Oklahoma Job Quarterly Earnings Percentile Changes

All Industries for Years 2005 to 2015

OKLAHOMA

Oklahoma Employment Security Commission

Economic Research and Analysis Division

Oklahoma Job Quarterly Earnings Percentile Changes:
All industries for years 2005 to 2015

Oklahoma Employment Security Commission
Richard McPherson, Executive Director

Economic Research and Analysis Division
Lynn Gray, Director

Will Rogers Memorial Office Building
Labor Market Information Unit, 4th Floor N
P.O. Box 52003
Oklahoma City, OK 73152-2003
Phone: (405) 405-557-7107
Fax: (405) 525-0139
jesse.fuchs@oesc.state.ok.us

By Jesse Fuchs, PhD, Analyst

Along with significant contributions from the following individuals:
Lynn Gray, Director; Huifen (Shirley) Zhang, Programs Manager; Monty Evans, Senior
Economist; James Mouser, QCEW Manager; Kristie Brown, Analyst and Brad Arnold, Economist.

March 2016

Oklahoma Job Quarterly Earnings Percentile Changes:
All industries for years 2005 to 2015

I. Introduction

A time series analysis of earnings is an important economic indicator of the relative health of Oklahoma's businesses as well as our workforce well-being. While we have always been able to measure the change in average earnings using administrative records, we have not been able to see changes in earnings across the income spectrum. To address this we have used our agency administrative earnings records to construct a ten year history and four year recent changes in earnings as measured by percentiles. In short, it is a percentile ranking of the job quarterly earnings of individual jobs, from lowest to highest. For example the 10th percentile job ($1,105 in 2015) is the individual job which had earnings higher than 10% of the all the jobs but lower earnings than 90% of the jobs.

The data set is by job not individual. Consequently, if a person works two part-time jobs than the two part-time jobs would each show up separately. In addition we excluded any job with earnings of less than $300 for the reference quarter. The data for second job quarter earnings for the years 2005 and 2015 as well as a number of years between are included, but the data set does not include federal jobs.

At present we have completed the analysis for the earnings of an aggregate of all industries in this report. In the future, our plans are to expand the number of industries and additional years, for comparison. The results for recent years will be reported first and long term changes for an aggregate of all industries will be reported second.

II. All Industry Percentile Job Quarterly Earnings 1-Year Changes - Years 2011 to 2015

Table 1 shows the job quarterly earnings and percentile change of an aggregate of all industries between the 2nd quarter 2011 and the 2nd quarter 2012.

Table 1. All Industry: Job Quarterly Earnings by Percentile - 2011 to 2012

Percentile	2011	2012	Numeric Change	Percent Change
5	$655	$650	-$5	-0.8
10	$1,095	$1,086	-$9	-0.8
20	$2,200	$2,202	$2	0.1
25	$2,855	$2,873	$18	0.6
30	$3,515	$3,558	$43	1.2
40	$4,827	$4,947	$120	2.5
50	$6,200	$6,365	$165	2.7
60	$7,751	$7,988	$237	3.1
70	$9,708	$10,006	$298	3.1
75	$10,980	$11,316	$336	3.1
80	$12,533	$12,936	$403	3.2
90	$17,252	$17,685	$433	2.5
95	$22,286	$22,877	$591	2.7
99	$43,236	$44,495	$1,259	2.9
Total Jobs	**1,616,720**	**1,673,232**	**56,512**	**3.5**

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

Table 1 shows the superiority of reporting earnings changes by percentile over central tendency statistics, such as arithmetic average and median. The 50th percentile or medium in this table is 2.7% earnings change. The lower percentiles exhibit much less change and even a negative percent change in the 5th and

10th percentiles. The larger percentiles showing up to 3.2% in the 80th percentile, displays the wider spectrum of change for different portions of earnings in all jobs. During this year, jobs with larger earnings fared better than those with small earnings.

Table 2 reveals the job quarterly earnings and percentile change of an aggregate of all industries between the 2nd quarter 2012 and the 2nd quarter 2013.

Table 2. All Industry: Job Quarterly Earnings by Percentile - 2012 to 2013

Percentile	2012	2013	Numeric Change	Percent Change
5	$650	$651	$1	0.2
10	$1,086	$1,093	$7	0.6
20	$2,202	$2,220	$18	0.8
25	$2,873	$2,908	$35	1.2
30	$3,558	$3,614	$56	1.6
40	$4,947	$5,052	$105	2.1
50	$6,365	$6,531	$166	2.6
60	$7,988	$8,192	$204	2.6
70	$10,006	$10,281	$275	2.7
75	$11,316	$11,636	$320	2.8
80	$12,936	$13,275	$339	2.6
90	$17,685	$18,182	$497	2.8
95	$22,877	$23,751	$874	3.8
99	$44,495	$46,200	$1,705	3.8
Total Jobs	**1,673,232**	**1,704,091**	**30,859**	**1.8**

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

Table 2 shows that for the job quarter earnings percentiles the higher ones had the larger dollar and percent change than those below the 50th percentile. The highest dollar and percent change were the 95th and 99th percentiles with $874 and $1,705 change and 3.8% change, respectively.   The 5th and 10th percentiles had small positive changes, compared to the small negative changes that they experienced in the previous year.

Table 3 exhibits the job quarterly earnings and percentile change of an aggregate of all industries between the 2nd quarter 2013 and the 2nd quarter 2014.

Table 3. All Industry: Job Quarterly Earnings by Percentile - 2013 to 2014

Percentile	2013	2014	Numeric Change	Percent Change
5	$651	$653	$2	0.3
10	$1,093	$1,091	-$2	-0.2
20	$2,220	$2,232	$12	0.5
25	$2,908	$2,932	$24	0.8
30	$3,614	$3,658	$44	1.2
40	$5,052	$5,150	$98	1.9
50	$6,531	$6,680	$149	2.3
60	$8,192	$8,389	$197	2.4
70	$10,281	$10,508	$227	2.2
75	$11,636	$11,918	$282	2.4
80	$13,275	$13,582	$307	2.3
90	$18,182	$18,702	$520	2.9
95	$23,751	$24,441	$690	2.9
99	$46,200	$47,709	$1,509	3.3
Total Jobs	**1,704,091**	**1,727,152**	**23,061**	**1.4**

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

The 5th and 10th percentiles in Table 3 shows change in the year 2013 to 2014, just as they did in 2011 to 2012. The remainder of the percentiles shows a steady increase in dollar and percent amounts for job earnings, as the value of the percentile increases. The highest change was in the 99th percentile, which had a 3.3% change year 2013 to 2014.

Table 4 shows the job quarterly earnings and percentile change of an aggregate of all industries between the 2nd quarter 2014 and the 2nd quarter 2015.

Table 4. All Industry: Job Quarterly Earnings by Percentile - 2014 to 2015

| Percentile	2014	2015	Numeric Change	Percent Change
5	$653	$656	$3	0.5
10	$1,091	$1,105	$14	1.3
20	$2,232	$2,262	$30	1.3
25	$2,932	$2,970	$38	1.3
30	$3,658	$3,708	$50	1.4
40	$5,150	$5,212	$62	1.2
50	$6,680	$6,750	$70	1.0
60	$8,389	$8,450	$61	0.7
70	$10,508	$10,554	$46	0.4
75	$11,918	$11,947	$29	0.2
80	$13,582	$13,608	$26	0.2
90	$18,702	$18,698	-$4	0.0
95	$24,441	$24,641	$200	0.8
99	$47,709	$48,176	$467	1.0
Total Jobs	**1,727,152**	**1,730,040**	**2,888**	**0.2**

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

As shown in Table 4, the job quarterly earnings change for the 10th through 40th percentiles had larger percent increases than 50th through 99th percentiles during the year 2014 to 2015. This sort of change is a reverse ratio of lower to higher quarterly earnings percentiles, when compared to that of the previous three years.

An excellent way to comprehend the job quarterly earnings percentile changes over this four year period, 2011 to 2015 is with the information displayed in graphs. Chart 1, below, summarizes the job quarterly earnings percentile changes over the 2011 to 2015 period, as outlined in Tables 1, 2, 3 and 4.
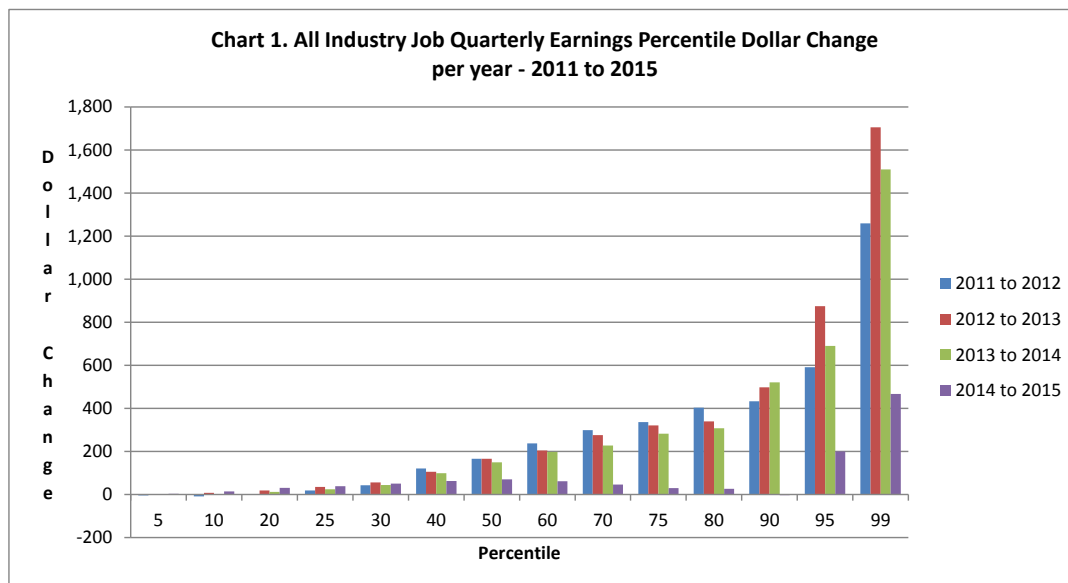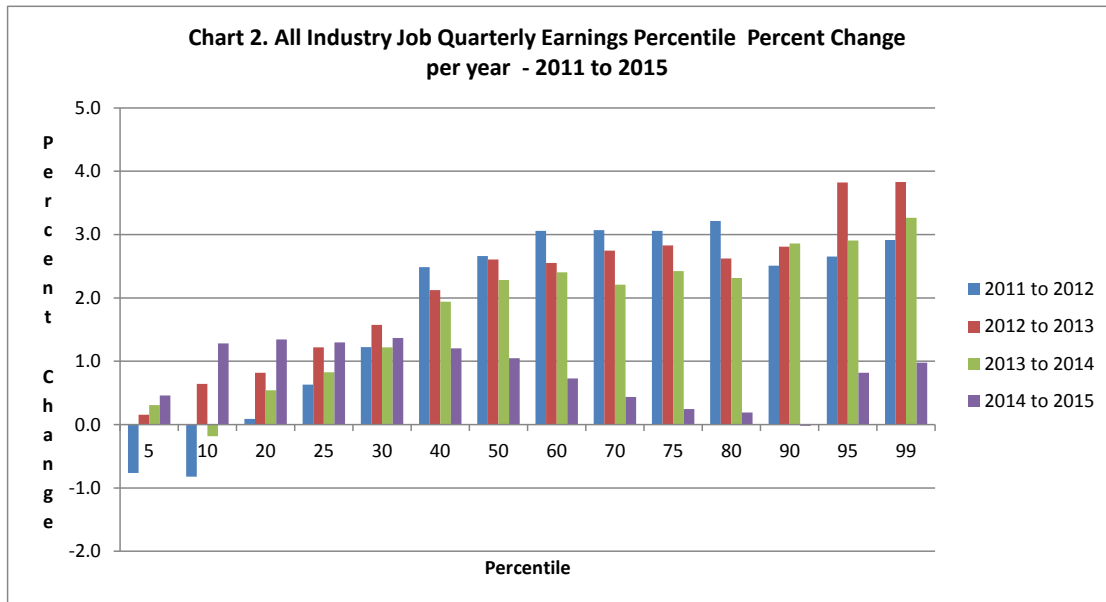

Chart 1. All Industry Job Quarterly Earnings Percentile Dollar Change per year - 2011 to 2015

Note1: Earnings are second quarter job totals, excluding Federal jobs.

Note2: Cases where earnings are less than $300 removed.

Note3: The unit of analysis is a job.

Chart 1 shows the dollar change for different percentiles for the years 2011 to 2014. In general, those job quarterly earnings the 50th through 99th percentiles had larger dollar amounts than the 5th through the 40th percentiles. The two largest percentiles, the 95th and the 99th, increased in amount for the first two years and thereafter decreased in amount.

Chart 2 displays the job quarterly earnings percentile percent change for an aggregate of industries for years 2011 to 2015.

Chart 2. All Industry Job Quarterly Earnings Percentile Percent Change per year - 2011 to 2015

Note[1]: **Earnings are second quarter job totals, excluding Federal jobs.**

Note[2]: **Cases where earnings are less than $300 removed.**

Note[3]: **The unit of analysis is a job.**

As Chart 2 displays, the general trend for job quarterly earnings percentiles below the 40th is that the percent increased until year 2013 and fell afterward. The same general trend is evidenced in 90th, 95th and 99th percentiles. Another trend shown is that percentiles lower than the 50th had less job earnings percent increases than those greater than the 50th. The reverse is true for years 2013 to 2015.

III. All Industry Percentile Job Quarterly Earnings 3-Year Changes - Years 2006 to 2015

This section looks at job quarterly earnings changes in three year intervals, namely the interval of years that fell within 2006 to 2015. The advantage of a 3-year interval analysis is that we can examine job earnings percentile changes that occurred before our nation's recent recession. Although Oklahoma's entry and exit from this recession was somewhat delayed from compared to other states, it fell within the same 3-year period of 2009 to 2012. Therefore using this 3-year interval of analysis we can examine Oklahoma's job earnings percentile change that occurred before the recession, within the years of recession and the years since the recession.

Table 5, shown on the next page, displays the job quarterly earnings percentile change in dollars and percent change for an aggregate of all industries between the 2nd quarter 2006 and the 2nd quarter 2009.

Table 5. All Industry: Job Quarterly Earnings in 3-Year Interval by Percentile - 2006 to 2009

Percentile	2006	2009	Numeric Change	Percent Change
5	$559	$631	$72	12.9
10	$883	$1,038	$155	17.6
20	$1,725	$2,088	$363	21.0
25	$2,261	$2,723	$462	20.4
30	$2,857	$3,388	$531	18.6
40	$4,088	$4,697	$609	14.9
50	$5,311	$5,990	$679	12.8
60	$6,657	$7,415	$758	11.4
70	$8,359	$9,179	$820	9.8
75	$9,450	$10,361	$911	9.6
80	$10,782	$11,812	$1,030	9.6
90	$14,787	$16,267	$1,480	10.0
95	$18,750	$20,790	$2,040	10.9
99	$35,351	$39,682	$4,331	12.3
Total Jobs	**1,602,805**	**1,587,094**	**-15,711**	**-1.0**

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

Table 5 shows that in the 3-year interval prior to the 2nd quarter 2009 job earnings, the percent change in the 5th through 50th percentiles was greater than of the 60th through 99th percentiles. The latter had a larger dollar amount change, but not percent change.   The largest percent change was in the 20th percentile, which had a 21.0% change. This table shows that between 2006-2009, the number of jobs declined by 15,711 (-1%), while the earnings generally grew at a faster rate than they did in the other 3-year intervals. It is interesting to note that the minimum wage increased twice during this interval (up to $5.85 in 2007 and to $6.55 in 2008). However, at this point without additional research we are unable to theorize what role these minimum wage increases may have had on the 2009 earning levels. The same is true regarding the impact of the large employment declines in early 2009

Table 6 displays the job quarterly earnings percentile change for the 3-years period, which includes the recent recession.

Table 6. All Industry: Job Quarterly Earnings in 3-Year Interval by Percentile - 2009 to 2012

Percentile	2009	2012	Numeric Change	Percent Change
5	$631	$650	$19	3.0
10	$1,038	$1,086	$48	4.6
20	$2,088	$2,202	$114	5.5
25	$2,723	$2,873	$150	5.5
30	$3,388	$3,558	$170	5.0
40	$4,697	$4,947	$250	5.3
50	$5,990	$6,365	$375	6.3
60	$7,415	$7,988	$573	7.7
70	$9,179	$10,006	$827	9.0
75	$10,361	$11,316	$955	9.2
80	$11,812	$12,936	$1,124	9.5
90	$16,267	$17,685	$1,418	8.7
95	$20,790	$22,877	$2,087	10.0
99	$39,682	$44,495	$4,813	12.1
Total Jobs	**1,587,094**	**1,673,232**	**86,138**	**5.4**

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

The job quarterly earnings percentile change shown in Table 6 is the reverse of the previous 3-year interval, with the percent of change for the 60th through 99th percentiles being greater than 5th through 50th percentiles. However, the dollar amount increase for the former is greater than the latter in both 3-year intervals. The highest dollar and percent amount of change is greatest in the 99th percentile in the years 2009 through 2012. All percentiles experienced a smaller change in the interval that contained the recent recession.

Table 7 shows the job quarterly earnings percentile change for the three years after the recent recession, the years 2012 to 2015.

Table 7. Job Quarterly Earnings in 3-Year Interval by Percentile - 2012 to 2015

| Percentile	2012	2015	Numeric Change	Percent Change
5	$650	$656	$6	0.9
10	$1,086	$1,105	$19	1.7
20	$2,202	$2,262	$60	2.7
25	$2,873	$2,970	$97	3.4
30	$3,558	$3,708	$150	4.2
40	$4,947	$5,212	$265	5.4
50	$6,365	$6,750	$385	6.0
60	$7,988	$8,450	$462	5.8
70	$10,006	$10,554	$548	5.5
75	$11,316	$11,947	$631	5.6
80	$12,936	$13,608	$672	5.2
90	$17,685	$18,698	$1,013	5.7
95	$22,877	$24,641	$1,764	7.7
99	$44,495	$48,176	$3,681	8.3
Total Jobs	**1,673,232**	**1,730,040**	**56,808**	**3.4**

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

As seen in Table 7, the 3-year interval after 2012 job quarterly earnings percent change in the 5th through 40th percentiles were less than in the 50th through 99th percentiles. The latter percentiles had larger dollar amount change and greater percent change. The largest percent change was in the 99th percentile, which had an 8.3% change. The size of the job quarter earnings percentile percent of change for most percentiles was less than either of the preceding 3-year intervals, likely partially reflecting the decline of Oklahoma's mining industry, which has occurred in the last three years, particularly in 2015.

Chart 3, below, illustrates the dollar changes over the last nine years outlined previously in Tables 5, 6 and 7.
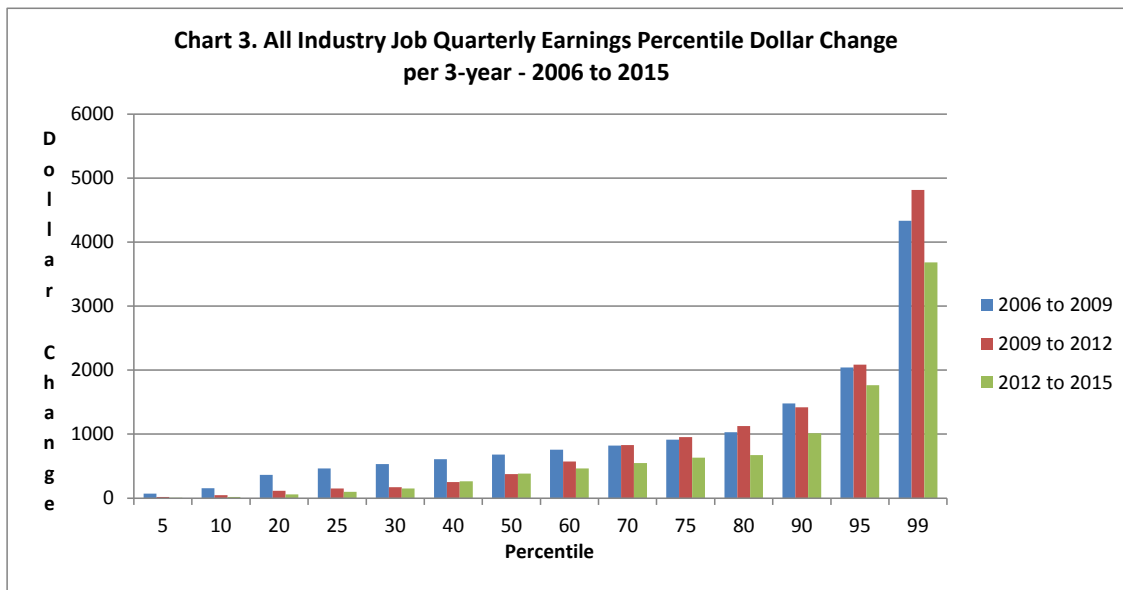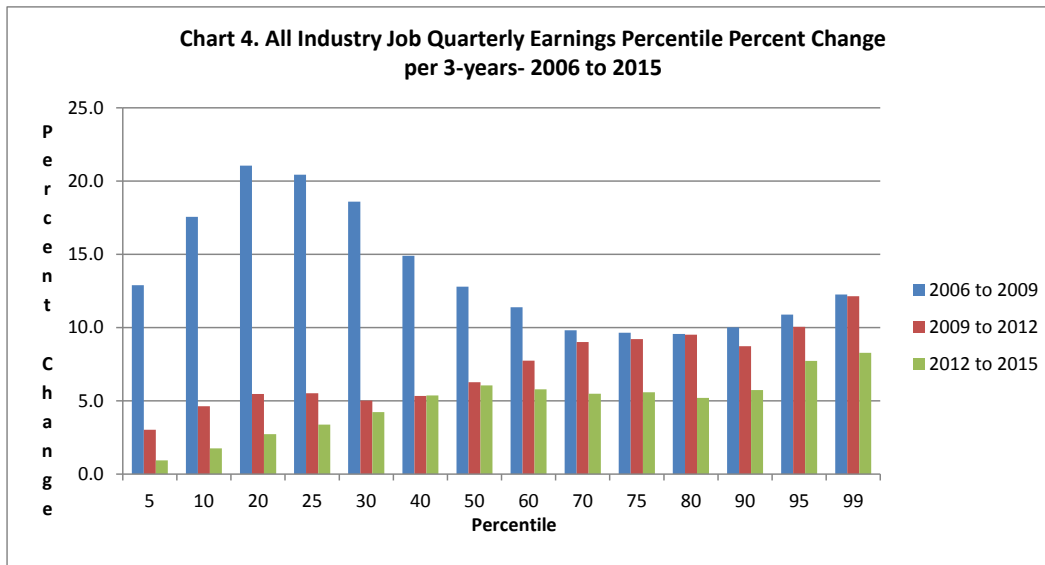

Chart 3. All Industry Job Quarterly Earnings Percentile Dollar Change per 3-year - 2006 to 2015

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

Chart 3 displays that in the first 3-year interval of 2006 to 2009; all job quarterly earnings percentiles showed dollar amount increases. In the following 3-year interval of 2009 to 2012, all percentiles showed an increase in dollar amounts; however with the exception of the 70th, 90th, 95th and 95th percentiles the amount was lesser than the preceding 3-year interval. In the final 3-year interval of 2012 to 2015 all percentiles showed a dollar amount increase in job earnings, with all also showing a lesser amount increase than occurred in 2006 to 2009.

Chart 4 shows the job quarterly earnings percentile percent change, for an aggregate of all Oklahoma industries for the 3-year intervals of 2006 to 2009, 2009 to 2012 and 2012 to 2015.

Chart 4. All Industry Job Quarterly Earnings Percentile Percent Change per 3-years- 2006 to 2015

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

Chart 4 exhibits the highest job quarterly earnings percent change occurred among the 5th through 50th percentiles in the 3-year interval of 2006 to 2009. The reverse was true for job earnings the 60th through 99th percentiles in the 3-year interval of 2009 to 2012, which had the higher change in job quarterly earnings percent. The highest job quarterly earnings percent change that occurred in 2012 to 2015 was in the 90th and 99th percentiles.

One way of comparing the job quarterly earnings and the earning changes is by quarterly earning dollar amounts for the four individual years of the 3-year intervals side-by-side in a table. Table 8 below, title "Quarterly Earnings Dollar Amounts by Percentile for Years 2006, 2009, 2012 & 2015" shows these dollar amounts for each of these years and the percent change between the years.

Table 8. Job Quarterly Earnings Dollar Amounts by Percentile for Years 2006. 2009, 2012 & 2015

| Percentile	2006	2009	2012	2015	2006-09 % Change	2009-12 % Change	2012-15 % Change
5	559	631	650	656	12.9	3.0	0.9
10	883	1,038	1,086	1,105	17.6	4.6	1.7
20	1,725	2,088	2,202	2,262	21.0	5.5	2.7
25	2,261	2,723	2,873	2,970	20.4	5.5	3.4
30	2,857	3,388	3,558	3,708	18.6	5.0	4.2
40	4,088	4,697	4,947	5,212	14.9	5.3	5.4
50	5,311	5,990	6,365	6,750	12.8	6.3	6.0
60	6,657	7,415	7,988	8,450	11.4	7.7	5.8
70	8,359	9,179	10,006	10,554	9.8	9.0	5.5
75	9,450	10,361	11,316	11,947	9.6	9.2	5.6
80	10,782	11,812	12,936	13,608	9.6	9.5	5.2
90	14,787	16,267	17,685	18,698	10.0	8.7	5.7
95	18,750	20,790	22,877	24,641	10.9	10.0	7.7
99	35,351	39,682	44,495	48,176	12.3	12.1	8.3
Total Jobs	1,602,805	1,587,094	1,673,232	1,730,040	-1.0	5.4	3.4

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

The job quarterly earnings dollar amounts in the years of this 3-year interval visually display how each percentile changes within each time frame.

Chart 5, summarizing data in Table 8, also displays an enlightening illustration of this quarterly earnings dollar amounts and their changes in each 3-year period.
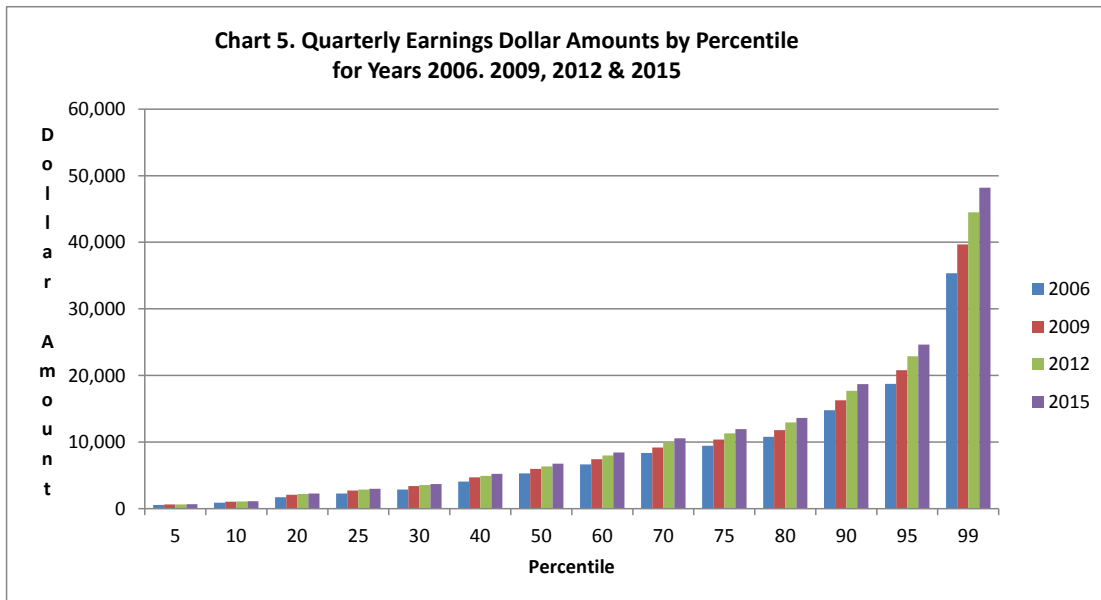
Chart 5. Quarterly Earnings Dollar Amounts by Percentile for Years 2006. 2009, 2012 & 2015

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

Side-by-side display of the four years in each percentile illustrates the total dollar amount of earnings between each of the years enlarges increasingly as percentile level increases from 5th to 99th.

IV. All Industry Percentile Job Quarterly Earnings 10-Year Changes - 2005 to 2015

A fourth way in which all industry percentile earnings and percentile earnings change can be illustrated is by the job quarterly earnings dollar amounts and percent change for the 10-year interval of 2005 to 2015.

Table 9 shows both the quarterly earnings dollar amounts and percent change.

Table 9. Job Quarterly Earnings in 10-Year Interval by Percentile - 2005 to 2015

| Percentile	2005	2015	Numeric Change	Percent Change
5	$560	$656	$96	17.1
10	$882	$1,105	$223	25.3
20	$1,706	$2,262	$556	32.6
25	$2,231	$2,970	$739	33.1
30	$2,812	$3,708	$896	31.9
40	$3,986	$5,212	$1,226	30.8
50	$5,127	$6,750	$1,623	31.7
60	$6,400	$8,450	$2,050	32.0
70	$7,998	$10,554	$2,556	32.0
75	$9,005	$11,947	$2,942	32.7
80	$10,268	$13,608	$3,340	32.5
90	$14,053	$18,698	$4,645	33.1
95	$17,911	$24,641	$6,730	37.6
99	$33,000	$48,176	$15,176	46.0
Total Jobs	**1,531,846**	**1,730,040**	**198,194**	**12.9**

Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

Table 9 shows that job quarterly earnings steadily increase in the 10-years as the size of the percentile increases. The same cannot be said for the size of the percent change. The percent change is relatively flat for 20th to 90th percentiles, with a slight depression in the size of percent change in the middle percentiles of 30th to 40th.

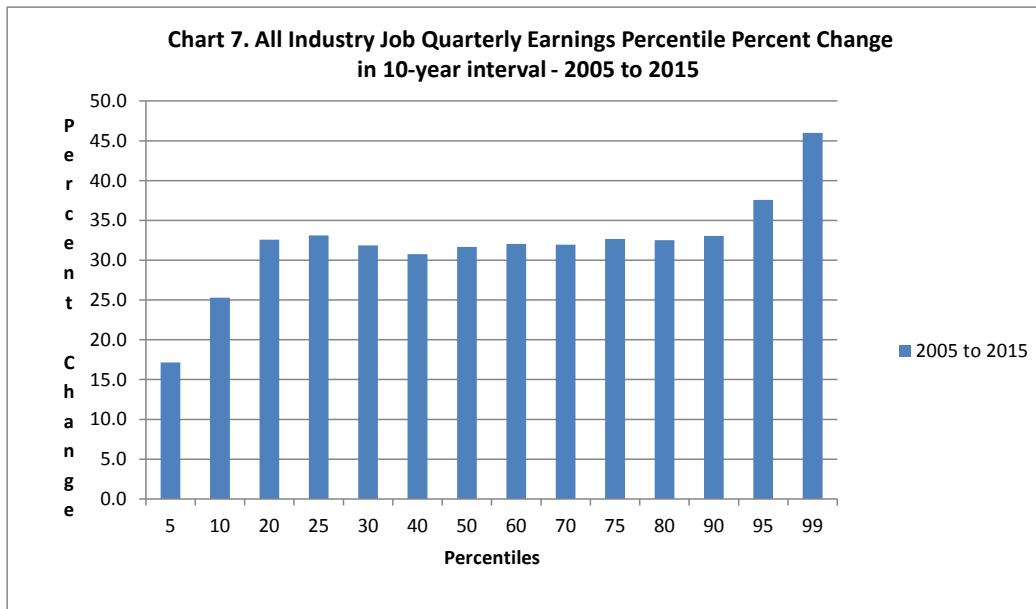Chart 6 below displays the job quarterly earnings dollar amount change, between 2005 and 2015.
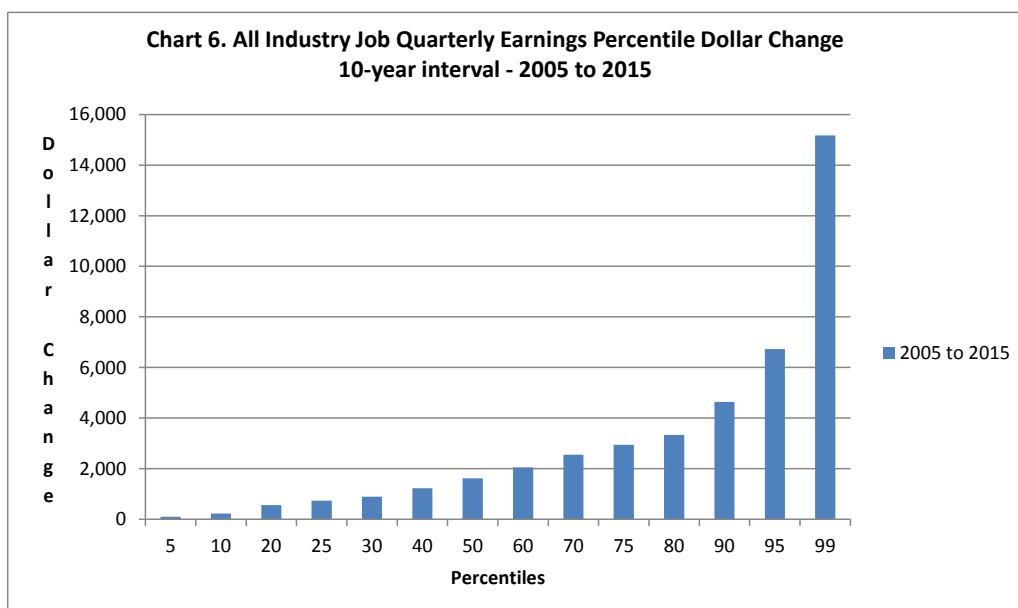
Note[1]: Earnings are second quarter job totals, excluding Federal jobs.

Note[2]: Cases where earnings are less than $300 removed.

Note[3]: The unit of analysis is a job.

As shown in Chart 6, the size of the percentile increases, so does the size of the job quarterly dollar amount change increase. The jump in size of change between 95th and 99th percentile is the largest change.

Chart 7 below displays the job quarterly earnings percent amount change, between 2005 and 2015.

Chart 7. All Industry Job Quarterly Earnings Percentile Percent Change in 10-year interval - 2005 to 2015

Note[1]: **Earnings are second quarter job totals, excluding Federal jobs.**

Note[2]: **Cases where earnings are less than $300 removed.**

Note[3]: **The unit of analysis is a job.**

In Chart 7, the job quarterly earnings percent change is relatively flat for the percentiles 20th to 90th, with a slight decline in the size of percent change in the middle percentiles of 30 through 40. The percent change between the 5th and 10th, 10th and 20th percentiles and between 95th and 99th percentile are relatively large.

V. Summary and Conclusions

In summary, Section II examined the second quarter job quarterly earnings in 1-year intervals, from 2011 to 2015. In general, both the dollar amount changes and the percent changes were greater for the 50[th]percentile though the 90th. The exception is the period from 2014 to 2015, when the 10th through the 50th percentile had greater percent change than percentiles greater than the 50th. The dollar amount changes for 75th, 80th and 90th percentiles were also less than the lower 20th to 50th percentiles.

In Section III, second quarter job quarterly earnings were explored in 3-year intervals 2006 to 2015. The dollar amount earnings for each of the three 3-year interval increased with percentile level. This was also true for earnings percent changes for intervals 2009 to 2012 and generally true for 2012 to 2015, except the 60th percentile. However in the 3-year interval 2006 to 2009, the 50th percentile level and lower had higher percent increases than the higher 60th to 95th percentiles.

In summary of Section IV, the 10-year dollar amount and percent change examination of job quarterly earnings revealed that the dollar amounts increased with each percentile level, with the 99th highest

percentile showing the greatest amount change. However, an examination of percent changes during this period showed that the 20th to 90th percentiles levels were relatively flat, with a slight decline in of percent values in the middle 30th through 50th percentiles. The changes in percent between 5th to 10th, 10th to 20th and 95th to 99th percentile levels are relatively large.

In conclusion, examining all industry job quarterly earnings changes by a range of percentiles provides a rich, informative and useful tool for analysis of the vitality of Oklahoma's economy.