

# Appendix F: Location Quotient Analysis

This appendix compares key sectors of the FNSB to the state of Alaska and the United States (U.S.) using location quotient analyses. Location quotients use employment data to compare the relative concentration of different industries in a region. Employment data can tell us which industries are more specialized in a specific regional economy and help us understand the unique characteristics of a region. Analysis of these data also informs economic development planning by anticipating which industries are growing, and which are shrinking relative to other locations.

The employment data used in this section come from the Bureau of Economic Analysis (BEA) and the measure is number of full-time and part-time jobs by North American Industry Classification System (NAICS) industry (Bureau of Economic Analysis, 2021b). The county employment estimates reflect a worker’s participation in the region, counting all jobs held by the employee. The estimates are based on job location and give a good measure of a region’s industrial mix (Bureau of Economic Analysis, 2021a).

Location quotient (LQ) is determined by identifying the share of employment in an industry locally, then comparing that to the share of employment in the same industry in a reference region. For example, to see how FNSB’s level of employment in the military sector compares to a base region, say the state of Alaska, we would divide the share of military employment in FNSB by the share of military employment in the state. This generates a ratio that if larger than 1 tells us FNSB has a larger share of workers in that sector than the state does.

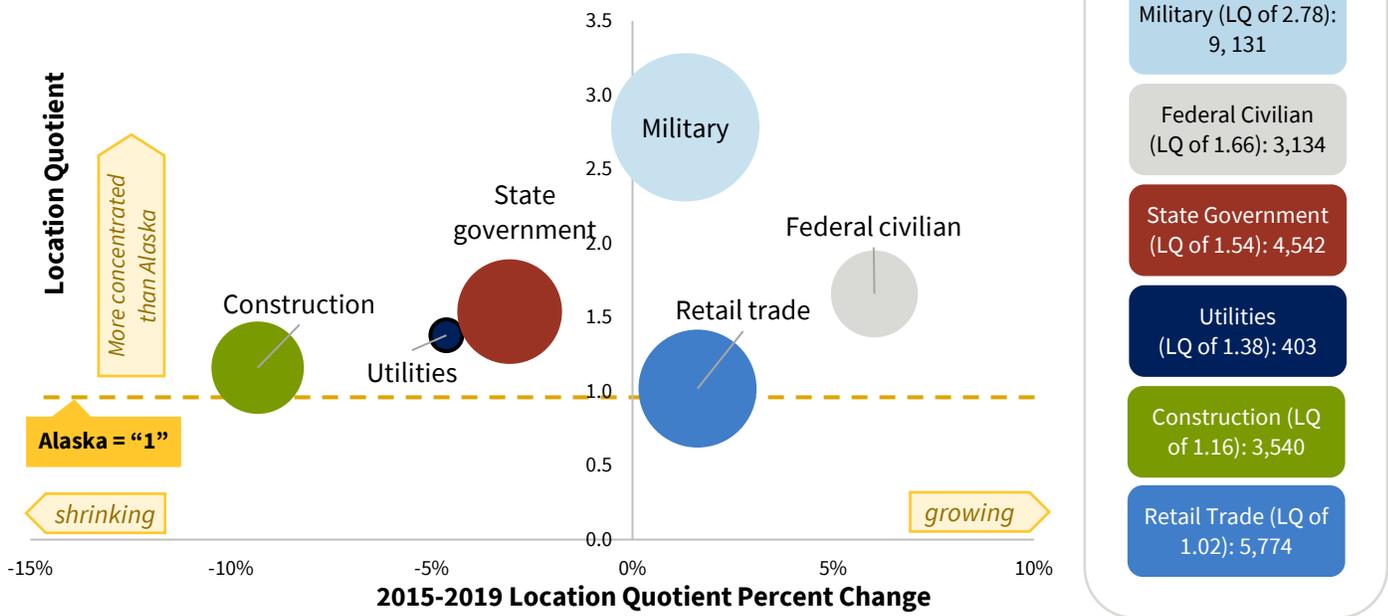
This analysis includes LQ analyses for two reference regions: FNSB compared to Alaska as the reference region, and FNSB compared to the U.S. as a reference region. Table 1 defines LQ values and offers some examples specific to the FNSB.

**Table 1: Location Quotient Values and Examples**

Location Quotient (LQ) Value	What it Means	Example
Greater than One (“LQ>1”)	An LQ of greater than 1 means a location employs a higher share of its workforce in that industry compared against the reference region.	<b><i>FNSB mining, quarrying, and oil and gas extraction compared to U.S.: LQ of 4.00</i></b> The FNSB mining, quarrying, and oil and gas industry has an LQ score of 4.00 when compared to the U.S. as a reference region. This means this industry is four times more concentrated in the FNSB region than the nation overall.
One (“1”)	An LQ of 1 means a region employs a similar share of its workforce in that industry when compared against the reference region.	<b><i>FNSB retail sector compared to Alaska: LQ of 1.02</i></b> FNSB retail industry has an LQ score of 1.02 when compared to Alaska. This means the relative percentage of employment in the retail industry in FNSB is nearly identical to that of Alaska. In this case, retail employs about 10% of people in FNSB and 10% in Alaska overall.
Less than One (“LQ<1”)	An LQ lower than 1 means the location employs a smaller share of its workforce in that industry compared against the reference region.	<b><i>FNSB finance and insurance sector compared to U.S.: LQ of 0.33</i></b> The FNSB finance and insurance sector has an LQ score of 0.33 when compared with the U.S. overall. This means FNSB has only one-third the concentration of employment in this industry when compared with the U.S. overall. In 2019, Finance and Insurance accounted for approximately 1.8% of total employment, compared with 5.4% in the U.S.

**Figure 1. FNSB Employment Location Quotient Compared to Alaska (2019)**

Note: Bubble size shows total employment in a specific industry; actual employment numbers are on the right of the chart.



Source: U.S. Bureau of Economic Analysis (2021); only shows industries with LQs over 1

Figure 1 and Figure 2 that follow compare FNSB LQs to Alaska and to the U.S. In addition to showing the location quotient for key industries (those with a LQ greater than 1), the graphs also show how the location quotient has changed between 2015 to 2019. Based on the LQs and their changes over the past five years, the industries are classified into four categories, defined further in this section.

Figure 1 shows how FNSB’s industries compare to Alaska based on total share of employment. Specifically, it shows all sectors with an LQ greater than 1, or industries that have a higher concentration of employees than the state of Alaska. Key findings include:

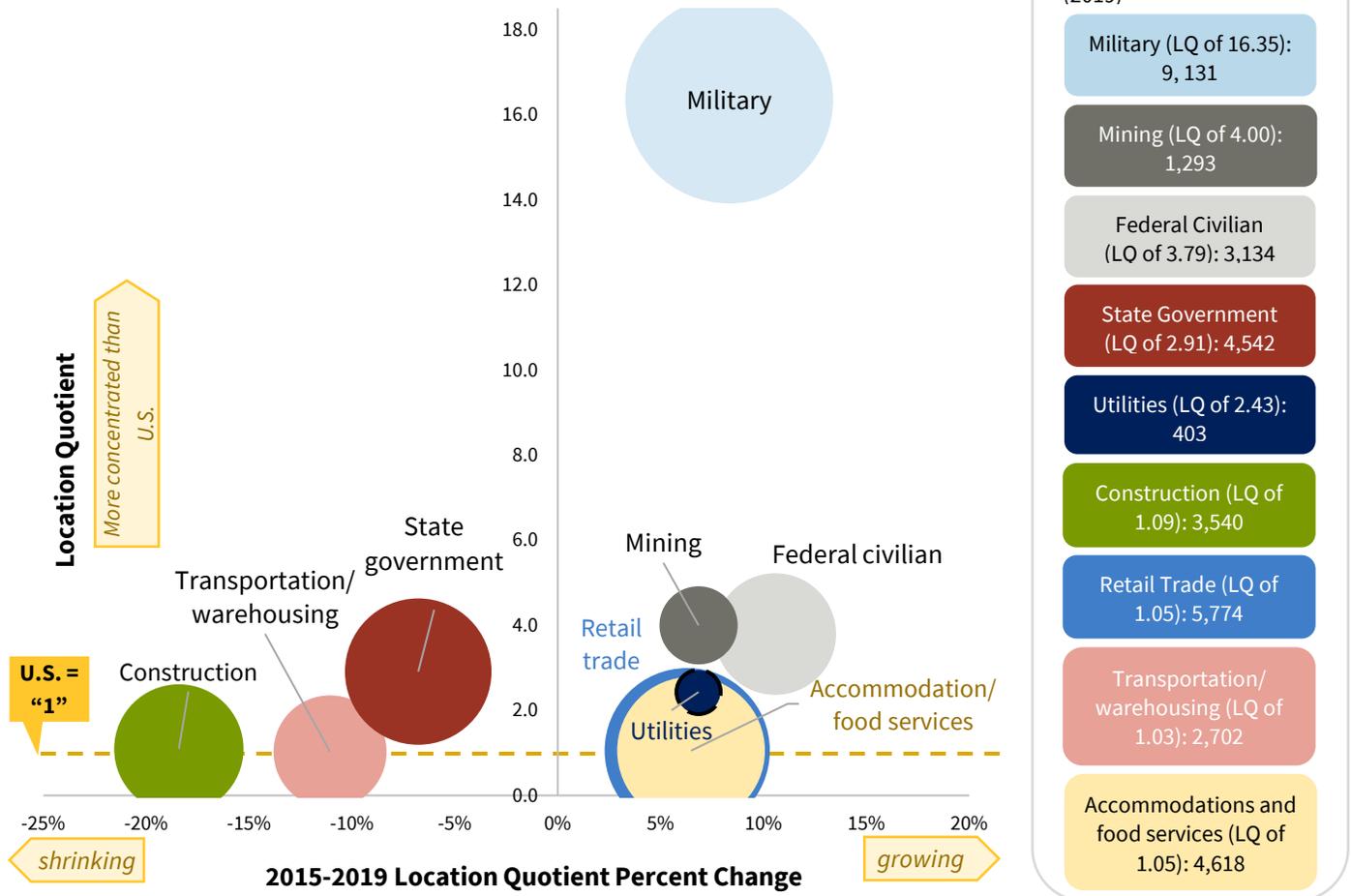
- The higher up on the y-axis (vertical), the more prominent the industry is in the FNSB compared to Alaska. The military is the most concentrated of all the industries with an LQ score of 2.78.
- Position along the x-axis (horizontal) indicates whether an industry is increasing or decreasing its FNSB concentration relative to overall employment concentration in Alaska. Federal civilian saw the biggest growth with a 6% increase in its LQ between 2015 and 2019. This growth was largely due to an increase in FNSB employment in the sector (6.5%) while statewide federal civilian employment decreased (0.6%). Other industries that are growing relative to Alaska (e.g., the industry represents an increasing share of local employment in 2019 compared to 2015) include retail trade and the military, both of which saw an increase in FNSB employment between 2015 and 2019.
- Construction saw the biggest decrease in FNSB concentration relative to overall Alaska employment, with a 9% decrease between 2015 and 2019. Actual construction employment decreased in both FNSB and the state, but FNSB saw a larger decrease, with a decrease of 12.1% between 2015 and 2019 compared with a 4.1% decrease for Alaska. Other industries that are shrinking relative to the Alaska

economy (e.g., the industry represents a smaller share of local employment in 2019 compared to 2015) include utilities and state government.

- Bubble size represents the number of individuals employed in the industry in the FNSB. Of the industries in the Alaska comparison chart, the military is the largest employer, with 9,131 employees.

**Figure 2. FNSB Employment Location Quotient Compared to the U.S. (2019)**

Note: Bubble size shows total employment in a specific industry.



Source: U.S. Bureau of Economic Analysis (2021); only shows industries with LQs over 1

Figure 2 uses the same approach, but compares the FNSB to the U.S. economy as the reference region. Key findings include:

- The higher up on the y-axis (vertical), the more prominent the industry is in the FNSB compared to the US. The military is the most concentrated of all the industries with an LQ score of 16.35.
- Position along the x-axis (horizontal) indicates whether an industry is increasing or decreasing its FNSB concentration relative to overall employment concentration in the U.S. FNSB industries that are growing relative to the U.S. overall (e.g., the industry represents an increasing share of local employment in 2019 compared to 2015) include military, mining, federal civilian, utilities, retail trade, and accommodations and food services.

- FNSB industries that are shrinking relative to the U.S. overall (e.g., the industry represents a smaller share of local employment in 2019 compared to 2015) include state government, construction, and transportation and warehousing.

The industry summary matrix in Table 2 offers a snapshot of which specialized industries in the FNSB are growing or shrinking based on LQ trends between 2015 and 2019. Industries with an LQ of 2.00 or higher are categorized as “high LQ,” while industries with an LQ below 2.00 but higher than 1.00 are categorized as “smaller LQ.”

**Table 2. Industry Summary Matrix.** Uses the U.S. as a reference region. LQ scores are shown in parenthesis. High LQ = over 2.00, smaller LQ = between 1.00 and 2.00.

Mature - high LQ and declining	Star - high LQ and growing
<p style="text-align: center;"><b>State Government (2.91, -6.8%)</b></p>	<p style="text-align: center;"><b>Military (16.35, 8.3%)      Mining (4.00, 6.8%)</b>  <b>Federal Civilian (3.79, 10.6%)      Utilities (2.43, 6.8%)</b></p>
<p><b>U.S. comparison:</b> State government has a higher concentration than the U.S. but experienced declines over the past several years, with an 11% decrease in total FNSB employment in this sector between 2015 and 2019. This is significant because state government is also a major employer, employing an average of 4,750 FNSB residents annually between 2015 and 2019. This sector includes employment at UAF.</p> <p><b>Alaska comparison:</b> Using Alaska as a reference region instead of the U.S., the FNSB location quotient for state government follows similar patterns, with an LQ score over 1 and a pattern of declining concentration.</p>	<p><b>U.S. comparison:</b> These industries are much more concentrated in FNSB than the U.S. All four of the star industries in FNSB saw LQ growth from 2015 to 2019, meaning FNSB’s share of residents employed in those sectors grew relative to the U.S. Utilities and mining both saw declines in employment levels (-2.9% and -26%, respectively); however, FNSB declines were less than national declines, which is why the two sectors still saw an increase in their LQs.</p> <p><b>Alaska comparison:</b> Using Alaska as a reference region instead of the U.S., the military and federal civilian sectors follow similar patterns, with LQs over 1 and growth. Mining has an LQ below 1 and the utilities sector’s LQ is above 1 but shrinking.</p>
Challenge – smaller LQ and declining	Emerging - smaller LQ and growing
<p style="text-align: center;"><b>Construction (1.09, -18.4%)</b>  <b>Transportation/Warehousing (1.03, -11.1%)</b></p>	<p style="text-align: center;"><b>Accommodation/Food Services (1.05, 6.5%)</b>  <b>Retail Trade (1.05, 6.3%)</b></p>
<p><b>U.S. comparison:</b> These industries still maintain a larger share of employees in the FNSB than the U.S. but have been trending down since 2015. While FNSB transportation and warehousing employment grew 11% between 2015 and 2019, the sector grew at 32% nationally; therefore, the LQ ratio dropped. Between 2015 and 2019 construction employment saw a decline in FNSB (-12%) but substantial growth nationally (15%).</p> <p><b>Alaska comparison:</b> Using Alaska as a reference region instead of the U.S., construction follows similar trends with a LQ just over 1 and a pattern of negative growth. Transportation/warehousing has an LQ below 1.</p>	<p><b>U.S. comparison:</b> Over the five-year period between 2015 and 2019, both accommodation/food services and retail trade in FNSB increased their share of employment relative to the U.S., going from LQ scores just under 1 (0.99 for both) to 1.05 for both, slightly surpassing average U.S. concentrations for both industries.</p> <p><b>Alaska comparison:</b> Using Alaska as a reference region instead of the U.S., retail trade follows similar trends with an LQ just over 1 and a pattern of growth. Accommodation and food services has an LQ below 1.</p>

By comparing the FNSB-Alaska location quotient data in Figure 1 and FNSB-U.S. location quotient data in Figure 2, it is possible to see the FNSB economy more closely resembles the overall sector composition of Alaska than the sector composition in the U.S. This can be seen when looking at the LQ numbers; the FNSB-

Alaska numbers are generally closer to 1, indicating a more similar composition. For example, the military sector in FNSB employs greater than 16 times the share of their workforce than the U.S. (LQ score of 16.35, as seen in Figure 2), but only 2.8 times the share of their workforce when compared to Alaska (LQ score of 2.8, as seen in Figure 1).

## Industry Classification of FNSB's Biggest Employers

Information about a region's largest employers can be obscured by industry names when they have ambiguous classifications. For example:

- All public education data are captured at the government level.
- The University of Alaska Fairbanks, one of the region's largest employers, is reported in the state government industry (Bureau of Economic Analysis, 2021a).
- The region's largest employer of crude oil transport, Alyeska Pipeline Service Company, is captured by the transportation and warehousing industry, which also captures well-known day tour providers like Riverboat Discovery (ADOLWD, 2022).
- Petro Star Inc. is counted in manufacturing and Doyon, Limited, the regional Native corporation, has many subsidiaries that are classified based on their industry. For example, Doyon Utilities is tucked into the construction industry, Doyon Government Contracting and Doyon Oil Field Services are captured in the management industry, and Doyon Natural Resources Development Corporation is captured in the mining sector (DCCED, 2022).
- Similarly, Tanana Chiefs Conference subsidiaries vary by industry. Chief Andrew Isaac Medical Center (owned by Tanana Chiefs) is captured in health care and social assistance, and Tanana Chiefs administrative services are likely captured in the professional, scientific, and technical services (DCCED, 2022).
- The information category includes news and media organizations (radio, newspaper, etc.), telecommunication companies, and libraries.

Other large employers in the region like Fred Meyer, Walmart, and Costco are captured within the retail trade sectors and Petro Star petroleum refinery is counted in the manufacturing industry. The information industry includes a wide variety of sectors like newspaper publishers (Fairbanks Daily News-Miner), movie theaters, radio and television broadcasting, resellers like GCI, and libraries throughout the region. Many tour operators are captured under the administration, support and waste management industry in the travel arrangement and reservation services subsector (ADOLWD, 2022).

Table 3 shows the full set of location quotients for FNSB and other comparative Alaska regions against the U.S. as a reference region. These comparative regions represent other key population centers and economic hubs around the state.

Key takeaways from the table below include:

- Overall, industry trends are similar across the state, with some variation from region to region.
- Industries where all four regions and Alaska overall show higher location quotients when compared with the U.S. include the military; mining, quarrying and oil and gas extraction; state government; utilities; retail trade; and accommodation and food services.
- Industries with some of the lowest concentrations across comparative regions include manufacturing, management of companies and enterprises, finance and insurance, and wholesale trade.

**Table 3: Comparative Location Quotient Table: Alaska Regions Compared to U.S. as Reference of “1”, 2019**

(from highest to lowest LQ by sector in the FNSB)

Industry Sector	Fairbanks North Star Borough	Municipality of Anchorage	Kenai Peninsula Borough	Matanuska-Susitna Borough	Alaska
Military	16.35	6.40	1.54	1.84	5.88
Mining, quarrying, and oil and gas extraction	4.00	2.87	6.15	1.92	6.05
Federal civilian	3.79	2.89	0.79	0.40	2.29
State government	2.91	n/a	1.47	1.34	1.89
Utilities	2.43	1.18	2.37	1.84	1.76
Construction	1.09	0.88	1.10	1.93	0.94
Retail trade	1.05	1.04	1.18	1.42	1.03
Accommodation and food services	1.05	1.10	1.41	1.09	1.07
Transportation and warehousing	1.03	1.43	0.90	0.78	1.24
Arts, entertainment, and recreation	0.98	1.02	1.25	1.22	1.03
Health care and social assistance	0.90	1.21	1.00	1.13	1.03
Forestry, fishing, and related activities	0.79	1.19	12.05	3.37	4.77
Real estate and rental and leasing	0.70	0.92	0.96	1.08	0.82
Other services	0.67	0.80	0.94	1.15	0.80
Local government	0.64	n/a	1.38	1.17	1.18
Professional, scientific, and technical services	0.62	0.96	0.59	0.68	0.72
Administrative, support and waste management	0.51	0.75	0.49	0.55	0.62
Farm employment	0.49	0.00	0.58	1.18	0.25
Information	0.48	1.07	0.64	0.98	0.82
Educational services	0.47	0.58	0.50	0.84	0.54
Wholesale trade	0.41	0.82	0.32	0.23	0.52
Finance and insurance	0.33	0.69	0.38	0.54	0.48
Management of companies and enterprises	0.27	0.74	0.14	0.22	0.56
Manufacturing	0.23	0.21	0.62	0.29	0.52

Source: U.S. Bureau of Economic Analysis (2021)

The industry categories in this table are based on North American Industry Classification System (NAICS) codes. To see a more detailed list of industries within each category, visit <https://www.bls.gov/cew/classifications/industry/industry-titles.htm>

## Location Quotient References

- ADOLWD (Alaska Department of Labor and Workforce Development). 2022. Alaska Employers by Region and Industry. Available online at <https://live.laborstats.alaska.gov/employer/index.html>. Accessed January 21, 2022.
- Bureau of Economic Analysis. 2021a. Local Area Personal Income and Employment Methodology. Available online at <https://www.bea.gov/resources/methodologies/local-area-personal-income-employment>. Accessed January 21, 2022.
- Bureau of Economic Analysis. 2021b. Total Full-Time and Part-Time Employment by NAICS Industry. Available online at <https://www.bea.gov/data/by-place-county-metro-local>. Accessed May 4, 2021.
- DCCED (Alaska Department of Commerce, Community, and Economic Development). 2022. Division of corporations, Business & Professional Licensing. Available online at <https://www.commerce.alaska.gov/cbp/businesslicense/search/License>. Accessed on January 24, 2022.
- Guettabi, M. 2018. A short brief on the regional dimensions of the Alaska recession. Available online at <https://iseralaska.org/publications/?id=1731>. Accessed September 16, 2021.