



Oklahoma



**Oklahoma Energy and Other Oklahoma Industries:
A correlation analysis with industry employment and employee earnings**

Oklahoma Employment Security Commission
Economic Research and Analysis Division

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EXECUTIVE SUMMARY

Oklahoma Energy Industries and Other Oklahoma Industries: A correlation analysis with industry employment and employee earnings

Introduction

The analysis in this report takes an exploratory qualitative comparative approach in examining the detailed relationships between Oklahoma energy industries, individual Oklahoma industries and an aggregate of all Oklahoma industries. This innovative approach consists of correlating, scale measuring, score tabulation and ranking of bivariate correlation scale scores; between the employment and earnings of individual industries, energy industries, Baker-Hughes Total US Land Rig Counts and aggregate of all Oklahoma industries. The exciting details of the special relationship between employment and earnings of state energy industries and other state industries are uncovered by this analysis. The results reported in this report, is of interest to business managers and planners, government officials, educators, career advisors, employment service providers, employment seekers and economic analysts. In short, it is anticipated that the results reported from this unusual and new analytic approach will prove exceedingly beneficial, perhaps at times even surprising to the reader, as it was to our LMI research team.

Data and Methodology

The data for this analysis was taken from the US Census Bureau's LEHD. QWI NAICS 3-digit NAICS industry employment and earnings (of employees) ten-year data was downloaded from the Census website at: <http://qwexplorer.ces.census.gov/> Total US Land Rig Counts and Oklahoma Rig Counts for the same period were downloaded from Baker-Hughes Baker Company's website. In order to measure the link between Oklahoma energy companies, individual Oklahoma industries and an aggregate of all Oklahoma industries, two separate four item correlation score scales were constructed, an employment correlation score scale and an earning score scale. These scales measure a composite of amount and degree of association between the items or groups, whichever was desire in this comparison. The two scales were checked for internal validity by bivariate correlations between the four scale items.

Bivariate correlations of Oklahoma industry employment and earnings for all 92 Oklahoma NAICS 3-digit industries and all six firm sizes were run in order to obtain scale scores for each industry. Positive and negative scores for each of scale results were tabulated. Twelve tables ranking industry by scale magnitude were constructed, six positive and six negative for industry employment. Twelve tables ranking industry scale magnitude was also constructed, six positive and six negative for industry earnings. Each of these twenty-four total tables ranked industries from highest to lowest correlation scale magnitude.

Conclusions

The six major findings and conclusions which can be drawn from this analysis are as follows:

- Historical data of Oklahoma employment in the state's two energy industries (NAICS 211 Oil & Gas Extraction and NAICS 213 Support Activities for Mining) are good indicators of changes in employment in many other Oklahoma industries.

- The historical earnings data of the state's two energy industries is also a good indicator of changes in the earnings in many other Oklahoma industries, however they detect that only a few industries in each size has negative related earnings changes.
- Baker-Hughes Total US Land Rig Counts is also a good predictor of positive and negative changes in the employment in many other Oklahoma industries, in positive changes in earnings; however they detected that only a few industries in each size having negatively-related earnings changes.
- Baker-Hughes state rig counts for Oklahoma are of little value in predicting changes in Oklahoma industry employment and earnings.
- When compared to employment in Oklahoma's two energy industries, only slightly fewer number of industries employment move in a negative or opposite direction than the number of those whose employment move in a coordinative positive or same direction. On the other hand, in a similar comparison of energy industry earnings, only a few of Oklahoma industries' earnings move in a negative or opposite direction.
- Both industry employment and earnings must be broken down and examined by firm size in order to accurately determine employment and earning changes, because an examination of the aggregate of each alone could result in misleading understanding and conclusions, concerning energy industries' relationship to other Oklahoma industries. This sixth finding is likely the major finding of this study.

When considering and applying the results of this analysis; there are some concerns that must be heeded. The method of analysis does not in any way determine causation, nor can the directions of causation be implied. There are likely unknown, endogenous variables and perhaps spurious relationships that were beyond the scope of this analysis to investigate or control. Simply put, this analysis is a study of state energy industry employment and earnings correlative relationships to other Oklahoma state industries, an evaluation to determine their value, along with Total US Land Rig Counts value as indicators of future changes in industry employment and earnings.

Finally, this analysis is not considered to be a definitive conclusion to investigations of energy industries' relation to changes in other state industries, but rather it may be a beginning point for future investigation of this relationship in other energy states, using breakdowns by firm size. A frank criticism of this investigation is in regard to the two designed and constructed employment and earning correlation scales. In future investigations, these could be tweaked by perhaps separating the two energy scale items from the aggregate of all firm sizes scale item, not doing them concurrently at the same time. A clearer and more qualitative result may thereby be obtained.

Oklahoma Energy Industries and Other Oklahoma Industries: A correlation analysis with industry employment and employee earnings

Introduction

It has long been known among those that regularly follow state industry employment and earnings that the energy industries in Oklahoma and other oil and gas producing states contribute largely to employment and average earnings of other industries. However, this idea has often been taken for granted in most reports which are written from time to time on the topic. This report seeks to provide an analysis of this fact, using Oklahoma industry employment and average monthly earnings in energy and other Oklahoma industries, broken down by five firm sizes plus an aggregate of all firm sizes. The data used in the analysis for this report was taken from the **U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD)**, specifically the **Quarterly Workforce Indicators (QWI)** for private 3-digit NAICS industries in Oklahoma for the years 2004 through 2014, specifically their point-in-time, first day of the reference quarter employment and their average monthly earnings.

The analysis in this report takes an exploratory qualitative comparative approach in examining the detailed relationships between Oklahoma energy industries, all other Oklahoma industries and an aggregate of all Oklahoma industries. This innovative approach consists of correlating, scale measuring, score tabulation and ranking of bivariate correlation scale scores between the employment and earnings of individual industries, energy industries, Baker-Hughes Total US Land Rig Counts and an aggregate of all Oklahoma industries. The exciting details of the special relationship between employment and earnings of state energy industries and other state industries are uncovered by this analysis. The results found in this report, is of interest to business managers and planners, government officials, educators, career advisors, employment service providers, employment seekers and economic analysts. In short, it is anticipated that the results reported from this unusual and new analytic approach will prove exceedingly beneficial and perhaps at times even surprising to the reader, as it was to our LMI research team.

Methodology

Typically methodology is provided in an appendix following the report. However, in order to facilitate a thorough understanding of this analysis, a summary description of the research methodology is provided here. Following this report, an unabridged account of the methodology is also provided in **Appendix F**, with research definitions in **Appendix D**.

As mentioned previously, the ten-year data sample was taken from the US Census Bureau's LEHD QWI 3-digit NAICS industry employment and employee earnings. Total U.S. Land Rig Counts and Oklahoma Rig Counts for the same period are from oilfield service company, Baker-Hughes Incorporated. In order to measure a composite of the amount and degree of association between Oklahoma energy firms, individual Oklahoma industries and an aggregate of all Oklahoma industries, two separate four-item correlation score scales were constructed, an employment correlation score scale and an earnings score scale. The two scales were checked for internal validity by bivariate correlations between the four scale items. Again, an exact description for construction and internal validity check for the two scales is described in detail at the end of this report.

A summary of the analysis process is as follows, bivariate correlations of Oklahoma 3-digit NAICS industry employment and earnings for 92 industries for six firm sizes were run in order to obtain scale scores for each industry. Positive and negative scores for each of scale results were tabulated. Twenty-four industry tables ranking industry by scale magnitude were constructed, six positive and six negative industry employment and six positive and six negative industry earnings tables, ranking industries from

highest to lowest correlation scale magnitude. These 24 unabridged tables are provided at the end of this report in **Appendixes A through E**.

For the body of this report, shorter and smaller tables were constructed. Six tables, one of each size, were constructed from the 24 unabridged tables. These six tables show the top ten ranked industries that had employment with positive correlation scale scores. Another six tables, one for each size, were constructed from 24 unabridged tables showing the top ten ranked industries that had employment with negative correlation scale scores.

In a similar manner, 12 tables were constructed from the 24 unabridged tables, showing the top five industries with earnings correlations scale scores, six tables for positive and six tables for negative correlation scale scores. These six positive score tables and six negative score tables were constructed to reflect one type for each of our six firm sizes.

Chapter 1, in the next section, reports the top ten industries with positive employment correlation scale scores, followed by the top ten industries with negative employment correlation scale scores, each reported by firm size.

Chapter 1: Industry Employment Rank Correlations

Positive Employment Correlations

The top ten Size1 (0 – 19 Employees) industries ranked for positive scale score values are shown in Table 1, identifying which industries' employment is closest and positively related to those of energy industries, an aggregate of all Oklahoma industries and changes in Baker-Hughes Total US Land Rig Counts are used.

Table 1: Top Ten Industry Rank¹: Employment Total Positive Correlation Scale Scores² of Firm Size1, 0-19 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Couriers and Messengers	492	1	26
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	2	24
Accommodation	721	3	23
Professional, Scientific, and Technical Services	541	4	21
Repair and Maintenance	811	4	21
Ambulatory Health Care Services	621	5	19
Food Services and Drinking Places	722	5	19
Truck Transportation	484	6	18
Educational Services	611	6	18
Food Manufacturing	311	7	17
Merchant Wholesalers, Nondurable Goods	424	7	17
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	7	17
Administrative and Support Services	561	7	17
Museums, Historical Sites, and Similar Institutions	712	7	17
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	8	15
Gasoline Stations	447	9	14
Support Activities for Transportation	488	9	14
Insurance Carriers and Related Activities	524	9	14
Utilities	221	10	13
Textile Mills	313	10	13

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

The three top ranked positive employment correlation scale industries in descending order are: NAICS 492 Couriers and Messengers, NAICS 523 Securities, Commodity Contracts, and Other Financial Investments and Related Activities, and NAICS 721 Accommodation. This means that over the ten years of our study, employment in these three industries in this size closely followed the magnitude and direction changes in our four scale items. These scale items consisted of the two energy industries employment, a third item of the aggregate of all Oklahoma industry employment and a fourth item of the US Land Rig Count. As the employment in these top three ranked industries went up and down, the employment of our three scale comparison items and the US Land Rig Count also tended to go up and down. The table shows decreasing amounts of relationship of industries downward toward the bottom of the table. NAICS 313 Textile Mills is ranked tenth and last in Table 1.

It is important to note that a positive correlation score on the scale does not imply causality. In other words, the changes in the four items on our scale, consisting of the two energy industries, an aggregate to all industries and in the US Land Rig Count may or may not cause a similar magnitude and same direction change of the industry making the score's employment. The positive correlation score implies that there is strong positive relationship between the former and the latter. Given the ten-year history of this relationship, knowing these changes in the scale items is a good indication of what may happen in the future to the industry making the score. Let's look at some different sized industries.

Table 2: Top Ten Industry Rank¹: Employment Total Positive Correlation Scale Scores² of Firm Size2, 20-49 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Accommodation	721	1	24
Fabricated Metal Product Manufacturing	332	2	23
Repair and Maintenance	811	2	23
Crop Production	111	3	22
Food Services and Drinking Places	722	4	18
Leather and Allied Product Manufacturing	316	5	17
Support Activities for Transportation	488	6	16
Social Assistance	624	6	16
Administrative and Support Services	561	7	15
Ambulatory Health Care Services	621	7	15
Primary Metal Manufacturing	331	8	14
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	9	13
Rental and Leasing Services	532	9	13
Paper Manufacturing	322	10	12
Miscellaneous Manufacturing	339	10	12
Professional, Scientific, and Technical Services	541	10	12

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 2 shows the top ten positive employment correlation scale scored industries for Size2, firms having 20 – 49 employees. NAICS 721 Accommodation tops the rank in this table. It was ranked three in the previous table, but lower ranked. NAICS332 Fabricated Metal Product Manufacturing is number two and NAICS 811 Repair and Maintenance is number three in rank on this table. NAICS 541 Professional, Scientific, and Technical Services is ranked tenth, tying for last with two other industries in this table. However, **Appendix A** shows that the ranking for this size industry continues on down to ranking 15. All in all, 28 industries have a ranking of 15 or less.

Table 3: Top Ten Industry Rank¹: Employment Total Positive Correlation Scale Scores², of Firm Size3, 50-249 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Professional, Scientific, and Technical Services	541	1	23
Food Services and Drinking Places	722	2	23
Specialty Trade Contractors	238	3	22
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	3	22
Heavy and Civil Engineering Construction	237	4	21
Building Material and Garden Equipment and Supplies Dealers	444	4	21
Air Transportation	481	4	21
Museums, Historical Sites, and Similar Institutions	712	4	21
Insurance Carriers and Related Activities	524	5	18
Rental and Leasing Services	532	5	18
Truck Transportation	484	6	17
Wholesale Electronic Markets and Agents and Brokers	425	7	16
Pipeline Transportation	486	7	16
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	7	16
Social Assistance	624	7	16
Personal and Laundry Services	812	7	16
Fabricated Metal Product Manufacturing	332	8	15
Transportation Equipment Manufacturing	336	9	14
Nonstore Retailers	454	9	14
Animal Production and Aquaculture	112	10	12
Machinery Manufacturing	333	10	12
Electrical Equipment, Appliance, and Component Manufacturing	335	10	12

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

The above Table 3 shows that the top two of the top ten positive employment correlations scale scored industries for firm size3 (50 to 249 employees) are NAICS 541 Professional, Scientific, and Technical Services and NAICS 722 Food Services and Drinking Places. NAICS 238 Specialty Trade Contractors and NAICS 451 Sporting Goods, Hobby, Musical Instrument, and Book Stores are tied for third place. NAICS 112 Animal Production and Aquaculture, NAICS 333, Machinery Manufacturing and NAICS 335 Electrical Equipment, Appliance, and Component Manufacturing are tied for tenth place.

Table 4: Top Ten Industry Rank¹: Employment Total Positive Correlation Scale Scores² of Firm Size4, 250-499 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Transit and Ground Passenger Transportation	485	1	27
Heavy and Civil Engineering Construction	237	2	25
Merchant Wholesalers, Durable Goods	423	2	25
Rental and Leasing Services	532	3	22
Warehousing and Storage	493	4	21
Primary Metal Manufacturing	331	5	19
Credit Intermediation and Related Activities	522	5	19
Repair and Maintenance	811	5	19
Real Estate	531	6	16
Specialty Trade Contractors	238	7	15
Electronics and Appliance Stores	443	8	14
Air Transportation	481	8	14
Fabricated Metal Product Manufacturing	332	9	13
Machinery Manufacturing	333	9	13
Miscellaneous Manufacturing	339	9	13
Clothing and Clothing Accessories Stores	448	10	11

Note¹: According to largest scale value to smallest.
 Note²: Total Correlations to our four scale items.

Table 4 above shows the top ten positive employment correlation scale scored industries for Size3, firms having 250 – 499 employees. The top first and third industries are NAICS 485 Transit and Ground Passenger Transportation and NAICS 532 Rental and Leasing Services, respectively. The industries of NAICS 237 Heavy and Civil Engineering Construction and NAICS 423 Merchant Wholesalers, Durable Goods are tied for second, while NAICS 448 Clothing and Clothing Accessories Stores is last on the table.

Table 5: Top Ten Industry Rank¹: Employment Total Positive Correlation Scale Scores² of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Machinery Manufacturing	333	1	28
Merchant Wholesalers, Durable Goods	423	2	26
Management of Companies and Enterprises	551	3	23
Repair and Maintenance	811	3	23
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	4	22
Hospitals	622	4	22
Building Material and Garden Equipment and Supplies Dealers	444	5	21
Professional, Scientific, and Technical Services	541	6	20
Ambulatory Health Care Services	621	6	20
Food Services and Drinking Places	722	6	20
Heavy and Civil Engineering Construction	237	7	19
Printing and Related Support Activities	323	7	19
Chemical Manufacturing	325	7	19
Support Activities for Transportation	488	7	19
Furniture and Home Furnishings Stores	442	8	18
Health and Personal Care Stores	446	8	18
Other Information Services	519	9	17
Credit Intermediation and Related Activities	522	9	17
Amusement, Gambling, and Recreation Industries	713	10	16

Note¹: According to largest scale value to smallest.
 Note²: Total Correlations to our four scale items.

The preceding Table 5 shows the positive correlation scale score rank for Size5, firms with 500+

employees. First place is NAICS 333 Machinery Manufacturing, second place is NAICS 423 Merchant Wholesalers, Durable Goods and third place is NAICS 551 Management of Companies and Enterprises. NAICS industry 713 Amusement, Gambling, and Recreation Industries occupies last place position on this table. A total of 19 industries occupy the top ten ranking on our positive correlation score scale.

Table 6: Top Ten Industry Rank¹: Employment Positive Correlation Scale Scores² of Firm Size6, All Firm Sizes.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Repair and Maintenance	811	1	28
Professional, Scientific, and Technical Services	541	2	27
Machinery Manufacturing	333	3	25
Heavy and Civil Engineering Construction	237	4	24
Merchant Wholesalers, Durable Goods	423	4	24
Museums, Historical Sites, and Similar Institutions	712	4	24
Accommodation	721	4	24
Food Services and Drinking Places	722	5	23
Warehousing and Storage	493	6	22
Management of Companies and Enterprises	551	6	22
Electronics and Appliance Stores	443	7	21
Health and Personal Care Stores	446	7	21
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	7	21
Hospitals	622	7	21
Support Activities for Transportation	488	8	20
Ambulatory Health Care Services	621	8	20
Chemical Manufacturing	325	9	19
Gasoline Stations	447	9	19
Transit and Ground Passenger Transportation	485	9	19
Social Assistance	624	9	19
Building Material and Garden Equipment and Supplies Dealers	444	10	18

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

The top ten ranked employment and positive correlation scale score industries for size6, All Firm Sizes are displayed in Table 6 above. The top three ranked NAICS industries are 811 Repair and Maintenance, 541 Professional, Scientific, and Technical Services and 333 Machinery Manufacturing. A total of 21 industries have top ten industry rank scores.

Negative Employment Correlations

In this section we will examine the negative employment correlation scale score ranking. Note that a negative correlation score on the scale does not imply causality. In other words, changes in our four scale items may or may not cause a similar magnitude and **opposite** direction change of the industry making the score's employment. What the negative score does imply is that there is strong negative relationship between the former and the latter. Given the ten-year history of this relationship, knowing the changes in the scale items is a good indication of what may happen in the future to the industry that made this score. The first negative score ranking examined is Size1 (0 to 19 employees).

Table 7: Top Ten Industry Rank¹: Employment Total Negative Correlation Scale Scores² of Firm Size1, 0-19 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Private Households	814	1	24
Electronics and Appliance Stores	443	2	22
Apparel Manufacturing	315	3	20
Printing and Related Support Activities	323	4	19
Credit Intermediation and Related Activities	522	5	17
Air Transportation	481	6	16
Funds, Trusts, and Other Financial Vehicles	525	6	16
General Merchandise Stores	452	7	15
Textile Product Mills	314	8	14
Support Activities for Agriculture and Forestry	115	9	13
Miscellaneous Store Retailers	453	9	13
Data Processing, Hosting, and Related Services	518	9	13
Plastics and Rubber Products Manufacturing	326	10	12

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

The three top ranked negative employment correlation scale industries in Table 7, in descending order are: NAICS 814 Private Households, NAICS 443 Electronics and Appliance Stores, and NAICS 315 Apparel Manufacturing. This means that over the ten years of our study employment in these three industries of this size more closely followed the magnitude, but *counter* direction changes in employment of energy industries, an aggregate of all Oklahoma and the US Land Rig Count as measured by our employment correlation scale, than did any other Oklahoma industries. Stated simply, as the employment in this firm size of these top three ranked industries went up, the employment of our three scale comparison items and the US Land Rig Count tended to go down. When the former went down, the latter went up. The table shows decreasing amounts of relationship of industries, moving downward toward the bottom of the table. NAICS 326 Plastics and Rubber Products Manufacturing is ranked last on this table.

Table 8: Top Ten Industry Rank¹: Employment Total Negative Correlation Scale Scores² of Firm Size2, 20-49 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Credit Intermediation and Related Activities	522	1	20
General Merchandise Stores	452	2	19
Couriers and Messengers	492	3	18
Furniture and Related Product Manufacturing	337	4	17
Miscellaneous Store Retailers	453	4	17
Health and Personal Care Stores	446	5	14
Nonmetallic Mineral Product Manufacturing	327	6	13
Broadcasting (except Internet)	515	6	13
Printing and Related Support Activities	323	7	12
Computer and Electronic Product Manufacturing	334	7	12
Furniture and Home Furnishings Stores	442	7	12
Electronics and Appliance Stores	443	7	12
Building Material and Garden Equipment and Supplies Dealers	444	7	12
Data Processing, Hosting, and Related Services	518	7	12
Food and Beverage Stores	445	8	11
Merchant Wholesalers, Nondurable Goods	424	9	10
Animal Production and Aquaculture	112	10	9

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

In the Table 8, the top three negatively employment correlation scoring NAICS industries for firm Size2, 20 – 49 employees are 522 Credit Intermediation and Related Activities, 452 General Merchandise Store and 492 Couriers and Messengers. NAICS 112 Animal Production and Aquaculture was ranked last on Table 8.

Table 9: Top Ten Industry Rank¹: Employment Total Negative Correlation Scale Scores² of Firm Size3, 50-249 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Wood Product Manufacturing	321	1	20
Food and Beverage Stores	445	2	16
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	3	16
Hospitals	622	4	14
Forestry and Logging	113	5	13
Miscellaneous Manufacturing	339	5	13
Printing and Related Support Activities	323	6	12
Broadcasting (except Internet)	515	7	11
Crop Production	111	8	10
Support Activities for Agriculture and Forestry	115	9	8
Beverage and Tobacco Product Manufacturing	312	9	8
Petroleum and Coal Products Manufacturing	324	9	8
Furniture and Related Product Manufacturing	337	9	8
General Merchandise Stores	452	9	8
Management of Companies and Enterprises	551	9	8
Leather and Allied Product Manufacturing	316	10	7
Gasoline Stations	447	10	7

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 9 above displays that NAICS 321 Wood Product Manufacturing ranked first, NAICS 445 Food and Beverage Stores is second and NAICS 813 Religious, Grantmaking, Civic, Professional, and Similar Organizations is ranked third in firm Size3, firms with 50 -249 employees on the negative employment correlation scale. NAICS 447 Gasoline Stations is tenth and last in this table.

Table 10: Top Ten Industry Rank¹: Employment Total Negative Correlation Scale Scores² of Firm Size4, 250-499 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Wood Product Manufacturing	321	1	18
Air Transportation	481	1	18
Nursing and Residential Care Facilities	623	2	17
Crop Production	111	3	16
Data Processing, Hosting, and Related Services	518	4	15
Wholesale Electronic Markets and Agents and Brokers	425	5	12
Plastics and Rubber Products Manufacturing	326	6	10
Transportation Equipment Manufacturing	336	7	9
Amusement, Gambling, and Recreation Industries	713	7	9
Health and Personal Care Stores	446	8	8
Utilities	221	9	7
Electrical Equipment, Appliance, and Component Manufacturing	335	9	7
Accommodation	721	9	7
Couriers and Messengers	492	10	5
Other Information Services	519	10	5

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

The above Table 10 demonstrates a tie for first rank for firm Size4, 250 – 499 employees. NAICS 312 Wood Product Manufacturing and NAICS 481 Air Transportation have a negative employment correlation scales scores are tied for ranking 1. NAICS 623 Nursing and Residential Care Facilities and 111 Crop Production in descending order are in second and third places on this table. NAICS 519 Other Information Services is in last place.

Table 11: Top Ten Industry Rank¹: Employment Total Negative Correlation Scale Scores² of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Real Estate	531	1	24
Private Households	814	2	22
Textile Product Mills	314	3	20
Electronics and Appliance Stores	443	3	20
Broadcasting (except Internet)	515	3	20
Data Processing, Hosting, and Related Services	518	4	19
Telecommunications	517	5	18
Wood Product Manufacturing	321	6	17
Miscellaneous Manufacturing	339	6	17
Nonstore Retailers	454	7	16
Funds, Trusts, and Other Financial Vehicles	525	8	15
Electrical Equipment, Appliance, and Component Manufacturing	335	9	14
Publishing Industries (except Internet)	511	9	14
Paper Manufacturing	322	10	13
Insurance Carriers and Related Activities	524	10	13

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Looking at Table 11, we can see that NAICS 513 Real Estate and 814 Private Households are in first and second place in negative employment scale score rank. NAICS 314 Textile Product Mills, NAICS 443 Electronics and Appliance Stores and NAICS 515 Broadcasting (except Internet) industry employment are in third place. NAICS 322 Paper Manufacturing and NAICS 524 Insurance Carriers and Related Activities are two industries tied for last place on this table.

Table 12: Top Ten Industry Rank¹: Employment Total Negative Correlation Scale Scores² of Firm Size6, All Firm Sizes.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Private Households	814	1	24
Data Processing, Hosting, and Related Services	518	2	23
Broadcasting (except Internet)	515	3	21
Printing and Related Support Activities	323	4	20
Funds, Trusts, and Other Financial Vehicles	525	4	20
Forestry and Logging	113	5	18
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	5	18
Miscellaneous Manufacturing	339	6	16
Telecommunications	517	6	16
Nursing and Residential Care Facilities	623	6	16
Wood Product Manufacturing	321	7	15
Insurance Carriers and Related Activities	524	8	14
Miscellaneous Store Retailers	453	9	13
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	9	13
Support Activities for Agriculture and Forestry	115	10	12

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

The last table ranking industry negative correlation employment scores are shown in Table 12. This table ranks industries in size6, an aggregate of all firm sizes. The first, second and third ranked NAICS industries for negative employment correlation scale scores are 814 Private Households, 518 Data Processing, Hosting, and Related Services and 514 Broadcasting (except Internet). NAICS 115 Support Activities for Agriculture and Forestry is last in this top ten ranking.

Table 12 shows the importance of examining energy industries relationships with other Oklahoma industries according to firm size, because the firm ranking for this aggregate of all firm sizes is different than all of the previous five sizes. If one were to use the rankings in this table and anticipate the same sort of industry changes in any of the previous five sizes, they would have a misconception toward what changes to expect. Firm Size6 and firm Size4 only share three industries in the top ten, NAICS 518 Data Processing, Hosting, and Related Services, NAICS 321 Wood Product Manufacturing and NAICS 623 Nursing and Residential Care Facilities, as shown in Tables 12 and 10. The two tables also show different ranks for the industries. Several of the different firm sized industry ranking tables shares only 2 – 3 industries in their top ten ranks.

Chapter 2 in the next section examines and exhibits the top ten ranking of positive and negative earnings correlation scale scores.

Chapter 2: Industry Earnings Rank Correlations

Positive Earnings Correlations

This analysis determined that a large number, and therefore a large percent, of Oklahoma industries in all six firm sizes have earnings highly and positively correlated with the four correlation scale items. This earnings correlation scale consisting of the earnings of the two energy industries, the earnings of the aggregate of all Oklahoma industries and the changes in Baker-Hughes Total US Land Rig Counts. This large number indicates a high degree of relationship between energy industry earnings and most other Oklahoma industries. However, this analysis cannot rule out that this high degree of positive correlation indicated by the scale is not due to most industry earnings moving together positively for other similar and other mutual reasons. The possibility of this being the case will be discussed later in this report. However due to this large number, industry earnings correlation scale score ranks will be reported by the top five earnings ranked industries, instead of the previous employment reporting ten. The complete industry positive and negative scale score ranking for all six sizes may be seen Appendix C and Appendix D, which follows this report.

As cautioned in the preceding chapter, high correlations of our four scale items with an industry's earnings' characteristics does not imply causality; only that they share a correlated relationship that could be used as a good indication of future earnings of the industry that made the score. Let's look at the earning characteristic of some different size industries.

Table 13: Top Five Rank¹: Industry Rank Earnings Total Positive Correlation Scale Scores² of Firm Size1, 0-19 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Truck Transportation	484	1	27
General Merchandise Stores	452	2	23
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	2	23
Repair and Maintenance	811	3	22
Fabricated Metal Product Manufacturing	332	4	21
Motor Vehicle and Parts Dealers	441	4	21
Furniture and Home Furnishings Stores	442	4	21
Data Processing, Hosting, and Related Services	518	4	21
Accommodation	721	4	21
Food Services and Drinking Places	722	4	21
Personal and Laundry Services	812	4	21
Private Households	814	4	21
Heavy and Civil Engineering Construction	237	5	20
Merchant Wholesalers, Nondurable Goods	424	5	20
Food and Beverage Stores	445	5	20
Gasoline Stations	447	5	20
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	5	20
Warehousing and Storage	493	5	20
Waste Management and Remediation Services	562	5	20

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

As shown in Table 13, the top ranked positive employment correlation scale industry is NAICS 484 Truck Transportation. NAICS 452 General Merchandise Stores Religious, Grantmaking, Civic, Professional, and Similar Organizations and NAICS 813 Repair and Maintenance are tied in rank for second place, while NAICS 811 repair and maintenance is ranked third. A total of seven industries made identical last place scores.

Table 14: Top Five Rank¹: Industry Rank Earnings Total Positive Correlation Scale Scores² of Firm Size2, 20-49 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Food Manufacturing	311	1	21
Health and Personal Care Stores	446	1	21
Nonstore Retailers	454	1	21
Support Activities for Transportation	488	1	21
Waste Management and Remediation Services	562	1	21
Merchant Wholesalers, Nondurable Goods	424	2	20
Motor Vehicle and Parts Dealers	441	2	20
Gasoline Stations	447	2	20
Real Estate	531	2	20
Food Services and Drinking Places	722	2	20
Specialty Trade Contractors	238	3	19
Textile Product Mills	314	3	19
Nonmetallic Mineral Product Manufacturing	327	3	19
Fabricated Metal Product Manufacturing	332	3	19
Transportation Equipment Manufacturing	336	3	19
Furniture and Home Furnishings Stores	442	3	19
Accommodation	721	3	19
Repair and Maintenance	811	3	19
Personal and Laundry Services	812	3	19
Construction of Buildings	236	4	18
Plastics and Rubber Products Manufacturing	326	4	18
Nursing and Residential Care Facilities	623	4	18
Social Assistance	624	4	18
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	4	18
Chemical Manufacturing	325	5	17
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	5	17
Broadcasting (except Internet)	515	5	17
Credit Intermediation and Related Activities	522	5	17
Rental and Leasing Services	532	5	17

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 14 shows that five industries have positive earnings correlation scale scores that place them in first place for Size3. These are NAICS 311 Food Manufacturing, NAICS 446 Health and Personal Care Stores, NAICS 454 Nonstore Retailers, NAICS 488 Support Activities for Transportation and NAICS 562 Waste Management and Remediation Services. Altogether twenty-nine industries have scale scores that place them in the top five having positive earnings correlation scale score ranks for firms of this size.

Table 15: Top Five Rank¹: Industry Rank Earnings Total Positive Correlation Scale Scores² of Firm Size3, 50-249 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Specialty Trade Contractors	238	1	23
Insurance Carriers and Related Activities	524	1	23
Credit Intermediation and Related Activities	522	2	22
Management of Companies and Enterprises	551	2	22
Machinery Manufacturing	333	3	21
Gasoline Stations	447	3	21
Administrative and Support Services	561	3	21
Nursing and Residential Care Facilities	623	3	21
Food Services and Drinking Places	722	3	21
Repair and Maintenance	811	3	21
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	3	21
Leather and Allied Product Manufacturing	316	4	20
Miscellaneous Manufacturing	339	4	20
Merchant Wholesalers, Nondurable Goods	424	4	20
Motor Vehicle and Parts Dealers	441	4	20
Social Assistance	624	4	20
Accommodation	721	4	20
Utilities	221	5	19
Chemical Manufacturing	325	5	19
Merchant Wholesalers, Durable Goods	423	5	19
Wholesale Electronic Markets and Agents and Brokers	425	5	19
Rental and Leasing Services	532	5	19
Educational Services	611	5	19
Personal and Laundry Services	812	5	19

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

On Table 15, two industries are tied for first place in industry earnings positive correlation scale scores for Size3, firms with 50 to 249 employees. The two industries tied for first place are NAICS 238 Specialty Trade Contractors and NAICS 524 Insurance Carriers and Related Activities. Twenty-four industries have top five ranked scale scores for firms of this size.

Table 16: Top Five Rank¹: Industry Rank Earnings Total Positive Correlation Scale Scores² of Firm Size4, 250-499 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Truck Transportation	484	1	27
General Merchandise Stores	452	2	23
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	2	23
Repair and Maintenance	811	3	22
Fabricated Metal Product Manufacturing	332	4	21
Motor Vehicle and Parts Dealers	441	4	21
Furniture and Home Furnishings Stores	442	4	21
Data Processing, Hosting, and Related Services	518	4	21
Accommodation	721	4	21
Food Services and Drinking Places	722	4	21
Personal and Laundry Services	812	4	21
Private Households	814	4	21
Heavy and Civil Engineering Construction	237	5	20
Merchant Wholesalers, Nondurable Goods	424	5	20
Food and Beverage Stores	445	5	20
Gasoline Stations	447	5	20
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	5	20
Warehousing and Storage	493	5	20
Waste Management and Remediation Services	562	5	20

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 16 displays that NAICS 484 Truck Transportation is in first place in industry earnings positive correlation scale scores for Size4, firms with 250 to 499 employees. Tied for second place are NAICS 452 General Merchandise Stores and NAICS 813 Religious, Grantmaking, Civic, Professional, and Similar Organizations. Nineteen industries have top five rank scale scores in this size.

Table 17: Top Five Rank¹: Industry Rank Earnings Total Positive Correlation Scale Scores² of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Fabricated Metal Product Manufacturing	332	1	25
Telecommunications	517	2	23
Machinery Manufacturing	333	3	22
Merchant Wholesalers, Durable Goods	423	3	22
Real Estate	531	3	22
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	3	22
Professional, Scientific, and Technical Services	541	3	22
Food Services and Drinking Places	722	3	22
Repair and Maintenance	811	3	22
Transportation Equipment Manufacturing	336	4	21
Funds, Trusts, and Other Financial Vehicles	525	4	21
Administrative and Support Services	561	4	21
Hospitals	622	4	21
Nursing and Residential Care Facilities	623	4	21
Animal Production and Aquaculture	112	5	20
Specialty Trade Contractors	238	5	20
Nonmetallic Mineral Product Manufacturing	327	5	20
Wholesale Electronic Markets and Agents and Brokers	425	5	20
Truck Transportation	484	5	20
Transit and Ground Passenger Transportation	485	5	20
Support Activities for Transportation	488	5	20
Monetary Authorities-Central Bank	521	5	20
Credit Intermediation and Related Activities	522	5	20
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	5	20
Educational Services	611	5	20

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

The top five places in industry positive earnings correlation scale scores for Size5, firms with 500+ employees, are shown in Table 17. NAICS 332 Fabricated Metal Product Manufacturing is in first place and NAICS 517 Telecommunications holds second place. Altogether 25 industries have scale scores which place them in the top five industry rank.

Table 18: Top Ten Rank¹: Industry Rank Earnings Total Positive Correlation Scale Scores² of Firm Size6, All Firm Sizes.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Machinery Manufacturing	333	1	24
Merchant Wholesalers, Durable Goods	423	1	24
Wholesale Electronic Markets and Agents and Brokers	425	1	24
Telecommunications	517	1	24
Credit Intermediation and Related Activities	522	1	24
Chemical Manufacturing	325	2	23
Building Material and Garden Equipment and Supplies Dealers	444	2	23
Truck Transportation	484	2	23
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	2	23
Waste Management and Remediation Services	562	2	23
Repair and Maintenance	811	2	23
Mining (except Oil and Gas)	212	3	22
Fabricated Metal Product Manufacturing	332	3	22
Miscellaneous Manufacturing	339	3	22
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	3	22
Real Estate	531	3	22
Nursing and Residential Care Facilities	623	3	22
Accommodation	721	3	22
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	3	22
Specialty Trade Contractors	238	4	21
Petroleum and Coal Products Manufacturing	324	4	21
Nonmetallic Mineral Product Manufacturing	327	4	21
Electrical Equipment, Appliance, and Component Manufacturing	335	4	21
Furniture and Home Furnishings Stores	442	4	21
Other Information Services	519	4	21
Insurance Carriers and Related Activities	524	4	21
Hospitals	622	4	21
Food Services and Drinking Places	722	4	21
Construction of Buildings	236	5	20
Heavy and Civil Engineering Construction	237	5	20
Beverage and Tobacco Product Manufacturing	312	5	20
Transportation Equipment Manufacturing	336	5	20
Merchant Wholesalers, Nondurable Goods	424	5	20
Motor Vehicle and Parts Dealers	441	5	20
Food and Beverage Stores	445	5	20
Support Activities for Transportation	488	5	20
Data Processing, Hosting, and Related Services	518	5	20
Monetary Authorities-Central Bank	521	5	20
Rental and Leasing Services	532	5	20
Management of Companies and Enterprises	551	5	20
Administrative and Support Services	561	5	20
Educational Services	611	5	20
Social Assistance	624	5	20
Amusement, Gambling, and Recreation Industries	713	5	20
Private Households	814	5	20
Animal Production and Aquaculture	112	6	19
Computer and Electronic Product Manufacturing	334	6	19
Furniture and Related Product Manufacturing	337	6	19
Gasoline Stations	447	6	19
General Merchandise Stores	452	6	19
Personal and Laundry Services	812	6	19
Food Manufacturing	311	7	18
Printing and Related Support Activities	323	7	18
Health and Personal Care Stores	446	7	18
Air Transportation	481	7	18
Professional, Scientific, and Technical Services	541	7	18
Museums, Historical Sites, and Similar Institutions	712	7	18
Utilities	221	8	17
Plastics and Rubber Products Manufacturing	326	8	17
Electronics and Appliance Stores	443	8	17
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	8	17
Miscellaneous Store Retailers	453	8	17
Nonstore Retailers	454	8	17
Publishing Industries (except Internet)	511	8	17
Paper Manufacturing	322	9	16
Performing Arts, Spectator Sports, and Related Industries	711	9	16
Clothing and Clothing Accessories Stores	448	10	15
Couriers and Messengers	492	10	15

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

In Table 18, five industries occupy the first place in positive earnings correlation scale scores. A similar number occupies the second, third and fourth rank places. The fifth rank has seventeen industries having the same scale score of 20. Altogether 45 industries, just under half, have positive earnings correlation scores that place them in the top five ranks. The entire account of the large number of industries in each of the other five and this aggregated size, Size6, on the positive earnings correlation scale and their ranking may be viewed in Appendix D.

In summary of this section on positive earnings correlations, the earnings of all six industry sizes show a large number of industries demonstrating significant positive correlation scale scores with the four scale items. This is true to a slightly larger extent for this sixth size aggregate of all firm sizes. The possibility proposed at the beginning of Chapter 2 becomes a stronger possibility; that this high degree of positive earnings correlation with the four scale items may be part of most industry earnings moving positively together for other similar and mutual reasons. Therefore, caution should be used in interpreting the individual positive earnings correlation scale score rankings of industries in the six sizes displayed in these tables. It is suggested that the industry earnings score rankings be used as a single indicator of possibly many positive earnings with which a particular industry might take, with change in energy industry earnings and changes in US Rig Counts. Other unknown indicators are likely to exist, and they could be better than using historical changes in our four scale items as indicators.

Negative Earnings Correlations

In this section we identify which industry’s earnings are closely and negatively related to those of energy industries, the earnings of an aggregate of all Oklahoma industries and also negatively related to changes in Baker-Hughes Total Us Land Rig Counts. Below is the smallest firm size used in this analysis, size1, 0 to 19 employees. Industries with negative earnings correlations scale scores are those that have a significant and *opposite* direction movement from those of the four scale items. Since they are so few in number, all industries in each of the six sizes which have significant negative earnings correlated to the four scale scores will be reported in the top five ranked tables.

Table 19 shows the top five Size1 industries ranked for negative correlation scale score values, for firms that have 0 to 19 employees.

Table 19: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size1, 0-19 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Postal Service	491	1	5
Funds, Trusts, and Other Financial Vehicles	525	2	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Only two industries of this size were found to have significant negative earnings correlation scale scores. NAICS 491 Postal Service is ranked first with a score of 5 and NAICS 525 Funds, Trusts, and Other Financial Vehicles with a score of 2 is ranked second. However, both of the scores are rather low, when compared to the top two ranked industries for positive earnings for scale scores in this same size.

Table 20: Industry Rank¹ Earnings Total Correlation Scale Scores² of Firm Size2, 20-49 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Apparel Manufacturing	315	1	11
Scenic and Sightseeing Transportation	487	2	4

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Again in firm Size2 (20 to 49 employees), only two industries were found to have a significant negative earnings scale scores. NAICS 315 Apparel Manufacturing with a scale score of 11 is first in rank and NAICS 487 Scenic and Sightseeing Transportation with a score of 4 is ranked second.

Table 21: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size3, 50-249 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Telecommunications	517	1	17
Broadcasting (except Internet)	515	2	12
Postal Service	491	3	11
Private Households	814	3	11
Forestry and Logging	113	4	3
Funds, Trusts, and Other Financial Vehicles	525	4	3

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 21 displaying size3 firms (50 to 249 employees), reveals that six industries have significant negative earnings scale scores. NAICS 517 Telecommunications is ranked first and NAICS 515 Broadcasting (except Internet) is ranked second. NAICS 491 Postal Service and NAICS 814 Private Households are a close third with scale scores of 11.

Table 23: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Textile Product Mills	314	1	5
Textile Mills	313	2	4

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Size4 firms, (250 to 499 employees) are shown in Table 22 to have eight firms with significant negative earnings correlation scales scores. NAICS 339 Miscellaneous Manufacturing is ranked first with the score 12, double the score of NAICS 323 Printing and Related Support Activities ranked second with a score of 6. NAICS 445 Food and Beverage Stores and NAICS 481 Air Transportation are tied for third position, with a score of four.

Table 23: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Textile Product Mills	314	1	5
Textile Mills	313	2	4

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 23 shows the negative earnings correlation scale scores for size5 (500+ employees). Only two firms of this size show negative earnings scale scores. NAICS 314 Textile Product Mills is ranked first with a scale score of 5 and NAICS 313 Textile Mills industry is ranked second with a scale score of 4.

Table 24: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size6, All Firm Sizes.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
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Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

No Significant Negative Earnings Correlations with our scale items in this size.

Firm Size6 is an aggregate of all firm sizes. Table 24 shows that firm Size6 has no firms with negative earnings correlation score with our four scale items.

Summary and Conclusions

Summary

When investigating employment, this analysis determined that when broken down by firm size, a large number and percent of Oklahoma industries had positive high employment correlation scale scores. However of equal importance it was found that when broken down by firm size that only a slightly smaller number of Oklahoma industries had negative and high employment correlation scale scores, than did the number having positive scores. A comparison of the employment positive scale scores for five firm sizes with that of the sixth all firm size aggregate determined only a slightly smaller number of industries in the five sizes had positive scores than the sixth aggregate of all firm sizes. Furthermore, each of the six firm sizes had a different list of industries, having different rank, in each of the six sizes. A comparison of the employment negative scale scores between the five sizes and the sixth aggregate size determined an identical description as the positive, that being that the five sizes were slightly smaller in number of industries than the aggregate of firm sizes, and that each of the sizes had different industries of different rank in each of the six sizes

In regard to examination of earnings, this analysis determined that when broken down by firm size, a large number and percent of Oklahoma industries had positive high earnings correlation scale scores, an even larger number than those found for the same size for employment. A comparison of the earnings positive scaled score of the five firm size industries with the sixth aggregate of all Oklahoma firm sizes, determined only a slightly smaller number of industries in the five sizes than in the sixth aggregate. Again with earnings as it was with employment, each of the six firm sizes had a different list of industries, having different rank, in each of the six sizes. Only a small number of Oklahoma industries in each of the five sizes were determined to have negative earnings correlation scale scores. Three firm sizes were found to have two industries with negative earnings correlation scale scores, with firm size3 found to have six industries and firm size4 found to have eight industries with negative earnings correlation scale scores. There were no industries with negative earnings scores in size6, the aggregate of all firm sizes. It was also determined that the industries in each of the six firm sizes, which had positive earnings were generally different than those that had positive employment scores in the same firm size.

Finally, this analysis determined that Total US Land Rig Counts were also a good energy related indicator of positive and negative employment changes and of positive earnings changes. However, as with the other three scale items, Bake-Hughes state rig counts for Oklahoma detected only a few industries that had negatively-related earnings to rig counts, in any of the six size firms.

Conclusions

The six major findings and conclusions which can be drawn from this analysis can be summed as follows:

- Historical data of Oklahoma employment in the state's two energy industries (NAICS 211 Oil & Gas Extraction and NAICS 213 Support Activities for Mining) are good indicators of changes in employment in many other Oklahoma industries.
- The historical earnings data of the states two energy industries is also a good indicator of changes in many other Oklahoma industries earnings, however they detect that only a few industries in each size has negative related earnings changes.

- Baker-Hughes Total US Land Rig Counts is also a good predictor of positive and negative changes in many other Oklahoma industries employment, positive changes in earnings, while detecting that only a few industries in each size having negatively-related earnings changes.
- Baker-Hughes Oklahoma state rig counts are of little value in predicting changes in Oklahoma industry employment and earnings.
- When compared to Oklahoma's two energy industries employment, only slightly fewer numbers of Oklahoma industries' employment move in a negative or opposite direction than those whose employment move in a coordinative positive or same direction. On the other hand, in a similar comparison of energy industries earnings, only a few Oklahoma industries' earnings move in a negative or opposite direction.
- Both industry employment and earnings must be broken down and examined by firm size in order to accurately determine employment and earning changes, because an examination of the aggregate of each alone could result in misleading understanding and conclusions, concerning energy industries' relationship to other Oklahoma industries. This sixth finding is likely the major finding of this study.

When considering and applying the results of this analysis; there are some concerns that must be heeded. The method of analysis does not in any way determine causation, nor can the directions of causation be implied. There are likely unknown, endogenous variables and perhaps spurious relationships that were beyond the scope of this analysis to investigate or control. Simply put, this analysis is a study of state energy industry employment and earnings correlative relationships to other Oklahoma state industries, an evaluation to determine their and Total US Land Rig Counts value as indicators of future changes in industry employment and earnings.

Finally, this analysis is not considered to be a definitive conclusion to investigations of energy state's energy industries' relation to changes in other state industries, but rather it may be a beginning point for future investigation of this relationship in other energy states, using breakdowns by firm size. A frank criticism of this investigation is in regard to the two designed and constructed employment and earning correlation scales. In future investigations, these could be tweaked by perhaps separating the two energy scale items from the aggregate of all firm sizes scale item, not doing them concurrently at the same time. A clearer and more qualitative result may thereby be obtained.

Appendix A

Industry Rank Employment Tables: Positive Correlation Scale Scores by Firm Size

Positive Employment Correlation Scale Score Totals for Firm Size1, 0 – 19 Employees

Table 25: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size1, 0-19 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Couriers and Messengers	492	1	26
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	2	24
Accommodation	721	3	23
Professional, Scientific, and Technical Services	541	4	21
Repair and Maintenance	811	4	21
Ambulatory Health Care Services	621	5	19
Food Services and Drinking Places	722	5	19
Truck Transportation	484	6	18
Educational Services	611	6	18
Food Manufacturing	311	7	17
Merchant Wholesalers, Nondurable Goods	424	7	17
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	7	17
Administrative and Support Services	561	7	17
Museums, Historical Sites, and Similar Institutions	712	7	17
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	8	15
Gasoline Stations	447	9	14
Support Activities for Transportation	488	9	14
Insurance Carriers and Related Activities	524	9	14
Utilities	221	10	13
Textile Mills	313	10	13
Real Estate	531	11	11
Animal Production and Aquaculture	112	12	10
Wholesale Electronic Markets and Agents and Brokers	425	12	10
Personal and Laundry Services	812	13	9
Social Assistance	624	14	8
Beverage and Tobacco Product Manufacturing	312	15	7
Fishing, Hunting and Trapping	114	16	4
Leather and Allied Product Manufacturing	316	16	4
Fabricated Metal Product Manufacturing	332	16	4
Specialty Trade Contractors	238	17	3
Publishing Industries (except Internet)	511	18	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Employment Correlation Scale Score Totals for Firm Size2, 20 – 49 Employees

Table 26: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size2, 20-49 Employees.

Industry Title	3-digit NAICS Industry	Rank¹	Industry Positive Total
Accommodation	721	1	24
Fabricated Metal Product Manufacturing	332	2	23
Repair and Maintenance	811	2	23
Crop Production	111	3	22
Food Services and Drinking Places	722	4	18
Leather and Allied Product Manufacturing	316	5	17
Support Activities for Transportation	488	6	16
Social Assistance	624	6	16
Administrative and Support Services	561	7	15
Ambulatory Health Care Services	621	7	15
Primary Metal Manufacturing	331	8	14
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	9	13
Rental and Leasing Services	532	9	13
Paper Manufacturing	322	10	12
Miscellaneous Manufacturing	339	10	12
Professional, Scientific, and Technical Services	541	10	12
Electrical Equipment, Appliance, and Component Manufacturing	335	11	11
Publishing Industries (except Internet)	511	11	11
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	12	6
Museums, Historical Sites, and Similar Institutions	712	12	6
Heavy and Civil Engineering Construction	237	13	5
Wholesale Electronic Markets and Agents and Brokers	425	13	5
Gasoline Stations	447	13	5
Forestry and Logging	113	14	3
Specialty Trade Contractors	238	14	3
Plastics and Rubber Products Manufacturing	326	15	2
Machinery Manufacturing	333	15	2
Insurance Carriers and Related Activities	524	15	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Employment Correlation Scale Totals for Firm Size3, 50 – 249 Employees

Table 27: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size3, 50-249 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Professional, Scientific, and Technical Services	541	1	23
Food Services and Drinking Places	722	2	23
Specialty Trade Contractors	238	3	22
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	3	22
Heavy and Civil Engineering Construction	237	4	21
Building Material and Garden Equipment and Supplies Dealers	444	4	21
Air Transportation	481	4	21
Museums, Historical Sites, and Similar Institutions	712	4	21
Insurance Carriers and Related Activities	524	5	18
Rental and Leasing Services	532	5	18
Truck Transportation	484	6	17
Wholesale Electronic Markets and Agents and Brokers	425	7	16
Pipeline Transportation	486	7	16
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	7	16
Social Assistance	624	7	16
Personal and Laundry Services	812	7	16
Fabricated Metal Product Manufacturing	332	8	15
Transportation Equipment Manufacturing	336	9	14
Nonstore Retailers	454	9	14
Animal Production and Aquaculture	112	10	12
Machinery Manufacturing	333	10	12
Electrical Equipment, Appliance, and Component Manufacturing	335	10	12
Ambulatory Health Care Services	621	11	11
Merchant Wholesalers, Durable Goods	423	12	10
Motor Vehicle and Parts Dealers	441	12	10
Utilities	221	13	8
Construction of Buildings	236	13	8
Primary Metal Manufacturing	331	13	8
Merchant Wholesalers, Nondurable Goods	424	13	8
Real Estate	531	14	6
Private Households	814	14	6
Health and Personal Care Stores	446	15	4
Motion Picture and Sound Recording Industries	512	15	4
Credit Intermediation and Related Activities	522	15	4
Apparel Manufacturing	315	16	3
Waste Management and Remediation Services	562	16	3
Performing Arts, Spectator Sports, and Related Industries	711	16	3
Nonmetallic Mineral Product Manufacturing	327	17	2
Data Processing, Hosting, and Related Services	518	17	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Employment Correlation Scale Totals for Firm Size4, 250 – 499 Employees

Table 28: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size4, 250-499 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Transit and Ground Passenger Transportation	485	1	27
Heavy and Civil Engineering Construction	237	2	25
Merchant Wholesalers, Durable Goods	423	2	25
Rental and Leasing Services	532	3	22
Warehousing and Storage	493	4	21
Primary Metal Manufacturing	331	5	19
Credit Intermediation and Related Activities	522	5	19
Repair and Maintenance	811	5	19
Real Estate	531	6	16
Specialty Trade Contractors	238	7	15
Electronics and Appliance Stores	443	8	14
Air Transportation	481	8	14
Fabricated Metal Product Manufacturing	332	9	13
Machinery Manufacturing	333	9	13
Miscellaneous Manufacturing	339	9	13
Clothing and Clothing Accessories Stores	448	10	11
Administrative and Support Services	561	11	10
Hospitals	622	12	9
Mining (except Oil and Gas)	212	13	8
Furniture and Home Furnishings Stores	442	13	8
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	13	8
Truck Transportation	484	13	8
Performing Arts, Spectator Sports, and Related Industries	711	13	8
Motion Picture and Sound Recording Industries	512	14	7
Telecommunications	517	14	7
Educational Services	611	14	7
Food Services and Drinking Places	722	14	7
Merchant Wholesalers, Nondurable Goods	424	15	5
Gasoline Stations	447	16	3
Professional, Scientific, and Technical Services	541	16	3
Computer and Electronic Product Manufacturing	334	17	2
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	17	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Employment Correlation Scale Totals for Firm Size5, 500+ Employees

Table 29: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Machinery Manufacturing	333	1	28
Merchant Wholesalers, Durable Goods	423	2	26
Management of Companies and Enterprises	551	3	23
Repair and Maintenance	811	3	23
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	4	22
Hospitals	622	4	22
Building Material and Garden Equipment and Supplies Dealers	444	5	21
Professional, Scientific, and Technical Services	541	6	20
Ambulatory Health Care Services	621	6	20
Food Services and Drinking Places	722	6	20
Heavy and Civil Engineering Construction	237	7	19
Printing and Related Support Activities	323	7	19
Chemical Manufacturing	325	7	19
Support Activities for Transportation	488	7	19
Furniture and Home Furnishings Stores	442	8	18
Health and Personal Care Stores	446	8	18
Other Information Services	519	9	17
Credit Intermediation and Related Activities	522	9	17
Amusement, Gambling, and Recreation Industries	713	10	16
Warehousing and Storage	493	11	15
Gasoline Stations	447	12	14
Clothing and Clothing Accessories Stores	448	12	14
Social Assistance	624	12	14
Pipeline Transportation	486	13	13
Merchant Wholesalers, Nondurable Goods	424	13	12
Wholesale Electronic Markets and Agents and Brokers	425	13	12
Construction of Buildings	236	14	10
Specialty Trade Contractors	238	14	10
Beverage and Tobacco Product Manufacturing	312	14	10
Animal Production and Aquaculture	112	15	9
Couriers and Messengers	492	15	9
Utilities	221	16	8
Motor Vehicle and Parts Dealers	441	17	7
General Merchandise Stores	452	17	7
Administrative and Support Services	561	17	7
Waste Management and Remediation Services	562	18	6
Leather and Allied Product Manufacturing	316	19	5
Nursing and Residential Care Facilities	623	19	5
Miscellaneous Store Retailers	453	20	4
Truck Transportation	484	21	3
Educational Services	611	22	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Employment Correlation Scale Totals for Firm Size6, All Firm Sizes

Table 30: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size6, All Firm Sizes.

Industry Title	3-digit NAICS Industry	Rank¹	Industry Positive Total
Repair and Maintenance	811	1	28
Professional, Scientific, and Technical Services	541	2	27
Machinery Manufacturing	333	3	25
Heavy and Civil Engineering Construction	237	4	24
Merchant Wholesalers, Durable Goods	423	4	24
Museums, Historical Sites, and Similar Institutions	712	4	24
Accommodation	721	4	24
Food Services and Drinking Places	722	5	23
Warehousing and Storage	493	6	22
Management of Companies and Enterprises	551	6	22
Electronics and Appliance Stores	443	7	21
Health and Personal Care Stores	446	7	21
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	7	21
Hospitals	622	7	21
Support Activities for Transportation	488	8	20
Ambulatory Health Care Services	621	8	20
Chemical Manufacturing	325	9	19
Gasoline Stations	447	9	19
Transit and Ground Passenger Transportation	485	9	19
Social Assistance	624	9	19
Building Material and Garden Equipment and Supplies Dealers	444	10	18
Fabricated Metal Product Manufacturing	332	11	17
Specialty Trade Contractors	238	12	16
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	13	15
Wholesale Electronic Markets and Agents and Brokers	425	14	14
Textile Mills	313	15	13
Truck Transportation	484	15	13
Pipeline Transportation	486	15	13
Administrative and Support Services	561	16	12
Waste Management and Remediation Services	562	17	11
Educational Services	611	17	11
Performing Arts, Spectator Sports, and Related Industries	711	17	11
Animal Production and Aquaculture	112	18	10
Beverage and Tobacco Product Manufacturing	312	18	10
Primary Metal Manufacturing	331	18	10
Furniture and Home Furnishings Stores	442	18	10
Clothing and Clothing Accessories Stores	448	19	9
Credit Intermediation and Related Activities	522	19	9
Utilities	221	20	7
Rail Transportation	482	20	7
Couriers and Messengers	492	20	7
Motor Vehicle and Parts Dealers	441	21	5
Construction of Buildings	236	22	4
General Merchandise Stores	452	22	4
Postal Service	491	22	4

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Appendix B

Industry Rank Employment Tables: Negative Correlation Scale Scores by Firm Size

Negative Employment Correlation Scale Score Totals for Firm Size1, 0 – 19 Employees

Table 31: Industry Rank¹ Employment Total Negative Correlation Scale Scores² of Firm Size1, 0-19 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Private Households	814	1	24
Electronics and Appliance Stores	443	2	22
Apparel Manufacturing	315	3	20
Printing and Related Support Activities	323	4	19
Credit Intermediation and Related Activities	522	5	17
Air Transportation	481	6	16
Funds, Trusts, and Other Financial Vehicles	525	6	16
General Merchandise Stores	452	7	15
Textile Product Mills	314	8	14
Support Activities for Agriculture and Forestry	115	9	13
Miscellaneous Store Retailers	453	9	13
Data Processing, Hosting, and Related Services	518	9	13
Plastics and Rubber Products Manufacturing	326	10	12
Machinery Manufacturing	333	11	11
Warehousing and Storage	493	11	11
Building Material and Garden Equipment and Supplies Dealers	444	12	10
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	12	10
Forestry and Logging	113	13	9
Electrical Equipment, Appliance, and Component Manufacturing	335	14	7
Motor Vehicle and Parts Dealers	441	14	7
Furniture and Home Furnishings Stores	442	14	7
Food and Beverage Stores	445	14	7
Postal Service	491	14	7
Waste Management and Remediation Services	562	14	7
Wood Product Manufacturing	321	15	6
Paper Manufacturing	322	15	6
Primary Metal Manufacturing	331	15	6
Pipeline Transportation	486	15	6
Computer and Electronic Product Manufacturing	334	16	5
Merchant Wholesalers, Durable Goods	423	17	4
Telecommunications	517	17	4
Chemical Manufacturing	325	18	3
Motion Picture and Sound Recording Industries	512	19	3
Construction of Buildings	236	20	2
Heavy and Civil Engineering Construction	237	20	2
Petroleum and Coal Products Manufacturing	324	20	2
Nonmetallic Mineral Product Manufacturing	327	20	2
Miscellaneous Manufacturing	339	20	2
Nursing and Residential Care Facilities	623	20	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Employment Correlation Scale Score Totals for Firm Size2, 20 – 49 Employees

Table 32: Industry Rank¹ Employment Total Negative Correlation Scale Scores² of Firm Size2, 20-49 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Credit Intermediation and Related Activities	522	1	20
General Merchandise Stores	452	2	19
Couriers and Messengers	492	3	18
Furniture and Related Product Manufacturing	337	4	17
Miscellaneous Store Retailers	453	4	17
Health and Personal Care Stores	446	5	14
Nonmetallic Mineral Product Manufacturing	327	6	13
Broadcasting (except Internet)	515	6	13
Printing and Related Support Activities	323	7	12
Computer and Electronic Product Manufacturing	334	7	12
Furniture and Home Furnishings Stores	442	7	12
Electronics and Appliance Stores	443	7	12
Building Material and Garden Equipment and Supplies Dealers	444	7	12
Data Processing, Hosting, and Related Services	518	7	12
Food and Beverage Stores	445	8	11
Merchant Wholesalers, Nondurable Goods	424	9	10
Animal Production and Aquaculture	112	10	9
Real Estate	531	11	8
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	11	8
Support Activities for Agriculture and Forestry	115	12	6
Construction of Buildings	236	13	6
Motor Vehicle and Parts Dealers	441	13	6
Apparel Manufacturing	315	14	4
Other Information Services	519	14	4
Mining (except Oil and Gas)	212	15	3
Wood Product Manufacturing	321	15	3
Textile Product Mills	314	16	2
Transportation Equipment Manufacturing	336	16	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Employment Correlation Scale Totals for Firm Size3, 50 – 249 Employees

Table 33: Industry Rank¹ Employment Total Negative Correlation Scale Scores² of Firm Size3, 50-249 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Wood Product Manufacturing	321	1	20
Food and Beverage Stores	445	2	16
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	3	16
Hospitals	622	4	14
Forestry and Logging	113	5	13
Miscellaneous Manufacturing	339	5	13
Printing and Related Support Activities	323	6	12
Broadcasting (except Internet)	515	7	11
Crop Production	111	8	10
Support Activities for Agriculture and Forestry	115	9	8
Beverage and Tobacco Product Manufacturing	312	9	8
Petroleum and Coal Products Manufacturing	324	9	8
Furniture and Related Product Manufacturing	337	9	8
General Merchandise Stores	452	9	8
Management of Companies and Enterprises	551	9	8
Leather and Allied Product Manufacturing	316	10	7
Gasoline Stations	447	10	7
Telecommunications	517	11	5
Repair and Maintenance	811	12	4
Food Manufacturing	311	13	3
Chemical Manufacturing	325	13	3
Nursing and Residential Care Facilities	623	13	3
Warehousing and Storage	493	14	2
Other Information Services	519	14	2
Accommodation	721	14	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Employment Correlation Scale Totals for Firm Size4, 250 – 499 Employees

Table 34: Industry Rank¹ Employment Total Negative Correlation Scale Scores² of Firm Size4, 250-499 Employees.

Industry Title	3-digit NAICS Industry	Rank¹	Industry Positive Total
Wood Product Manufacturing	321	1	18
Air Transportation	481	1	18
Nursing and Residential Care Facilities	623	2	17
Crop Production	111	3	16
Data Processing, Hosting, and Related Services	518	4	15
Wholesale Electronic Markets and Agents and Brokers	425	5	12
Plastics and Rubber Products Manufacturing	326	6	10
Transportation Equipment Manufacturing	336	7	9
Amusement, Gambling, and Recreation Industries	713	7	9
Health and Personal Care Stores	446	8	8
Utilities	221	9	7
Electrical Equipment, Appliance, and Component Manufacturing	335	9	7
Accommodation	721	9	7
Couriers and Messengers	492	10	5
Other Information Services	519	10	5
Construction of Buildings	236	11	4
General Merchandise Stores	452	11	4
Telecommunications	517	11	4
Food Manufacturing	311	12	3
Animal Production and Aquaculture	112	13	2
Printing and Related Support Activities	323	13	2
Food and Beverage Stores	445	13	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Employment Correlation Scale Totals for Firm Size5, 500+ Employees

Table 35: Industry Rank¹ Employment Total Negative Correlation Scale² Scores of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Real Estate	531	1	24
Private Households	814	2	22
Textile Product Mills	314	3	20
Electronics and Appliance Stores	443	3	20
Broadcasting (except Internet)	515	3	20
Data Processing, Hosting, and Related Services	518	4	19
Telecommunications	517	5	18
Wood Product Manufacturing	321	6	17
Miscellaneous Manufacturing	339	6	17
Nonstore Retailers	454	7	16
Funds, Trusts, and Other Financial Vehicles	525	8	15
Electrical Equipment, Appliance, and Component Manufacturing	335	9	14
Publishing Industries (except Internet)	511	9	14
Paper Manufacturing	322	10	13
Insurance Carriers and Related Activities	524	10	13
Food Manufacturing	311	11	12
Air Transportation	481	12	10
Rental and Leasing Services	532	12	10
Nonmetallic Mineral Product Manufacturing	327	13	9
Support Activities for Agriculture and Forestry	115	14	8
Primary Metal Manufacturing	331	15	5
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	15	5
Mining (except Oil and Gas)	212	16	4
Postal Service	491	16	4
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	16	4
Apparel Manufacturing	315	17	3
Motion Picture and Sound Recording Industries	512	17	3
Accommodation	721	17	3
Crop Production	111	18	2
Transportation Equipment Manufacturing	336	18	2
Performing Arts, Spectator Sports, and Related Industries	711	18	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Employment Correlation Scale Totals for Firm Size6, All Firm Sizes

Table 36: Industry Rank¹ Employment Total Negative Correlation Scale Scores² of Firm Size6, All Firm Sizes.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Private Households	814	1	24
Data Processing, Hosting, and Related Services	518	2	23
Broadcasting (except Internet)	515	3	21
Printing and Related Support Activities	323	4	20
Funds, Trusts, and Other Financial Vehicles	525	4	20
Forestry and Logging	113	5	18
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	5	18
Miscellaneous Manufacturing	339	6	16
Telecommunications	517	6	16
Nursing and Residential Care Facilities	623	6	16
Wood Product Manufacturing	321	7	15
Insurance Carriers and Related Activities	524	8	14
Miscellaneous Store Retailers	453	9	13
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	9	13
Support Activities for Agriculture and Forestry	115	10	12
Apparel Manufacturing	315	11	11
Crop Production	111	12	10
Food Manufacturing	311	12	10
Leather and Allied Product Manufacturing	316	12	10
Publishing Industries (except Internet)	511	12	10
Nonmetallic Mineral Product Manufacturing	327	13	9
Air Transportation	481	13	9
Paper Manufacturing	322	14	8
Food and Beverage Stores	445	14	8
Electrical Equipment, Appliance, and Component Manufacturing	335	15	7
Rental and Leasing Services	532	15	7
Plastics and Rubber Products Manufacturing	326	16	6
Merchant Wholesalers, Nondurable Goods	424	16	6
Monetary Authorities-Central Bank	521	16	6
Real Estate	531	16	6
Furniture and Related Product Manufacturing	337	17	5
Mining (except Oil and Gas)	212	18	4
Computer and Electronic Product Manufacturing	334	19	3
Petroleum and Coal Products Manufacturing	324	20	2
Transportation Equipment Manufacturing	336	20	2
Motion Picture and Sound Recording Industries	512	20	2
Personal and Laundry Services	812	20	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Appendix C

Industry Rank Earnings Tables: Positive Correlation Scale Scores by Firm Size

Positive Earnings Correlation Scale Score Totals for Firm Size1, 0 – 19 Employees

Table 37: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size1, 0-19 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Truck Transportation	484	1	27
General Merchandise Stores	452	2	23
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	2	23
Repair and Maintenance	811	3	22
Fabricated Metal Product Manufacturing	332	4	21
Motor Vehicle and Parts Dealers	441	4	21
Furniture and Home Furnishings Stores	442	4	21
Data Processing, Hosting, and Related Services	518	4	21
Accommodation	721	4	21
Food Services and Drinking Places	722	4	21
Personal and Laundry Services	812	4	21
Private Households	814	4	21
Heavy and Civil Engineering Construction	237	5	20
Merchant Wholesalers, Nondurable Goods	424	5	20
Food and Beverage Stores	445	5	20
Gasoline Stations	447	5	20
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	5	20
Warehousing and Storage	493	5	20
Waste Management and Remediation Services	562	5	20
Construction of Buildings	236	6	19
Specialty Trade Contractors	238	6	19
Furniture and Related Product Manufacturing	337	6	19
Merchant Wholesalers, Durable Goods	423	6	19
Health and Personal Care Stores	446	6	19
Miscellaneous Store Retailers	453	6	19
Publishing Industries (except Internet)	511	6	19
Motion Picture and Sound Recording Industries	512	6	19
Other Information Services	519	6	19
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	6	19
Rental and Leasing Services	532	6	19
Building Material and Garden Equipment and Supplies Dealers	444	7	18
Nonstore Retailers	454	7	18
Insurance Carriers and Related Activities	524	7	18
Real Estate	531	7	18
Nursing and Residential Care Facilities	623	7	18
Social Assistance	624	7	18
Amusement, Gambling, and Recreation Industries	713	7	18
Animal Production and Aquaculture	112	8	17
Leather and Allied Product Manufacturing	316	8	17
Wood Product Manufacturing	321	8	17
Printing and Related Support Activities	323	8	17
Chemical Manufacturing	325	8	17
Miscellaneous Manufacturing	339	8	17
Air Transportation	481	8	17
Administrative and Support Services	561	8	17
Museums, Historical Sites, and Similar Institutions	712	8	17
Crop Production	111	9	16
Machinery Manufacturing	333	9	16
Support Activities for Transportation	488	9	16

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 37: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size1, 0-19 Employees (continued).

Industry Title	3-digit NAICS Industry	Rank¹	Industry Positive Total
Couriers and Messengers	492	9	16
Electrical Equipment, Appliance, and Component Manufacturing	335	10	15
Clothing and Clothing Accessories Stores	448	10	15
Professional, Scientific, and Technical Services	541	10	15
Mining (except Oil and Gas)	212	11	14
Textile Mills	313	11	14
Plastics and Rubber Products Manufacturing	326	11	14
Wholesale Electronic Markets and Agents and Brokers	425	11	14
Forestry and Logging	113	12	13
Primary Metal Manufacturing	331	12	13
Management of Companies and Enterprises	551	12	13
Computer and Electronic Product Manufacturing	334	13	12
Telecommunications	517	13	12
Educational Services	611	13	12
Support Activities for Agriculture and Forestry	115	14	11
Utilities	221	14	11
Credit Intermediation and Related Activities	522	14	11
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	14	11
Textile Product Mills	314	15	10
Monetary Authorities-Central Bank	521	16	9
Performing Arts, Spectator Sports, and Related Industries	711	16	9
Food Manufacturing	311	17	8
Apparel Manufacturing	315	17	8
Ambulatory Health Care Services	621	17	8
Hospitals	622	17	8
Nonmetallic Mineral Product Manufacturing	327	18	7
Transportation Equipment Manufacturing	336	19	6
Transit and Ground Passenger Transportation	485	19	6
Rail Transportation	482	20	4
Pipeline Transportation	486	21	3
Petroleum and Coal Products Manufacturing	324	22	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Earnings Correlation Scale Score Totals for Firm Size2, 20 – 49 Employees

Table 38: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size2, 20-49 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Food Manufacturing	311	1	21
Health and Personal Care Stores	446	1	21
Nonstore Retailers	454	1	21
Support Activities for Transportation	488	1	21
Waste Management and Remediation Services	562	1	21
Merchant Wholesalers, Nondurable Goods	424	2	20
Motor Vehicle and Parts Dealers	441	2	20
Gasoline Stations	447	2	20
Real Estate	531	2	20
Food Services and Drinking Places	722	2	20
Specialty Trade Contractors	238	3	19
Textile Product Mills	314	3	19
Nonmetallic Mineral Product Manufacturing	327	3	19
Fabricated Metal Product Manufacturing	332	3	19
Transportation Equipment Manufacturing	336	3	19
Furniture and Home Furnishings Stores	442	3	19
Accommodation	721	3	19
Repair and Maintenance	811	3	19
Personal and Laundry Services	812	3	19
Construction of Buildings	236	4	18
Plastics and Rubber Products Manufacturing	326	4	18
Nursing and Residential Care Facilities	623	4	18
Social Assistance	624	4	18
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	4	18
Chemical Manufacturing	325	5	17
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	5	17
Broadcasting (except Internet)	515	5	17
Credit Intermediation and Related Activities	522	5	17
Rental and Leasing Services	532	5	17
Machinery Manufacturing	333	6	16
Merchant Wholesalers, Durable Goods	423	6	16
Wholesale Electronic Markets and Agents and Brokers	425	6	16
Administrative and Support Services	561	6	16
Crop Production	111	7	15
Heavy and Civil Engineering Construction	237	7	15
Food and Beverage Stores	445	7	15
Publishing Industries (except Internet)	511	7	15
Printing and Related Support Activities	323	8	14
Building Material and Garden Equipment and Supplies Dealers	444	8	14
Paper Manufacturing	322	9	13
Miscellaneous Manufacturing	339	9	13
Truck Transportation	484	9	13
Warehousing and Storage	493	9	13
Insurance Carriers and Related Activities	524	9	13
Forestry and Logging	113	10	12
Support Activities for Agriculture and Forestry	115	10	12
Support Activities for Mining	213	10	12
Telecommunications	517	10	12
Museums, Historical Sites, and Similar Institutions	712	10	12

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 38: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size², 20-49 Employees (continued).

Industry Title	3-digit NAICS Industry	Rank¹	Industry Positive Total
Beverage and Tobacco Product Manufacturing	312	11	11
Air Transportation	481	11	11
Management of Companies and Enterprises	551	11	11
Animal Production and Aquaculture	112	12	10
Miscellaneous Store Retailers	453	12	10
Professional, Scientific, and Technical Services	541	12	10
Educational Services	611	12	10
Computer and Electronic Product Manufacturing	334	13	9
Private Households	814	13	9
Data Processing, Hosting, and Related Services	518	14	8
Primary Metal Manufacturing	331	15	7
Furniture and Related Product Manufacturing	337	15	7
Clothing and Clothing Accessories Stores	448	15	7
Mining (except Oil and Gas)	212	16	6
Petroleum and Coal Products Manufacturing	324	16	6
Ambulatory Health Care Services	621	16	6
Amusement, Gambling, and Recreation Industries	713	16	6
Electrical Equipment, Appliance, and Component Manufacturing	335	17	5
Wood Product Manufacturing	321	18	4
General Merchandise Stores	452	18	4
Scenic and Sightseeing Transportation	487	18	4
Transit and Ground Passenger Transportation	485	19	3
Motion Picture and Sound Recording Industries	512	19	3
Other Information Services	519	20	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Earnings Correlation Scale Totals for Firm Size3, 50 – 249 Employees

Table 39: Industry Rank¹ Earnings Total Positive Correlation Scale Scores², of Firm Size3, 50-249 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Specialty Trade Contractors	238	1	23
Insurance Carriers and Related Activities	524	1	23
Credit Intermediation and Related Activities	522	2	22
Management of Companies and Enterprises	551	2	22
Machinery Manufacturing	333	3	21
Gasoline Stations	447	3	21
Administrative and Support Services	561	3	21
Nursing and Residential Care Facilities	623	3	21
Food Services and Drinking Places	722	3	21
Repair and Maintenance	811	3	21
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	3	21
Leather and Allied Product Manufacturing	316	4	20
Miscellaneous Manufacturing	339	4	20
Merchant Wholesalers, Nondurable Goods	424	4	20
Motor Vehicle and Parts Dealers	441	4	20
Social Assistance	624	4	20
Accommodation	721	4	20
Utilities	221	5	19
Chemical Manufacturing	325	5	19
Merchant Wholesalers, Durable Goods	423	5	19
Wholesale Electronic Markets and Agents and Brokers	425	5	19
Rental and Leasing Services	532	5	19
Educational Services	611	5	19
Personal and Laundry Services	812	5	19
Construction of Buildings	236	6	18
Heavy and Civil Engineering Construction	237	6	18
Beverage and Tobacco Product Manufacturing	312	6	18
Fabricated Metal Product Manufacturing	332	6	18
Transportation Equipment Manufacturing	336	6	18
Building Material and Garden Equipment and Supplies Dealers	444	6	18
Mining (except Oil and Gas)	212	7	17
Food Manufacturing	311	7	17
Health and Personal Care Stores	446	7	17
Real Estate	531	7	17
Hospitals	622	7	17
Animal Production and Aquaculture	112	8	16
Paper Manufacturing	322	8	16
Plastics and Rubber Products Manufacturing	326	8	16
Nonmetallic Mineral Product Manufacturing	327	8	16
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	8	16
Museums, Historical Sites, and Similar Institutions	712	8	16
Furniture and Home Furnishings Stores	442	9	15
Truck Transportation	484	9	15
Transit and Ground Passenger Transportation	485	9	15
Data Processing, Hosting, and Related Services	518	9	15
Crop Production	111	10	14
Computer and Electronic Product Manufacturing	334	10	14
Warehousing and Storage	493	10	14
Electrical Equipment, Appliance, and Component Manufacturing	335	11	13

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 39: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size³, 50-249 Employees (continued).

Industry Title	3-digit NAICS Industry	Rank²	Industry Positive Total
Waste Management and Remediation Services	562	11	13
Petroleum and Coal Products Manufacturing	324	12	12
Clothing and Clothing Accessories Stores	448	12	12
Air Transportation	481	12	12
Other Information Services	519	12	12
Primary Metal Manufacturing	331	13	11
Furniture and Related Product Manufacturing	337	13	11
Food and Beverage Stores	445	13	11
General Merchandise Stores	452	13	11
Professional, Scientific, and Technical Services	541	13	11
Ambulatory Health Care Services	621	13	11
Support Activities for Transportation	488	14	8
Amusement, Gambling, and Recreation Industries	713	14	8
Support Activities for Agriculture and Forestry	115	15	7
Apparel Manufacturing	315	15	7
Printing and Related Support Activities	323	15	7
Nonstore Retailers	454	16	6
Textile Product Mills	314	17	5
Wood Product Manufacturing	321	18	2
Motion Picture and Sound Recording Industries	512	18	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Earnings Correlation Scale Totals for Firm Size4, 250 – 499 Employees

Table 40: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size4, 250-499 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Truck Transportation	484	1	27
General Merchandise Stores	452	2	23
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	2	23
Repair and Maintenance	811	3	22
Fabricated Metal Product Manufacturing	332	4	21
Motor Vehicle and Parts Dealers	441	4	21
Furniture and Home Furnishings Stores	442	4	21
Data Processing, Hosting, and Related Services	518	4	21
Accommodation	721	4	21
Food Services and Drinking Places	722	4	21
Personal and Laundry Services	812	4	21
Private Households	814	4	21
Heavy and Civil Engineering Construction	237	5	20
Merchant Wholesalers, Nondurable Goods	424	5	20
Food and Beverage Stores	445	5	20
Gasoline Stations	447	5	20
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	5	20
Warehousing and Storage	493	5	20
Waste Management and Remediation Services	562	5	20
Construction of Buildings	236	6	19
Specialty Trade Contractors	238	6	19
Furniture and Related Product Manufacturing	337	6	19
Merchant Wholesalers, Durable Goods	423	6	19
Health and Personal Care Stores	446	6	19
Miscellaneous Store Retailers	453	6	19
Publishing Industries (except Internet)	511	6	19
Motion Picture and Sound Recording Industries	512	6	19
Other Information Services	519	6	19
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	6	19
Rental and Leasing Services	532	6	19
Building Material and Garden Equipment and Supplies Dealers	444	7	18
Nonstore Retailers	454	7	18
Insurance Carriers and Related Activities	524	7	18
Real Estate	531	7	18
Nursing and Residential Care Facilities	623	7	18
Social Assistance	624	7	18
Amusement, Gambling, and Recreation Industries	713	7	18
Animal Production and Aquaculture	112	8	17
Leather and Allied Product Manufacturing	316	8	17
Wood Product Manufacturing	321	8	17
Printing and Related Support Activities	323	8	17
Chemical Manufacturing	325	8	17
Miscellaneous Manufacturing	339	8	17
Air Transportation	481	8	17
Administrative and Support Services	561	8	17
Museums, Historical Sites, and Similar Institutions	712	8	17
Crop Production	111	9	16
Machinery Manufacturing	333	9	16
Support Activities for Transportation	488	9	16

Note¹ : According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 40: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size4, 250-499 Employees (continued).

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Couriers and Messengers	492	9	16
Electrical Equipment, Appliance, and Component Manufacturing	335	10	15
Clothing and Clothing Accessories Stores	448	10	15
Professional, Scientific, and Technical Services	541	10	15
Mining (except Oil and Gas)	212	11	14
Textile Mills	313	11	14
Plastics and Rubber Products Manufacturing	326	11	14
Wholesale Electronic Markets and Agents and Brokers	425	11	14
Forestry and Logging	113	12	13
Primary Metal Manufacturing	331	12	13
Management of Companies and Enterprises	551	12	13
Computer and Electronic Product Manufacturing	334	13	12
Telecommunications	517	13	12
Educational Services	611	13	12
Support Activities for Agriculture and Forestry	115	14	11
Utilities	221	14	11
Credit Intermediation and Related Activities	522	14	11
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	14	11
Textile Product Mills	314	15	10
Monetary Authorities-Central Bank	521	16	9
Performing Arts, Spectator Sports, and Related Industries	711	16	9
Food Manufacturing	311	17	8
Apparel Manufacturing	315	17	8
Ambulatory Health Care Services	621	17	8
Hospitals	622	17	8
Nonmetallic Mineral Product Manufacturing	327	18	7
Transportation Equipment Manufacturing	336	19	6
Transit and Ground Passenger Transportation	485	19	6
Rail Transportation	482	20	4
Pipeline Transportation	486	21	3
Petroleum and Coal Products Manufacturing	324	22	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Earnings Correlation Scale Totals for Firm Size5, 500+ Employees

Table 41: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Fabricated Metal Product Manufacturing	332	1	25
Telecommunications	517	2	23
Machinery Manufacturing	333	3	22
Merchant Wholesalers, Durable Goods	423	3	22
Real Estate	531	3	22
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	3	22
Professional, Scientific, and Technical Services	541	3	22
Food Services and Drinking Places	722	3	22
Repair and Maintenance	811	3	22
Transportation Equipment Manufacturing	336	4	21
Funds, Trusts, and Other Financial Vehicles	525	4	21
Administrative and Support Services	561	4	21
Hospitals	622	4	21
Nursing and Residential Care Facilities	623	4	21
Animal Production and Aquaculture	112	5	20
Specialty Trade Contractors	238	5	20
Nonmetallic Mineral Product Manufacturing	327	5	20
Wholesale Electronic Markets and Agents and Brokers	425	5	20
Truck Transportation	484	5	20
Transit and Ground Passenger Transportation	485	5	20
Support Activities for Transportation	488	5	20
Monetary Authorities-Central Bank	521	5	20
Credit Intermediation and Related Activities	522	5	20
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	5	20
Educational Services	611	5	20
Petroleum and Coal Products Manufacturing	324	6	19
Chemical Manufacturing	325	6	19
Food and Beverage Stores	445	6	19
General Merchandise Stores	452	6	19
Other Information Services	519	6	19
Insurance Carriers and Related Activities	524	6	19
Waste Management and Remediation Services	562	6	19
Ambulatory Health Care Services	621	6	19
Accommodation	721	6	19
Food Manufacturing	311	7	18
Motor Vehicle and Parts Dealers	441	7	18
Air Transportation	481	7	18
Printing and Related Support Activities	323	8	17
Furniture and Related Product Manufacturing	337	8	17
Miscellaneous Manufacturing	339	8	17
Electronics and Appliance Stores	443	8	17
Nonstore Retailers	454	8	17
Rental and Leasing Services	532	8	17
Management of Companies and Enterprises	551	8	17
Amusement, Gambling, and Recreation Industries	713	8	17
Personal and Laundry Services	812	8	17
Computer and Electronic Product Manufacturing	334	9	16
Electrical Equipment, Appliance, and Component Manufacturing	335	9	16
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	9	16

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 41: Industry Rank¹ Earnings Total² Positive Correlation Scale Scores² of Firm Size5, 500+ Employees (continued).

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Publishing Industries (except Internet)	511	9	16
Mining (except Oil and Gas)	212	10	15
Beverage and Tobacco Product Manufacturing	312	10	15
Leather and Allied Product Manufacturing	316	10	15
Pipeline Transportation	486	10	15
Health and Personal Care Stores	446	11	14
Data Processing, Hosting, and Related Services	518	11	12
Social Assistance	624	11	12
Performing Arts, Spectator Sports, and Related Industries	711	11	12
Utilities	221	12	13
Wood Product Manufacturing	321	12	13
Plastics and Rubber Products Manufacturing	326	12	13
Clothing and Clothing Accessories Stores	448	12	13
Rail Transportation	482	12	13
Couriers and Messengers	492	12	13
Heavy and Civil Engineering Construction	237	12	11
Building Material and Garden Equipment and Supplies Dealers	444	12	11
Warehousing and Storage	493	12	11
Motion Picture and Sound Recording Industries	512	12	11
Furniture and Home Furnishings Stores	442	13	10
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	13	10
Construction of Buildings	236	14	9
Paper Manufacturing	322	15	8
Primary Metal Manufacturing	331	15	8
Support Activities for Agriculture and Forestry	115	16	7
Apparel Manufacturing	315	17	6
Crop Production	111	18	5
Private Households	814	18	5
Broadcasting (except Internet)	515	19	3
Merchant Wholesalers, Nondurable Goods	424	20	2
Gasoline Stations	447	20	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Positive Earnings Correlation Scale Totals for Firm Size6, All Firm Sizes

Table 42: Industry Rank¹ Earnings Total² Positive Correlation Scale Scores of Firm Size6, All Firm Sizes.

Industry Title	3-digit Industry	Rank ¹	Industry Positive Total
Machinery Manufacturing	333	1	24
Merchant Wholesalers, Durable Goods	423	1	24
Wholesale Electronic Markets and Agents and Brokers	425	1	24
Telecommunications	517	1	24
Credit Intermediation and Related Activities	522	1	24
Chemical Manufacturing	325	2	23
Building Material and Garden Equipment and Supplies Dealers	444	2	23
Truck Transportation	484	2	23
Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	533	2	23
Waste Management and Remediation Services	562	2	23
Repair and Maintenance	811	2	23
Mining (except Oil and Gas)	212	3	22
Fabricated Metal Product Manufacturing	332	3	22
Miscellaneous Manufacturing	339	3	22
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	3	22
Real Estate	531	3	22
Nursing and Residential Care Facilities	623	3	22
Accommodation	721	3	22
Religious, Grantmaking, Civic, Professional, and Similar Organizations	813	3	22
Specialty Trade Contractors	238	4	21
Petroleum and Coal Products Manufacturing	324	4	21
Nonmetallic Mineral Product Manufacturing	327	4	21
Electrical Equipment, Appliance, and Component Manufacturing	335	4	21
Furniture and Home Furnishings Stores	442	4	21
Other Information Services	519	4	21
Insurance Carriers and Related Activities	524	4	21
Hospitals	622	4	21
Food Services and Drinking Places	722	4	21
Construction of Buildings	236	5	20
Heavy and Civil Engineering Construction	237	5	20
Beverage and Tobacco Product Manufacturing	312	5	20
Transportation Equipment Manufacturing	336	5	20
Merchant Wholesalers, Nondurable Goods	424	5	20
Motor Vehicle and Parts Dealers	441	5	20
Food and Beverage Stores	445	5	20
Support Activities for Transportation	488	5	20
Data Processing, Hosting, and Related Services	518	5	20
Monetary Authorities-Central Bank	521	5	20
Rental and Leasing Services	532	5	20
Management of Companies and Enterprises	551	5	20
Administrative and Support Services	561	5	20
Educational Services	611	5	20
Social Assistance	624	5	20
Amusement, Gambling, and Recreation Industries	713	5	20
Private Households	814	5	20
Animal Production and Aquaculture	112	6	19
Computer and Electronic Product Manufacturing	334	6	19
Furniture and Related Product Manufacturing	337	6	19
Gasoline Stations	447	6	19

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Table 42: Industry Rank¹ Earnings Total Positive Correlation Scale Scores² of Firm Size⁶, All Firm Sizes (continued).

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
General Merchandise Stores	452	6	19
Personal and Laundry Services	812	6	19
Food Manufacturing	311	7	18
Printing and Related Support Activities	323	7	18
Health and Personal Care Stores	446	7	18
Air Transportation	481	7	18
Professional, Scientific, and Technical Services	541	7	18
Museums, Historical Sites, and Similar Institutions	712	7	18
Utilities	221	8	17
Plastics and Rubber Products Manufacturing	326	8	17
Electronics and Appliance Stores	443	8	17
Sporting Goods, Hobby, Musical Instrument, and Book Stores	451	8	17
Miscellaneous Store Retailers	453	8	17
Nonstore Retailers	454	8	17
Publishing Industries (except Internet)	511	8	17
Paper Manufacturing	322	9	16
Performing Arts, Spectator Sports, and Related Industries	711	9	16
Clothing and Clothing Accessories Stores	448	10	15
Couriers and Messengers	492	10	15
Crop Production	111	11	14
Apparel Manufacturing	315	11	14
Wood Product Manufacturing	321	11	14
Warehousing and Storage	493	11	14
Transit and Ground Passenger Transportation	485	12	13
Ambulatory Health Care Services	621	12	13
Forestry and Logging	113	13	12
Leather and Allied Product Manufacturing	316	13	12
Primary Metal Manufacturing	331	13	12
Pipeline Transportation	486	13	12
Textile Product Mills	314	14	11
Motion Picture and Sound Recording Industries	512	14	11
Support Activities for Agriculture and Forestry	115	15	10
This Size, All Industries	All		26
Fishing, Hunting and Trapping	114		0
Textile Mills	313		0
Rail Transportation	482		0
Scenic and Sightseeing Transportation	487		0
Postal Service	491		0
Broadcasting (except Internet)	515		0
Funds, Trusts, and Other Financial Vehicles	525		0
Oil and Gas Extraction	211		
Support Activities for Mining	213		
Water Transportation	483		
Executive, Legislative, and Other General Government Support	921		
Scale Item - All Size - Oil and Gas Extraction	211A		20
Scale Item - All Size - Support Activities for Mining	213A		23
Scale Item - Scale Item - All Size All Industries	AllA		26
BakerHughes Total US Rig Count	USRigtIA		21

Note¹: According to largest scale value to smallest.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Note²: Total Correlations to our four scale items.

Appendix D

Industry Rank Earnings Tables: Negative Correlation Scale Scores by Firm Size

Negative Earnings Correlation Scale Score Totals for Firm Size1, 0 – 19 Employees

Table 43: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size1, 0-19 Employees.

Industry Title	3-digit NAICS Industry	Rank ²	Industry Positive Total
Postal Service	491	1	5
Funds, Trusts, and Other Financial Vehicles	525	2	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Earnings Correlation Scale Score Totals for Firm Size2, 20 – 49 Employees

Table 44: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size2, 20-49 Employees.

Industry Title	3-digit NAICS Industry	Rank ²	Industry Positive Total
Apparel Manufacturing	315	1	11
Scenic and Sightseeing Transportation	487	2	4

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Earnings Correlation Scale Totals for Firm Size3, 50 – 249 Employees

Table 45: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size3, 50-249 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Telecommunications	517	1	17
Broadcasting (except Internet)	515	2	12
Postal Service	491	3	11
Private Households	814	3	11
Forestry and Logging	113	4	3
Funds, Trusts, and Other Financial Vehicles	525	4	3

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Earnings Correlation Scale Totals for Firm Size4, 250 – 499 Employees

Table 46: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size4, 250-499 Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Miscellaneous Manufacturing	339	1	12
Printing and Related Support Activities	323	2	6
Food and Beverage Stores	445	3	4
Air Transportation	481	3	4
Mining (except Oil and Gas)	212	4	3
Petroleum and Coal Products Manufacturing	324	4	3
Building Material and Garden Equipment and Supplies Dealers	444	4	3
Personal and Laundry Services	812	5	2

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Earnings Correlation Scale Totals for Firm Size5, 500+ Employees

Table 47: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size5, 500+ Employees.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
Textile Product Mills	314	1	5
Textile Mills	313	2	4

Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

Negative Earnings Correlation Scale Totals for Firm Size6, All Firm Sizes

Table 48: Industry Rank¹ Earnings Total Negative Correlation Scale Scores² of Firm Size6, All Firm Sizes.

Industry Title	3-digit NAICS Industry	Rank ¹	Industry Positive Total
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Note¹: According to largest scale value to smallest.

Note²: Total Correlations to our four scale items.

Note: None of the remaining 3-digit NAICS industries have significant correlations.

No Significant Negative Earnings Correlations with our scale items in this size.

Appendix E Definitions

(Those definitions from Census website are noted*)

<http://qwiexplorer.ces.census.gov/>

Employment (Emp on website)*

Beginning of Quarter Employment: Counts

Estimate of the total number of jobs on the first day of the reference quarter.

Beginning-of-quarter employment counts are similar to point-in-time employment measures, such as the QCEW (see: www.bls.gov/cew/).

A worker i is beginning-of-quarter employed with employer j in t if worker has positive earnings at j in $t-1$ and t .

Earnings (EarnBeg on website)*

Beginning-of-Quarter Employment: Average Monthly Earnings Average monthly earnings of employees who worked on the first day of the reference quarter. Add all quarterly earnings at j in t for all i who are beginning-of-quarter employees. Divide this by the number of beginning-of-quarter employees at j . Then divide that by three.

Firm Size (firmsize on website)*

Firmsize	Label
Size1	0-19 Employees
Size2	20-49 Employees
Size3	50-249 Employees
Size4	250-499 Employees
Size5	500+ Employees
Size6	All Firm Sizes (reabeled from firmsize0 on website)

Note: All the firms are private firms

Industries

3-digit NIACS Oklahoma Industries

The four scale Items

211A - NAICS 211 Oil and Gas Extraction

213A - NAICS 213 Support Activities for Mining

ALLA - All NAICS Sectors (aggregate of all industries)

USRigTtIA - Baker Hughes US Land Total Rig Count (1st Reporting Monday of each Quarter 2004 – 2014 1st quarter)

Appendix F Methodology

Purpose

The purpose of this analysis methodology was to determine which Oklahoma industries in terms of employment and employee earnings are significantly related to the state's oil and gas industry. An additional purpose was to examine which Oklahoma industries that did have a significant employment and earnings relationships with those of the oil and gas industries, and also concurrently had a significant relationship with the employment and earnings of the aggregate of all Oklahoma industries.

Data

The data used in the analysis for this report was taken from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD), specifically the Quarterly Workforce Indicators (QWI) for Oklahoma private 3 digit NAICS Industry from 1st quarter 2004 to 2nd quarter 2014. The original data may be obtained and viewed on the US Census Bureau website at: <http://ledextract.ces.census.gov/>

The data for Baker Hughes Total U.S. Land Rig Count labeled USRigTtIA, and Oklahoma Rig Count labeled OKRigA are taken from the company website at: <http://www.bakerhughes.com/rig-count> The Total U.S. Land Rig Count data and Oklahoma Rig Count data selected was the 1st reporting Monday of the 1st quarter and for each subsequent quarter for years 2004 to 1st quarter 2014.

Statistical Tools

SPSS bivariate correlations were run in order to determine Pearson's r Correlation significant to the 0.05 or less level. Using a combination score of degree and amount of correlation, two scales were constructed; one for employment correlations and one for earnings correlations. These scales were constructed in order to qualitatively determine a measure of the relationship between the employment and earnings of Oklahoma industries and those of Oklahoma energy industries. These two scales were also used to examine if Oklahoma industries determined to be highly correlated with energy were also related to an Oklahoma aggregate of industries and the Total U.S. Land Rig Count, using the employment and earnings characteristics in the comparisons.

Scales – Description of Construction

Employment correlation score scale

NAICS 211 Oil and Gas Extraction and NAICS 213 Support Activities for Mining were two industries out of 92 Oklahoma 3-digit industries identified by professional consensus to be energy industries. Oklahoma Statewide Rig Counts (labeled OKRig) and Total U.S. Land Rig Count (labeled USRigTtIA) are also widely accepted by energy professionals as indicators or proxy-variables of energy industry activity, and commonly hypothesized along with energy industries to be strongly related to employment and income earnings of the aggregate of all industries in energy states, such as Oklahoma. In our analysis, employment for NAICS 211 Oil and Gas Extraction is labeled Emp211A, NAICS 213 Support Activities for Mining is labeled Emp213A, and employment for the aggregate of all Oklahoma Industries is labeled EmpAllA.

SPSS bivariate employment correlations were run in order to determine Pearson's r Correlation significant to the 0.05 or less level for the above five items. The resulting correlation matrix is shown below.

Table 49: Correlations

Scale Items & Statistics	Emp211A	Emp213A	EmpAllA	OKRig	USRigtTtIA
Emp211A Pearson Correlation	1	.836**	.671**	.333*	.614**
Sig. (2-tailed)		0	0	0.033	0
N	42	42	42	41	41
Emp213A Pearson Correlation	.836**	1	.917**	.591**	.855**
Sig. (2-tailed)	0		0	0	0
N	42	42	42	41	41
EmpAllA Pearson Correlation	.671**	.917**	1	.629**	.771**
Sig. (2-tailed)	0	0		0	0
N	42	42	42	41	41
OKRig Pearson Correlation	.333*	.591**	.629**	1	.820**
Sig. (2-tailed)	0.033	0	0		0
N	41	41	41	41	41
USRigtTtIA Pearson Correlation	.614**	.855**	.771**	.820**	1
Sig. (2-tailed)	0	0	0	0	
N	41	41	41	41	41

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

It was noted that the correlations for Oklahoma Statewide Rig Counts (labeled OKRig) were relatively weak, compared to the other four. Therefore, SPSS bivariate correlation was run with this item and employment for all 92 of NAICS 3-digit Oklahoma industries. It was determined that OKRig only had significant correlations with seven other industries (not shown). Therefore, OKRig was discarded from our scale, leaving the four items of Emp211A, Emp213A, EmpAllA and USRigtTtIA. The bivariate correlations for these are shown in the matrix below.

Table 50: Correlations

Scale Items & Statistics	Emp211A	Emp213A	EmpAllA	USRigtTtIA
Emp211A Pearson Correlation	1	.836**	.671**	.614**
Sig. (2-tailed)		0	0	0
N	42	42	42	41
Emp213A Pearson Correlation	.836**	1	.917**	.855**
Sig. (2-tailed)	0		0	0
N	42	42	42	41
EmpAllA Pearson Correlation	.671**	.917**	1	.771**
Sig. (2-tailed)	0	0		0
N	42	42	42	41
USRigtTtIA Pearson Correlation	.614**	.855**	.771**	1
Sig. (2-tailed)	0	0	0	
N	41	41	41	41

** Correlation is significant at the 0.01 level (2-tailed).

An employment correlation score scale was created for these four items by coding the significant Person's values as follows:

Pearson's r

Correlations Code (or Score)

0 - .19	0
.2 - .29	1
.3 - .39	2
.4 - .49	3
.5 - .59	4
.6 - .69	5
.7 - .79	6
.8 - .89	7
.9 - .99	8
1.0	9

Note: 1.0 Correlation only occurs in our data when a scale item is correlated with itself.

Positive and negative correlations were tabulated separately, resulting in two scale values for each 3-digit NAICS industry, one positive and one negative.

Earning Correlation score scale

In exactly the same manner, an Earnings Correlation score scale was created for our energy firm earnings relationship with other industries and Earnings of an aggregate of all Oklahoma industries. In our analysis, Earnings for NAICS 211 Oil and Gas Extraction is labeled Earn211A, NAICS 213 Support Activities for Mining is labeled Earn213A, and Earnings for the aggregate of all Oklahoma Industries is labeled EarnAllA.

SPSS bivariate earnings correlations were run in order to determine Pearson's r Correlation significant to the 0.05 or less level for the above five items. The resulting correlation matrix is shown below.

Table 51: Correlations

Scale Items & Statistics	Earn211A	Earn213A	EarnAllA	OKRig	USRigtIA
Earn211A Pearson Correlation	1	.479**	.651**	0.192	.407**
Sig. (2-tailed)		0.001	0	0.23	0.008
N	42	42	42	41	41
Earn213A Pearson Correlation	.479**	1	.829**	0.157	.597**
Sig. (2-tailed)	0.001		0	0.327	0
N	42	42	42	41	41
EarnAllA Pearson Correlation	.651**	.829**	1	0.21	.602**
Sig. (2-tailed)	0	0		0.188	0
N	42	42	42	41	41
OKRig Pearson Correlation	0.192	0.157	0.21	1	.820**
Sig. (2-tailed)	0.23	0.327	0.188		0
N	41	41	41	41	41
USRigtIA Pearson Correlation	.407**	.597**	.602**	.820**	1
Sig. (2-tailed)	0.008	0	0	0	
N	41	41	41	41	41

** Correlation is significant at the 0.01 level (2-tailed).

Note: OKRig is only significantly correlated with 5 other NAICS 3-digit Industries of all firm sizes.

It was noted that correlations for Oklahoma Statewide Rig Counts (labeled OKRig) were relatively weak, compared to the other four. Therefore, SPSS bivariate correlation was run with this item and earnings of all 92 of 3-digit NAICS Oklahoma industries. It was then determined that OKRig only had significant correlations with five other industries (not shown). Therefore, OKRig was discarded from our scale, leaving the four items of Earn211a, Earn213, EarnAllA and USRigTtIA. The bivariate correlations for these are shown in the matrix below.

Table 52: Correlations

Scale Items & Statistics	Earn211A	Earn213A	EarnAllA	USRigTtIA
Earn211A Pearson Correlation	1	.479**	.651**	.407**
Sig. (2-tailed)		0.001	0	0.008
N	42	42	42	41
Earn213A Pearson Correlation	.479**	1	.829**	.597**
Sig. (2-tailed)	0.001		0	0
N	42	42	42	41
EarnAllA Pearson Correlation	.651**	.829**	1	.602**
Sig. (2-tailed)	0	0		0
N	42	42	42	41
USRigTtIA Pearson Correlation	.407**	.597**	.602**	1
Sig. (2-tailed)	0.008	0	0	
N	41	41	41	41

** Correlation is significant at the 0.01 level (2-tailed).

An earnings correlation score scale was created for these four items by coding the significant Person's values as follows:

Pearson's r	Code (or Score)
0 - .19	0
.2 - .29	1
.3 - .39	2
.4 - .49	3
.5 - .59	4
.6 - .69	5
.7 - .79	6
.8 - .89	7
.9 - .99	8
2.0	9

Note: 1.0 Correlation only occurs in our data when a scale item is correlated with itself.

Positive and negative correlations were tabulated separately, resulting in a positive and a negative scale value for employment and a positive and a negative scale value for earnings, a total of four scale values for each of Oklahoma's approximate 92 3-digit NAICS industries, the total varying in each of our different six firm sizes.

Tabulation of correlation scale scores

The process for tabulation of the employment scale scores for industry employment and earnings are exactly the same. An example for the process of tabulation for industry employment correlation scale scores, for both positive and negative scores, are provide below.

Table 53: Example of Employment Correlations Scale Score Tabulations

Employment Positive Scale Scores	NAICS 3-digit Industry	Stistical Terms	Emp211A	Emp213A	EmpAllA	USRigtTtIA	Employment Negative Scale Scores
	EarnBeg111	Pearson Correlation	-.756**	-.544**	-.740**	-.360*	
		Sig. (2-tailed)	0	0	0	0.021	18
		N	42	42	42	41	
12	EarnBeg112	Pearson Correlation	.357*	.559**	.753**	0.208	
		Sig. (2-tailed)	0.02	0	0	0.191	
		N	42	42	42	41	
	EarnBeg113	Pearson Correlation	-.417**	-.630**	-.606**	-.505**	17
		Sig. (2-tailed)	0.006	0	0	0.001	
		N	42	42	42	41	
	EarnBeg114	Pearson Correlation	0.232	0.1	0.112	0.28	
		Sig. (2-tailed)	0.707	0.873	0.857	0.649	
		N	5	5	5	5	
	EarnBeg115	Pearson Correlation	-.345*	-.504**	-.720**	-.363*	14
		Sig. (2-tailed)	0.025	0.001	0	0.02	
		N	42	42	42	41	
6	Emp221	Pearson Correlation	0.226	.348*	.572**	0.064	
		Sig. (2-tailed)	0.149	0.024	0	0.693	
		N	42	42	42	41	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Both positive and negative correlation scale scores were tabulated for all NAICS 3-digit industries for both employment and earnings by five firm sizes and an aggregate of all Oklahoma industries

Ranking Industries on Correlation Scale Scores

After the correlation scale scores were tabulated, six unabridged ranking tables were constructed for positive employment correlation scaled industry scores by five firm sizes and an aggregate of all size Oklahoma industry sizes. Six ranking tables of the same were also constructed for the negative top ranked industry sizes.

Next, six unabridged ranking tables were constructed for positive earnings scale correlation scale industry scores by five firm sizes and an aggregate of all Oklahoma industry sizes. Six ranking tables of the same were also constructed for the negative top ranked industries. These unabridged tables were provided in Appendices A through D.

For the report, six ranking tables of the top ten industries were constructed for positive employment correlation scaled industry scores by five firm sizes and an aggregate of all Oklahoma industry sizes. Six ranking tables of the same were constructed for the negative top ranked industries.

Three example tables (above) were constructed for this Methodology Appendices F.

An additional table was constructed to determine how the total number of bivariate correlations for each of the four scale items on the employment correlation scale and Oklahoma Statewide Rig Counts (labeled OKRigA) compared with the average number of Industry Employment bivariate Correlations for each Firm Size.

**Table 54: Total number of Significant Bivariate Employment Correlations with all Other Industries'
Employment, by Firm Size**

Firm Size	Emp211A	Emp213A	EmpAllA	USRigtTtIA	OKRig	Average Number of Correlations per Industry ¹	Total 3-digit NAICS Industries in Firm Size ²
Size 1	71	70	57	53	39	47	92
Size2	51	62	55	51	35	35	88
Size3	61	62	51	53	40	41	85
Size4	58	57	42	46	33	30	83
Size5	78	73	62	54	27	50	87
Size6	76	77	66	60	35	60	88

Note¹: Average Number of Significant to the 0.05 or less level Bivariate Correlations per Industry are given for comparison purposes.

Note²: Total 3-digit NAICS Industries in Firm Size are provided for clarification.

In the above table 54, the larger number than average bivariate correlations of each of the four employment scale items demonstrates why each was appropriate for the scale, while the smaller than average number of bivariate correlation for OKRig reveals another reason why it was eliminated. This table also indicates that changes in energy industry employment are related to changes in many other industries' employment, more times than average.

An additional table was constructed to determine how the total number of bivariate correlations for each of the four scale items on the earnings correlation scale and Oklahoma Statewide Rig Counts compared with the average number of Industry Earning bivariate Correlations for each Firm Size.

**Table 55: Total number of Significant Bivariate Earnings Correlations with all Other Industries'
Earnings, by Firm Size**

Firm Size	Earn211A	Earn213A	EarnAllA	USRigtTtIA	OKRig	Average Number of Correlations per Industry ¹	Total 3-digit NAICS Industries in Firm Size ²
Size 1	54	88	89	79	14	71	92
Size2	47	76	79	60	11	58	88
Size3	58	78	80	72	10	64	85
Size4	43	65	67	50	15	40	83
Size5	74	84	86	74	11	69	87
Size6	71	85	85	83	9	78	88

Note¹: Average Number of Significant to the 0.05 or less level Bivariate Correlations per Industry are given for comparison purposes.

Note²: Total 3-digit NAICS Industries in Firm Size are provided for clarification.

In the above table 55, the larger number than average bivariate correlations of each of the four earnings scale items reveals why each was appropriate for the scale, while the smaller than average number of bivariate correlation for OKRig reveals another reason why it was not included. There is only exception to this rule of a scale item having a larger than average number of bivariate correlations. This is item Earn211A in Size6. This table indicates that changes in energy industry earnings are related to changes in many other industries' earnings, more times than average.