



An Analysis of Quarterly Employment/Unemployment Data

Final Report
Prepared for the Nebraska Department of Labor

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I. Introduction and Overview

The Nebraska Department of Labor (NDOL) collects quarterly data on more than 90,000 people employed by firms throughout the state. In an initial project with the NDOL, the Bureau of Business Research (BBR) began a preliminary analysis of the data to examine the work experiences of Nebraska employees. This report describes extended research: in particular, we isolate different labor patterns, including seasonal employment patterns, demographic patterns, and industries with significant turnover or highly varied labor patterns.

II. Description of Data

This data are from the Nebraska Department of Labor. The analysis covers eight quarters of data from the first quarter of 2017 to the last quarter of 2018. In aggregate, the data set contains approximately 1.2 million observations on individual employees. Each observation is someone employed in the state of Nebraska during a relevant quarter. It contains information such as the anonymized employee and employer identification numbers, demographic information, industry information, and wage information.

III. Industry Analysis

The industry analysis examines the different labor movement patterns in various industries throughout the state: more specifically, quarterly percentage changes in employment were calculated across 2-digit NAICS industries. The results are shown in Appendix 1. Industries such as Agriculture, Forestry, Fishing and Hunting (NAICS 11); Arts, Entertainment, and Recreation (NAICS 71); Public Administration (NAICS 92) and Manufacturing (NAICS 31-33) had relatively large percentage changes in employment from quarter to quarter. At the other extreme, Administrative and Support and Waste Management and Remediation Services (NAICS 56), and Health Care and Social Services (NAICS 62) had relatively small percentage changes in employment from quarter to quarter.

Some industries had predictable variations in employment across quarters. For example, Agriculture, Forestry, Fishing and Hunting (NAICS 11) saw small increases in employment from Q1 to Q2 and large jumps in employment from Q2 to Q3 in both years. Then employment falls drastically from Q3 to quarter Q4. Retail Trade (NAICS 44-45) posted fourth-quarter employment growth in advance of the holidays, as did Transportation and Warehousing (NAICS 48-49). Manufacturing (NAICS 31-33) also followed a similar pattern. Then the three general saw employment declines through the rest of the year. In contrast, Educational Services (NAICS 61) saw employment declines as summer approached and employment gains with the start of the new year in Q4. Interestingly, across all industries, overall employment numbers remained relatively stable, with maximum swings of around 2,000 employees. This implies that those who are in seasonal work can find employment in another industry.

Results were also disaggregated to 6-digit NAICS codes, although complete reporting of these results is not shown in this report. An interesting finding at the 6-digit level was the surge in employment in the nanotechnology industry. This industry is within NAICS industry 54, Professional, Scientific and Technical Services. Nanotechnology employs thousands of individuals in the summers and very few in the winters with percent changes of well over 1,000% between Q3 and Q4. All employees in this industry were tied to a single employer. Another industry with interesting change was the Oil and Gas industry (NAICS 6-digit 213112). This industry had seasonal changes with summer months having significantly higher employment than winter months. Across most industries, however, more hiring occurred during winters and dropped off in their employment levels during the summers. For the most part, between Q1 and Q2 there were large job losses and between Q3 and Q4 there were moderate gains. The rest of the year had negligible changes in employment.

IV. Individual Analysis

This analysis consisted of observing the labor patterns of individual employees. Primarily, it dealt with the characteristics of employees who do not have stable employment: those employed only one or

two quarters across all eight quarters included in the analysis. Those employed for all eight quarters were also identified.

Out of the 1.2 million employees in the data set, nearly 530,000 people were not employed during all eight quarters. When observing those who were employed only in one or two quarters, the results are as expected.¹ Most industries that employed individuals with unstable employment patterns were the service, retail trade, or transportation industries. In contrast, the employees with stable employment tended to work in higher-skilled jobs. This would include people working at hospitals, universities, software, and other white-collar jobs. These jobs are more likely to have college-educated employees. Employees who appear intermittently were also observed. For the most part, they were employed in fields such as temporary work or seasonal work. This would include agricultural jobs that only hire in the summers or jobs characterized as temporary help services.

Overall, the data mostly follow intuitive assumptions about labor patterns. It shows that employees in higher-skilled industries have less turnover than those in lower-skilled industries. Also, there seems to be an influx of agricultural workers in the state that are temporarily employed in the summers.

V. Demographic Data

Overall, the demographic data aligns well with the demographics of the state. The percentage of employees that are male or female aligns precisely with the gender distribution in Nebraska. This finding is surprising because Nebraska seems to be missing the overall employment gap between men and women. Racial data shows similar patterns: most races align well with the overall demographic data of

¹ The first and last quarters of the data set have the highest numbers of individuals only employed in one quarter. This could imply a hiring surge but may mean that people are staying at a job longer than the bounds of the data set.

the state. Hispanic people, however, make up only around 4 percent of the labor force and 11 percent of the state's population. This gap may be because of a large proportion of undocumented employees, but it is worth exploring.

VI. Appendix 1: Percentage Changes in Employment Across 2-Digit NAICS Industries

	From: To:	2018: III 2018: IV	2018: II 2018: III	2018: I 2018: II	2017: IV 2018: I	2017: III 2017: IV	2017: II 2017: III	2017: I 2017: II
11	Agriculture, Forestry, Fishing and Hunting	-18.2%	36.7%	0.6%	-9.7%	-23.5%	45.8%	1.6%
21	Mining, Quarrying, and Oil and Gas Extraction	-4.8%	-1.9%	14.2%	-6.0%	-2.5%	0.1%	15.3%
22	Utilities	-1.5%	-1.2%	1.4%	0.6%	-1.7%	-2.0%	-0.4%
23	Construction	-2.6%	0.6%	8.9%	-4.7%	0.0%	-0.6%	7.3%
31-33	Manufacturing	5.1%	-1.6%	-8.0%	6.4%	5.0%	-1.6%	-8.0%
42	Wholesale Trade	-0.5%	-2.0%	0.4%	0.8%	-2.0%	-0.3%	0.9%
44-45	Retail Trade	3.3%	-0.9%	-2.6%	-2.0%	4.0%	-0.6%	-2.6%
48-49	Transportation and Warehousing	10.0%	-2.2%	-3.2%	-1.2%	7.5%	-1.1%	-3.7%
51	Information	1.0%	-2.2%	-2.2%	1.1%	1.3%	-2.0%	-1.8%
52	Finance and Insurance	2.1%	-0.8%	-1.1%	-0.9%	1.1%	0.0%	-0.5%
53	Real Estate and Rental and Leasing	1.4%	-0.5%	1.9%	-1.4%	0.2%	1.1%	1.2%
54	Professional, Scientific, and Technical Services	-3.6%	3.3%	0.0%	0.1%	-3.2%	2.8%	0.6%
55	Management of Companies and Enterprises	0.8%	-1.8%	-0.3%	-4.9%	2.7%	-3.2%	-1.4%
56	Administrative and Support and Waste Management and Remediation Services	1.2%	-0.9%	-0.1%	-0.1%	1.6%	-0.4%	0.7%
61	Educational Services	2.9%	-2.4%	-0.6%	0.1%	3.4%	-2.7%	-0.5%
62	Health Care and Social Assistance	-0.4%	0.8%	-1.1%	1.1%	0.1%	-0.5%	-1.2%
71	Arts, Entertainment, and Recreation	-12.5%	0.9%	29.9%	-10.5%	-14.3%	2.3%	28.5%
72	Accommodation and Food Services	-2.9%	0.2%	0.9%	1.9%	-2.6%	-1.3%	1.3%
81	Other Services (except Public Administration)	-1.2%	0.0%	2.9%	0.5%	-1.0%	-1.4%	1.6%
92	Public Administration	-9.6%	0.6%	12.2%	-1.5%	-9.5%	1.4%	12.7%
	Total	0.1%	0.0%	-0.2%	0.1%	0.0%	0.0%	-0.1%