Employment and Earnings in Agriculture and Industries with a High Concentration of Undocumented Workers Washington State, 2002 to 2009

Washington State
Employment Security Department

Labor Market and Economic Analysis

May 2011

Employment and Earnings in Agriculture and Industries with a High Concentration of Undocumented Workers Washington State, 2002 to 2009

Washington State Employment Security Department
Labor Market and Economic Analysis

by

Ernst W. Stromsdorfer, Ph.D., *economist*
John H. Wines, *economist*

Presented at the conference on
Immigration Reform: Implications for Farmers, Farm Workers, and Communities
University of California - D.C. Conference Center
Washington, D.C.
May 12 and 13, 2011

This report and other agricultural and labor market information are available at www.workforceexplorer.com

Or call our Labor Market Information Center at 1-800-215-1617

Contents

Acknowledgements

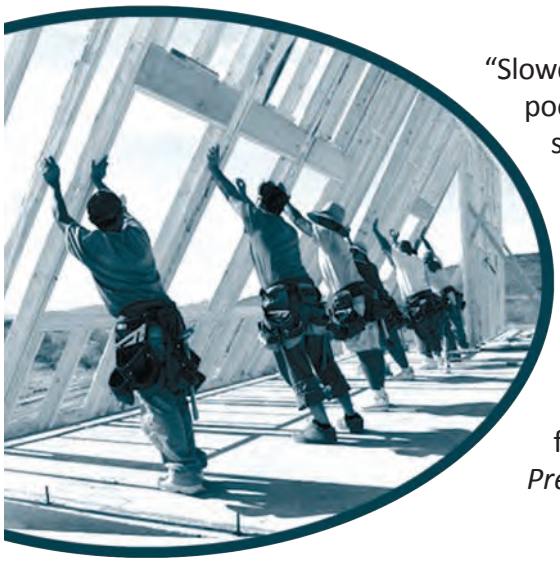
We wish to thank Greg Weeks, Dave Wallace, Toby Paterson, Jeff Zahir and Carol Welch for their contributions to this report. Toby Paterson designed *Figure 2*.

The authors accept responsibility for any remaining errors of fact or interpretation.

This study does not reflect the official policy of the Washington State Employment Security Department.

Ernst W. Stromsdorfer, Ph.D., *economist*
John H. Wines, *economist*

Employment and Earnings in Agriculture and Industries with a High Concentration of Undocumented Workers Washington State, 2002 through 2009



"Slowdowns in other industries may be helping sustain the labor pool for Washington's agricultural employers.... But leaders of several trade groups and others say they fear the labor supply will tighten in the future as workers again leave agriculture for higher-paying jobs in the construction industry as the economy recovers." *Tri-City Herald*. "Ag industry says labor pool 'plentiful.'" Section B. May 3, 2010.

"The reality is, as the economy gets better, you're going to find less and less (available workers) in the field." Quote from Paul Simonds, Western Growers spokesman. *Capital Press*. "Farmers expect plentiful labor this year." April 23, 2010.

This study describes the employment and earnings for agricultural workers in Washington state and compares that employment with employment in Washington state industries that have been identified nationally as having a high concentration of undocumented workers.

While we do not know the exact nature of the flows of undocumented labor between the agriculture sector and other sectors in the state and national economy, we hypothesize that such flows do exist. In addition, those sectors other than agriculture that have a high concentration of undocumented workers, we hypothesize, are more likely to have labor markets that interact with the state's agricultural labor market over the business cycle.[1]

The motivation for investigating these labor flows among agricultural and other industrial sectors is the concern of agricultural producers that they will be faced with a structural "shortage" of agricultural labor over the production cycle. There is also concern over incurring spot "shortages."

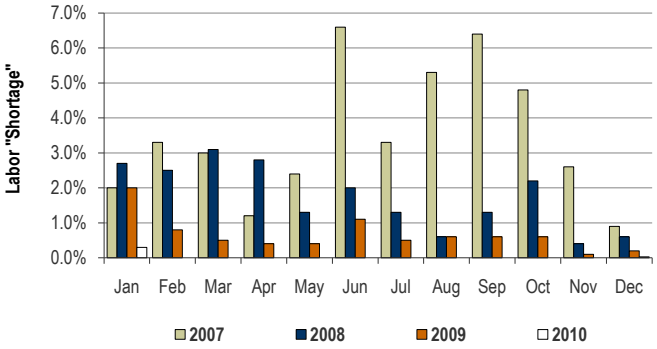
This notion of "shortage" can best be understood as awareness on the part of agricultural producers that they will have to offer higher wages in order to acquire enough labor at a given point in the growing and harvest seasons to successfully manage their agricultural production.

Photo by ©Orangeline/Dreamstime.com

Photo by ©iStock/Mark Sauerwein

Figure 1 shows sample survey estimates of seasonal agricultural employment "shortage" provided by Washington state agricultural producers for the years 2007 through 2010. The reported "shortages" fall to 0 percent by 2010, a time when the Great Recession had a firm hold on Washington state. At the same time, employment in agriculture declined in 2010 compared to 2009.

Figure 1
Seasonal Agricultural Employment "Shortage", in Percent, Weighted by Labor Force Size of Employer Reporting
Washington State, 2007 through 2010
Source: Employment Security Department/LMEA, Monthly Seasonal Farm Labor Survey



Reports of labor "shortage" by agricultural producers have essentially dropped to 0 percent as of the 2010 agricultural cycle.

As suggested above, one hypothesis for this apparent absence of a "shortage" of agricultural workers is that, as the recession progressed, both documented and undocumented workers became unemployed in the economy, particularly in sectors such as construction. Some of these workers may then have moved back to the agricultural labor market, seeking work. The existing data for the Washington state agricultural sector indicate that agricultural producers have had sufficient workers over the past several years. In Washington state, labor supply has been such that inflation-adjusted average hourly before-tax earnings at the equilibrium between supply and demand have actually fallen since the start of the Great Recession.[2]

A Schematic View of the Washington State Agricultural Labor Market

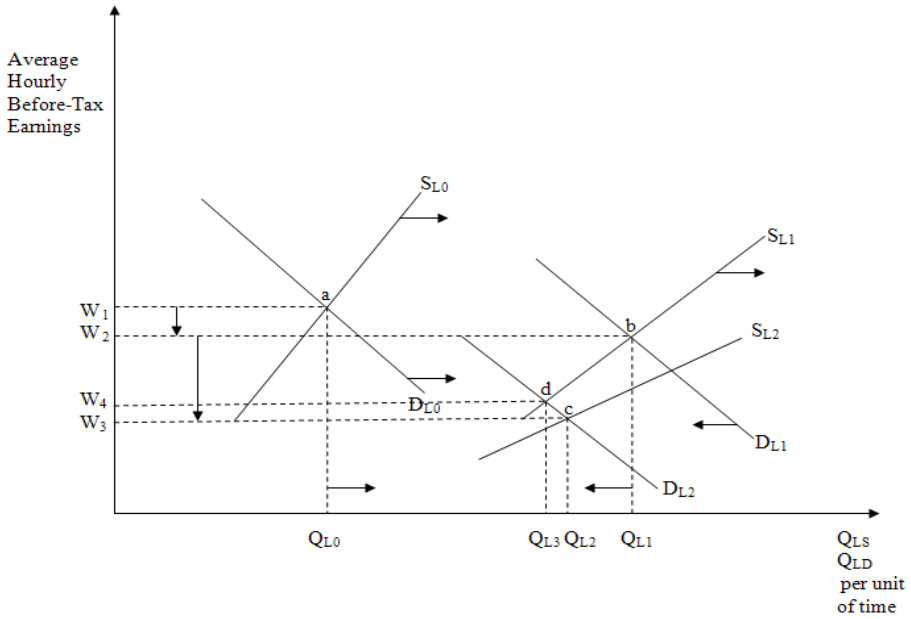
Figure 2 is a heuristic depiction of employment and earnings changes in the Washington state agricultural labor market that could account for the observed empirical fact that over the past three years, inflation-adjusted average hourly earnings have decreased.

The average annual employment of workers at the equilibrium between labor supply and labor demand increased through 2009, but then decreased in 2010. This labor market adjustment process is shown in *Figure 2* by the shift of employment from Q_{L0} to Q_{L1} and then back to Q_{L2} (or Q_{L3}). At the same time, average hourly before-tax earnings at the equilibrium between labor demand and labor supply have shown a downward trend. This downward trend is depicted by the drop in average hourly before-tax earnings from W_1 to W_2 and then to W_3 (or W_4).

An important qualification to this analysis is that we cannot statistically identify the actual empirical shifts in the agricultural labor demand and supply curves with these data, since we are working only with equilibrium measures of average hourly before-tax earnings and employment.

However, starting with S_{L0} and D_{L0}, for employment to increase in the next period while average hourly before-tax earnings fall, there must have been an increase in labor supply. There may or may not have been an increase in labor demand, though we have drawn the diagram to indicate such an increase. However, in the third period, from 2009 to 2010, we see a further drop in average hourly before-tax earnings and a decrease in equilibrium labor supplied. For this situation to have occurred, either labor demand has shifted back down along S_{L1}, or there has been an increase in labor supply to S_{L2} while labor demand has also decreased from D_{L1} to D_{L2}. We cannot tell which is the true case with the equilibrium data that we have.

Figure 2
A Heuristic Diagram of the Demand for and Supply of Agricultural Labor with Falling Equilibrium Average Hourly Before-tax Earnings



The Pattern of Unauthorized Immigrants by Industry and Occupation

In 2008, 5.4 percent of the civilian labor force was undocumented workers.[3] Passel and Cohn identify five industry sectors and six occupations across the national economy that have a high concentration of unauthorized immigrants working in them. As of 2008, these were:[4]

Industries:

- Construction – 14 percent
- Agriculture – 13 percent
- Leisure and hospitality – 10 percent
- Professional and business services – 7 percent
- Manufacturing – 7 percent

Occupations:

- Farming – 25 percent
- Building, groundskeeping and maintenance – 19 percent
- Construction – 17 percent
- Food preparation and serving – 12 percent
- Production – 10 percent
- Transportation and material moving – 7 percent

Passel and Cohn point out that the number of unauthorized immigrants in the national civilian labor force (both employed and unemployed workers) has fallen from an estimated 8.4 million in 2007 to 7.8 million in 2009.[5] They also state that, "Immigration from Mexico to the U.S., especially unauthorized immigration, began to drop off in mid-2006, and that pattern has continued into 2009."[6]

Finally, Passel and Cohn estimate that 230,000 unauthorized immigrants were living in Washington state in 2010, with the range of that estimate being from 140,000 to 325,000 individuals.[7]

Comparisons of Employment and Earnings: Agriculture and Selected Industrial Sectors in Washington State

Following the analysis of Passel and Cohn, we have identified seven industrial sectors in the Washington state economy in addition to agriculture that are likely to have some undocumented workers employed in them. The workers in these seven sectors, both documented and undocumented, are a potential source of labor for the agricultural sector as the state economy moves through the business cycle and into recession after the fourth quarter of 2007.

The Quarterly Census of Employment and Wages (QCEW) and Unemployment Insurance (UI) Wage File data allow us to identify population statistics on average annual before-tax earnings and average quarterly employment for these North American Industry Classification System (NAICS) sectors:[8]

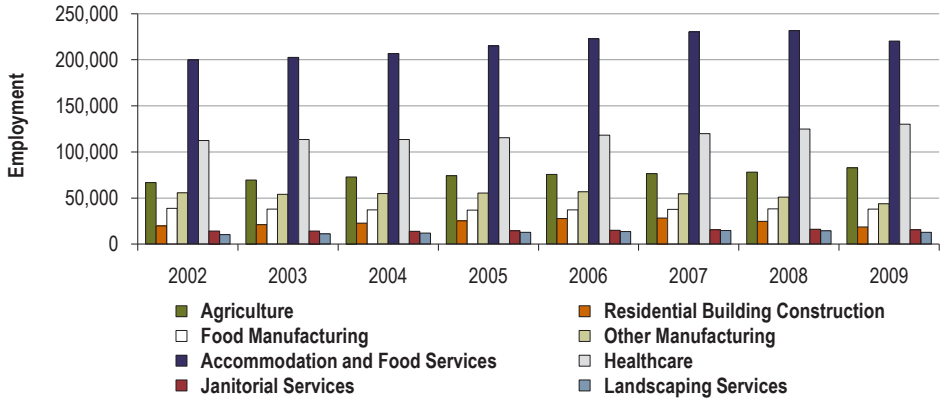
- Agriculture
  - Crop production – 111
  - Animal production – 112
  - Support activities for crop production – 1151
  - Support activities for animal production – 1152
- Accommodation and food services – 72
- Food manufacturing
  - Food manufacturing – 311
  - Beverage and tobacco product manufacturing – 312
- Healthcare
  - Nursing and residential care facilities – 623
  - General medical and surgical hospitals – 622110
- Janitorial services – 561720
- Landscaping services – 561730

- Other manufacturing
  - Textile mills – 313
  - Textile product mills – 314
  - Apparel manufacturing – 315
  - Leather and allied product manufacturing – 316
  - Wood product manufacturing – 321
  - Paper manufacturing – 322
  - Furniture and related product manufacturing – 337
  - Miscellaneous manufacturing – 339
- Residential building construction – 2361

Average Quarterly Employment[9] in Agriculture Contrasted with Selected Industrial Sectors

Figure 3 shows average quarterly employment for these eight industry sectors in Washington state. As shown, in 2009, accommodation and food services and healthcare had the highest levels of quarterly employment. Agriculture and healthcare were the only industries to have employment increases from 2008 to 2009.[10]

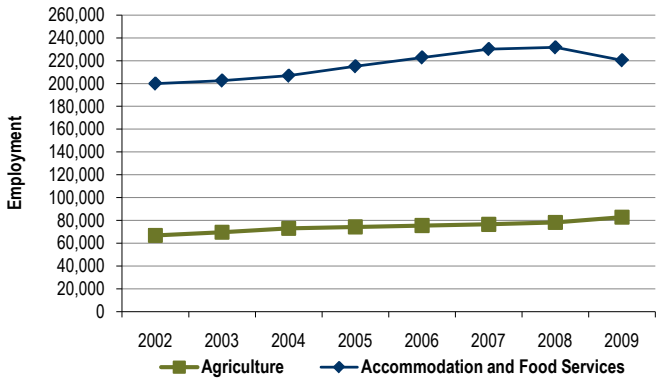
Figure 3
Average Quarterly Employment for Agriculture and Selected Industries
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



As of 2009, there are approximately 500,000 workers in industrial sectors that could feed labor, at the margin, into the agricultural labor market.

Accommodation and Food Services. *Figure 4* compares the trend in average quarterly employment of agriculture with accommodation and food services. As can be seen in this and subsequent figures, average quarterly employment in agriculture has gradually increased over the period of 2002 through 2009. The increase between 2008 and 2009 was particularly large – 6 percent – given the short-run stability in agricultural production, largely due to factors such as weather. Average quarterly employment in accommodation and food services increases steadily from 2002 to 2008, where after it drops by 11,328 workers, or 4.9 percent, between 2008 and 2009. Some of the workers released from accommodation and food services likely become candidates for potential employment in agriculture.

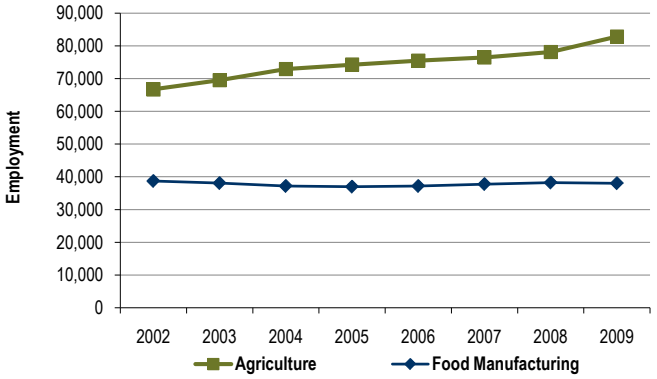
Figure 4
Average Quarterly Employment for Agriculture and Accommodation and Food Services
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



As employment in accommodation and food services decreases, falling by 11,328 workers between 2008 and 2009, employment in agriculture increases. Some of the workers from accommodation and food services likely became workers in agriculture.

Food Manufacturing. As shown in *Figure 5*, average quarterly employment in food manufacturing fluctuated little from 2002 through 2009. This stability in employment suggests that this sector was not a significant source of potential workers in agriculture during the recession.

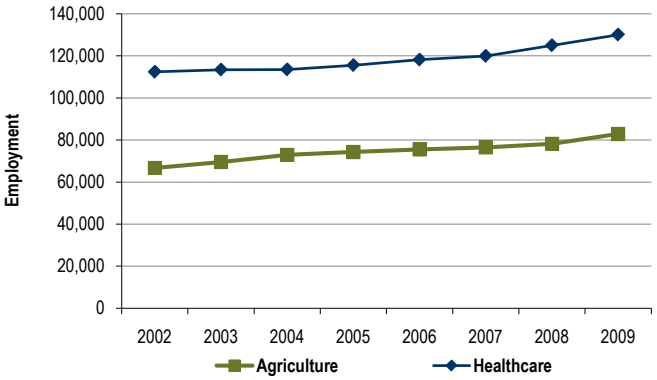
Figure 5
Average Quarterly Employment for Agriculture and Food Manufacturing
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



Stability in employment in food manufacturing suggests that this sector was not a source of agricultural workers during the recession.

Healthcare. As shown in *Figure 6*, average quarterly employment in healthcare grew steadily over the period of 2002 to 2009, expanding 15.7 percent.[11] Employment expansion continued during the recession, from 119,900 workers in 2007 to 130,032 workers in 2009, an 8.5 percent increase. This growth suggests that the healthcare sector likely competed with the agriculture sector for workers during the recession.

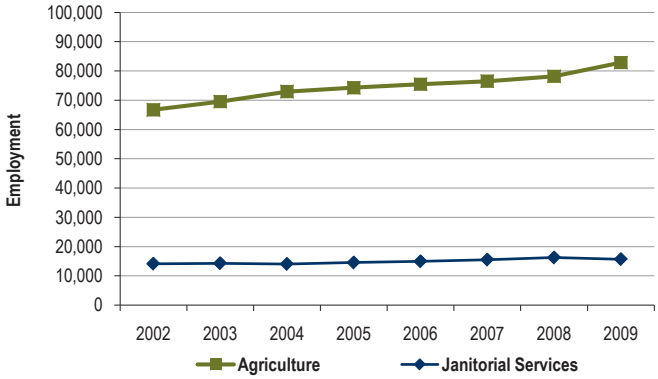
Figure 6
Average Quarterly Employment for Agriculture and Healthcare
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



Healthcare employment increased by 10,132 workers between 2007 and 2009. Steady growth in the healthcare sector suggests this industry competed with agriculture for workers during the recession.

Janitorial Services. *Figure 7* shows a slow, steady increase in average quarterly employment in janitorial services until 2008, when average quarterly employment drops by 564 workers – 3.5 percent – between 2008 and 2009. This sector was likely not a significant source of potential workers for the agricultural sector, for its average quarterly employment in 2009 was only 18.9 percent of average quarterly agricultural employment in that year.

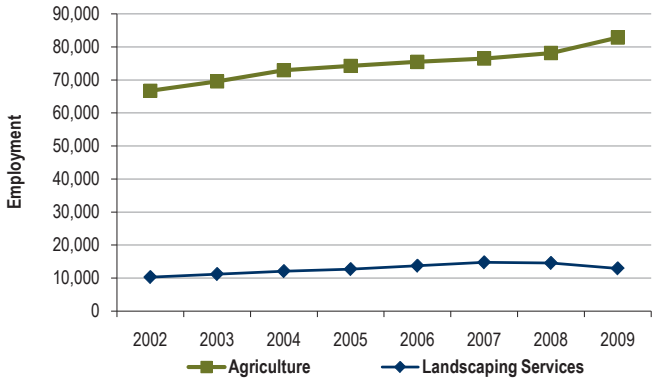
Figure 7
Average Quarterly Employment for Agriculture and Janitorial Services
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



The gradual increase in employment in janitorial services from 2002 to 2008 reversed in 2009. The janitorial services sector is much smaller than the agricultural sector and was likely not likely a source of agricultural labor during the recession.

Landscaping Services. It is reasonable to assume that workers in landscaping services are close substitutes for workers in agriculture. However, as *Figure 8* shows, landscaping services is a very small sector in terms of average quarterly employment. Average quarterly employment peaked in 2007 at 14,753 workers – 19.2 percent of average quarterly employment in agriculture. From 2007 to 2009 landscaping services employment falls by 1,818 workers, a 12.3 percent drop. At the margin, these 1,818 workers are likely a significant potential source of employment in the agricultural sector.

Figure 8
Average Quarterly Employment for Agriculture and Landscaping Services
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages

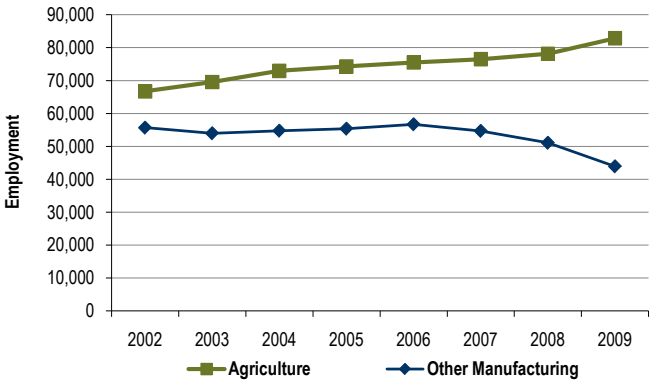


The gradual increase in employment in landscaping services peaked at 14,753 workers on a quarterly average in 2007, and then dropped 14.1 percent to 12,935 workers in 2009.

Photo by ©iStock/WoodenDinosaur

Other Manufacturing. In 2002, other manufacturing comprised 83.5 percent of the average quarterly employment in agriculture – 55,689 workers compared to 66,722 agricultural workers (*Figure 9*). By 2009 this ratio dropped to 53 percent. The recession hit other manufacturing hard, with employment dropping from 56,706 workers in 2006 to 43,882 workers in 2009, a decline of 22.6 percent. This release of workers from other manufacturing was likely a significant source of potential labor for the agricultural sector.

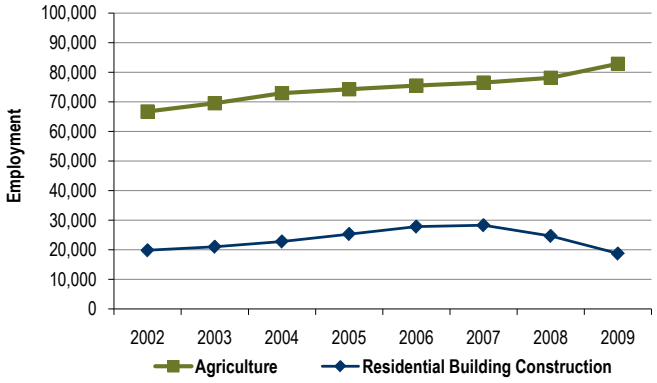
Figure 9
Average Quarterly Employment for Agriculture and Other Manufacturing
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



Other manufacturing released over 12,000 workers into the labor market between 2006 and 2009, enhancing the potential labor supply to the agricultural labor market.

Residential Building Construction. In 2002, average quarterly employment in residential building construction was 29.7 percent of average quarterly employment in agriculture (*Figure 10*). By 2007 this ratio had risen to 37 percent, but then fell to 22.6 percent by 2009. Peak average quarterly employment in residential building construction was 28,272 workers in 2007, right before Washington's housing bubble burst. Employment fell by 9,539 workers in 2009. This sector likely represents a large potential source of additional labor to the agricultural labor market.

Figure 10
Average Quarterly Employment for Agriculture and Residential Building Construction
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



Between 2007 and 2009, residential building construction released almost 10,000 workers into the Washington state labor market, enhancing the potential labor supply to agriculture.

The Overall Picture. We have the following picture of workers who are potential labor for the agricultural sector, based on the total change in average quarterly employment between 2006 and 2009 in the industry sectors discussed in this study (*Figures 3* and *11*):

- While agricultural employment grew by 1,023 average quarterly workers between 2006 and 2007, the seven industry sectors discussed in this study grew by 9,751 workers.
- While agricultural employment grew by 1,656 average quarterly workers between 2007 and 2008, the seven industry sectors remained essentially static at an average quarterly increase of 315 workers.
- While agricultural employment grew by 4,703 average quarterly workers between 2008 and 2009, the seven industry sectors released 21,798 workers back into the state's labor market.

Figure 11
Year-to-Year Change in Average Quarterly Employment for Agriculture and Selected Industries
Washington State, 2006 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages

INDUSTRY	2007-2006	2008-2007	2009-2008
Agriculture	1,023	1,656	4,703
Accomodation and Food Services	7,370	1,467	(11,328)
Food Manufacturing	594	468	(216)
Healthcare	1,746	5,073	5,059
Janitorial Services	571	724	(564)
Landscaping Services	1,021	(192)	(1,626)
Other Manufacturing	(2,015)	(3,622)	(7,187)
Residential Building Construction	464	(3,603)	(5,936)
Net Total	**9,571**	**315**	**(21,798)**

From 2006 to 2009, agricultural employment grew by 4,703. At the same time, the seven other industry sectors with high concentrations of undocumented workers released 21,798 workers back into the state's labor market.

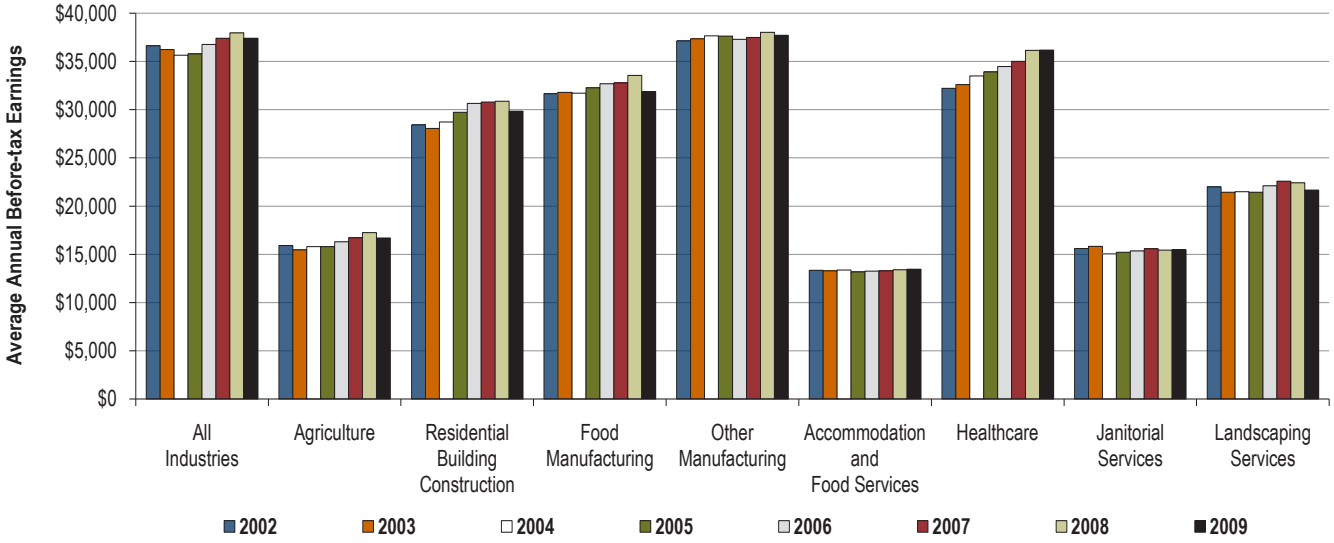
Average Annual Before-tax Earnings, Inflation-adjusted Dollars

Figure 12 shows the distribution of average annual before-tax earnings over the period 2002 to 2009 for all industries in the state, agriculture, and the industries selected to compare with agriculture.

In general, economic theory predicts that workers will attempt to move from lower-paying to higher-paying industrial sectors. Note that agriculture is the third lowest-paying sector in terms of average annual earnings.[12] Only the janitorial services sector and accommodation and food services sector pay lower average annual earnings. Note that landscaping services pay about $5,000 more per year, on average, than does employment in the agricultural sector. Residential building construction, food manufacturing, other manufacturing and healthcare all pay considerably more per year than does agriculture.[13]

Earnings comparisons in this section are based on the assumption that a significant portion of the workers in agriculture, at least half nationwide, are undocumented. They incur travel and other expenses, such as purchase of false documents and fees to coyotes, and are under considerable legal uncertainty – which is also a cost – as they seek work in the United States. So, while hourly wage rates among occupations clearly serve to allocate labor, one might expect undocumented workers to be maximizing annual earnings, even while responding to higher hourly wage rates or higher piece rates. Also, the risk of being apprehended and deported discounts the annual value of earnings. So, the higher the risk of being apprehended, other things equal, the higher the risk discount rate on future earnings and therefore the higher the expected annual earnings would have to be to compensate for the money and non-money costs of crossing the border illegally.

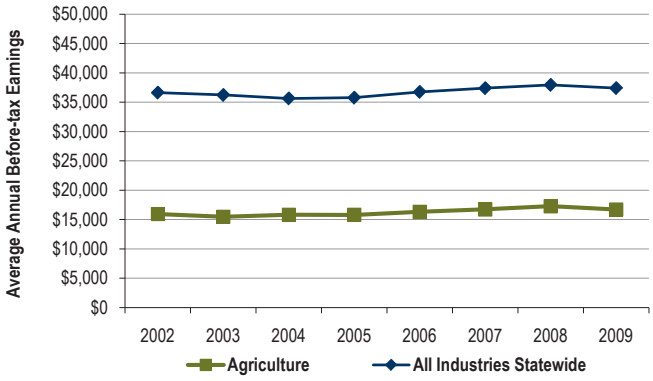
Figure 12
Average Annual Before-tax Earnings for All Industries, Agriculture and Selected Industries, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



Agriculture ranks third from the bottom in average annual earnings, exceeding only janitorial services and accommodation and food service. Yet, average quarterly employment in agriculture grew from 2002 to 2009.

All Industries, Statewide. *Figure 13* compares the time trend of average annual earnings in agriculture with the earnings trend in all industries statewide. Average annual earnings in agriculture range from a low of 42.7 percent of average annual earnings in statewide industry in 2003 to a high of 45.5 percent in 2008. Average annual earnings in agriculture are relatively stable from 2002 through 2005. Average annual earnings then begin to increase in 2006, reaching $17,266 by 2008. They then fall to $16,708 as of 2009. In contrast, average annual earnings for all statewide industries range between $35,000 to $36,000 over the period of 2002 to 2006 and then break in to the $37,000 range in 2007, reaching $37,948 in 2008 before dropping about $500 to $37,404 in 2009. For agriculture, the drop from 2008 to 2009 – the worst period of the recession – is 3.3 percent; for all industries it is only 1.5 percent.

Figure 13
Average Annual Before-tax Earnings for Agriculture and All Industries, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



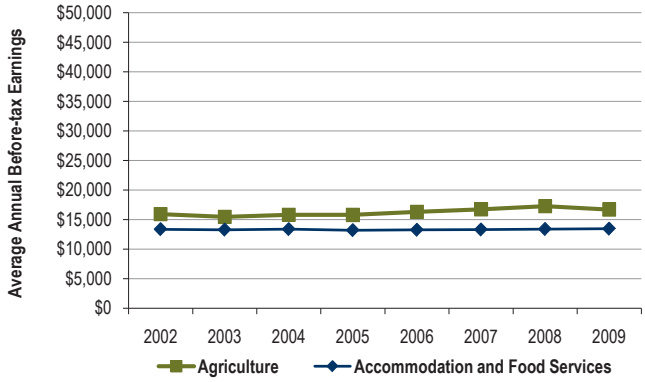
Average annual earnings in agriculture are about 44 percent of average annual earnings in all industries statewide.

Accommodation and Food Services. *Figure 14* displays the relationship between average annual earnings in agriculture and average annual earnings in accommodation and food services. Accommodation and food service earnings range from a low of 77.5 percent of agricultural earnings in 2008 to a high of 85.9 percent of agricultural earnings in 2003. Average annual earnings in accommodation and food services are very stable over time, averaging in the low $13,000s. Agricultural earnings, in contrast, rise steadily through 2008 to a high of $17,266, and then fall in 2009 to $16,708. Accommodation and food service earnings are essentially unchanged between 2008 and 2009 even though employment has fallen in this sector over the current business cycle.

Figure 14

Average Annual Before-tax Earnings for Agriculture and Accommodation and Food Services, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W Washington State, 2002 through 2009

Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



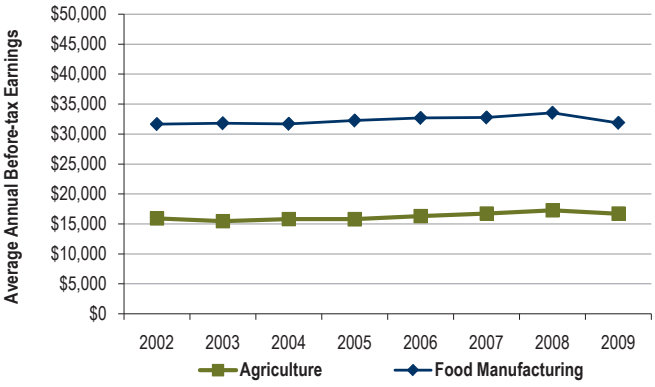
Inflation-adjusted average annual earnings in accommodation and food services are stable over time.

Food Manufacturing. Average annual earnings in food manufacturing have risen gradually since 2002, peaking at $33,551 in 2008. Average annual earnings then dropped 5 percent in one year, falling to $31,862 in 2009. Recall, though, that employment in food manufacturing has been relatively stable in recent years. In 2009, agricultural earnings were 52.4 percent of earnings in food manufacturing. This is an increase from a low of 48.7 percent in 2003.

Figure 15

Average Annual Before-tax Earnings for Agriculture and Food Manufacturing, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W Washington State, 2002 through 2009

Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages

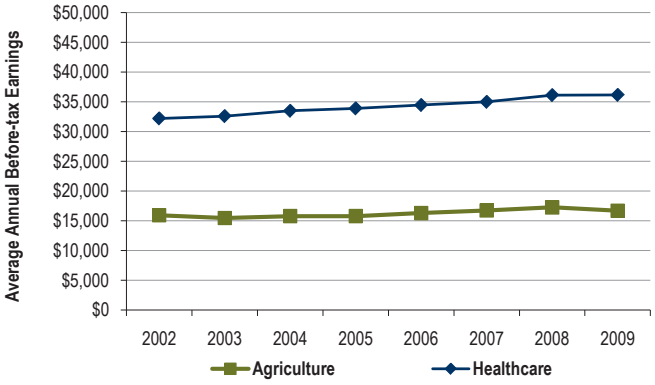


Average annual earnings have been relatively stable in food manufacturing.

Photo by ©Sebastian Czapnik/Dreamstime.com

Healthcare. Average annual earnings and average quarterly employment have been rising in healthcare over the period of 2002 to 2009. For earnings and employment to rise at the same time, one of two situations has to be occurring: Either labor demand is increasing and moving out along the labor supply curve, or both the labor demand curve and the labor supply curve are increasing over time. If this latter situation is occurring, workers are likely to be attracted away from the agriculture sector, where average annual earnings remain at less than half of those in healthcare over the entire period of 2002 to 2009. In 2009, for example, agriculture average annual earnings were only 46.2 percent of average annual earnings in healthcare.

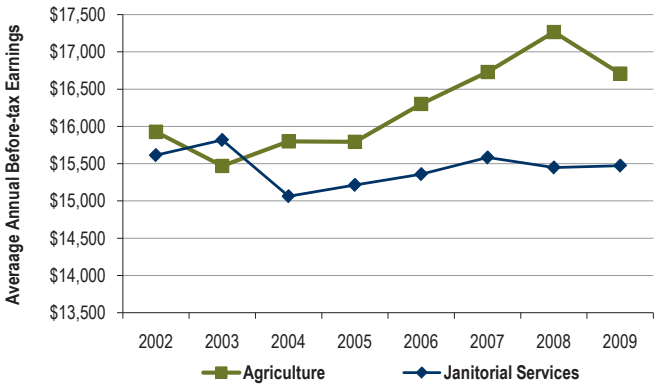
Figure 16
Average Annual Before-tax Earnings for Agriculture and Healthcare, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



Average annual before-tax earnings in healthcare have risen consistently from 2002 through 2009. Earnings in healthcare are more than double the earnings in agriculture.

Janitorial Services. Except for 2003, average annual earnings in janitorial services have been lower than earnings in agriculture, and, on the whole, the earnings trend has been relatively flat, with annual earnings falling in the low-to mid-$15,000s. From 2004 through 2008, average annual earnings in agriculture rose. Employment in janitorial services rose moderately over the same period, falling from 2008 to 2009 by 664 workers. Thus, while agriculture has a modest average annual earnings advantage over janitorial services, this sector was not likely a significant source of added workers to the agricultural labor market.

Figure 17
Average Annual Before-tax Earnings for Agriculture and Janitorial Services, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages

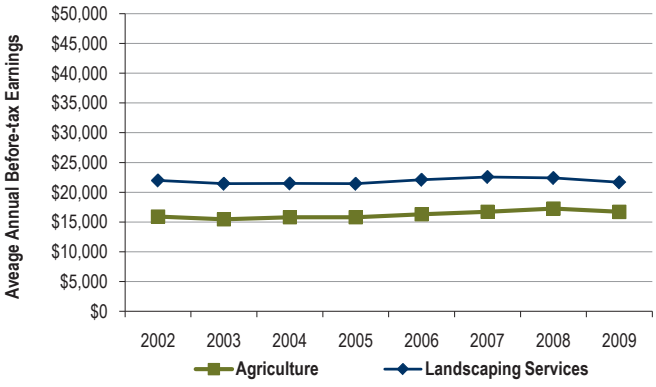


Average annual earnings in janitorial services are relatively stable over time and are consistently lower than earnings in agriculture starting in 2004.

Photo by ©Razvanjp/Dreamstime.com

Landscaping Services. The skill requirements and working conditions in agriculture and landscaping services overlap somewhat. As shown in *Figure 18*, average annual earnings in landscaping services are consistently higher than earnings in agriculture over the period of 2002 to 2009. Over time, however, the earnings ratio has narrowed, from a low of 72.1 percent in 2003 to a high of 77.1 percent in 2009. As noted above, landscaping services released 1,626 workers into the labor market between 2008 and 2009. It is likely that some of these workers entered the agricultural labor market.

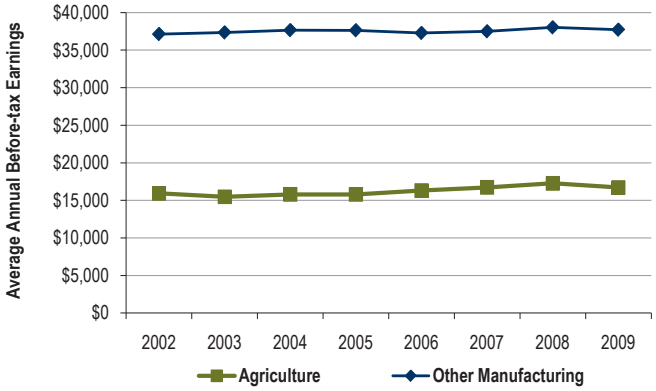
Figure 18
Average Annual Before-tax Earnings for Agriculture and Landscaping Services, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



Average annual earnings in agriculture are approximately 75 percent of average annual earnings in landscaping services.

Other Manufacturing. With the exception of 2008, average annual earnings in other manufacturing have averaged in the mid- to high-$37,000s. Agricultural average annual earnings have never exceeded 45.4 percent of other manufacturing earnings and have been as low as 41.4 percent. However, firms in the other manufacturing sector released over 10,000 workers into the labor market between 2008 and 2009. Some portion of these workers likely entered the agricultural labor market.

Figure 19
Average Annual Before-tax Earnings for Agriculture and Other Manufacturing, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages

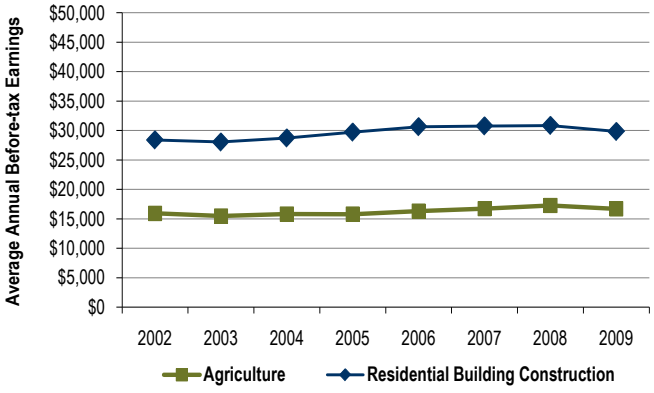


Average annual earnings in other manufacturing have been relatively stable over time, even as a significant number of workers were laid off between 2008 and 2009.

Photo by ©Ljupco Smokovski/Dreamstime.com

Residential Building Construction. Construction, including residential building construction, is seen by representatives of the agricultural sector as being a source of additional labor during the current business cycle. (*See Endnote 10.*) While average annual earnings have risen somewhat over time and have been relatively stable during the current business cycle, the construction industry did release an estimated 9,539 workers from 2007 to 2009. It is, thus, a recognized source of added labor for the agriculture sector.

Figure 20
Average Annual Before-tax Earnings for Agriculture and Residential Building Construction, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 2002 through 2009
Source: Employment Security Department/LMEA, Quarterly Census of Employment and Wages



Average annual earnings in residential building construction have remained relatively stable. The industry released almost 10,000 workers back into the state economy between 2007 and 2009.

Tree Fruit: Apples, Cherries and Pears

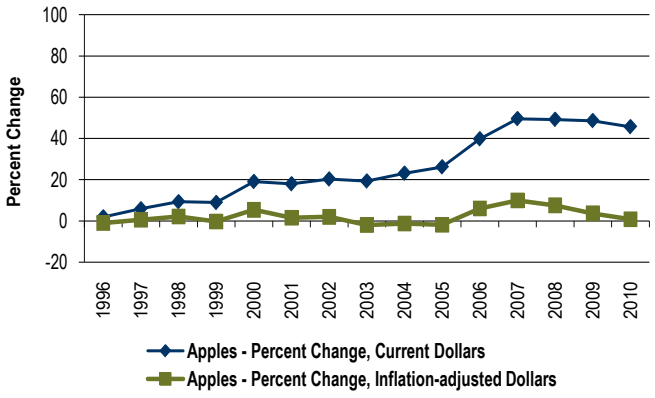
The impact of recent recessionary labor market conditions on Washington state apple, cherry and pear production is particularly important because these three subsectors employ the overwhelming share of seasonal and migrant labor.

There are two surges, or shifts, in labor demand each year. The first surge is typically in mid-June, depending on the weather, and is due to the highly valuable sweet cherry harvest. This harvest tapers off in July. Demand increases again in early August as the apple and pear harvest accelerates and culminates in a maximum labor demand surge in September or October, depending on the weather.

Figures 21 to *23* compare cumulative percent change in current and inflation-adjusted average hourly before-tax earnings in apples, cherries and pears for the period 1996 through 2010. For all three tree fruit subsectors, average hourly before-tax earnings rose in both current and inflation-adjusted terms over the period 2005 through 2007. The Great Recession hit the state in the second or third quarter of 2008. As the figures show, at the equilibrium between labor demand and labor supply, current and inflation-adjusted average hourly before-tax earnings fell in 2008, 2009 and 2010.

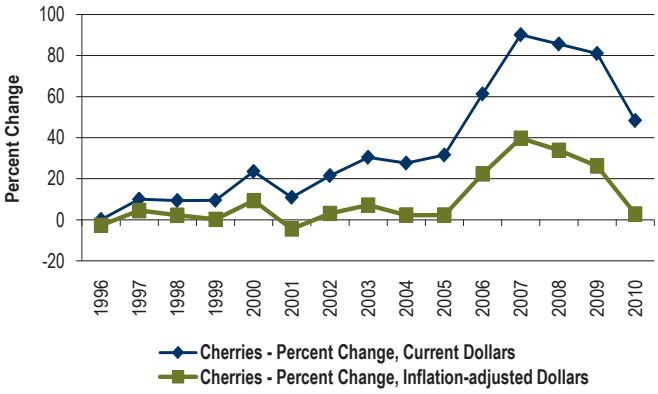
Two-tailed t-tests were conducted separately for each tree fruit for all annual pairs of average hourly before-tax earnings between 2006 and 2010. Except for cherries, when comparing 2006 with 2009 average hourly earnings, all annual hourly earnings pairs for each tree fruit are statistically significantly different from each other. Average hourly before-tax earnings in tree fruit fell consistently over the current business cycle.

Figure 21
Comparison of Cumulative Percent Change in Current and Inflation-adjusted Average Hourly Before-tax Earnings, Apples, Base Year 2000 = 100, CPI-W
Washington State, 1996 through 2010, Fourth Quarter Data
Source: Employment Security Department/LMEA, UI Wage File



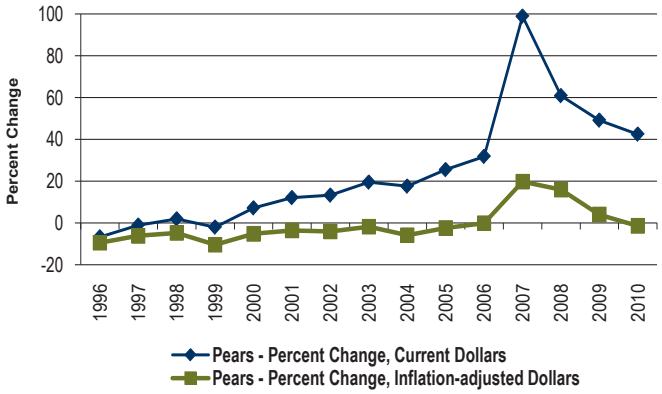
The cumulative change in average hourly before-tax earnings for apples dropped by 6.7 percentage points between 2009 and 2010.

Figure 22
Comparison of Cumulative Percent Change in Current and Inflation-adjusted Average Hourly Before-tax Earnings, Cherries, Base Year 2000 = 100, CPI-W
Washington State, 1996 through 2010, Third Quarter Data
Source: Employment Security Department/LMEA, UI Wage File



The cumulative change in average hourly before-tax earnings for cherries dropped by 32.7 percentage points between 2009 and 2010.

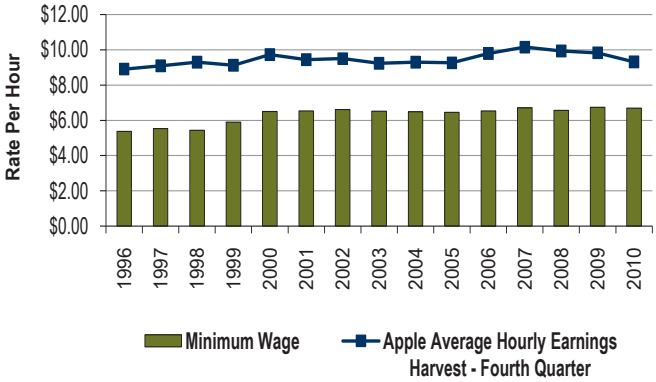
Figure 23
Comparison of Cumulative Percent Change in Current and Inflation-adjusted Average Hourly Before-tax Earnings, Pears, Base Year 2000 = 100, CPI-W
Washington State, 1996 through 2010, Third Quarter Data
Source: Employment Security Department/LMEA, UI Wage File



The cumulative change in average hourly before-tax earnings for pears dropped by 2.9 percentage points between 2009 and 2010.

Figures 24 to *26* compare inflation-adjusted average hourly before-tax earnings for work in apples, cherries and pears with the inflation-adjusted Washington state minimum wage. Consistent with the data in *Figures 23* to *25*, inflation-adjusted average hourly before-tax earnings rise relative to the state minimum wage rate from 2005 through 2007. Inflation-adjusted average hourly earnings then fall from 2008 through 2010, though they are still well above the inflation-adjusted state minimum wage.

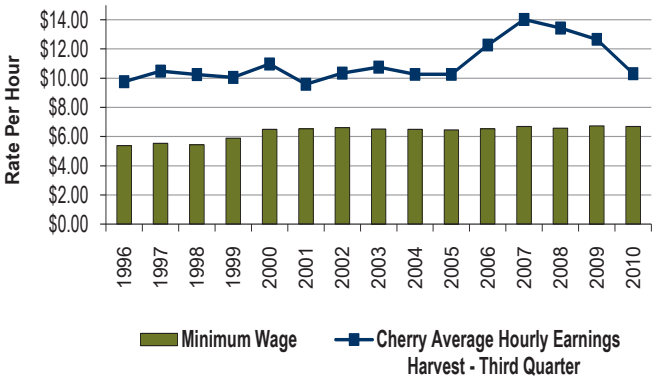
Figure 24
Average Hourly Before-tax Earnings in Apples Compared to the Washington State Minimum Wage, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 1996 through 2010
Source: Employment Security Department/LMEA, UI Wage File



Inflation-adjusted average hourly before-tax earnings fell from $9.83 in 2009 to $9.31 in 2010, still well above the inflation-adjusted state minimum wage of $6.69 in 2010.

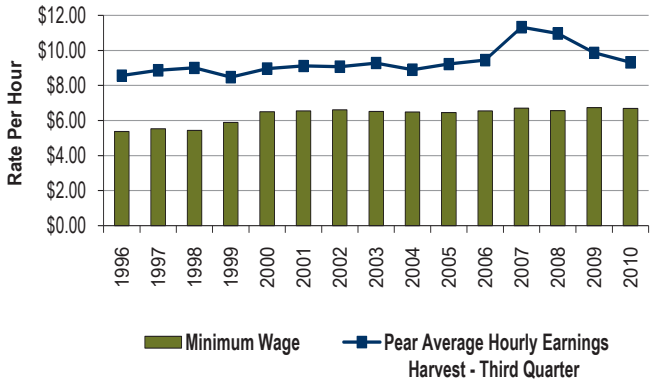
Photo by ©Lya Cattel/ Dreamstime.com

Figure 25
Average Hourly Before-tax Earnings in Cherries Compared to the Washington State Minimum Wage, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 1996 through 2010
Source: Employment Security Department/LMEA, UI Wage File



Inflation-adjusted average hourly before-tax earnings work fell from $12.66 in 2009 to $10.31 in 2010, still well above the inflation-adjusted state minimum wage of $6.69 in 2010.

Figure 26
Average Hourly Before-tax Earnings in Pears Compared to the Washington State Minimum Wage, Inflation-adjusted Dollars, Base Year 2000 = 100, CPI-W
Washington State, 1996 through 2010
Source: Employment Security Department/LMEA, UI Wage File



Inflation-adjusted average hourly before-tax earnings fell from $9.86 in 2009 to $9.32 in 2010, still well above the inflation-adjusted state minimum wage of $6.69 in 2010.

Finally, note the following estimates of average annual employment at labor market equilibrium for fruit and tree nut production in Washington state:

- 2006 – 38,398 workers
- 2007 – 38,973 workers
- 2008 – 39,961 workers
- 2009 – 42,758 workers

Summary and Conclusions

- There has been no structural "shortage" of agricultural labor supply in the period of 2007 to 2009 and spot "shortages," as measured by the responses of agricultural producers, have been declining to 0 percent over the period of 2007 to 2010.
- Representatives of the agricultural economy in Washington state are aware that the Great Recession has alleviated concerns over labor "shortages" in agriculture.
- While agricultural employment grew by 1,023 average quarterly workers between 2006 and 2007, the seven industry sectors discussed in this study grew by 9,751 workers.
- While agricultural employment grew by 1,656 average quarterly workers between 2007 and 2008, the seven industry sectors remained essentially static with an average quarterly increase of 315 workers.
- While agricultural employment grew by 4,703 average quarterly workers between 2008 and 2009, the seven industry sectors released 21,798 workers back into the state's labor market.
- Undocumented workers likely respond to the incentive of higher average annual earnings as well as to higher hourly wage rates when seeking employment in the United States. This behavior is hypothesized to be a function of the money and non-money costs of being an undocumented worker.
- Inflation-adjusted average annual earnings in agriculture are the third lowest in the eight industry sectors discussed in this study, yet employment has increased in agriculture over the period of 2002 to 2009.

Endnotes

1 Historically, the primary industry entry point into the U.S. labor market for undocumented workers from Mexico and Central America has been agriculture. Then, as individual workers became more familiar with the opportunities for employment in the U.S. economy, some would move on to other industrial sectors, such as construction. A conversation with Dr. Philip Martin, University of California-Davis, however, indicates that in recent years, some undocumented workers have by-passed agriculture and moved directly into industries such as construction and the service sector.

2 Nevertheless, there is still concern among agricultural producers that there is a shortage of legal, documented workers. Thus, agricultural producers remain exposed to uncertain legal and economic costs. An Immigration and Customs Enforcement (ICE) official reports that 1,000 audits were scheduled for 2010, of which 30 were scheduled for Washington state, not all of which were in agriculture. See: *The Wenatchee World*. "Gebbers Farm audit worries state ag industry." February 17, 2010. *Capital Press*. "Farm Bureau: More ICE audits soon." October 1, 2010.

3 Passel and Cohn. April 14, 2009. Figure 21. Page 16.

4 Passel and Cohn. April 14, 2009. Figure 19. Page 15.

5 Passel and Cohn. September 1, 2010. Figure 10. Page 8.

6 Passel and Cohn. July 22, 2009. Page 3.

7 Passel and Cohn. February 1, 2011. Table 4. Page 14.

8 The numbers following the industry titles are NAICS industry codes. Go to www.bls.gov/bls/naics.htm for an explanation of the NAICS system.

9 Average quarterly employment represents a count of the unduplicated Social Security numbers that occur each calendar quarter in the QCEW/UI Wage File database. To the extent that two or more undocumented workers may be using the same SSN, the quarterly employment estimates are an undercount of the actual number of workers in any given industrial sector for that quarter. These data are counts of individuals that have *ever worked* during each production quarter. They are not adjusted for actual hours of work over the production quarter. We do not adjust for hours worked since we are interested in measuring the number of individual persons who make themselves available for work over the course of the production quarter.

10 From October 2009 through September 2010 there were 140,053 exhaustees of unemployment benefits in Washington state. Of this number, 29,665 were in construction. *Washington State Labor Market and Economic Report*. December 2010. Exhibit 4.7. And note the following: "Jon DeVaney, executive director of the Yakima Valley Growers-Shippers Association in Washington, also points to the construction industry's collapse as a trigger for greater availability of workers." *Capital Press*. "Farmers expect plentiful labor this year." April 23, 2010. "Edwards said about 15 percent of 250 applicants received so far for cherry-season warehouse work appear to be workers from construction trades." Quote from Linda Edwards, human resources manager, Oneonta Starr Ranch Growers. *The Wenatchee World*. "Idled blue-collar workers turn to ag jobs." April 14, 2010.

11 Source: U.S. Bureau of Labor Statistics. Last updated March 8, 2011.

12 Throughout the remainder of this section, we will generally drop the modifiers "inflation-adjusted" and "before-tax" and use only the term "average annual earnings," it being understood that we always are discussing inflation-adjusted before-tax average annual earnings.

[13] In comparing average annual earnings between agriculture and the other seven sectors in this chapter, the implicit assumption is being made that compensating wage variations cancel out between any two industrial sectors. This is likely to be a strong assumption, for it is common to hear that workers prefer to work in industries other than agriculture, where the work is seasonal, often outside in the weather, potentially dangerous and physically demanding, relative to other industrial occupations.

[14] Tree fruit production dominates the statewide agricultural employment data. These annual employment data are calculated in this way: The number of workers employed is measured each month. The number of workers is then summed for the 12 months of the year, gaining a measure of total worker-months employed during the year. Dividing that total by 12 yields an annualized measure of "worker-months," where 12 worker-months equal one worker full time over the year. Tree nut production data are not reported in the *Washington Annual Agriculture Bulletin*.

Bibliography

Capital Press. "Farmers expect plentiful labor this year." April 23, 2010.

Capital Press. "Farm Bureau: Labor inspections loom." May 14, 2010.

Capital Press. "Farm Bureau: More ICE audits soon." October 1, 2010.

Columbia Basin Herald. "Immigration reform needed for ag workers." May 13, 2010.

Passel, Jeffrey S. and D'Vera Cohn. "A Portrait of Unauthorized Immigrants in the United States." Pew Hispanic Center. Washington, D.C. April 14, 2009.

Passel, Jeffrey S. and D'Vera Cohn. "Mexican Immigrants: How Many Come? How Many Leave?" Pew Hispanic Center. Washington, D.C. July 22, 2009.

Passel, Jeffrey S. and D'Vera Cohn. "U.S. Unauthorized Immigration Flows Are Down Sharply Since Mid-Decade." Pew Hispanic Center. Washington, D.C. September 1, 2010.

Passel, Jeffrey S. and D'Vera Cohn. "Unauthorized Immigrant Population: National and State Trends, 2010." Pew Hispanic Center. Washington, D.C. February 1, 2011.

Tri-City Herald. "Ag industry says labor pool 'plentiful.'" Section B. May 3, 2010.

Washington State Employment Security Department. Labor Market and Economic Analysis branch. *2010 Washington State Labor Market and Economic Report*. December 2010.

The Wenatchee World. "Gebbers Farm audit worries state ag industry." February 17, 2010.

The Wenatchee World. "Idled blue-collar workers turn to ag jobs." April 14, 2010.

Appendix

Appendix Figure 1
Cumulative Percent Change in Average Hourly Before-tax Earnings, Apples, Cherries and Pears, Base year 2000 = 100, CPI-W
Washington State, 1996 through 2010
Source: Employment Security Department/LMEA, UI Wage File

YEAR	APPLES PERCENT CHANGE CURRENT DOLLARS	APPLES PERCENT CHANGE INFLATION-ADJUSTED DOLLARS	CHERRIES PERCENT CHANGE CURRENT DOLLARS	CHERRIES PERCENT CHANGE INFLATION-ADJUSTED DOLLARS	PEARS PERCENT CHANGE CURRENT DOLLARS	PEARS PERCENT CHANGE INFLATION-ADJUSTED DOLLARS
1996	1.96%	-0.95%	0.11%	-2.69%	-6.70%	-9.42%
1997	5.88%	0.54%	10.02%	4.49%	-1.08%	-6.14%
1998	9.30%	2.15%	9.35%	2.19%	1.91%	-4.76%
1999	8.94%	-0.30%	9.46%	0.20%	-2.03%	-10.37%
2000	19.09%	5.40%	23.54%	9.37%	7.18%	-5.19%
2001	17.99%	1.58%	10.92%	-4.49%	12.08%	-3.60%
2002	20.32%	1.99%	21.51%	3.09%	13.28%	-4.02%
2003	19.34%	-1.94%	30.41%	7.18%	19.50%	-1.80%
2004	23.13%	-1.29%	27.59%	2.29%	17.58%	-5.82%
2005	26.19%	-1.86%	31.53%	2.29%	25.48%	-2.43%
2006	39.78%	6.05%	61.26%	22.33%	31.82%	-0.11%
2007	49.57%	9.95%	90.09%	39.78%	98.92%	19.79%
2008	49.20%	7.56%	85.59%	33.90%	60.89%	15.98%
2009	48.59%	3.67%	80.97%	26.22%	49.16%	4.02%
2010	45.65%	0.85%	48.31%	2.79%	42.46%	-1.38%