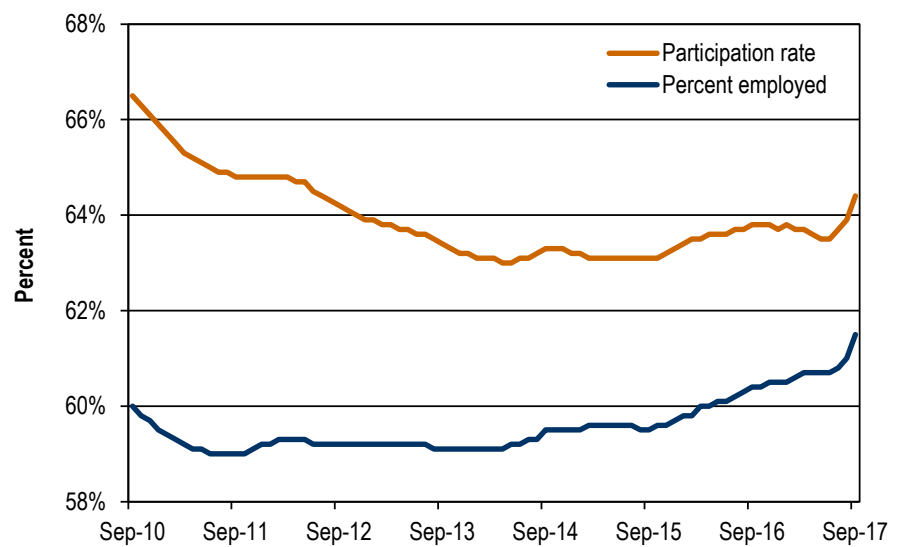

The labor force participation rate and the percent of the population employed have been trending upward as the labor market strengthens.

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 (see *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 2016.[10] 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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[10] 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

Based on an analysis of 97 industries in Washington state, 18 industries were identified as having high levels of seasonality, with a seasonal factor 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 through 2016
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Seasonal factor
111	Crop production	37.2%
487	Scenic and sightseeing transportation	18.4%
115	Support activities for agriculture and forestry	15.3%
711	Performing arts, spectator sports and related industries	9.1%
237	Heavy and civil engineering construction	8.9%
213	Support activities for mining	8.8%
114	Fishing, hunting and trapping	8.1%
814	Private households	7.9%
721	Accommodation	5.7%
525	Funds, trusts and other financial vehicles	5.5%
611	Educational services	4.9%
311	Food manufacturing	4.9%
448	Clothing and clothing accessories stores	4.7%
713	Amusement, gambling and recreation industries	4.6%
492	Couriers and messengers	4.6%
312	Beverage and tobacco product manufacturing	4.5%
512	Motion picture and sound recording industries	4.4%
519	Other information services	4.1%

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

Structural and cyclical industries

For total covered employment, the trend component accounts for 76.8 percent of total employment changes (*Appendix figure A2-2*). There were 27 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, educational services and software publishers 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 through 2016
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics,
Quarterly Census of Employment and Wages

NAICS	Industry	Structural factor
621	Ambulatory healthcare services	84.2%
722	Food services and drinking places	78.8%
611	Educational services	78.7%
5112	Software publishers	77.8%
453	Miscellaneous store retailers	76.7%
454	Nonstore retailers	74.9%
622	Hospitals	73.8%
532	Rental and leasing services	73.2%
903	Local government (other)	72.1%
238	Specialty trade contractors	72.0%
812	Personal and laundry services	71.1%
519	Other information services	71.0%
312	Beverage and tobacco product manufacturing	70.8%
531	Real estate	70.5%
425	Wholesale electronic markets and agents and brokers	70.4%
623	Nursing and residential care facilities	70.2%
236	Construction of buildings	69.7%
541	Professional, scientific and technical services	68.6%
452	General merchandise stores	68.6%
491	Postal service	68.4%
323	Printing and related support activities	68.4%
331	Primary metal manufacturing	67.6%
423	Merchant wholesalers, durable goods	67.1%
813	Religious, grantmaking, civic, professional and similar orgs.	67.1%
441	Motor vehicle and parts dealers	67.1%

NAICS	Industry	Structural factor
511*	Other publishers	66.9%
444	Building material and garden equip. and supplies dealers	66.8%

* 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 23.2 percent of total employment change. Support activities for mining, scenic and sightseeing transportation, and crop production 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 through 2016
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

NAICS	Industry	Cyclical factor
213	Support activities for mining	67.8%
487	Scenic and sightseeing transportation	65.1%
111	Crop production	61.5%
486	Pipeline transportation	59.2%
324	Petroleum and coal products manufacturing	58.1%
316	Leather and allied product manufacturing	57.4%
313	Textile mills	56.2%
515	Broadcasting (except internet)	56.2%
112	Animal production	53.1%
521	Monetary authorities-central bank	52.9%
446	Health and personal care stores	52.3%
114	Fishing, hunting and trapping	52.0%
483	Water transportation	51.9%
512	Motion picture and sound recording industries	50.9%
221	Utilities	50.3%
901	Federal government (other)	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* with the full results of these analyses.

Chapter 4: Unemployment

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

Unemployment benefits

In September 2017, more than 45,000 people received unemployment benefits. *Figure 4-1* shows that the number of beneficiaries has continued to decrease, by 85 percent in September 2017 from a peak of just over 300,000 in January 2010. The drop in beneficiaries reflects factors including: individual beneficiaries finding jobs, fewer people being laid off and needing to apply for benefits, and beneficiaries exhausting all of their unemployment benefits.

Figure 4-1. Unemployment benefit recipients by month, all benefits[11]
Washington state, January 2013 through September 2017
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
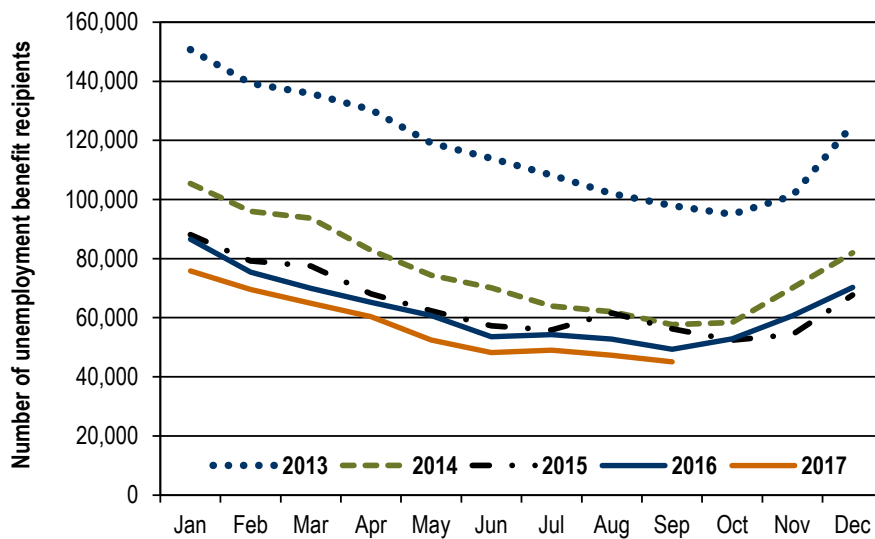
From year to year, the number of people receiving unemployment benefits has continued to decline since 2013.

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.

[11]All benefit programs include regular, emergency unemployment compensation (EUC) and extended benefits (EB).

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 2016, was 14.9. From January 2017 through September 2017, the average duration for both regular benefits and all benefits decreased to 14.8 weeks.[12]

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[12] 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 2017
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
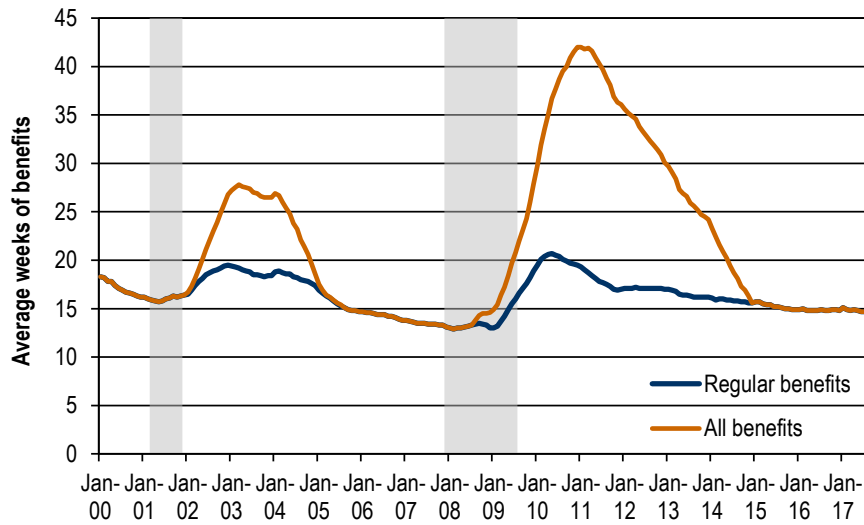
Shaded areas are U.S. recession periods.

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. *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 2017, 2,956 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 2017
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
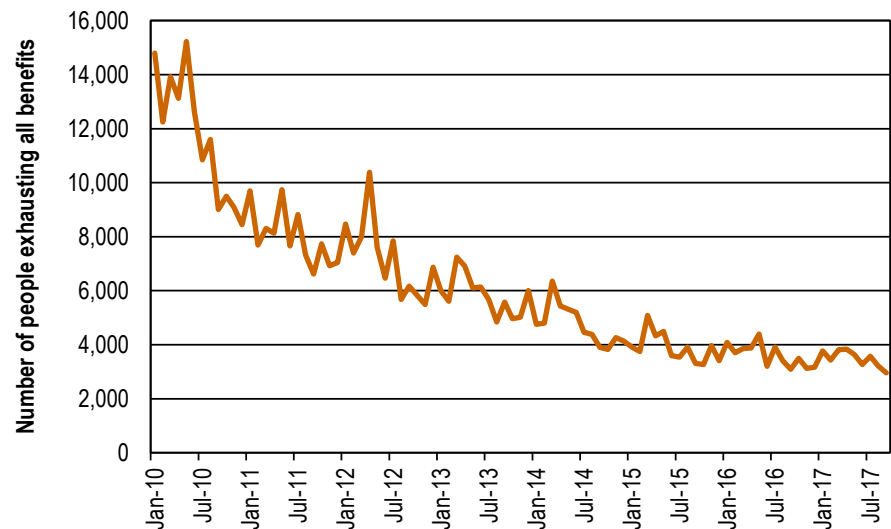
In September 2017, 2,956 people exhausted all of their unemployment benefits.

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 2017. 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 recent recession. The larger the exhaustion-to-employment ratio, the more likely workers were to exhaust.

From October 2016 through September 2017, workers in the utilities industry were most likely to exhaust unemployment benefits with an exhaustion-to-employment ratio of 2.2. Construction and administrative and support and waste management and remediation services followed as second and third most likely to exhaust (1.9 and 1.7, respectively).

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

The manufacturing industry accounted for the greatest portion of exhaustions at 12.2 percent. The manufacturing industry's share of total covered employment was 8.6 percent and the exhaustion-to-employment ratio was 1.4. Construction had the second largest portion of exhaustions at 11.2 percent.

Figure 4-4. Unemployment benefit exhaustions by industry, all benefits
Washington state, October 2016 through September 2017
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse; U.S. Bureau of Labor Statistics, Current Employment Statistics

NAICS	Industry sector	Annual exhaustions, all benefits	Percent of all exhaustions	Industry share of nonfarm employment	Exhaustions-to-employment ratio
11	Agriculture, forestry, fishing and hunting	1,998	4.8%	N/A	N/A
21	Mining	74	0.2%	N/A	N/A
22	Utilities	92	0.2%	0.1%	2.2%
23	Construction	4,637	11.2%	6.0%	1.9%
31-33	Manufacturing	5,047	12.2%	8.6%	1.4%
42	Wholesale trade	2,124	5.1%	4.1%	1.3%
44-45	Trade	3,277	7.9%	11.5%	0.7%
48-49	Transportation and warehousing	1,262	3.1%	3.1%	1.0%
51	Information	1,517	3.7%	3.8%	1.0%
52	Finance and insurance	1,211	2.9%	3.0%	1.0%
53	Real estate, rental and leasing	670	1.6%	1.7%	1.0%
54	Professional, scientific and technical services	3,449	8.3%	6.1%	1.4%
55	Management of companies and enterprises	105	0.3%	1.3%	0.2%
56	Admin. and support and waste mgmt. and remediation svcs.	3,576	8.7%	5.0%	1.7%
61	Educational services	848	2.1%	1.8%	1.1%
62	Healthcare and social assistance	3,299	8.0%	12.5%	0.6%
71	Arts, entertainment and recreation	581	1.4%	1.6%	0.9%
72	Accommodation and food services	1,580	3.8%	8.4%	0.5%
81	Other services	1,027	2.5%	3.6%	0.7%
GOV	Government	962	2.3%	17.7%	0.1%
	Unknown	3,998	9.7%	N/A	N/A
	Total	**37,336**	**90.3%**	**100.0%**	**N/A**

N/A = Nonfarm employment does not include farmworkers, private households or non-profit organization employees. Exhaustion totals were not comparable to nonfarm employment totals.

Utilities and construction industry workers were most likely to exhaust unemployment benefits from October 2016 through September 2017 (2.2 and 1.9 exhaustion-to-employment ratios, respectively).

Exhaustions by occupation

Figure 4-5 examines unemployment benefit exhaustions by occupational group. Management, office and administrative support and construction and extraction occupations combined for 32.4 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 2016 through September 2017
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse

SOC	Major occupational group	Annual exhaustions, all benefits	Percent of all exhaustions
11	Management	5,175	12.5%
43	Office and administrative support	4,236	10.2%
47	Construction and extraction	3,984	9.6%
41	Sales and related	3,436	8.3%
51	Production	3,394	8.2%
45	Farming, fishing and forestry	2,537	6.1%
49	Installation, maintenance and repair	2,121	5.1%
53	Transportation and material moving	1,964	4.8%
13	Business and financial operations	1,872	4.5%
15	Computer and mathematical	1,864	4.5%
39	Personal care and service	1,302	3.1%
35	Food preparation and serving related	1,182	2.9%
17	Architecture and engineering	1,041	2.5%
37	Building and grounds cleaning and maintenance	906	2.2%
27	Arts, design, entertainment, sports and media	799	1.9%
33	Protective service	718	1.7%
29	Healthcare practitioners and technical	710	1.7%
31	Healthcare support	609	1.5%
25	Education, training and library	544	1.3%
19	Life, physical and social science	412	1.0%
21	Community and social services	347	0.8%
23	Legal	280	0.7%
55	Military specific	265	0.6%
	Unknown	1,636	4.0%
	Total	**41,334**	**100.0%**

Unemployed workers in management, office and administrative support and construction and extraction occupations accounted for nearly one-third of all individuals to exhaust unemployment benefits from October 2016 through September 2017.

Exhaustions by workforce development area

Figure 4-6 shows exhaustions by workforce development area (WDA) for October 2016 through September 2017. The Seattle-King County and Tacoma-Pierce County WDAs are the largest in the state in terms of population and have had the largest numbers of unemployed workers throughout the recent recession and recovery. Collectively, they accounted for more than one-third of all exhaustions. The Seattle-King County WDA had more than twice the number of exhaustions observed in the Tacoma-Pierce County WDA. The lowest level of exhaustions occurred in the Eastern Washington WDA.

Figure 4-6. Unemployment benefit exhaustions by workforce development area, all benefits
Washington state, October 2016 through September 2017
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse

Workforce development area	Annual exhaustions, all benefits	Percent of exhaustions
Seattle-King County	10,565	25.6%
Tacoma-Pierce County	4,650	11.2%
Out of state	4,210	10.2%
Snohomish County	4,186	10.1%
Pacific Mountain	2,796	6.8%
Spokane County	2,461	6.0%
South Central Washington	2,420	5.9%
Southwest Washington	2,219	5.4%
Northwest Washington	2,009	4.9%
North Central Washington	1,800	4.4%
Benton-Franklin	1,669	4.0%
Olympic Consortium	1,658	4.0%
Eastern Washington	691	1.7%
Total	**41,334**	**100.0%**

Areas containing higher populations accounted for more exhaustions of unemployment benefits.

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.[14]

[14] 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.

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

Figure 4-7 compares the overall and insured unemployment rates for Washington. The rates have basically moved in tandem, with the insured rate historically about half the overall unemployment rate. In late 2008, both measures of unemployment began a dramatic rise, with rates peaking during 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 2017
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics
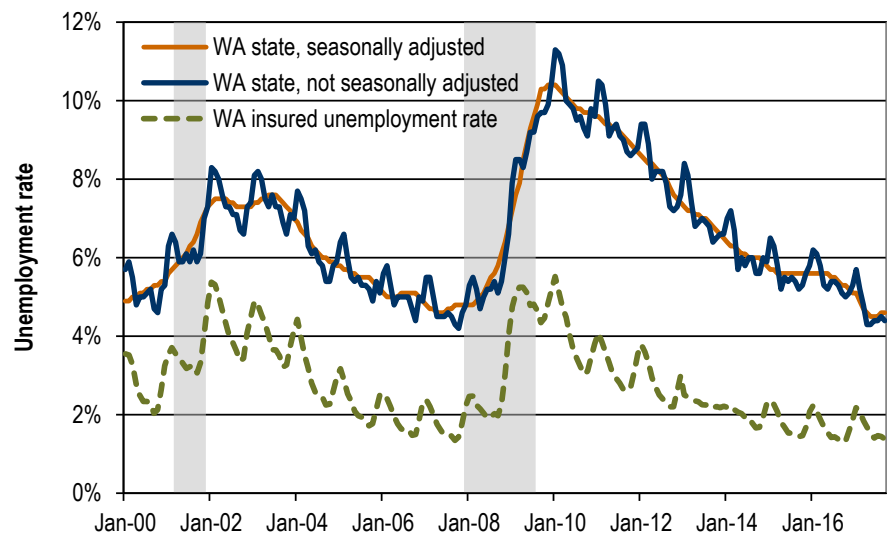
Shaded areas are U.S. recession periods.

The gap between unemployed workers who are eligible for unemployment benefits and those who are not has widened following recent recessions.

The overall unemployment rate

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

As shown in *Figure 4-8*, the state unemployment rate peaked in the first quarter 2010. During most of 2010, 2011 and 2012, the unemployment rate for Washington state remained higher than the national rate. Starting in July 2012, the state unemployment rate fell below the national rate and remained below the national rate through August 2014 before rising above the nation in September 2014 at 6 percent. For 2016 and 2017, to date, the state remained above the national rate. By September 2017, the state and national rates were at 4.6 and 4.2 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 2017, the unemployment rate for the Seattle MD declined by 2.8 percentage points. For comparison, the balance of the state declined by 4.2 percentage points over the same period. The national rate dropped by 4.0 percentage points.

Figure 4-8. Historical U-3 unemployment rates, seasonally adjusted
United States and Washington state, January 2000 through September 2017
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics; National Bureau of Economic Research
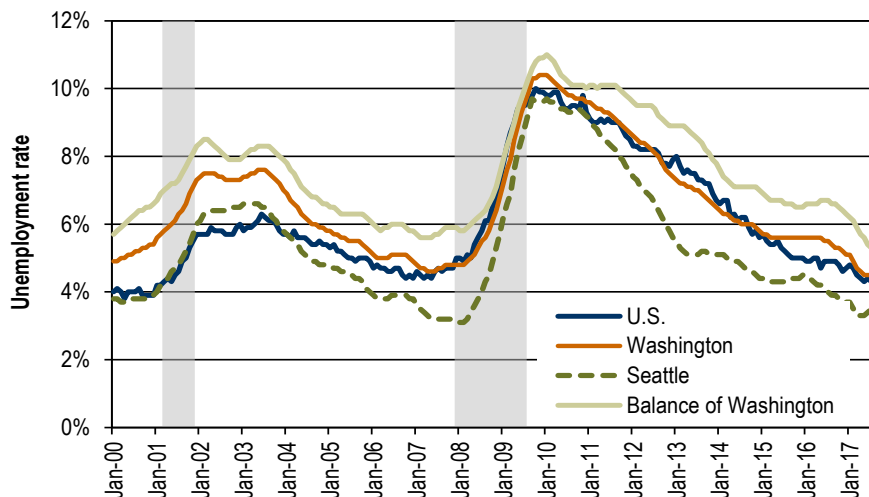
Shaded areas are U.S. recession periods.

National and state unemployment rates tracked closely during the recent recession. From July 2012 through September 2017, the Washington state unemployment rate declined more rapidly than the Seattle 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 two of the six alternative measurements, are defined as:

- U-3 – Unemployed as a percent of the labor force.

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

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

The U-4 measure rose faster and remained higher in Washington state than for the country as a whole during the recent recession (*Figure 4-9*). The moving average for the third quarter 2009 through the second quarter 2010 had Washington state and the nation both at 10.3 percent. From the fourth quarter 2011 through the 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 is now 4.7 percent and the U.S. rate is 4.5 percent for the period fourth quarter 2016 through third quarter 2017.

Figure 4-9. U-4 unemployment rate (includes discouraged workers), four-quarter moving average
United States and Washington state, first quarter 2009 through third quarter 2017
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics
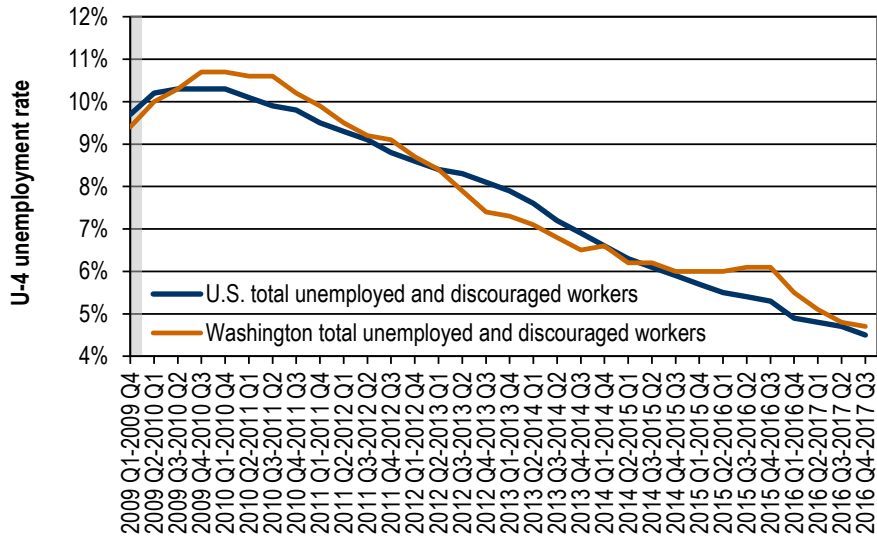
Shaded area is a U.S. recession period.

The U-4 measure of unemployment has been declining throughout the recovery. As of September 2017, Washington state's U-4 is currently 4.7 percent and the U.S. is at 4.5 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 since the first quarter 2010. 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 the second quarter 2009 until the fourth quarter 2013. Most recently, Washington remains 0.50 percentage points above the national rolling average from fourth quarter 2016 through third quarter 2017.

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, first quarter 2009 through third quarter 2017
Source: U.S. Bureau of Labor Statistics, Current Population Survey, Local Area Unemployment Statistics
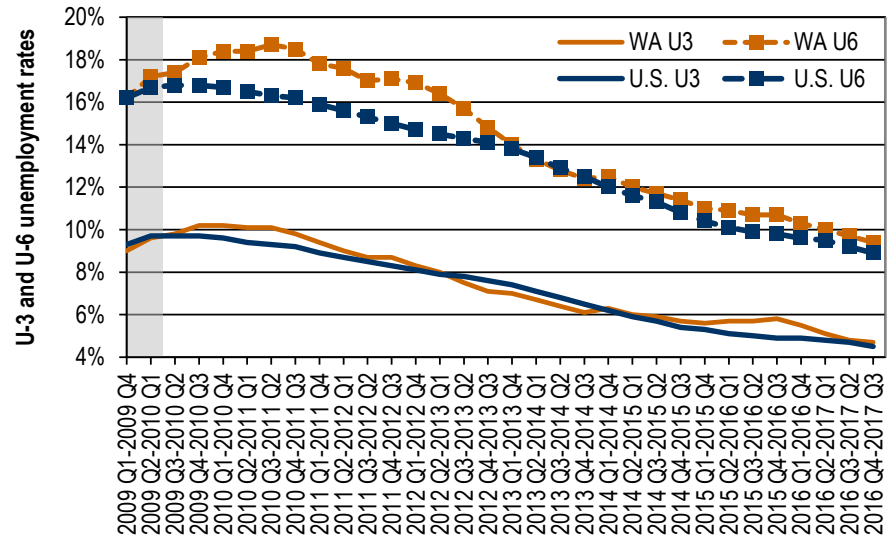
Shaded area is a U.S. recession period.

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

Chapter 5: Employment projections

This chapter provides information on the Employment Security Department's (ESD) short, medium- and long-term industry and occupational employment projections (**2017 Employment Projections Report**).[15]

Industry and occupational employment projections provide a general outlook for Washington state. They are used by policy makers, job seekers, training providers, economic analysts and others. While the projections may not provide a complete picture of Washington's future labor market, they do provide a reasonably plausible view about Washington industry and occupational employment in the future.

Annually, ESD produces industry forecasts for two-, five- and 10-year time horizons. The occupational staffing pattern for each industry is used to convert industry projections into occupational projections. Occupational projections show how many job openings are expected due to overall growth as well as replacement or turnover.

Total openings from occupational projections do not represent total demand, but can be used as an indicator of demand.

The base period for short-term projections is second quarter 2016 and the base period for medium- and long-term projections is 2015.[16]

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[15] More detailed information can be found in the 2017 Employment Projections report at:
esdorchardstorage.blob.core.windows.net/esdwa/Default/ESDWAGOV/labor-market-info/Libraries/
Industry-reports/Employment-projections/2017%20projections/2017%20Projections%20Report.pdf

[16] Due to some differences in non-covered employment (which is used for benchmarking) and the way non-economic code changes are handled, the base numbers used for projections could be slightly different from those published in the Current Employment Statistics (CES) estimates.

Industry employment projections

Total nonfarm industry employment in Washington state is projected to reach about 3.45 million jobs by 2020 and about 3.67 million jobs by 2025 (*Figure 5-1*).

Figure 5-1. Base and projected nonfarm industry employment
Washington state, 2015, 2020 and 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics,
Current Employment Statistics
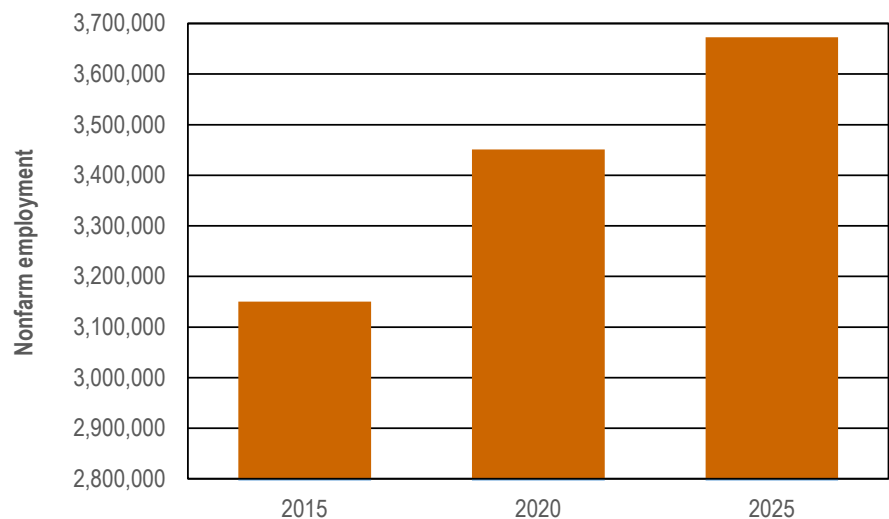
Nonfarm employment in Washington is expected to reach 3.45 million jobs by 2020 and 3.67 million jobs by 2025.

Washington state is projected to have an estimated 300,600 net new nonfarm jobs from 2015 to 2020 with an average annual growth rate of 1.84 percent. This growth rate is more than the growth rate of 1.80 percent projected for the state from 2014 to 2019. The state is projected to have an estimated 522,400 net new nonfarm jobs from 2015 to 2025 with an average annual growth rate of 1.55 percent. This growth rate is the same as the growth rate that was projected for the state from 2014 to 2024.

2017 industry projections results

Figure 5-2 presents 2015 estimated employment, 2015, 2020 and 2025 employment shares, and changes in employment shares from 2015 to 2020 and 2020 to 2025 by industry for Washington state.

By 2025, 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 construction.

For this same time period, the two industry sectors with the largest decreases in employment shares are projected to be manufacturing and financial activities.

Figure 5-2. Base and projected nonfarm industry employment
Washington state, 2015, 2020 and 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Industry sector[1]	Est. empl. 2015	Est. share of empl. in 2015	Proj. share of empl. in 2020	Proj. share of empl. in 2025	Percentage point change in empl. share 2015 to 2020	Percentage point change in empl. share 2020 to 2025	Percentage point change in empl. share 2015 to 2025
Natural resources and mining[2]	6,300	0.20%	0.18%	0.17%	-0.02%	-0.01%	-0.03%
Construction	173,100	5.49%	5.93%	6.08%	0.43%	0.15%	0.58%
Manufacturing	290,700	9.23%	8.20%	7.66%	-1.02%	-0.54%	-1.56%
Wholesale trade	132,600	4.21%	3.98%	3.84%	-0.23%	-0.14%	-0.36%
Retail trade	355,100	11.27%	11.40%	11.30%	0.13%	-0.09%	0.03%
Utilities	4,900	0.16%	0.14%	0.13%	-0.02%	-0.01%	-0.02%
Transportation and warehousing	96,400	3.06%	3.03%	2.96%	-0.03%	-0.07%	-0.10%
Information	114,300	3.63%	3.95%	4.10%	0.32%	0.15%	0.47%
Financial activities	147,800	4.69%	4.49%	4.32%	-0.20%	-0.18%	-0.38%
Professional and business services	388,000	12.32%	13.01%	13.67%	0.69%	0.65%	1.35%
Education services	55,800	1.77%	1.85%	1.98%	0.08%	0.13%	0.21%
Health services and social assistance	397,300	12.61%	12.80%	13.22%	0.19%	0.42%	0.61%
Leisure and hospitality	309,400	9.82%	9.93%	9.65%	0.11%	-0.28%	-0.17%
Other services	116,000	3.68%	3.61%	3.52%	-0.07%	-0.09%	-0.16%
Federal government	73,200	2.32%	2.17%	2.04%	-0.16%	-0.12%	-0.28%
State and local gov. (incl. education)	489,500	15.54%	15.33%	15.36%	-0.21%	0.03%	-0.18%

[1] The sectors in the table are Washington state specific and are patterned after Current Employment Statistic (CES) definitions. Though these are not CES categories, they act as a bridge between the Global Insight and Industry Control Total coding systems. This coding is available in a crosswalk file named "All code file" at esd.wa.gov/labormarketinfo/projections.
[2] Logging is not included in natural resources and mining.

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

Historical and projected growth rates

Figure 5-3 shows the historical and projected growth rates for the state and Washington's 12 workforce development areas (WDAs).

Six of the 12 WDAs have projected growth rates greater than the previous 10 years' growth and six have projected growth less than the previous 10 years' growth. The statewide projected growth rate is 0.26 percentage points less than the historical growth rate.

The six WDAs with projected growth greater than the past are: Olympic Consortium, Pacific Mountain, Spokane, Northwest Washington, Eastern Washington and South Central Washington.

The largest positive difference between historical growth rates and projected growth rates is in the Olympic Consortium. For this area, the difference between the historical and projected rates is 0.49 percentage points. Pacific Mountain was a close second with a difference of 0.42 percentage points.

The six WDAs with projected growth less than the past 10 years are: Snohomish County, Benton-Franklin, North Central Washington, Southwest Washington, Seattle-King County and Tacoma-Pierce County.

Figure 5-3. Historical and projected total nonfarm employment growth
Washington state and workforce development areas, 1990 to 2015 and 2015 to 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Workforce development area[1]	Historical growth[2] rate 2005 to 2015	Projected growth rate 2015 to 2025	Historical trend growth[3] 1990 to 2015
Statewide	**1.81%**	**1.55%**	**1.35%**
Olympic Consortium	0.71%	1.20%	1.14%
Pacific Mountain	1.03%	1.45%	1.29%
Northwest Washington	1.20%	1.39%	1.81%
Snohomish County	2.88%	1.15%	2.14%
Seattle-King County	1.95%	1.69%	1.20%
Tacoma-Pierce County	1.76%	1.60%	1.70%
Southwest Washington	1.83%	1.54%	1.75%
North Central Washington	1.94%	1.47%	1.35%
South Central Washington	1.26%	1.35%	0.83%
Eastern Washington	1.16%	1.29%	0.98%
Benton-Franklin	2.39%	1.76%	2.25%
Spokane	1.23%	1.47%	1.28%

[1] Workforce development areas are regions within Washington state with economic and geographic similarities.
[2] Historical growth is based only on covered employment.
[3] The historical trend growth is defined as growth rate of linear trend line.

Six of the twelve WDAs have projected growth less than the previous 10 years' growth.

2017 occupational projection results

Occupational projections represent total employment. Total employment includes nonfarm employment, private households, self-employment, agriculture, forestry and fishing.

In occupational projections, the average annual growth rate for total employment is projected to be 1.85 percent from 2015 to 2020 and 1.26 percent from 2020 to 2025. The Employment Security Department predicted average annual growth rates for total employment growth of 1.84 percent from 2014 to 2019 and 1.26 percent from 2019 to 2024.

The detailed state level occupational projections cover 812 occupations, 805[17] of which are publishable. Year to year, the number of occupations used in projections changes due to the way staffing patterns are created. This publication, however, provides only a summary of the top occupations. For a complete list of occupations and projected employment, see the 2017 Employment Projections data files available at: esd.wa.gov/labormarketinfo/projections.

Figure 5-4 shows occupational employment estimates and employment shares for Washington state.

At the state level, two occupational groups stand out with increases in employment shares from 2015 to 2025. Computer and mathematical occupations are projected to increase employment shares from 4.71 percent to 5.58 percent for an increase of 0.87 percentage points. The next highest increase in shares is projected for construction and extraction occupations with an increase of 0.48 percentage points.[18]

The largest decreases in employment shares at the state level are in production occupations, with a projected decrease of 0.60 percentage points, and in sales and related occupations, with a projected decrease of 0.40 percentage points.

By 2025, the top three state occupational groups for shares of employment are projected to be:

1. Office and administrative support occupations (12.24 percent)

2. Sales and related occupations (9.17 percent)

3. Food preparation and serving related occupations (7.76 percent)

By 2025 these three major groups combined are projected to represent nearly 30 percent of total employment shares for the state.

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[17] In general, occupations are suppressed due to reliability and confidentiality. The numbers of suppressed occupations varies depending on area.
[18] Displayed numbers in figures might not add up to actual totals due to rounding.

Figure 5-4. Estimated and projected occupational employment
Washington state, 2015, 2020 and 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics

2-digit SOC	Major occupational group	Est. empl. 2015	Est. empl. shares 2015	Proj. empl. shares 2020	Proj. empl. shares 2025	Percentage point change in empl. shares 2015 to 2020	Percentage point change in empl. shares 2020 to 2025
11	Management	201,436	5.62%	5.70%	5.76%	0.08%	0.07%
13	Business and financial operations	216,364	6.03%	6.10%	6.18%	0.07%	0.08%
15	Computer and mathematical	168,888	4.71%	5.24%	5.58%	0.53%	0.34%
17	Architecture and engineering	84,760	2.36%	2.15%	2.06%	-0.22%	-0.08%
19	Life, physical and social sciences	38,477	1.07%	1.07%	1.08%	-0.01%	0.01%
21	Community and social services	59,765	1.67%	1.63%	1.63%	-0.04%	0.00%
23	Legal	28,207	0.79%	0.76%	0.76%	-0.03%	0.00%
25	Education, training and library	216,242	6.03%	6.09%	6.24%	0.05%	0.15%
27	Arts, design, entertainment, sports and media	67,709	1.89%	1.93%	1.96%	0.04%	0.03%
29	Healthcare practitioners and technical	167,823	4.68%	4.78%	4.94%	0.10%	0.16%
31	Healthcare support	89,056	2.48%	2.52%	2.59%	0.03%	0.08%
33	Protective service	62,806	1.75%	1.74%	1.74%	-0.01%	-0.01%
35	Food preparation and serving related	285,347	7.96%	7.99%	7.76%	0.03%	-0.24%
37	Building and grounds cleaning and maintenance	116,668	3.25%	3.29%	3.33%	0.04%	0.03%
39	Personal care and service	149,254	4.16%	4.23%	4.30%	0.06%	0.08%
41	Sales and related	343,301	9.57%	9.37%	9.17%	-0.21%	-0.20%
43	Office and administrative support	449,756	12.54%	12.36%	12.24%	-0.18%	-0.12%
45	Farming, fishing and forestry	93,779	2.62%	2.52%	2.47%	-0.09%	-0.06%
47	Construction and extraction	199,454	5.56%	5.92%	6.05%	0.36%	0.12%
49	Installation, maintenance and repair	130,739	3.65%	3.54%	3.44%	-0.11%	-0.09%
51	Production	188,915	5.27%	4.88%	4.67%	-0.38%	-0.22%
53	Transportation and material moving	227,291	6.34%	6.20%	6.06%	-0.14%	-0.14%

Over the 2015 to 2025 period, the largest increases in employment shares are expected for computer and mathematical occupations and construction and extraction.

The projected average annual growth rates for the major occupational groups in Washington state are presented in *Figure 5-5*.

Computer and mathematical (3.29 percent), construction and extraction (2.41 percent), and healthcare practitioners and technical (2.10 percent), are projected to grow faster than other major occupational groups from 2015 to 2025. In the long term, four occupational groups are projected to fall below a 1 percent average annual growth rate: installation, maintenance and repair (0.98 percent), farming, fishing and forestry (0.96 percent), production (0.34 percent) and architecture and engineering (0.19 percent).

Figure 5-5. Projected average annual growth rates for major occupational groups
Washington state, 2015 to 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics

Computer and mathematical, construction and extraction and healthcare practitioners and technical occupations are projected to experience the largest growth rates from 2015 to 2025 (3.29, 2.41 and 2.10 percent, respectively).

Separations, replacement and growth openings

The Bureau of Labor Statistics (BLS) concluded that the current replacement methodology undercounts occupational openings. As a result, they created a new separations methodology. BLS created replacement and separation results for the 2012 to 2022 and 2014 to 2024 projections. They will not completely omit the replacement methodology until the 2016 to 2026 projections. This gives states time to convert their projections software over to the separations methodology.

More detailed information about the separations and replacement approaches can be found at **www.bls.gov/emp/ep_separations_methods.htm** and **www.bls.gov/emp/ep_replacements.htm**, respectively.

The replacement and separations methods measure workers who leave their occupation and need to be replaced by new entrants into the occupation. The separations method is different from the replacement methodology used in previous years in how it estimates workers who leave permanently.

In the replacement methodology, workers who leave an occupation and are replaced by workers from different age cohorts are considered to have permanently left and are identified as generating replacement openings. Workers replaced by workers from the same age cohort are not identified as generating replacement openings. The inability to track openings generated by replacement workers of the same age cohort causes a significant undercount of openings.

In the separations methodology, workers who exit the labor force or transfer to an occupation with a different Standard Occupational Classification (SOC) are identified as generating separations openings.

For all methods, average annual openings due to growth are calculated by subtracting base year values from projected year values and then dividing by the number of years used for the calculation period.

For this year's 2017 projections cycle, we created a new state specific alternative method to the BLS replacement and separations methods. The BLS methods are based on national data. Our alternative method is based on Washington state wage records, making results specific to our state.

The alternative rate not only measures when workers leave one occupation for another or leave the workforce, but also measures openings created by turnover within occupations, i.e., workers stay within an occupation but transfer to different companies.

The data for the alternative rates come from Washington state wage files. We estimate the numbers of annual transfers between industries, inside industries and in and out of Washington covered employment. Then we use occupation-to-industry staffing patterns (shares of occupations for each industry) to convert industry transfers to occupational transfers. Alternative replacement rates are calculated as the shares of total transfers, minus growth or decline, divided by estimated occupational employment for a base period.

Figure 5-6 presents a comparison between replacement, separations and alternative methodologies. Average annual total openings are compared at the two-digit SOC level. Separations openings are three times larger than replacement openings, and alternative openings are more than two and a half times larger than separations openings. The alternative method increase makes sense since the alternative method measures openings not tracked by BLS. The alternative method measures turnover within occupations, while the BLS methods do not.

In *Figure 5-6*, the three largest separations to replacement ratios are for farming, fishing and forestry (4.46), production (4.31) and personal care and service (4.16). These higher than average values mean that compared to other occupational groups, these three have high exit rates. A higher proportion of workers within these occupational groups leave their occupations.

For these same three occupational groups, the alternative to separations ratios are farming, fishing and forestry (2.59), production (2.27) and personal care and service (2.41). All three of these ratios are below the average alternative to separations ratio of 2.63. These lower ratios mean that for workers that stay within these occupational groups, the transfer rate to other jobs within the same occupation is low.

Figure 5-6. Comparison of separations and alternative methodologies on total openings
Washington state, 2015 to 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

2-digit SOC	Major occupational group	Est. empl. 2015	Est. empl. 2025	Seps. average annual total opens. 2015-2025	Alt. average annual total opens. 2015-2025	Ratio alternative to separations
11	Management	201,436	241,252	20,382	66,747	3.27
13	Business and financial operations	216,364	258,768	24,432	66,835	2.74
15	Computer and mathematical	168,888	233,355	19,080	60,107	3.15
17	Architecture and engineering	84,760	86,389	5,772	17,750	3.08
19	Life, physical and social science	38,477	45,055	4,481	10,282	2.29
21	Community and social service	59,765	68,083	7,339	17,289	2.36
23	Legal	28,207	31,777	1,984	7,350	3.70
25	Education, training and library	216,242	261,139	25,743	52,838	2.05
27	Arts, design, entertainment, sports and media	67,709	81,994	8,821	24,033	2.72
29	Healthcare practitioners and technical	167,823	206,643	13,250	53,466	4.04
31	Healthcare support	89,056	108,580	13,254	35,044	2.64
33	Protective service	62,806	72,725	8,334	17,638	2.12
35	Food preparation and serving related	285,347	324,617	57,510	129,073	2.24
37	Building and grounds cleaning and maintenance	116,668	139,247	18,290	49,047	2.68
39	Personal care and service	149,254	179,993	26,870	64,832	2.41
41	Sales and related	343,301	383,725	52,254	122,679	2.35
43	Office and administrative support	449,756	512,331	58,932	148,342	2.52
45	Farming, fishing and forestry	93,779	103,178	15,592	40,356	2.59
47	Construction and extraction	199,454	252,989	26,999	97,277	3.60
49	Installation, maintenance and repair	130,739	144,136	13,854	43,358	3.13
51	Production	188,915	195,351	22,131	50,230	2.27
53	Transportation and material moving	227,291	253,695	31,720	79,548	2.51

On average, alternative openings are more than two and a half times larger than separations openings.

Projections for specific occupations

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

Figure 5-8 shows the top 20 specific occupations by total openings based on the alternative methodology.

Within these two methodologies, 18 of the top 20 specific occupations are identical. Heavy and tractor-trailer truck drivers and general and operations managers are in the alternative top 20, but are not in the separations top 20. Teacher assistants and sales representatives, wholesale and manufacturing, except technical and scientific products, are in the separations top 20, but are not in the alternative top 20.

In the alternative method, at the six-digit SOC level, retail salespersons are projected to have the largest number of total openings followed by combined food preparation and serving workers, including fast food. In the separations method, the same two occupations are in the top spots, but in reverse order.

At the state level, the total number of openings due to the alternative rate are about 20 times greater than the number of openings due to growth. Under the separations methodology, the total number of openings due to separations are 7 times larger than the number of openings due to growth.

Neither method contains occupations where growth openings are greater than alternative or separations openings.

Figure 5-7. Top 20 specific occupations by average annual total openings, separations methodology
Washington state, 2015 to 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics
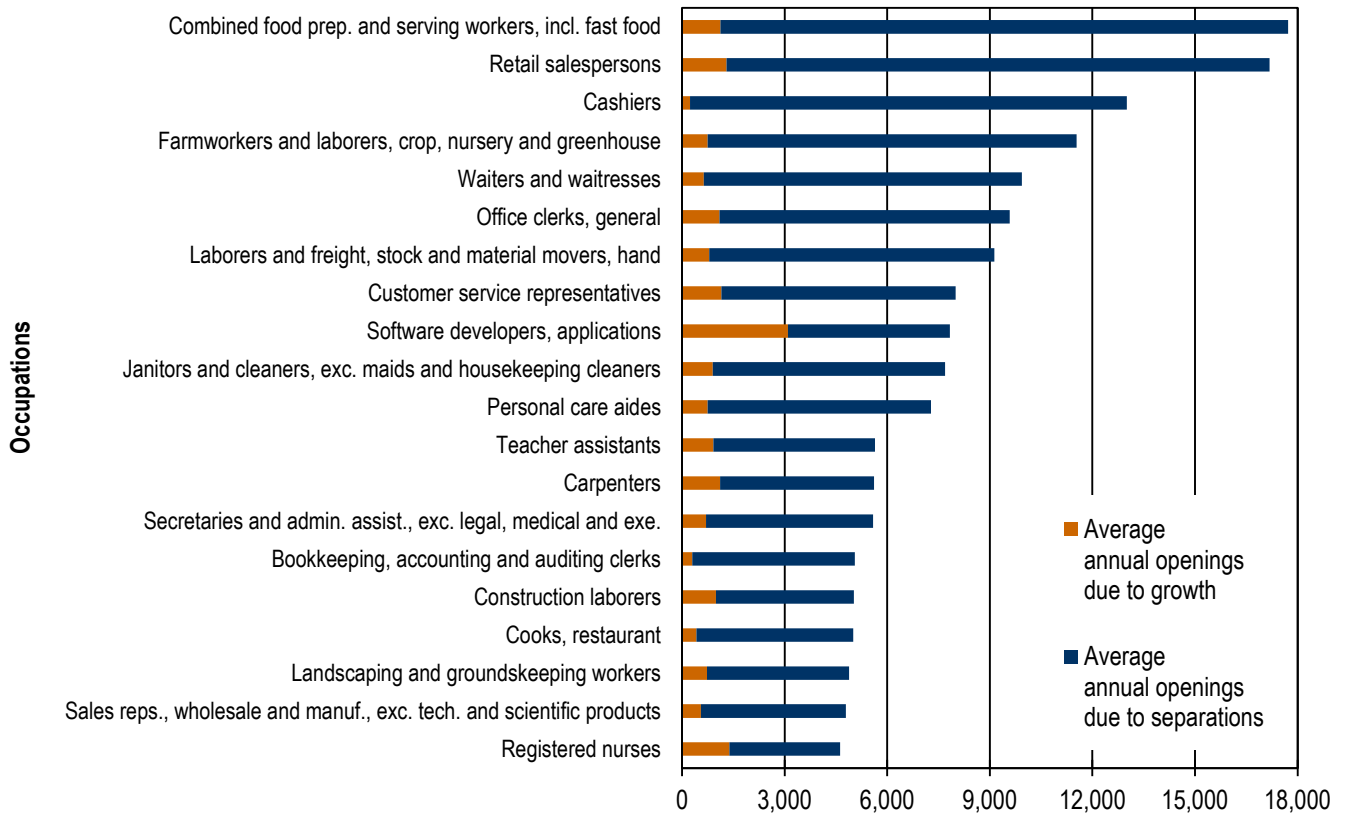
The separations methodology measures when workers leave occupations entirely and when workers leave the labor force entirely. It does not measure turnover within occupations.

Figure 5-8. Top 20 specific occupations by average annual total openings, alternative methodology
Washington state, 2015 to 2025
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Occupational Employment Statistics
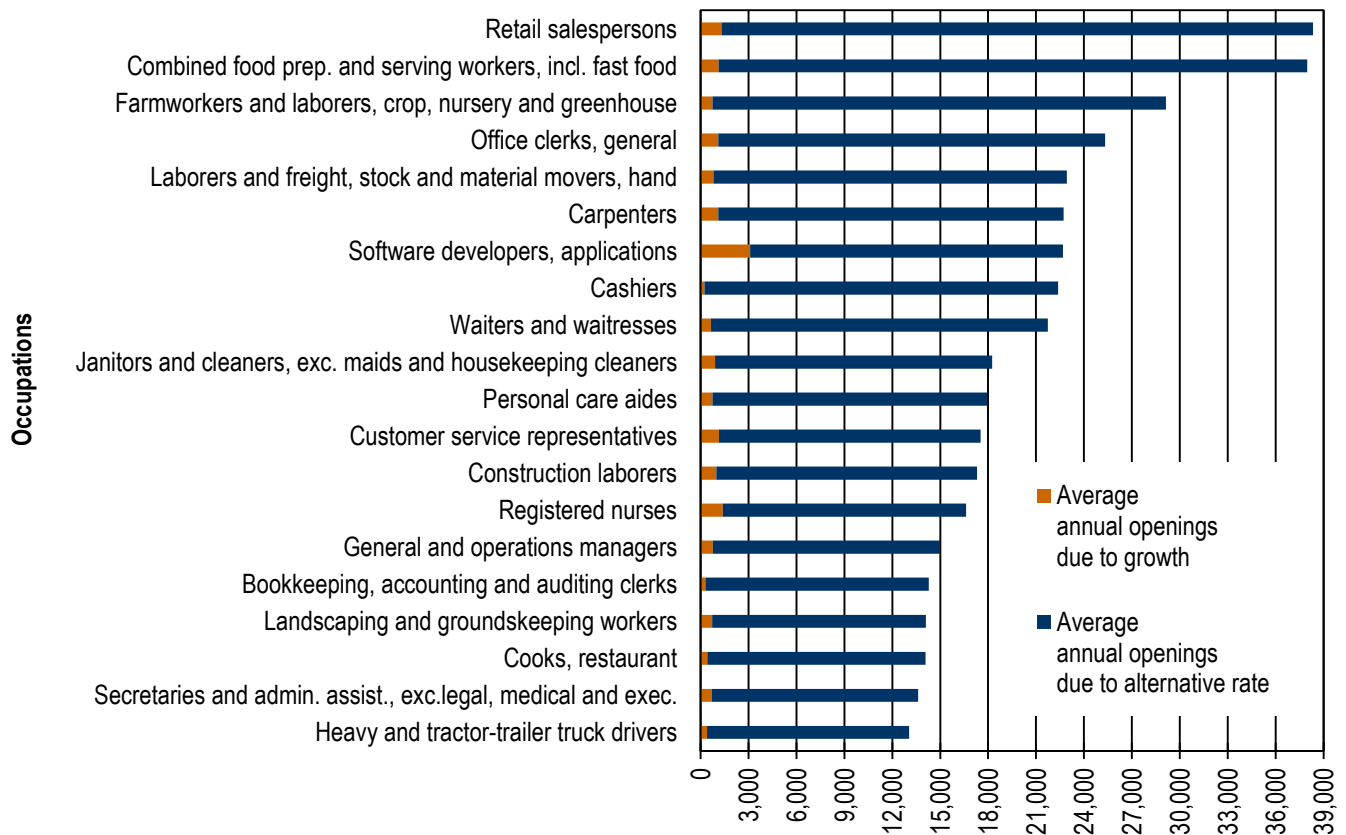
The alternative methodology measures when workers leave one occupation for another and turnover within occupations.

Specific occupations by area

Tables showing projections for specific occupations by state and each workforce development area are available on Employment Security's website.[19]

Occupations in Demand list

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 created to support the unemployment insurance Training Benefits program.

[19] esd.wa.gov/labormarketinfo/projections.

The full OID list is accessible through the "Learn about an occupation" tool located at: 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. "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 as follows:

The data sources for the OID list:

The 2017 list is based on projections:

- Five-year projections from 2015 to 2020, using average annual growth rates and total job openings.

- Ten-year projections from 2015 to 2025, using average annual growth rates and total job openings.

- A combination of two-year (second quarter 2016 to second quarter 2018) and ten-year (2015 to 2025) projections, using average annual growth rates and total job openings.

All of these time frames use unsuppressed occupations with employment in a base year (2015), consisting of 50 or more employees, for the state and WDAs.

In addition to projections, the OID list is created using supply and demand data:

- Supply data – average annual counts of unemployment claimants for WDAs for the most recent full year (April 2017 and the preceding 11 months).

- Demand data – average annual counts of job announcements from Help Wanted OnLine (HWOL) mid-monthly time series (April 2017 and the preceding 11 months).

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 areas' (statewide or WDA) total average annual growth rates and a share of total openings of at least .08 percent are defined as "in demand."

- Occupations with average annual growth rates less than 70 percent of their respective geographic areas' total growth rates and a share of total openings of less than 1 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 is 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 postings to information on unemployment claimants. An adjustment is 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 exist when the largest values between announcements and unemployment insurance (UI) claimants are greater than 100 or are between 50 and 100 and these values are more than 10 percent of annual job openings for the period 2015 to 2025.

- 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 Workforce Information and Technology Services division uses the methodology outlined above to prepare the initial lists for the state as a whole and by WDA. Those lists are then given to local workforce development councils to review, adjust and approve based on their local, on-the-ground experience.

Skill projections

Occupational projections can be converted into skills projections. We rely on the content of employers' job postings rather than predefined, general O*NET skills to make skills projections possible.

Data Sources

As in previous years, 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 the extracted hard skills from online job announcements posted in the last three years. This year we downloaded files from May 2014 to April 2017. Each skill is displayed with the number of job announcements from which it was extracted. This skill announcement(s) pairing permits every occupation to display the relative importance of each skill. Theoretically, each occupation could contain a vector of up to 100 components with announcement numbers indicating the relative importance of each skill. A vector is a single entity (i.e., a column) consisting of an ordered collection of numbers. A skill drawn from a greater number of job announcements is relatively more important. The number of job announcements is summed for each occupation. Only vectors with a summation value of at least 5 percent and not less than 2 percent of base year employment were used. Some occupations contain very limited (if any) numbers of skill components.

Vectors were normalized (i.e., scaled) to totals of one. With this type of normalization, we created skill–to-occupation matrices. These matrices were used to convert occupational estimations and projections into comparable numbers expressed as hard skills.

The skill–to-occupation matrices are similar in structure and function to normalized matrices used for occupation-industry staffing patterns. The skill matrices were based on statewide data and were used to convert alternative occupational projections for the state and all areas into skill projections.

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

The conversion size (occupational employment to skills), calculated on base year employment, varies between about 89.8 percent for Seattle-King County WDA, to a low of 69.1 percent for the North Central Washington WDA. The average ratio for WDAs is 82.6 percent and for the state is 86.7 percent.

Some results

The skill-to-occupation matrices have different dimensions for the state's areas based on data availability. As a result, the largest number of detailed skills were 3,544 for Washington state, followed by King County at 2,999.

The top six detailed hard skills[20] for the state and all areas, based on projected numbers of openings and available number of jobs, are relatively stable between areas. The top six are: **Food preparation**, **Bilingual**, **Mathematics**, **Quality Assurance**, **Forklifts** and **Freight+**. The stability among areas is no surprise since the same statewide matrix was used for all areas. The combined top six skills represent 15.6 percent of total openings for the state. The ranking order is slightly different for different areas, depending on sorting criteria (by number of jobs or total openings). For instance, for the state, sorting results by total openings are the same as the top six detailed hard list, but sorting results by numbers of jobs in the second quarter 2016, switches the top two skills: **Bilingual** became first and **Food preparation** second. The order of the other four skills remains the same.

For Seattle-King County, sorting results by total openings is different from the state, where the order of **Quality assurance** (became number three) and **Mathematics** (became number four) switch places. All other rankings for the top six skills remains the same as the state. Sorting by employment modifies rankings more significantly for the top four skills: **Bilingual**, **Quality assurance**, **Mathematics** and **Food preparation**.

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[20] Bolded skills are spelled exactly as they are found on the internet.

The list of top skills are relatively consistent with previous year results: where four of the top six skills remain the same: **Food preparation**, **Bilingual**, **Quality assurance** and **Forklifts**. However, it is apparent that the algorithm for extracting skills used by HWOL this year was different than last year. Two of the top six skills this year, **Mathematics** and **Freight+**, were not among extracted skills last year.

The fastest growth 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 largest average annual growth rates for the state between 2015 and 2025 for skills with total openings of at least 100 are expected to be: **Asynchronous JavaScript** and **XML**, **AngularJS**, **Spring**, **CSS3 (Cascading Style Sheets)**, **JavaScript Object Notation**, and **RESTful Web Services**. However, the combined totals for these top six detailed occupations represented an insignificant share, less than 0.1 percent of total openings represented in the skill projections.

The top 20 detailed skills for Washington state based on a combined rank of average annual openings and growth for 2015 to 2025 are presented in *Figure 5-9*.

Figure 5-9. Top 20 skills by combined growth and openings
Washington state, 2015 to 2025
Source: Employment Security Department/WITS; WANTED Analytics

Combined rank	Hard skill titles	Estimated hard skill employment numbers - 2015	Projected hard skill employment numbers - 2025	Average annual growth rate 2015 to 2025	Total average annual openings 2015 to 2025
1	Java	8,818	12,117	3.23%	3,057
2	C-sharp	4,477	6,312	3.50%	1,568
3	JavaScript	3,331	4,833	3.79%	1,238
4	C/C++	4,950	6,808	3.24%	1,666
5	Linux	6,128	8,125	2.86%	2,069
6	Amazon Web Services	2,970	4,190	3.50%	1,069
7	Hypertext markup language	3,869	5,246	3.09%	1,430
8	Systems Development Life Cycle	3,311	4,582	3.30%	1,173
9	Distributed system	2,815	3,965	3.48%	1,011
10	Cascading Style Sheets	2,304	3,292	3.63%	876
11	Python	6,115	8,034	2.77%	1,982
12	Microsoft SQL Server	3,319	4,509	3.11%	1,163
13	User Experience design	1,944	2,794	3.70%	728
14	Big Data	4,719	6,194	2.76%	1,592
15	Data structures	2,036	2,913	3.65%	729
16	Web services	9,043	11,645	2.56%	3,074
17	Graphical User Interface design	3,297	4,396	2.92%	1,166
18	Microsoft .NET Framework	2,117	2,963	3.42%	747
19	Machine learning techniques	3,062	4,103	2.97%	1,046
20	Scrum agile methodology	2,726	3,682	3.05%	969

All of the top 20 skills are related to IT.

The top 20 occupations represent 2.6 percent of total openings in the skills forecast. Fourteen of the top 20 skills are identical to last year.

In the entire list of skills, some skills are quite general and represent a significant share of total numbers and openings. Examples are the top three skills based on openings: **Food preparation**, **Bilingual**, **Mathematics**, etc. The majority of skills, especially related to IT and high-tech, are very specific and their numbers are dispersed among all occupations. As a result, such detailed skills normally do not represent a significant share of total numbers.

Results change significantly if we group all detailed skills together, based on primary type of skill within a skill category (e.g., engineering skills, IT skills). This type of skill category grouping

is quite challenging since a significant number of skills are a combination of specific fields and IT skills. A good example of this is the grouping of CAD software with the field of architectural drawing.

In the skills forecast, by far the largest group of skills are IT related. They represent more than 21.3 percent of total openings. The IT group is projected to be the fastest growing for the period 2015 to 2025, with an average annual growth rate of slightly more than 2 percent. The second and third largest groups of skills are related to production and maintenance, which accounts for almost 12.1 and 7.2 percent of all openings. This is closely followed by healthcare with 6.8 percent of openings. Healthcare also has the second largest projected growth rate of 1.79 percent.

It is interesting to note that out of a total of 644 occupations, IT skills are present in 595 occupations. For 240 of these occupations, IT skills comprise more than one-quarter of total numbers and for 90 they comprise more than one-half of total numbers.

The 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 (with IT skill numbers more than 100) are presented in *Figure 5-10*. The residual occupations, for example, Life Scientists, All other, are not included in the table.

Figure 5-10. Occupations, not primarily computer related, with the largest shares of computer skill requirements
Washington state, 2016 second quarter occupational estimations
Source: Employment Security Department/WITS; WANTED Analytics

SOC	Occupation	Share of skills that are IT
492095	Electrical and Electronics Repairers, Powerhouse, Substation and Relay	0.863
271022	Fashion Designers	0.842
193011	Economists	0.808
271014	Multimedia Artists and Animators	0.808
439111	Statistical Assistants	0.791
271013	Fine Artists, Including Painters, Sculptors and Illustrators	0.755
514122	Welding, Soldering, and Brazing Machine Setters, Operators and Tenders	0.75
254011	Archivists	0.745
131161	Market Research Analysts and Marketing Specialists	0.73
132051	Financial Analysts	0.728
271024	Graphic Designers	0.728
152031	Operations Research Analysts	0.725
131111	Management Analysts	0.725
152011	Actuaries	0.725
271021	Commercial and Industrial Designers	0.723

On average, alternative openings are more than two and a half times larger than separations openings.

Skill based related occupations

Skill–to-occupation matrices allowed 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 file, **reloccup_skills_2016. xlsm**.[21] 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.

[21] This data file is available on Employment Security's website under the Labor Market Info tab. Select "Projections: under the "QUICK LINKS" and select the "Related occupational skills file" under the Report data heading. The direct web link is: esdorchardstorage.blob.core.windows.net/ esdwa/Default/ESDWAGOV/labor-market-info/Libraries/Industry-reports/Employment-projections/ reloccup_skills_2017.xlsm.

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 computer programmers is in *Figure 5-11*.

Figure 5-11. Top 15 occupations related to computer programmers
Washington state, second quarter 2016
Source: Employment Security Department/WITS; WANTED Analytics

SOC	Occupation	151131-Computer Programmers
151132	Software Developers, Applications	0.779
151121	Computer Systems Analysts	0.718
151134	Web Developers	0.649
151199	Computer Occupations, All Other	0.645
151141	Database Administrators	0.578
152031	Operations Research Analysts	0.459
151133	Software Developers, Systems Software	0.445
151111	Computer and Information Research Scientists	0.44
131111	Management Analysts	0.382
131161	Market Research Analysts and Marketing Specialists	0.373
113021	Computer and Information Systems Managers	0.365
172061	Computer Hardware Engineers	0.357
151142	Network and Computer Systems Administrators	0.344
173019	Drafters, All Other	0.344
152011	Actuaries	0.342

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

The related occupations tool could be useful for job seekers in order to find additional occupations in which their skills may be transferable. The results are specific for Washington state since the skills come from job announcements in this state.

Conclusions

Some significant data limitations were encountered when converting occupational data from job announcements into skills. In spite of these limitations, useful results were produced. It is our conclusion that it is more important to connect education and training programs with real world skill requirements than with generic occupational skill definitions.

Some skills with large projected numbers of openings are well defined and can be linked to different levels of training. Examples of skills with the largest numbers of projected openings are: **Food preparation**, **Bilingual** (with a separate skill in bilingual Spanish), **Mathematics**, **Customer relationship management**, **Pediatrics**, **Behavioral health**, etc.

A second significant group of skills which for the most part are well defined in terms of primary activities, but which require significant secondary skills related to information technology are: **Quality control**, **Risk assessment** and lean related skills. These types of skills are much more dispersed than the first group. Relating this second skill group to training is more complicated. While primary fields are relatively stable and well defined, IT skill sets are ever changing. IT skills are concentrated mainly in software, algorithms, some hardware and in web applications. Since required IT skill sets change frequently, specific software applications should be given a secondary emphasis in training.

Though IT skills are a very large group, they are highly dispersed amongst detailed skills and are subject to frequent changes. Some specific skills, like those in *Figure 5-9*, 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 programming. In other words, foundational abilities to learn, develop and implement new knowledge and technology in the long run should take priority for career preparation.

Chapter 6: Income and wages

All income and wage data in this chapter have been adjusted for inflation to 2016 dollars. Data from previous annual reports will differ from figures for corresponding years in this report because of that adjustment.

Household[22] and family income

The Great Recession was characterized in Washington state by deep employment losses over the course of two years from 2008 to 2010. Since 2010, employment has improved, with the state reaching pre-recession levels in 2013. Employment estimates tell an important part of the story, but the translation of employment into quality of life requires additional investigation. This chapter explores measures related to household incomes and wages earned by Washington workers. Household income has five sources: earnings from wages, earnings from self-employment, investment income, transfer payments such as Social Security and private retirement payments.

In step with widespread employment losses, household incomes fell during the recent recession. Unlike employment, which bottomed out in 2010 and subsequently climbed to pre-recession peak levels in 2013, income recovery has taken much longer to materialize (*Figure 6-1*). According to the U.S. Census Bureau's American Community Survey (ACS), the real median household wage in Washington state declined each year from 2008 to 2012, with the first green shoots of recovery tentatively appearing in 2013, when the median household income in Washington rose by $69. Household income growth has since gained momentum, increasing by more than $2,000 each year since 2013. From 2012 to 2016, the median household income in Washington rose by 11.6 percent – with almost all of that growth occurring in the last three years. Family household incomes grew by 11.3 percent and non-family households grew by 8.8 percent. For comparison, the national median wage grew by 7.4 percent over the same period.

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[22] The U.S. Census Bureau divides households into two types. A family household contains at least two persons, 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 persons that are not related to the householder.

Figure 6-1. Median household income in 2016 dollars
United States and Washington state, 2012 through 2016
Source: U.S. Census Bureau, American Community Survey

Household type	2012	2013	2014	2015	2016	Change, 2012 to 2016
All households, U.S.	$53,631	$53,833	$54,459	$56,441	$57,617	7.4%
All households, Washington	$60,105	$60,174	$62,283	$64,895	$67,106	11.6%
Family households	$73,013	$73,533	$75,302	$77,873	$81,234	11.3%
Non-family households	$38,156	$37,556	$38,697	$40,674	$41,513	8.8%

Real median household income increased by 11.6 percent in Washington state from 2012 to 2016.

The following information describes select household statistics for Washington state from the American Community Survey.[23]

According to the ACS (*Figure 6-2*):

- The poverty rate for all individuals in Washington state dropped below 12 percent for the first time since entering into the recession, falling to 11.3 percent in 2016. The statewide poverty rate peaked in 2013, when it reached 14.1 percent. Children tend to have the highest poverty rates. In 2016, 13.7 percent of children under age 18 residing in Washington state were living under the poverty threshold. Although the poverty rate for children remains above the overall rate, it is noteworthy that the 13.7 rate observed in 2016 is below pre-recession rates.

- The share of households with earnings from a job increased slightly in 2016 (78.8 percent, up from 78.5 percent in 2015), but remains below pre-recession levels in the 81 percent range. The average earnings for households with job-related income increased by $3,915 or 4.4 percent in 2016.

- The proportion of the workforce that reported working in full-time jobs (35 or more hours per week) fell sharply during the recession and began to rebound in 2012. In 2016, the proportion of full-time job holders rose by 1.3 percent over the previous year and by 3 percent since 2012, but still remained 2.1 percentage points below the pre-recession level of 61.6 percent observed in 2007. The proportion of part-time workers rose somewhat during the depths of the recession, and declined each year from 2011 to 2016. In 2016, 18.7 percent of the working-age population were employed in part-time jobs.

[23]For expanded data from 2005 through 2016, see *Appendix figure A3-1* in *Appendix 3*.
[24] The U.S. government establishes a poverty threshold every year. The threshold varies based on family size and composition. In 2016, the threshold for a family of two adults and two children under age 18 was $24,339. Thresholds for other family sizes can be found at: www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html

- Median earnings for all workers in 2016 were $36,353. This estimate amounts to an increase of just over $500 over the year. The largest increase in median earnings was observed the previous year. The 2015 increase pushed median earnings above pre-recession earnings (adjusted for inflation) for the first time since the start of the Great Recession. The 2016 median exceeds the pre-recession median observed in 2007 ($35,533) and is 9.1 percent higher than the lowest level observed recently ($33,328 in 2013).

- From 2015 to 2016, full time year-round workers' earnings increased by $164 or 0.3 percent. Within that estimate, male full-time workers' earnings rose 4.6 percent from $57,579 to $60,242 and female full-time workers' wages increased by $6 or 0 percent. Female full-time workers earned a median wage of $45,163 in 2016.

- An estimated 9.7 percent of the workforce identified as primarily self-employed in 2016; this is down from 10.1 percent observed in 2015 and much lower than the 10.9 percent observed in 2007, on the eve of the recession.

- The percentage of households with a Social Security beneficiary has been increasing steadily over the past several years. It increased from 27.3 percent in 2012 to 29.6 percent in 2016; this comes as no surprise as the baby boomer generation has begun to enter retirement.

- The proportion of households receiving private pension payments increased from 19.2 percent in 2015 to 19.7 percent in 2016. Five years ago, 18.3 percent of households received private pensions. The increase is again not surprising in light of aging demographics. The average monthly payout in 2016 was $2,226, higher than $2,100 observed in 2015.

- Just under 5 percent of Washington households had members who received Supplemental Security Income (largely for people with disabilities) in 2016, with an average payout of $833 per month – a slight increase in the average payment of $803 per month observed in 2012.

- The share of households receiving welfare dropped from 3.5 percent in 2015 to 3.1 percent in 2016. This is down from 4 percent observed as recently as 2013. The proportion of Washington households receiving welfare payments reached a peak of 4.6 percent in 2010 – at the height of the jobs recession, and has fallen since then. The average benefit in 2016 was about $230 per month. This is down from $292 observed in 2012.

- The share of households receiving food stamps dropped from 13.4 percent in 2015 to 12.6 percent in 2016. This is down from rates observed during the early recovery. In 2012, 15.1 percent of households received food stamps.

- Health insurance coverage has been increasing over the past several years. The proportion of Washington state residents without health insurance dropped from 14 percent in 2013 to 6 percent in 2016 – a decrease on the order of nearly 532,000 residents over a three-year period. Private sector health insurance coverage increased from 73.1 percent to 76.6 percent over the same three-year period and the number of people relying on public health insurance rose from 17.2 percent to 22.1 percent.

- The homeownership rate in Washington state increased for the second year in a row. From 2015 to 2016, the homeownership rate increased from 62.4 percent to 62.5 percent. Despite recent increases, homeownership still falls well below the pre-recession peak of 66.1 percent observed in 2007.

- The federal government considers any household paying more than 30 percent of its income towards housing costs to be under duress. The percent of households in economic distress due to high housing costs rose in the first few years of the recession, but then declined in part through the foreclosure process as homeowners transitioned to renters and in part due to employment and wage growth. The percentage of renters exceeding that threshold increased during the recession, reaching 48.4 percent in 2010. By 2016, that proportion was down to 44.9 percent.

- Homeowners with a mortgage paying more than 30 percent of their income toward housing rose in the lead up to the recession, exceeding 33 percent from 2007 to 2010. Over the course of the recovery, that proportion has shifted downward, in part due to foreclosures, short sales, and the overall decline of home ownership, along with the improving job market. By 2016, the proportion was down to 24.1 percent.

Figure 6-2. Selected household statistics
Washington state, 2012 through 2016
Source: U.S. Census Bureau, American Community Survey

Household statistic	2012	2013	2014	2015	2016
Median household income	$60,105	$60,174	$62,283	$64,895	$67,106
Median family income	$73,013	$73,533	$75,302	$77,873	$81,234
Poverty rate, all individuals	13.5%	14.1%	13.2%	12.2%	11.3%
Poverty rate, children under 18	18.5%	18.8%	17.5%	15.5%	13.7%
Households with earnings from a job*	78.7%	78.5%	78.6%	78.5%	78.8%
Average household earnings from a job**	$80,512	$81,915	$83,662	$88,008	$91,923
Full-time workers, percent of population aged 16-64***	56.5%	57.1%	57.6%	58.2%	59.5%
Part-time workers, percent of population aged 16-64	19.5%	19.2%	19.1%	18.8%	18.7%
Median earnings for all workers	$33,396	$33,328	$33,672	$35,837	$36,353
Median earnings for full-time, year-round workers	$50,945	$51,213	$50,912	$51,816	$51,980
Median earnings for male full-time, year-round workers	$55,879	$55,365	$56,213	$57,579	$60,242
Median earnings for female full-time, year-round workers	$43,002	$43,224	$42,663	$45,157	$45,163
Percent of workers who are self-employed	10.0%	9.8%	10.1%	10.1%	9.7%
Households receiving Social Security	27.3%	28.1%	28.5%	29.0%	29.6%
Households receiving private pension payments	18.3%	18.2%	18.6%	19.2%	19.7%
Avg. mo. payout for households receiving private pensions	$2,057	$2,036	$2,088	$2,100	$2,226
Households receiving Supplemental Security Income (SSI)*	4.7%	4.6%	4.9%	4.9%	4.8%
Average monthly payout for those receiving SSI	$803	$810	$804	$825	$833
Households receiving welfare cash payments*	4.0%	4.0%	3.6%	3.5%	3.1%
Average monthly payout for welfare recipients	$292	$241	$233	$233	$230
Households receiving food stamps*	15.1%	14.8%	14.1%	13.4%	12.6%
Residents without health insurance	13.9%	14.0%	9.2%	6.6%	6.0%
Number of residents without health insurance	944,771	959,991	642,654	467,967	428,092
Residents with private health insurance	69.0%	68.5%	70.3%	71.1%	71.4%
Residents relying solely on public health insurance	17.1%	17.5%	20.5%	22.3%	22.6%
Renters paying more than 30 percent of income for housing	50.7%	51.0%	50.0%	48.0%	47.4%
Homeownership rate	62.3%	61.9%	61.7%	62.4%	62.5%
Homeowners with a mortgage paying more than 30 percent of income for housing	36.7%	34.3%	31.7%	29.6%	29.4%

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

In 2016, a number of indicators about the well-being of households in Washington showed continued improvement.

Many of the metrics presented in Figure 6-2 tell the story of a gradual recovery; however, in many cases the recovery appears to have gained momentum in the last two years. Figure 6-3 illustrates the share of households that fell within certain income ranges in 2016 dollars. Examining household income ranges allows for a more nuanced view of how the economic recovery differs socioeconomically.

Over the past five years, the portion of households identified as low income declined. Households with incomes less than $25,000 in 2016 adjusted dollars increased slightly from 2012 to 2013, but as the recovery began to take hold, the trend reversed. By 2016, the share of households with incomes less than $25,000 dropped from 19.8 percent in 2013 to 16.7 percent.

Similarly, lower middle-income households declined proportionally over the past five years. From 2012 to 2016, the share of households with incomes between $25,000 and $75,000 decreased from 41.5 percent in 2012 to 38.4 percent by 2016. Households with incomes between $75,000 and $100,000 changed little over the course of the past five years. A slight upward adjustment in 2015 was more or less negated by a subsequent decline in 2016.

Upper and upper-middle income households, meanwhile, 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 2012 through 2016. Over that time period, the share of households with incomes exceeding $100,000 per year expanded from 26.3 percent in 2012 to 31.3 percent in 2016.

Figure 6-3. Percent of households by income range, 2016 dollars
Washington state, 2012 through 2016
Source: U.S. Census Bureau, American Community Survey

Household income range in 2016 dollars
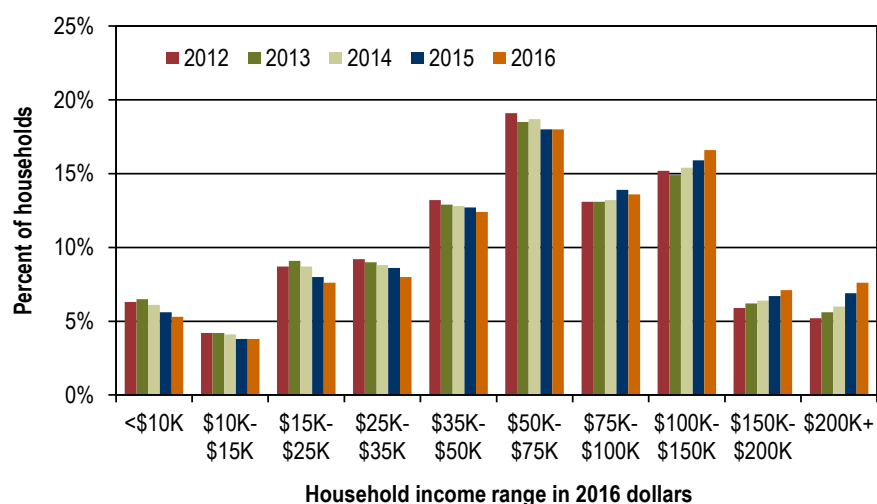
The share of households in upper income brackets rose in 2016.

Wages

Income includes money from a variety of sources, and in the cases of families and households, can include the contributions of more than one person. This section focuses on one source (and for many the most important source) of income – wages from a job. More specifically, it will analyze trends for those jobs covered by the Washington state unemployment insurance system.

In 2015, a tightening labor market pushed wages up across the board in Washington state. That trend continued in 2016. After rising by 2 percent in 2015, the median hourly wage increased by 2.2 percent to $23.91 per hour in 2016 (Figure 6-4). These were the two best back-to-back years since 2001 to 2002. Wage increases were again spread across the wage spectrum, but with one major difference from the previous year. In 2015, the average for jobs at the top of the wage scale increased by 1.3 percent, lower than lesser-paid jobs. In 2016, the average for the best-paid 10 percent of jobs jumped by 6.1 percent, the biggest one-year gain for any decile this century.

The average wage for the bottom 10 percent of jobs increased by 2.4 percent, while the next highest 10 percent of jobs climbed by 4 percent and the next highest by 2.8 percent (Figure 6-5). The averages for the next five deciles increased by between 1.9 percent and 2.1 percent, and the next-to-highest 10 percent of jobs were up 2.4 percent.

The average hourly wage for all jobs increased by 3.8 percent – faster than the median – indicating that wage inequality increased. 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. This 90/10 ratio climbed from 10.0 in 2010 to 10.9 in 2014, slipped to 10.8 in 2015 and then rose to 11.2 in 2016. The 90/10 ratio was only 7.6 back in 1990.[25]

Since 2002, the state has experienced an expansion, a deep recession and an uneven recovery. During the 2002-2007 expansion, wages were stagnant in the bottom half of the spectrum, with the median wage increasing by only 1.3 percent over the five-year period. Wage gains on the upper end were more robust, especially for jobs not quite at the top; the average wage for the second-highest tier of jobs increased by 6.4 percent. The median wage jumped in 2008, but this was a perverse effect of the initial year of the recession – the first wave of job losses was concentrated in lower-wage jobs.

From a longer-term perspective, wages in the state have generally moved upward, but more so at the upper end. The median hourly wage increased by 10.9 percent from 2001 to 2016. Wages at the

[25] The upper 10 percent paying jobs does not include many corporate officers (generally the highest-paid employees) and wages do not include stock options or income from capital gains.

top grew much more rapidly, with the average wage for the top 10 percent of jobs climbing by 23 percent and the average for the next-highest 10 percent rising by 26.5 percent. In contrast, wages for the second-lowest job tier increased by 10.2 percent, and the lowest 10 percent of jobs increased by 10.8 percent. This indicates that the state's inflation-adjusted minimum wage has provided some support for wages at the bottom of the pay scale, and perhaps has started to influence at the next lowest decile. The increase for the third-lowest decile was lower, however, at 8.4 percent.

Figure 6-4. Median and average hourly wage, 2016 dollars
Washington state, 1990 through 2016
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
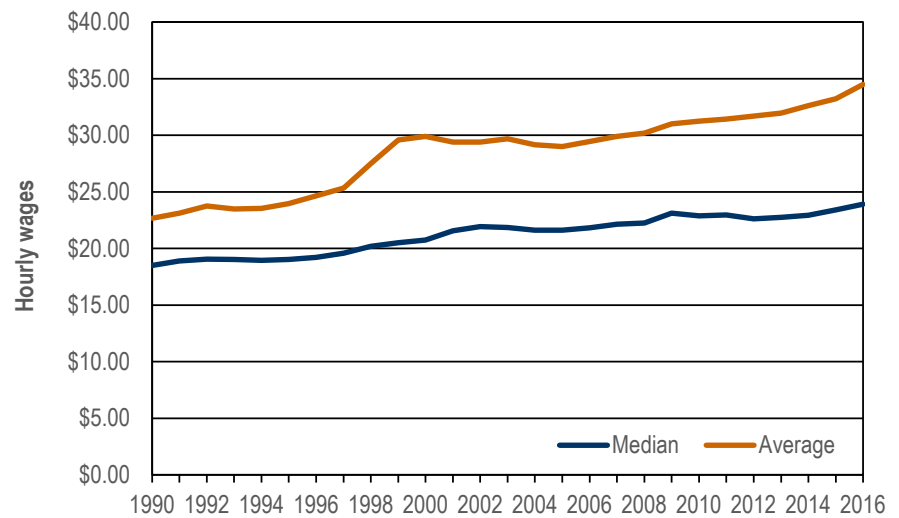
The median hourly wage increased by 2.2 percent in 2016, reaching an all-time high; the average hourly wage increased at a faster rate, indicating an increase in wage inequality.

Figure 6-5. Measuring the wage gap, 2016 dollars
Washington state, 2001 through 2016
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse

Hourly wages	2001	2007	2010	2014	2015	2016	Percent change, 2015-2016
Median hourly wage	$21.56	$22.14	$22.88	$22.94	$23.40	$23.91	2.2%
Average hourly wage for:							
Lowest-paid 10 percent of jobs	$9.29	$9.57	$9.76	$9.85	$10.05	$10.29	2.4%
Second-lowest 10 percent of jobs	$11.84	$11.95	$12.11	$12.20	$12.55	$13.05	4.0%
Third-lowest-paid 10 percent of jobs	$14.38	$14.57	$14.90	$14.85	$15.17	$15.59	2.8%
All jobs:	$29.39	$29.90	$31.25	$32.62	$33.24	$34.50	3.8%
Third-highest 10 percent of jobs	$33.17	$35.56	$37.76	$38.55	$39.34	$40.10	1.9%
Second-highest 10 percent of jobs	$41.37	$45.43	$48.42	$50.11	$51.09	$52.34	2.4%
Highest-paid 10 percent of jobs	$93.99	$92.27	$97.21	$107.51	$108.95	$115.57	6.1%
Ratio of highest 10 to lowest 10	10.1	9.6	10.0	10.9	10.8	11.2	N/A
Ratio of highest 10 to median	4.4	4.2	4.2	4.7	4.7	4.8	N/A
Ratio of median to lowest 10	2.3	2.3	2.3	2.3	2.3	2.3	N/A

The gap between the highest- and lowest-paid jobs closed slightly from 2015 to 2016.

For the state, 2016 was another good year for job growth. The total number of jobs covered by unemployment insurance (with the exclusions noted in Figure 6-6) increased by 3.1 percent. These are 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[26]), job growth was slightly lower (2.9 percent), indicating that the average hours worked per job inched downward. This may have been caused, for example, by more new jobs being part time, or by staffing shifts in existing jobs that lowered the average hours per worker.

[26] 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.

Year	Covered employment	Change from previous year	FTE employment	Change from previous year	Ratio of FTE to covered employment
2007	2,818,882	2.8%	2,308,634	3.8%	81.9%
2008	2,840,382	0.8%	2,323,601	0.6%	81.8%
2009	2,717,647	-4.3%	2,206,562	-5.0%	81.2%
2010	2,676,973	-1.5%	2,163,630	-1.9%	80.8%
2011	2,714,626	1.4%	2,214,158	2.3%	81.6%
2012	2,764,418	1.8%	2,264,864	2.3%	81.9%
2013	2,831,275	2.4%	2,316,139	2.3%	81.8%
2014	2,905,998	2.6%	2,380,299	2.8%	81.9%
2015	2,995,839	3.1%	2,457,393	3.2%	82.0%
2016	3,090,003	3.1%	2,529,220	2.9%	81.9%

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

Employment grouped by hourly wages paid in 2016 is shown in *Figure 6-7*, with the wage spectrum being divided into nine wage ranges; the first three wage ranges contain the majority of jobs: 10.6 percent paid below $12 per hour, 23 percent paid from $12 to $17.99 per hour and 16.7 percent paid from $18 to $23.99 per hour.

Figure 6-7. FTE jobs by hourly wage range, 2016 dollars
Washington state, 2016
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
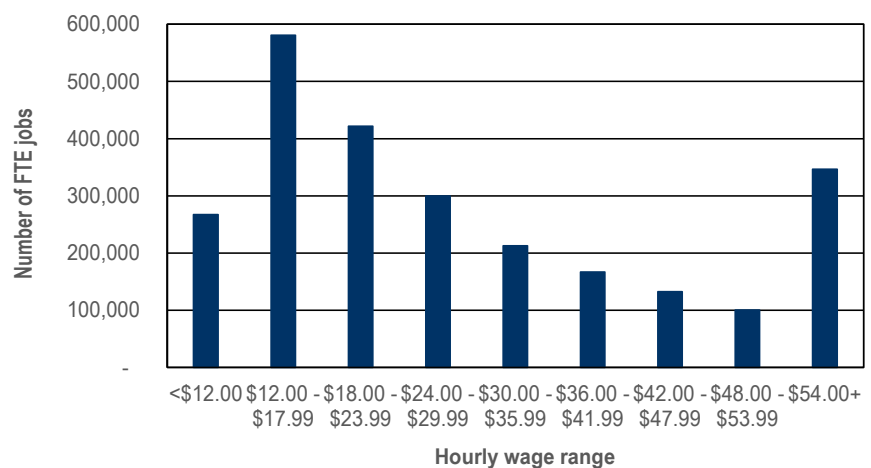
Slightly more than half of all jobs on an FTE basis pay below $24 per hour.

Job growth by hourly wage for 2016 in terms of total jobs added is shown in *Figures 6-8* and *6-9*. Overall, there was faster job growth in higher-wage categories in 2016.

- The number of jobs paying below $12 per hour declined by a huge amount –40,627 jobs, a drop of 13.2 percent. Tightening labor markets likely pushed wages up into the next bracket for these lower-wage jobs.

- There were 34,361 more jobs paying $12 to $17.99 per hour. In isolation, this wage range had the largest numerical increase, a faster than average growth rate (6.3 percent, versus 2.9 percent for all jobs) and accounted for more than a third of net new jobs for the year. However, when combined with the lower wage bracket, the percent change in jobs paying below $18 per hour was -0.7 percent.

- The number of FTE jobs increased in healthcare and social assistance (2,665), accommodations and food services (1,594), transportation and warehousing (762) and business services excluding staffing agencies (727) – all had net increases in jobs paying below $18 per hour. Meanwhile, jobs decreased in manufacturing (2,828), wholesale trade (1,706), finance and insurance (1,188), state government (1,106), information services (1,032) and local government (861) – all of these reduced the number of jobs paying below $18 per hour.

- Job gains were positive and slightly above average in percentage increase in the next six wage ranges stretching from $18 to $23.99 per hour to $48 to $53.99 per hour.

- At the top of the wage distribution, jobs paying $54 or more also expanded in almost every industry (aerospace being the glaring exception at 797 fewer high-wage jobs). The greatest increases were found in retail trade (7,473 total, with 6,591 in electronic commerce), information services (6,320, with software contributing 3,256), professional services (4,527, including 2,316 in computer systems design), local government (3,230, with 1,874 in local education), construction (1,882) and finance and insurance (1,058). Manufacturing outside of aerospace was also up significantly (955).

Figure 6-8. Change in FTE jobs by hourly wage range, 2016 dollars
Washington state, 2015 to 2016
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
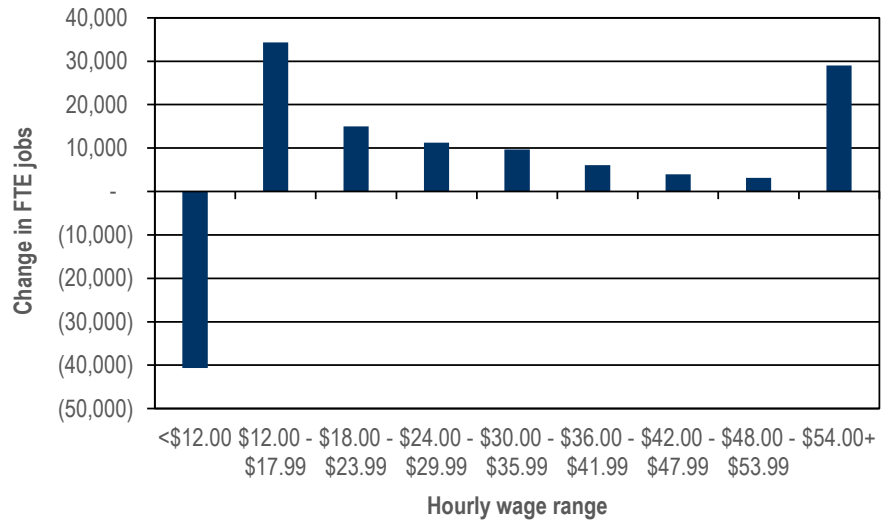
Job gains were largest in two wage ranges in 2016.

Figure 6-9. Percent change in FTE jobs by hourly wage range, 2016 dollars
Washington state, 2015 to 2016
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
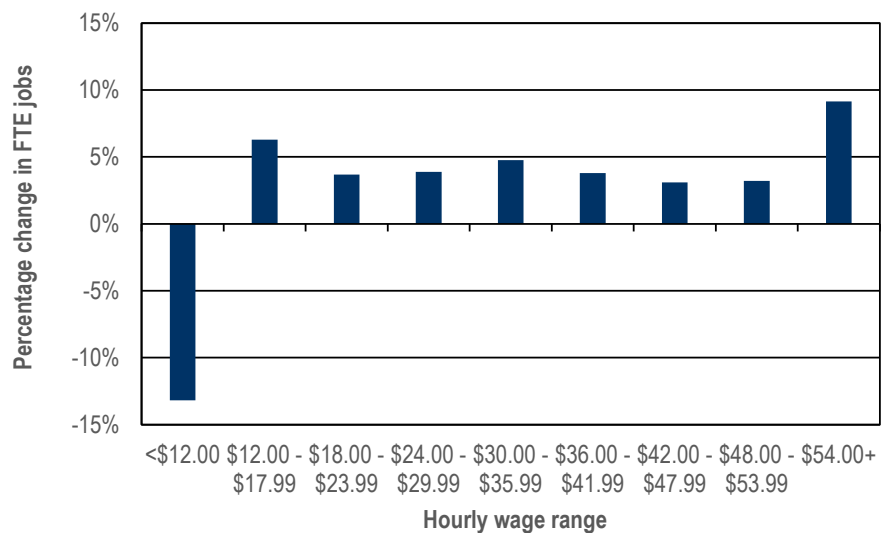
Jobs grew faster at the upper end of the wage scale.

Shifting to a longer-term outlook, Figures 6-10 and 6-11 show 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 and higher) grew by 147 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, local government excluding education and wholesale trade were also major sources.

In summary, wages improved in 2016 with across-the-board gains and a slight increase in wage inequality. The median hourly wage hit an all-time high. Since 2001, there has been a marked shift towards more higher-wage jobs. While total FTE employment grew by 22.7 percent, the number of jobs paying below $42 per hour increased at a slower pace, while jobs paying above that mark grew much faster.

A final note: the median hourly wage increased in all but three counties in 2016. Five counties saw their median increase by at least 3 percent: Klickitat (4.9 percent), Grant (3.8 percent), Okanogan (3.7 percent), Asotin (3.7 percent) and Walla Walla (3.5 percent). Only Lewis County suffered a significant decline (-1.8 percent), due to job losses in manufacturing.

Figure 6-10. Change in FTE employment by hourly wage range, 2016 dollars
Washington state, 2001 to 2016
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
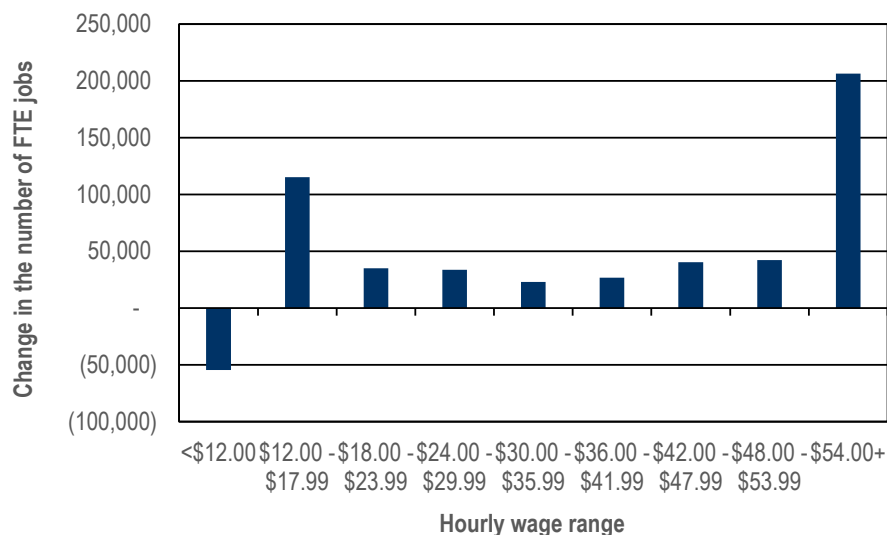
Employment growth over the past dozen years was heavily weighted on the higher end of the wage scale.

Figure 6-11. Percentage change in FTE employment by hourly wage range, 2016 dollars
Washington state, 2001 to 2016
Source: Employment Security Department/WITS, Unemployment Insurance Data Warehouse
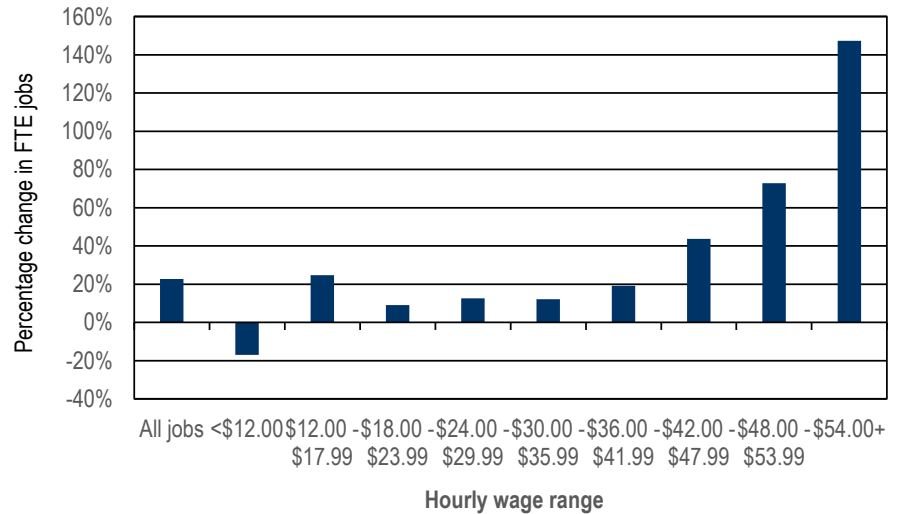
*The number of high-wage jobs more than doubled from 2001 to 2016*

Personal and per capita income[27]

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.

Per capita income, as shown in *Figure 6-12*, dropped sharply in 2009, slid a bit more in 2010 and then started an uneven recovery in 2011. Preliminary estimates showed a moderate increase of 1.6 percent in 2016. That followed two strong years – a 4.8 percent jump in 2014 and a 4 percent gain in 2015. Total personal income was estimated at $398 billion in 2016, or $54,579 on a per capita basis. 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 three years, reaching 10.8 percent in 2016.

Changes in income over the past few years can be clarified by disaggregating income into its three major components.

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[27] 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/WITS.

First, total ***earned income***, which makes up almost two thirds of total income, rose by 4.4 percent in 2016, and served as the primary driver for increased incomes that year. After a big drop in 2009 and no change in 2010, income from wages and business ownership has grown rapidly, reaching $250 billion in 2016. Growth of per capita earnings was slower (due to population growth) but still very strong over the past six years. Earned income accounted for 70 percent of total personal income in 2000 but since then its share has declined to 63 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, with occasional off years, 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 stagnation (increasing only 0.1 percent) in 2016. The 2016 total of $88 billion was an all-time high, but was below the 2015 peak on a per capita basis. Investment income was 22 percent of total personal income in 2016, little changed over the past decade.

For twenty five years (from 1982 to 2007), total ***transfer payments*** had grown 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, and has stayed higher at 15 percent during the recovery, as Medicaid payments increased under the Affordable Care Act (ACA).

The composition of transfer payments has changed a bit over the past two decades, however, as show in (*Figure 6-12*). The percentage of transfer payments going to Social Security and other public pension payment has dropped from 43 percent to 38 percent. Meanwhile, medical benefits (primarily Medicare and Medicaid) has risen from 33 percent to 40 percent. Unemployment insurance benefits have declined from 5 percent to 2 percent, while that going to income support has fallen from 10 percent to 9 percent. Finally, veterans' benefits moved from 3 percent to 4 percent of total transfers.

Figure 6-12. Per capita transfer payments, and components as a percent of total
Washington state, 1996 and 2016
Source: Employment Security Department/WITS; U.S. Bureau of Economic Analysis

Type of transfer payment	1996	2016	1996	2016
Total transfer payments	**$4,683**	**$8,186**	**100%**	**100%**
Social Security and other retirement-related payments	$1,991	$3,078	43%	38%
Medical benefits	$1,555	$3,305	33%	40%
Medicare	$743	$1,633	16%	20%
Medicaid	$798	$1,623	17%	20%
Income Maintenance	$475	$754	10%	9%
Supplemental Nutrition Assistance (food stamps)	$107	$219	2%	3%
Family assistance (AFDC/TANF)	$170	$254	4%	3%
Unemployment benefits	$229	$140	5%	2%
Veterans' benefits	$146	$362	3%	4%
All other	$287	$548	6%	7%

Over the past 20 years, the share of transfer payments going to medical benefits and veterans benefits has increased, while the share going to family assistance and unemployment insurance benefits has declined.

More recent trends are reflected in *Figure 6-13*. These include the steady rise in Social Security payments, the larger increase in medical payments, and the cyclical expansion and retrenchment of income maintenance and unemployment benefits through the recession.

Figure 6-13. Personal income including transfer payments, 2016 dollars
Washington state, 2008 through 2016
Source: Employment Security Department/WITS; U.S. Bureau of Economic Analysis

Type of income	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total personal income (billions)	**$325.50**	**$309.10**	**$310.10**	**$320.80**	**$340.80**	**$343.30**	**$364.40**	**$384.50**	**$397.80**
Earned income	$208.70	$196.70	$196.70	$203.80	$216.40	$219.60	$227.70	$239.50	$250.10
Investment income	$72.20	$62.10	$58.80	$63.80	$72.10	$71.20	$80.30	$87.90	$88.00
Transfer payments	$44.60	$50.30	$54.60	$53.20	$52.30	$52.50	$56.30	$57.20	$59.70
Social Security/retirement	$16.50	$18.10	$18.50	$18.80	$19.70	$20.40	$21.00	$22.00	$22.40
Medicare and Medicaid	$16.00	$17.20	$18.10	$18.60	$18.90	$19.10	$22.70	$22.10	$24.10
Welfare, food stamps, Social Security Income	$4.40	$5.80	$6.40	$6.00	$5.70	$5.60	$5.40	$5.50	$5.50
Unemployment benefits	$1.40	$4.20	$4.70	$3.40	$2.60	$1.90	$1.10	$1.00	$1.00
Per capita personal income (dollars)	**$49,595**	**$46,359**	**$45,986**	**$47,020**	**$49,420**	**$49,262**	**$51,651**	**$53,698**	**$54,579**
Earned income	$31,803	$29,504	$29,165	$29,868	$31,379	$31,518	$32,279	$33,443	$34,315
Investment income	$10,998	$9,312	$8,717	$9,356	$10,453	$10,213	$11,385	$12,270	$12,078
Transfer payments	$6,793	$7,542	$8,104	$7,796	$7,590	$7,531	$7,987	$7,985	$8,186
Social Security/retirement	$2,515	$2,709	$2,749	$2,749	$2,852	$2,923	$2,979	$3,070	$3,078
Medicare and Medicaid	$2,434	$2,575	$2,690	$2,726	$2,739	$2,737	$3,219	$3,087	$3,305
Welfare, food stamps, Supplemental Security Income	$669	$877	$945	$882	$833	$800	$770	$766	$754
Unemployment benefits	$212	$627	$698	$500	$378	$268	$160	$145	$140
Veterans' benefits	$219	$244	$272	$282	$298	$331	$339	$363	$362

Transfer payments, chiefly from government programs, grew during the recession and remained high in 2015 due primarily to a large increase in Medicaid, government-provided healthcare for low-income residents.

Chapter 7: Economic comparisons with other states

Figure 7-1. States[1] with minimum wage higher than federal minimum wage, based on 2017 ranking[2]
United States and Washington state, 2007, 2012 and 2017
Source: U.S. Department of Labor

Minimum Wage

Rank	State	2007	2012	2017
	United States	$5.15	$7.25	$7.25
1	District of Columbia	$7.00	$8.25	$12.50
2	Maine	$6.75	$7.50	$11.00
2	Massachusetts	$7.50	$8.00	$11.00
2	Washington	$7.93	$8.67	$11.00
5	California	$7.50	$8.00	$10.50
6	Oregon	$7.80	$8.50	$10.25
7	Connecticut	$7.65	$8.25	$10.10
8	Arizona	$6.75	$7.35	$10.00
9	Alaska	$7.15	$7.75	$9.80
10	New York	$7.15	$7.25	$9.70
11	Rhode Island	$7.40	$7.40	$9.60
12	Minnesota	$5.25	$5.25	$9.50
13	Colorado	$6.85	$7.36	$9.30
14	Hawaii	$7.25	$7.25	$9.25
14	Maryland	$6.15	$7.25	$9.25
16	West Virginia	$5.85	$7.25	$8.75
17	South Dakota	$5.15	$7.25	$8.65
18	New Jersey	$7.15	$7.25	$8.44
19	Delaware	$6.65	$7.25	$8.25
19	Nevada	$6.15	$7.25	$8.25
21	Ohio	$6.85	$7.40	$8.15
22	Florida	$6.67	$7.25	$8.10
23	Missouri	$6.50	$7.25	$7.70
24	New Mexico	$5.15	$7.50	$7.50

[1]Includes District of Columbia.
[2]Rates applicable to all employers.

Figure 7-2. Ten highest and lowest state* unemployment rates, not seasonally adjusted, based on 2016 ranking
United States and Washington state, 2006, 2011 and 2016
Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Unemployment Rates

Rank	State	2006	2011	2016
	United States	**4.6%**	**8.9%**	**4.9%**
1	New Hampshire	3.4%	5.4%	2.8%
1	South Dakota	3.2%	4.7%	2.8%
3	Hawaii	2.4%	6.8%	3.0%
4	Nebraska	3.0%	4.4%	3.2%
4	North Dakota	3.2%	3.5%	3.2%
6	Colorado	4.3%	8.4%	3.3%
6	Vermont	3.6%	5.5%	3.3%
8	Utah	2.9%	6.7%	3.4%
9	Iowa	3.7%	5.5%	3.7%
9	Massachusetts	5.0%	7.3%	3.7%
39	**Washington**	**5.0%**	**9.3%**	**5.4%**
39	California	4.9%	11.7%	5.4%
39	Georgia	4.6%	10.2%	5.4%
39	Pennsylvania	4.7%	7.9%	5.4%
43	Nevada	4.2%	13.0%	5.7%
44	Mississippi	6.8%	10.0%	5.8%
45	Illinois	4.5%	9.7%	5.9%
46	Alabama	3.6%	9.6%	6.0%
46	District of Columbia	6.0%	10.2%	6.0%
46	West Virginia	4.9%	8.1%	6.0%

*Includes District of Columbia.

Figure 7-3. Highest and lowest state* average annual job growth rates, nonfarm employment
United States and Washington state, 2000 to 2016
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

Nonfarm Employment

Rank	State	Average annual growth rate
	United States	**0.6%**
1	Utah	1.79%
2	North Dakota	1.78%
3	Texas	1.51%
4	Nevada	1.48%
5	Idaho	1.37%
6	Arizona	1.18%
7	District of Columbia	1.16%
8	Montana	1.12%
9	Florida	1.08%
10	**Washington**	**1.05%**
11	Hawaii	1.01%
12	Colorado	1.01%
40	Louisiana	0.17%
41	Rhode Island	0.17%
42	Indiana	0.16%
43	Alabama	0.14%
44	Maine	0.14%
45	New Jersey	0.12%
46	West Virginia	0.10%
47	Illinois	-0.03%
48	Connecticut	-0.05%
49	Mississippi	-0.06%
50	Ohio	-0.16%

*Includes District of Columbia.

Annual Exports

Rank[2]	State	2006	2011	2016
1	Texas	$150,890,067,958	$251,104,278,477	$231,106,721,066
2	California	$127,770,793,810	$159,421,393,886	$163,512,848,660
3	**Washington**	**$42,390,603,185**	**$64,800,272,158**	**$79,559,493,884**
4	New York	$59,131,681,664	$84,999,347,161	$76,720,209,610
5	Illinois	$42,134,675,259	$64,902,904,219	$59,757,898,842
6	Michigan	$40,499,792,371	$51,063,992,243	$54,713,476,605
7	Florida	$38,557,545,807	$65,009,786,038	$52,049,368,535
8	Ohio	$38,161,413,584	$46,457,638,989	$49,298,835,857
9	Louisiana	$23,476,817,989	$54,971,153,986	$48,418,789,649
10	Pennsylvania	$26,358,528,010	$41,103,128,737	$36,484,390,217
42	New Hampshire	$2,817,054,764	$4,306,552,050	$4,143,024,345
43	New Mexico	$2,895,240,289	$2,095,859,917	$3,631,617,039
44	Vermont	$3,874,099,720	$4,274,554,194	$2,989,758,629
45	Maine	$2,641,505,201	$3,422,092,609	$2,875,273,014
46	Rhode Island	$1,531,603,167	$2,288,561,451	$2,277,830,684
47	Montana	$900,389,969	$1,591,805,934	$1,360,096,978
48	District of Columbia	$1,039,908,749	$1,041,193,908	$1,330,667,868
49	South Dakota	$1,191,717,835	$1,461,508,120	$1,223,354,109
50	Wyoming	$834,134,716	$1,218,714,268	$1,098,107,862
51	Hawaii	$692,854,319	$884,370,236	$795,492,826

[1] Includes District of Columbia
[2] 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.

Figure 7-5. Ten highest and lowest state[1] per capita personal income,[2] in 2016 dollars,[3] based on 2016 ranking
United States and Washington state, 2006 and 2016
Source: U.S. Bureau of Economic Analysis

Rank	State	2006	2016	Average annual growth rate[4]
	United States	$38,144	$49,246	2.6%
1	District of Columbia	$57,025	$76,108	2.9%
2	Connecticut	$54,191	$69,311	2.5%
3	Massachusetts	$48,307	$64,235	2.9%
4	New Jersey	$48,360	$61,472	2.4%
5	New York	$44,448	$59,563	3.0%
6	Maryland	$45,832	$58,052	2.4%
7	California	$42,334	$56,374	2.9%
8	New Hampshire	$43,763	$55,954	2.5%
9	Alaska	$40,845	$55,646	3.1%
10	Wyoming	$43,208	$55,116	2.5%
12	Washington	$40,357	$54,579	3.1%
42	Utah	$31,154	$40,925	2.8%
43	Arizona	$34,705	$40,415	1.5%
44	Arkansas	$29,308	$39,722	3.1%
45	South Carolina	$30,577	$39,517	2.6%
46	Idaho	$31,357	$39,470	2.3%
47	Kentucky	$30,440	$38,926	2.5%
48	Alabama	$31,315	$38,896	2.2%
49	New Mexico	$30,364	$38,474	2.4%
50	West Virginia	$28,406	$36,624	2.6%
51	Mississippi	$27,711	$35,484	2.5%

Personal Income

[1] Includes District of Columbia.
[2] Per capita personal income is total personal income divided by total mid-year population.
[3] All dollar estimates are in current dollars (not adjusted for inflation).
[4] Last updated: September 26, 2017 – revised estimates for 2014-2016.

Building Permits

Figure 7-6. Ten highest and lowest states* in number of authorized privately owned building permits, based on 2016 ranking
United States and Washington state, 2006 and 2016
Source: U.S. Census Bureau

Rank	State	2006 building permits	2016 building permits	Percent change 2006 to 2016
	United States	1,838,903	1,206,642	-34.4%
1	Texas	216,642	165,853	-23.4%
2	Florida	203,238	116,240	-42.8%
3	California	160,502	102,350	-36.2%
4	North Carolina	99,979	60,550	-39.4%
5	Georgia	104,200	51,675	-50.4%
6	Washington	50,033	44,077	-11.9%
7	Arizona	65,363	35,578	-45.6%
8	New York	54,382	33,711	-38.0%
9	South Carolina	50,776	32,165	-36.7%
10	Illinois	58,802	19,571	-66.7%
42	South Dakota	5,304	5,686	7.2%
43	Montana	4,542	4,781	5.3%
44	District of Columbia	2,105	4,690	122.8%
45	North Dakota	3,529	3,981	12.8%
46	New Hampshire	5,677	3,796	-33.1%
47	West Virginia	5,645	2,544	-54.9%
48	Vermont	2,626	1,771	-32.6%
49	Wyoming	3,537	1,727	-51.2%
50	Alaska	2,739	1,503	-45.1%
51	Rhode Island	2,370	1,226	-48.3%

*Includes District of Columbia

Figure 7-7. Median single-family house prices in thousands, based on 2016 ranking
Selected U.S. metropolitan areas, 2014 and 2016
Source: National Association of Realtors

Rank	Metropolitan area	2014	2016	Percent change 2014 to 2016
	United States	**208.9**	**235.5**	**12.7%**
1	San Jose-Sunnyvale-Santa Clara, CA	860	1000	16.3%
2	San Francisco-Oakland-Hayward, CA	715.8	838.6	17.2%
3	Anaheim-Santa Ana-Irvine, CA	687.9	740	7.6%
4	Urban Honolulu, HI	682.8	733.5	7.4%
5	San Diego-Carlsbad, CA	497.9	565	13.5%
6	Boulder, CO	390.7	511.7	31.0%
7	Los Angeles-Long Beach-Glendale, CA	449.5	507.1	12.8%
8	Nassau County-Suffolk County, NY	405.9	437.5	7.8%
9	Boston-Cambridge-Newton, MA-NH	389.8	421.1	8.0%
10	Naples-Immokalee-Marco Island, FL	370	420.4	13.6%
11	**Seattle-Tacoma-Bellevue, WA**	**356.6**	**414.5**	**16.2%**
19	Portland-Vancouver-Hillsboro, OR-WA	286	351.2	22.8%
45	Salem, OR	187.7	237.2	26.4%
58	**Kennewick-Richland, WA**	**187.9**	**222.7**	**18.5%**
66	**Spokane-Spokane Valley, WA**	**178.3**	**207.2**	**16.2%**
84	**Yakima, WA**	**159.5**	**188.6**	**18.2%**
177	Decatur, IL	89.7	93.3	4.0%
178	Cumberland, MD-WV	92	88.8	-3.5%
179	Youngstown-Warren-Boardman, OH-PA	78.6	84.4	7.4%

Home Prices

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
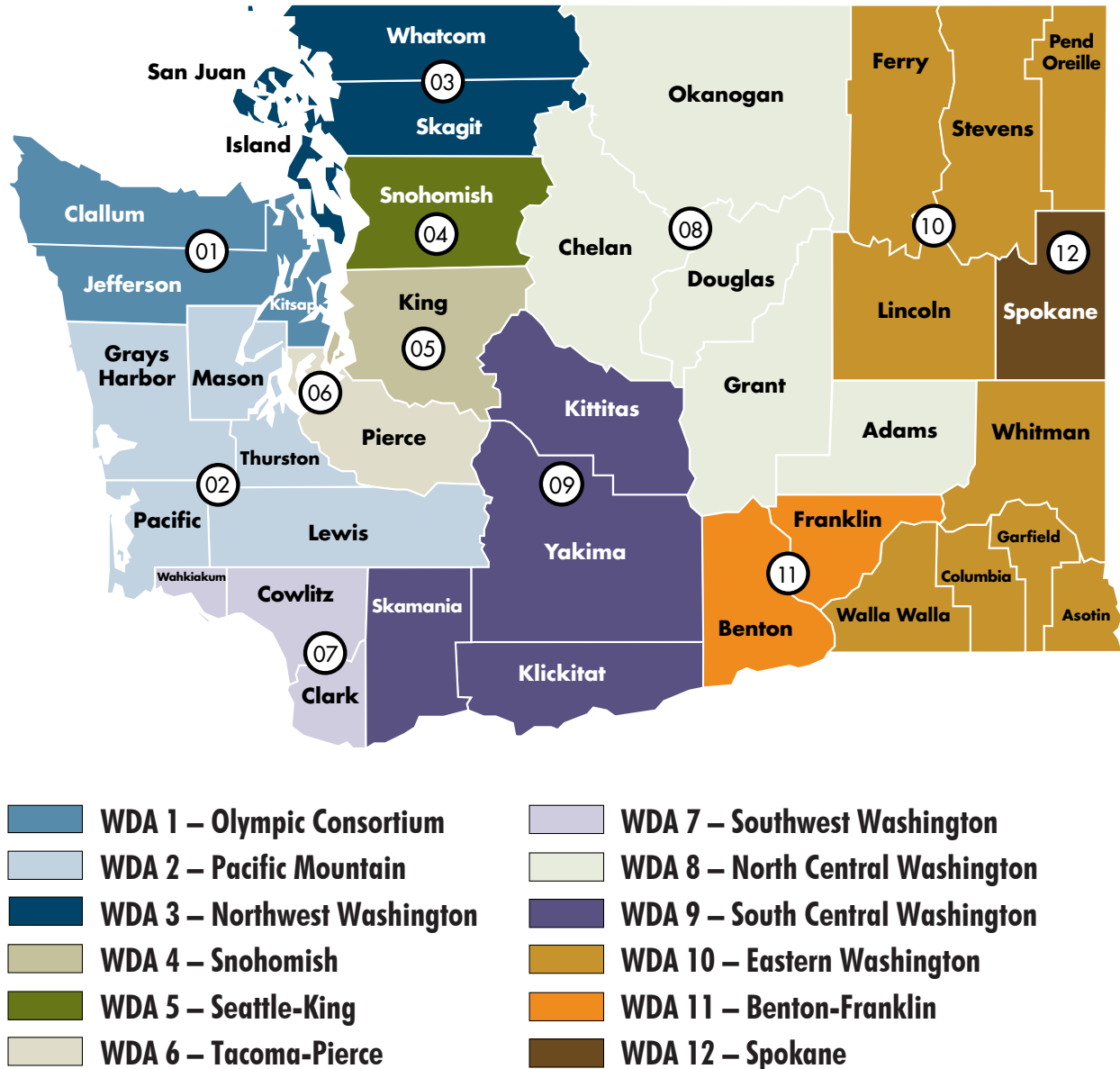
Appendix 2: Seasonal, structural and cyclical industry employment

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 through 2016
Source: Employment Security Department/WITS; U.S. Bureau of Labor Statistics,
Quarterly Census of Employment and Wages
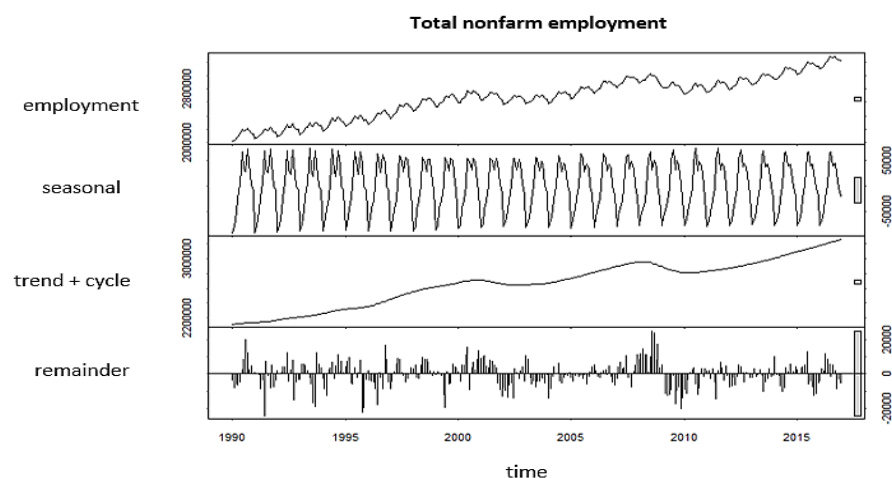
We used a state space model with auto selection of model variations (types of error, trend and seasonality). Model variations can be additive, multiplicative, none, etc. The software also includes the choice of 30 exponential smoothing variations. The main advantage of this type of approach lies in the fact that the types of models are not predefined and thus can vary for different series. Before this type of advanced capability, while parameters were estimated for each series, models were predefined. Previously, we used the U.S. Census Bureau's X-12-ARIMA seasonal adjustment software and the same model applied to 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:

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

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 frequency of the data. This default value was defined by dividing the number of months per year by four raised to a power (default value 2)[28] and multiplying by 1,600. For our purpose, for all series regardless of the model selected, the HP filter chooses s to minimize:

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

Industry seasonality levels

The level of employment seasonality for an industry is defined as an average of absolute values of the seasonal component divided by the initial series (mean [|seasonal| /employment]). The levels are presented in column three of *Appendix figure A2-2*. A larger level value indicates a larger seasonality value for the industry. To interpret the seasonal factors, arbitrary thresholds were established. Industries with a seasonal factor value of up to 1 percent were identified as non-seasonal. Industries with a factor value greater than 1.0 and up to 2 percent were identified as having low levels of seasonality. Industries with a factor value greater than 2.0 and up through 4 percent were identified as having moderate levels of seasonality, while industries with a factor value greater than 4 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 (15.8 percent) was ambulatory healthcare services, while support activities for mining had the highest cyclical component contribution (67.8 percent). The structural component accounted for the dominant share of change in total employment (76.8 percent), while the cyclical component accounted for the residual (23.2 percent).

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

Appendix figure A2-2. Employment decomposition components
Washington state, 1990 through 2016
Source: Employment Security Department/WITS; 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)
	Total covered employment	**1.53%**	**Low**	**4,090**	**1,237**	**76.8%**	**23.2%**
111	Crop production	37.17%	High	99	159	38.5%	61.5%
112	Animal production	2.94%	Mod	8	9	46.9%	53.1%
113	Forestry and logging	3.23%	Mod	21	13	61.4%	38.6%
114	Fishing, hunting and trapping	8.06%	High	6	7	48.0%	52.0%
115	Support activities for agriculture and forestry	15.29%	High	48	42	53.0%	47.0%
212	Mining (except oil and gas)	3.87%	Mod	10	6	61.7%	38.3%
213	Support activities for mining	8.83%	High	1	2	32.2%	67.8%
221	Utilities	1.19%	Low	9	9	49.7%	50.3%
236	Construction of buildings	3.41%	Mod	153	66	69.7%	30.3%
237	Heavy and civil engineering construction	8.89%	High	48	28	63.0%	37.0%
238	Specialty trade contractors	3.78%	Mod	400	156	72.0%	28.0%
311	Food manufacturing	4.89%	High	39	30	56.1%	43.9%
312	Beverage and tobacco product manufacturing	4.55%	High	19	8	70.8%	29.2%
313	Textile mills	1.76%	Low	2	2	43.8%	56.2%
314	Textile product mills	1.57%	Low	8	5	60.3%	39.7%
315	Apparel manufacturing	2.45%	Mod	15	10	59.4%	40.6%
316	Leather and allied product manufacturing	3.99%	Mod	1	2	42.6%	57.4%
321	Wood product manufacturing	1.30%	Low	53	39	57.5%	42.5%
322	Paper manufacturing	0.97%	NS	29	15	66.4%	33.6%
323	Printing and related support activities	0.82%	NS	28	13	68.4%	31.6%
324	Petroleum and coal products manufacturing	1.96%	Low	4	6	41.9%	58.1%
325	Chemical manufacturing	0.70%	NS	14	10	59.6%	40.4%
326	Plastics and rubber products manufacturing	1.21%	Low	25	15	63.3%	36.7%
327	Nonmetallic mineral product manufacturing	2.54%	Mod	20	12	62.9%	37.1%
331	Primary metal manufacturing	0.76%	NS	40	19	67.6%	32.4%
332	Fabricated metal product manufacturing	1.02%	Low	46	30	60.1%	39.9%
333	Machinery manufacturing	0.73%	NS	49	31	60.7%	39.3%
334	Computer and electronic product manufacturing	0.48%	NS	86	57	60.1%	39.9%
335	Electrical equipment, appliance and component manufacturing	0.86%	NS	11	7	59.1%	40.9%
3364	Aerospace product and parts manufacturing	1.03%	Low	380	300	55.8%	44.2%
3366	Ship and boat building	0.66%	NS	46	26	64.0%	36.0%
336*	Other transportation equipment manufacturing	1.00%	NS	26	24	52.0%	48.0%
337	Furniture and related product manufacturing	1.39%	Low	25	15	62.8%	37.2%

NAICS	Industry	Seasonal factor	Level of seasonality	Trend (average number)	Cycle (average number)	Trend (percent)	Cycle (percent)
339	Miscellaneous manufacturing	1.24%	Low	19	14	58.6%	41.4%
423	Merchant wholesalers, durable goods	0.55%	NS	114	56	67.1%	32.9%
424	Merchant wholesalers, nondurable goods	1.83%	Low	45	29	60.9%	39.1%
425	Wholesale electronic markets and agents and brokers	1.05%	Low	61	26	70.4%	29.6%
441	Motor vehicle and parts dealers	1.17%	Low	71	35	67.1%	32.9%
442	Furniture and home furnishings stores	1.87%	Low	23	18	55.0%	45.0%
443	Electronics and appliance stores	2.52%	Mod	24	23	52.0%	48.0%
444	Building material and garden equipment and supplies dealers	3.68%	Mod	55	27	66.8%	33.2%
445	Food and beverage stores	1.56%	Low	71	65	52.2%	47.8%
446	Health and personal care stores	1.31%	Low	15	16	47.7%	52.3%
447	Gasoline stations	1.86%	Low	17	12	57.8%	42.2%
448	Clothing and clothing accessories stores	4.65%	High	51	46	52.6%	47.4%
451	Sporting goods, hobby, book and music stores	3.67%	Mod	31	24	56.7%	43.3%
452	General merchandise stores	3.72%	Mod	151	69	68.6%	31.4%
453	Miscellaneous store retailers	1.91%	Low	53	16	76.7%	23.3%
454	Nonstore retailers	1.79%	Low	138	46	74.9%	25.1%
481	Air transportation	0.95%	NS	38	19	66.6%	33.4%
483	Water transportation	3.65%	Mod	5	5	48.1%	51.9%
484	Truck transportation	2.45%	Mod	39	23	62.5%	37.5%
485	Transit and ground passenger transportation	3.18%	Mod	11	9	57.3%	42.7%
486	Pipeline transportation	1.59%	Low	1	1	40.8%	59.2%
487	Scenic and sightseeing transportation	18.41%	High	3	5	34.9%	65.1%
488	Support activities for transportation	1.07%	Low	35	29	54.5%	45.5%
491	Postal service	0.98%	NS	26	12	68.4%	31.6%
492	Couriers and messengers	4.58%	High	42	29	59.1%	40.9%
493	Warehousing and storage	3.39%	Mod	29	27	51.2%	48.8%
5112	Software publishers	0.93%	NS	163	47	77.8%	22.2%
511*	Other publishers	0.68%	NS	36	18	66.9%	33.1%
512	Motion picture and sound recording industries	4.39%	High	13	14	49.1%	50.9%
515	Broadcasting (except internet)	0.95%	NS	6	8	43.8%	56.2%
5171	Wired telecommunications carriers	0.97%	NS	47	29	61.6%	38.4%
5172	Wireless telecommunications carriers (except satellite)	1.82%	Low	49	29	62.6%	37.4%
517*	Other telecommunications	3.03%	Mod	28	19	59.3%	40.7%
518	Data processing, hosting and related services	1.37%	Low	35	30	54.1%	45.9%
519	Other information services	4.12%	High	49	20	71.0%	29.0%
521	Monetary authorities-central bank	1.05%	Low	1	1	47.1%	52.9%

NAICS	Industry	Seasonal factor	Level of seasonality	Trend (average number)	Cycle (average number)	Trend (percent)	Cycle (percent)
522	Credit intermediation and related activities	0.33%	NS	99	80	55.2%	44.8%
523	Securities, commodity contracts and other financial investments and related activities	0.51%	NS	27	18	60.2%	39.8%
524	Insurance carriers and related activities	0.41%	NS	54	39	58.2%	41.8%
525	Funds, trusts and other financial vehicles	5.49%	High	6	5	55.5%	44.5%
531	Real estate	1.45%	Low	57	24	70.5%	29.5%
532	Rental and leasing services	2.42%	Mod	33	12	73.2%	26.8%
533	Lessors of nonfinancial intangible assets (except copyrighted works)	3.49%	Mod	3	2	56.4%	43.6%
541	Professional, scientific and technical services	0.41%	NS	329	150	68.6%	31.4%
551	Management of companies and enterprises	0.51%	NS	94	49	65.8%	34.2%
561	Administrative and support services	3.19%	Mod	383	198	65.9%	34.1%
562	Waste management and remediation services	0.93%	NS	30	30	50.7%	49.3%
611	Educational services	4.94%	High	346	94	78.7%	21.3%
621	Ambulatory healthcare services	0.36%	NS	242	45	84.2%	15.8%
622	Hospitals	0.33%	NS	176	63	73.8%	26.2%
623	Nursing and residential care facilities	0.40%	NS	75	32	70.2%	29.8%
624	Social assistance	1.25%	Low	284	223	56.1%	43.9%
711	Performing arts, spectator sports and related industries	9.09%	High	21	17	55.0%	45.0%
712	Museums, historical sites and similar institutions	3.62%	Mod	6	6	51.4%	48.6%
713	Amusement, gambling and recreation industries	4.59%	High	78	52	59.8%	40.2%
721	Accommodation	5.72%	High	44	33	56.9%	43.1%
722	Food services and drinking places	2.07%	Mod	354	95	78.8%	21.2%
811	Repair and maintenance	1.01%	Low	35	24	59.4%	40.6%
812	Personal and laundry services	1.14%	Low	38	15	71.1%	28.9%
813	Religious, grantmaking, civic, professional and similar organizations	2.22%	Mod	39	19	67.1%	32.9%
814	Private households	7.90%	High	344	248	58.1%	41.9%
901	Federal government (other)	1.62%	Low	59	60	49.7%	50.3%
902	State government (other)	1.06%	Low	54	50	51.9%	48.1%
903	Local government (other)	2.14%	Mod	208	80	72.1%	27.9%

* 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.

Mod = Moderate
NS = Not seasonal

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. We can find that neither series Granger-causes the other, or that each Granger-causes the other.

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

Results of industry and total employment analysis

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

The third of these five columns represents an attempt to identify the industries for which monthly employment could help in predicting the next month's total employment. F-statistics from the Granger causality test for time series, with a lag of one month, are presented in this column. The value of "F" indicates the significance of the impact of employment in the industry on the next month's total employment. Larger values indicate effects that were more significant. Probabilities for the rejection of the hypotheses of significance, associated with F-statistics, are listed in the next to last column. A lower probability indicates higher confidence that the effect is significant. To address the issue of possible mutual causality we also tested inverse causality of total employment on specific industries. As previously noted, if both direct and inverse causality are significant,

it means that an industry employment series might not be a good indicator for the next month's total employment. The last column of *Appendix figure A2-2* 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. Only 11 of 97 industries have the indicator "yes."

The combination of predictive abilities (indicator "yes") and correlation with total employment can be used to identify the main industries that can be 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 food services and drinking places; professional, scientific and technical services; electrical equipment, appliance and component manufacturing; building material and garden equipment and supplies dealers; food and beverage stores; and heavy and civil engineering construction.

Appendix figure A2-3. Relationships between industry and total employment
Washington state, 1990 through 2016
Source: Employment Security Department/WITS; 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
	Total covered employment	**100.0%**	**100.0%**			
111	Crop production	29.3%	73.1%	12.50	0.00	Yes
112	Animal production	78.4%	59.3%	0.55	0.46	No
113	Forestry and logging	-85.2%	50.8%	12.95	0.00	No
114	Fishing, hunting and trapping	-81.3%	-3.7%	0.88	0.35	No
115	Support activities for agriculture and forestry	86.4%	60.1%	7.37	0.01	No
212	Mining (except oil and gas)	-50.6%	54.5%	3.02	0.08	No
213	Support activities for mining	-49.4%	25.9%	5.52	0.02	No
221	Utilities	-64.1%	11.5%	1.19	0.28	No
236	Construction of buildings	56.6%	67.9%	2.12	0.15	No
237	Heavy and civil engineering construction	40.7%	71.4%	10.45	0.00	Yes
238	Specialty trade contractors	85.6%	73.0%	0.18	0.67	No
311	Food manufacturing	-23.8%	55.3%	16.86	0.00	Yes
312	Beverage and tobacco product manufacturing	78.6%	62.6%	2.57	0.11	No
313	Textile mills	-84.4%	24.1%	2.66	0.10	No
314	Textile product mills	-61.5%	40.6%	0.85	0.36	No
315	Apparel manufacturing	-80.6%	40.9%	3.30	0.07	No
316	Leather and allied product manufacturing	-79.6%	-1.2%	0.14	0.71	No

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
321	Wood product manufacturing	-78.9%	50.0%	1.03	0.31	No
322	Paper manufacturing	-87.6%	24.4%	6.08	0.01	No
323	Printing and related support activities	-80.1%	47.8%	2.97	0.09	No
324	Petroleum and coal products manufacturing	51.3%	31.3%	0.17	0.68	No
325	Chemical manufacturing	58.7%	22.3%	1.22	0.27	No
326	Plastics and rubber products manufacturing	30.8%	47.4%	0.00	0.99	No
327	Nonmetallic mineral product manufacturing	79.9%	65.1%	0.00	0.96	No
331	Primary metal manufacturing	-79.8%	14.2%	0.64	0.43	No
332	Fabricated metal product manufacturing	81.9%	49.2%	2.03	0.16	No
333	Machinery manufacturing	75.0%	28.4%	1.99	0.16	No
334	Computer and electronic product manufacturing	-55.6%	24.4%	0.64	0.42	No
335	Electrical equipment, appliance and component manufacturing	95.8%	18.1%	12.23	0.00	Yes
3364	Aerospace product and parts manufacturing	-39.3%	8.4%	0.02	0.88	No
3366	Ship and boat building	11.0%	-2.8%	1.00	0.32	No
336*	Other transportation equipment manufacturing	-37.4%	17.9%	0.15	0.70	No
337	Furniture and related product manufacturing	-35.0%	44.3%	0.66	0.42	No
339	Miscellaneous manufacturing	57.9%	34.9%	3.80	0.05	No
423	Merchant wholesalers, durable goods	75.6%	54.1%	0.06	0.80	No
424	Merchant wholesalers, nondurable goods	72.6%	75.2%	28.25	0.00	No
425	Wholesale electronic markets and agents and brokers	75.1%	26.9%	2.36	0.13	No
441	Motor vehicle and parts dealers	74.3%	52.9%	2.25	0.13	No
442	Furniture and home furnishings stores	50.7%	18.4%	5.85	0.02	No
443	Electronics and appliance stores	59.9%	2.7%	4.82	0.03	No
444	Building material and garden equipment and supplies dealers	90.6%	62.5%	29.53	0.00	Yes
445	Food and beverage stores	43.9%	53.0%	10.94	0.00	Yes
446	Health and personal care stores	84.1%	25.0%	24.39	0.00	No
447	Gasoline stations	-56.8%	56.0%	0.82	0.37	No
448	Clothing and clothing accessories stores	8.7%	24.0%	65.27	0.00	Yes
451	Sporting goods, hobby, book and music stores	48.8%	26.5%	48.51	0.00	No
452	General merchandise stores	91.8%	19.5%	8.05	0.00	No
453	Miscellaneous store retailers	51.3%	38.1%	6.49	0.01	No
454	Nonstore retailers	80.6%	27.0%	2.56	0.11	No
481	Air transportation	-27.0%	23.4%	0.33	0.56	No
483	Water transportation	51.4%	47.5%	0.40	0.53	No
484	Truck transportation	84.7%	72.2%	5.21	0.02	No

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
485	Transit and ground passenger transportation	93.2%	24.2%	2.78	0.10	No
486	Pipeline transportation	-67.9%	3.9%	0.91	0.34	No
487	Scenic and sightseeing transportation	-37.2%	10.2%	0.45	0.51	No
488	Support activities for transportation	95.6%	28.2%	7.09	0.01	No
491	Postal service	-33.7%	13.9%	5.20	0.02	No
492	Couriers and messengers	66.7%	17.3%	11.64	0.00	No
493	Warehousing and storage	3.6%	48.5%	10.19	0.00	Yes
5112	Software publishers	96.1%	27.8%	6.25	0.01	No
511*	Other publishers	-52.7%	32.4%	1.34	0.25	No
512	Motion picture and sound recording industries	79.6%	12.3%	9.76	0.00	No
515	Broadcasting (except internet)	-82.6%	25.6%	10.80	0.00	No
5171	Wired telecommunications carriers	-59.5%	-2.8%	0.44	0.51	No
5172	Wireless telecommunications carriers (except satellite)	79.7%	0.7%	0.03	0.87	No
517*	Other telecommunications	-36.3%	9.4%	0.62	0.43	No
518	Data processing, hosting and related services	63.2%	2.0%	1.36	0.24	No
519	Other information services	78.1%	-7.8%	3.87	0.05	No
521	Monetary authorities-central bank	-70.7%	7.3%	3.48	0.06	No
522	Credit intermediation and related activities	34.6%	15.7%	0.10	0.76	No
523	Securities, commodity contracts, and other financial investments and related activities	94.3%	21.7%	3.13	0.08	No
524	Insurance carriers and related activities	78.9%	28.9%	0.00	0.95	No
525	Funds, trusts and other financial vehicles	-91.3%	13.7%	10.27	0.00	Yes
531	Real estate	96.8%	64.5%	4.78	0.03	No
532	Rental and leasing services	-10.3%	53.5%	1.30	0.25	No
533	Lessors of nonfinancial intangible assets (except copyrighted works)	12.2%	1.3%	0.11	0.74	No
541	Professional, scientific and technical services	95.9%	18.6%	11.26	0.00	Yes
551	Management of companies and enterprises	84.8%	-5.0%	4.72	0.03	No
561	Administrative and support services	97.6%	72.4%	0.80	0.37	No
562	Waste management and remediation services	31.3%	35.3%	0.74	0.39	No
611	Educational services	85.7%	17.3%	5.03	0.03	No
621	Ambulatory healthcare services	93.7%	40.2%	5.24	0.02	No
622	Hospitals	94.6%	24.2%	4.03	0.05	No
623	Nursing and residential care facilities	94.8%	36.1%	3.40	0.07	No
624	Social assistance	85.8%	9.2%	5.38	0.02	No
711	Performing arts, spectator sports and related industries	36.4%	47.0%	1.81	0.18	No
712	Museums, historical sites and similar institutions	95.7%	17.4%	13.74	0.00	No

NAICS	Industry	Coorelation with total employment	Coorelation of first differences	F-statistic Granger test (one-month lag)	Probability	Signficant one-way impact
713	Amusement, gambling and recreation industries	92.0%	33.2%	10.07	0.00	No
721	Accommodation	84.7%	56.3%	0.75	0.39	No
722	Food services and drinking places	98.0%	72.0%	14.70	0.00	Yes
811	Repair and maintenance	65.7%	52.6%	1.37	0.24	No
812	Personal and laundry services	93.6%	65.6%	4.80	0.03	No
813	Religious, grantmaking, civic, prof.and similar orgs.	96.3%	46.0%	2.23	0.14	No
814	Private households	36.7%	-0.6%	0.09	0.76	No
901	Federal government (other)	38.5%	21.2%	0.09	0.77	No
902	State government (other)	82.9%	22.7%	0.44	0.51	No
903	Local government (other)	94.6%	30.2%	1.30	0.26	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: Selected household statistics

Appendix figure A3-1. Selected household statistics
Washington state, 2005 to 2016
Source: Employment Security Department/WITS; U.S. Census Bureau, American Community Survey

Household statistic	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Median household income	$59,155	$61,498	$63,427	$64,302	$62,649	$60,631	$60,459	$60,105	$60,174	$62,283	$64,895	$67,106
Median family income	$72,142	$74,505	$76,036	$78,053	$75,735	$73,379	$73,003	$73,013	$73,533	$75,302	$77,873	$81,234
Poverty rate, all individuals	11.9%	11.8%	11.4%	11.3%	12.3%	13.4%	13.9%	13.5%	14.1%	13.2%	12.2%	11.3%
Poverty rate, children under 5	15.1%	15.4%	15.0%	14.3%	16.2%	18.2%	18.3%	18.5%	18.8%	17.5%	15.5%	13.7%
Households with earnings from a job*	81.0%	81.2%	81.3%	81.3%	80.6%	79.2%	79.0%	78.7%	78.5%	78.6%	78.5%	78.8%
Average household earnings from a job**	$77,380	$80,009	$82,815	$83,081	$81,051	$78,636	$79,387	$80,512	$81,915	$83,662	$88,008	$91,923
Full-time workers, percent of population aged 16-64***	61.9%	61.1%	61.6%	61.1%	58.9%	56.5%	55.7%	56.5%	57.1%	57.6%	58.2%	59.5%
Part-time workers, percent of population aged 16-64	19.0%	19.3%	19.0%	19.5%	19.8%	19.8%	19.9%	19.5%	19.2%	19.1%	18.8%	18.7%
Median earnings for all workers	$34,886	$34,860	$35,533	$35,355	$34,115	$34,189	$33,918	$33,396	$33,328	$33,672	$35,837	$36,353
Median earnings for full-time, year-round workers	$50,074	$49,675	$51,229	$50,908	$51,516	$51,453	$51,612	$50,945	$51,213	$50,912	$51,816	$51,980
Median earnings for male full-time, year-round workers	$56,872	$57,366	$57,798	$57,325	$57,817	$57,475	$58,063	$55,879	$55,365	$56,213	$57,579	$60,242
Median earnings for female full-time, year-round workers	$42,957	$42,372	$42,947	$42,301	$42,878	$43,911	$43,688	$43,002	$43,224	$42,663	$45,157	$45,163
Percent of workers who are self-employed	10.9%	11.4%	10.9%	10.4%	10.7%	10.3%	10.1%	10.0%	9.8%	10.1%	10.1%	9.7%
Households receiving Social Security	23.8%	24.2%	24.7%	24.8%	25.2%	25.8%	26.9%	27.3%	28.1%	28.5%	29.0%	29.6%
Households receiving private pension payments	17.6%	17.8%	18.0%	18.0%	17.7%	17.9%	17.7%	18.3%	18.2%	18.6%	19.2%	19.7%
Average annual payout for households receiving private pensions	$1,948	$1,947	$1,992	$2,004	$2,037	$2,024	$2,114	$2,057	$2,036	$2,088	$2,100	$2,226
Households receiving Supplemental Security Income (SSI)*	3.7%	3.9%	3.7%	3.1%	3.2%	4.8%	4.8%	4.7%	4.6%	4.9%	4.9%	4.8%

Household statistic	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Average annual payout for those receiving SSI	$760	$718	$767	$785	$731	$807	$788	$803	$810	$804	$825	$833
Households receiving welfare cash payments*	3.8%	3.2%	3.1%	3.4%	4.1%	4.6%	4.3%	4.0%	4.0%	3.6%	3.5%	3.1%
Average annual payout for welfare recipients	$291	$315	$317	$314	$343	$359	$328	$292	$241	$233	$233	$230
Households receiving food stamps*	8.5%	8.4%	7.7%	8.7%	11.1%	13.3%	14.5%	15.1%	14.8%	14.1%	13.4%	12.6%
Residents without health insurance	N/A	N/A	N/A	12.5%	13.4%	14.2%	14.2%	13.9%	14.0%	9.2%	6.6%	6.0%
Number of residents without health insurance	N/A	N/A	N/A	841,997	877,184	942,608	953,978	944,238	960,981	642,654	467,967	428,092
Residents with private health insurance	N/A	N/A	N/A	73.6%	71.1%	73.8%	73.3%	69.0%	68.5%	70.3%	71.1%	71.4%
Residents relying solely on public health insurance	N/A	N/A	N/A	13.3%	15.6%	16.5%	17.0%	17.1%	17.5%	20.5%	22.3%	22.6%
Renters paying more than 30 percent of income for housing	49.5%	49.8%	47.2%	47.9%	50.1%	51.1%	50.7%	50.7%	51.0%	50.0%	48.0%	47.4%
Homeownership rate	66.9%	67.3%	66.1%	65.3%	64.3%	63.1%	62.8%	62.3%	61.9%	61.7%	62.4%	62.5%
Homeowners with a mortgage paying more than 30 percent of income for housing	36.1%	39.9%	40.7%	41.6%	41.1%	40.9%	39.4%	36.7%	34.3%	31.7%	29.6%	29.4%

*Households may fall into more than one of these categories.
**Includes earnings from all members in the household.
***Full-time workers usually worked at least 35 hours per week (but may not be year-round workers).
N/A = Data not available prior to 2008 because the American Community Survey did not include questions regarding healthcare coverage in the survey.