

Hachman Index of Economic Diversity, 2021

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OVERVIEW

The Hachman Index measures economic diversity. Using indicators such as gross domestic product (GDP) or employment, the index measures the mix of industries present in a particular region relative to a (well-diversified) reference region. The Hachman Index normalizes scores from 0 to 100. A higher score indicates more similarity with the reference region, while a lower score indicates less similarity. The Hachman Index is often applied at the national level using GDP, allowing for comparison between individual states. Since the well-diversified U.S. economy serves as the reference region, states with higher scores not only have economies similar to the national economy but are also economically diverse states. With reliable data, the index may be applied to measure industrial distribution across counties as well. This chapter examines the results of a Hachman Index analysis at the state and county levels using 2021 data.

Utah in Top 5 for Economic Diversity

Utah increased from the sixth to the fifth most economically diverse state in the U.S. between 2020 and 2021. Missouri (97.0) and Georgia (96.6) remain the most economically diverse states in the nation. Arizona (96.4) and Illinois (95.9) swapped places in the rankings while Utah (95.6) rounds out the top 5, edging out North Carolina (95.5) and Pennsylvania (95.4), which ranked 7th and 5th last year, respectively (see Figure 3.1). All seven of these states have index scores above 95 (see Table 3.1). As the Hachman Index is a relative measure, it is not definitive that any one of these states is significantly more diverse than another.¹

Utah ranks second in the West for economic diversity. California, Washington, Colorado, Arizona, and Oregon all have larger economies than Utah, but only Arizona has a higher Hachman Index score.² States with similar-sized economies include Alabama, Kentucky, Oklahoma, and Iowa.³ Of these, only Alabama has an index score above 90, indicating a very diverse economy. Alabama scores 91.1, Kentucky 88.6, Iowa 70.7, and Oklahoma 58.4. Despite Utah's midsized economy (29th largest), its industrial composition is more diverse than that of the largest state economies.

Urban Counties More Diverse, Rural Counties More Specialized

Salt Lake, Weber, Davis, Utah, and Washington counties remain the most economically diverse counties within Utah as of 2021. Because adequate GDP data are not available at the county level, we analyze employment data. A Hachman Index analysis of Utah Department of Workforce Services and Bureau of Labor Statistics data using two-digit NAICS codes shows the economic disparity of Utah's counties. As with the state-level analysis, the index uses the entire U.S. economy as the (well-diversified) reference region to analyze economic diversity among counties in Utah. Urban counties tend to have more diverse economies with a larger variety of employment opportunities and a wider range of industry sectors available to the population (see Figure 3.2). Washington County is the largest county outside of the Wasatch Front and the fifth most diverse county in Utah. By absolute change, the top 5 counties for population growth are also the most economically diverse. Other fast-growing counties (by rate of population growth) include Wasatch County, Morgan County, and Tooele County.⁴ As more people move to these counties and the employment opportunities increase in them, the industrial composition will continue to diversify.

Most of the counties bordering Salt Lake County have relatively diverse economies. Davis, Utah, and Tooele all have index scores above 75, ranking in the top 10 for most diverse Utah counties (see Table 3.2). A notable exception is Summit County, which has high employment in arts, entertainment and recreation and accommodations and food services, the result of a tourism-based economy centered on Park City.⁵ Another exception is Morgan County, which has the state's highest concentration of construction employment. In counties with small populations, just a few large employers can have an outsized effect on the counties' overall employment mix.

Duchesne, Emery, and Beaver remain the least economically diverse counties. In Emery and Duchesne, the low index scores are a result of a heavy concentration in mining (and utilities, in the case of Emery).⁶ These counties have a competitive advantage in the extractive industries due to their natural

resources, which are geographically dependent and not found everywhere in Utah. Beaver's highest industrial concentration in 2021 is in agriculture. Like Morgan and Summit counties, all three have relatively small populations, so just a few large employers can have a significant effect on their industrial composition.

With a few exceptions, Utah's metropolitan counties have the most diverse economies in the state, followed by the adjacent ring counties. The rural counties with smaller populations and fewer industries have the least diverse economies. This highlights a clear urban-rural divide in the economic opportunities available to Utahns. Urban counties offer a more diverse array of economic opportunities across a larger set of industries, while rural counties have fewer industries and economic opportunities to choose from. While economic diversification is not a measure of economic prosperity, it is an indicator of greater economic choice and opportunity.

Calculating the Hachman index

The Hachman Index is the reciprocal sum, or mean location quotient, of the study area across all industries where the mean is generated by weighting the respective sectors' location quotients⁷ by the sector shares in the region.⁸ The Hachman Index for a given time period is calculated as follows:

$$HI = \frac{1}{\left(\sum_i \left(\frac{E_{Si}}{E_{Ri}} \right) \times (E_{Si}) \right)}$$

E_{Si} is the share of the subject area's economic indicator in industry i .
 E_{Ri} is the share of the reference region's economic indicator in industry i .

Here, the state-level analysis utilizes GDP while the county-level analysis uses employment as the economic indicator. A Hachman Index score ranges from 0 to 100. A higher score indicates that the subject area's industrial distribution more closely resembles that of the reference geography and is therefore diverse. A lower score indicates a region is less diverse

than the reference area and more concentrated in fewer industries. Diversity in economic opportunities, as represented by a diverse set of industries, is generally considered a positive contributor to a region's economic stability.

The Hachman Index is not without its shortcomings. For one, the subject area is contained within the reference region, i.e. Utah is included in the U.S., and so, to some degree, the subject area is being compared to itself. Another limitation of the Hachman Index is that it does not account for the competitive advantages of a region. A region may have an advantage specializing in a specific industry, making a concentration in that industry economically justifiable over a more diversified economy.

Although diversification is usually considered a positive attribute for an economy, an increase in diversity may not be good for the labor market. As discussed in the 1995 *Economic Report to the Governor*, Utah had specialized in metal mining industries. In the mid-1980s Kennecott experienced major layoffs, which decreased its share of the overall Utah economy and therefore raised the measure of diversity in Utah. However, the effect on the labor market was negative, with lower employment levels. The transition to increased industrial diversity may not immediately result in improvements for residents of a region or imply economic growth.⁹

The Hachman Index is also affected by the measures used. The value of the Hachman Index will be affected if broader measures are used. For example, an index calculated from employment by industry will behave differently over time from one calculated from GDP, due to changes in labor productivity that lead to increased production using fewer employees.

1 The variation among the top five state scores is 1.4 points. The Hachman Index is not an exact measure and small differences are not definitive. When comparing state scores, the exact score is less important than the rank and size of the variation in scores relative to other states.

2 When ranking state economies by size using total nominal GDP, California is the largest in the nation, Washington ranks 11th, Colorado ranks 15th, Arizona ranks 18th, and Oregon ranks 24th. Utah ranks as the 29th largest state economy. See the BEA's seasonally adjusted annual rates ending 2022 Q3, found at: <https://www.bea.gov/data/gdp/gdp-state>.

3 When ranking state economies by size using total nominal GDP, Alabama (27th) and Kentucky (28th) rank just larger than Utah, and Oklahoma (30th) and Iowa (31st) rank just smaller. See the BEA's seasonally adjusted annual rates ending 2022 Q3, found at: <https://www.bea.gov/data/gdp/gdp-state>.

4 Kem C. Gardner Policy Institute, 2021, "First Insights – 2020 Census Utah Counties and Communities," Fact Sheet, August 2021, available from <https://gardner.utah.edu/wp-content/uploads/C2020-Counties-FS-Aug2021.pdf>.

5 This concentration is measured by the comparison of the location quotients of each employment sector in Summit County. Arts, entertainment, and recreation ranks first, with a location quotient of 9.8, followed by real estate and rental and leasing (3.2), and accommodation and food services (2.4).

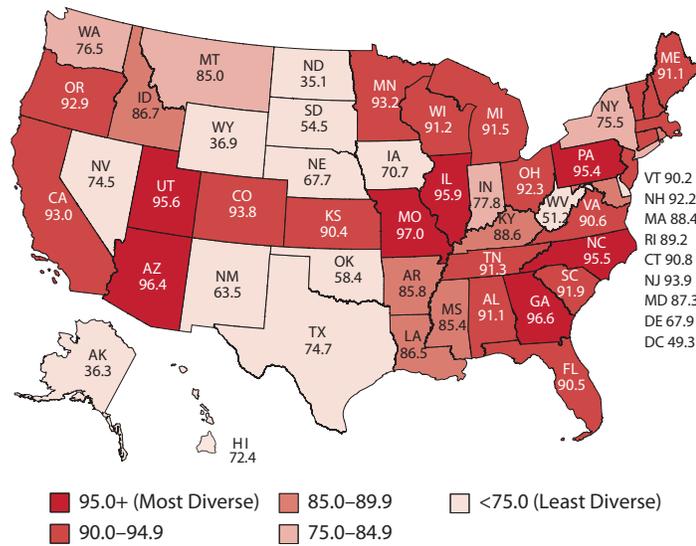
6 Duchesne has the highest mining location quotient of all counties in the state at 43.8, followed by Uintah at 28.3. The next highest are Emery at 25.4, Carbon at 24.6, and Sevier at 18.2. all well above other counties in the state.

7 A location quotient measures the relative concentration of an industry in one area compared with another. The Bureau of Labor Statistics defines it as a "ratio that compares the concentration of a resource or activity, such as employment, in a defined area to that of a larger area or base. For example, location quotients can be used to compare state employment by industry to that of the nation." It is calculated by dividing an industry's share of the total (employment, GDP, etc.) in the study region by its share in the reference region.

8 Frank Hachman, 2002, "The Degree of Similarity Index: A Measure of Diversification Superior to the Hachman Index," unpublished manuscript.

9 1995 *Economic Report to the Governor*, pages 207–214.

Figure 1: Hachman Index Scores for the States, 2021



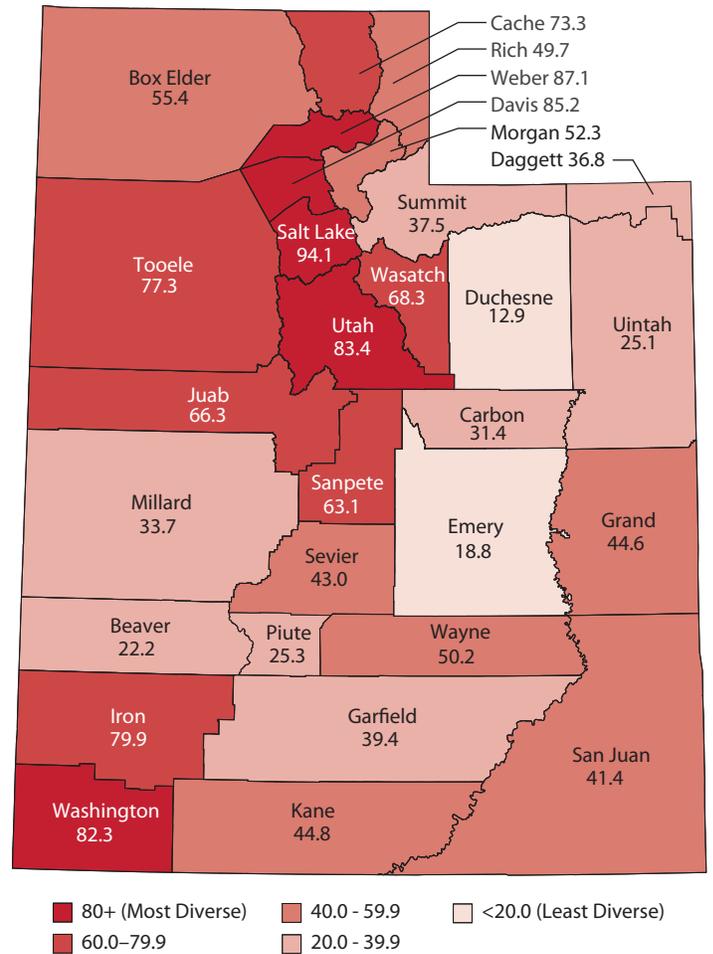
Source: Kem C. Gardner Policy Institute analysis of U.S. Bureau of Economic Analysis GDP data

Table 1: Hachman Index Scores for the States, 2021

State	Hachman Index	State	Hachman Index
Missouri	97.0	Kentucky	88.6
Georgia	96.6	Massachusetts	88.4
Arizona	96.4	Maryland	87.3
Illinois	95.9	Idaho	86.7
Utah	95.6	Louisiana	86.5
North Carolina	95.5	Arkansas	85.8
Pennsylvania	95.4	Mississippi	85.4
New Jersey	93.9	Montana	85.0
Colorado	93.8	Indiana	77.8
Minnesota	93.2	Washington	76.5
California	93.0	New York	75.5
Oregon	92.9	Texas	74.7
Ohio	92.3	Nevada	74.5
New Hampshire	92.2	Hawaii	72.4
South Carolina	91.9	Iowa	70.7
Michigan	91.5	Delaware	67.9
Tennessee	91.3	Nebraska	67.7
Wisconsin	91.2	New Mexico	63.5
Alabama	91.1	Oklahoma	58.4
Maine	91.1	South Dakota	54.5
Connecticut	90.8	West Virginia	51.2
Virginia	90.6	District of Columbia	49.3
Florida	90.5	Wyoming	36.9
Kansas	90.4	Alaska	36.3
Vermont	90.2	North Dakota	35.1
Rhode Island	89.2		

Source: Kem C. Gardner Policy Institute analysis of U.S. Bureau of Economic GDP data

Figure 2: Hachman Index Scores for Counties in Utah, 2021



Source: Kem C. Gardner Policy Institute analysis of Bureau of Labor Statistics (United States) and Utah Department of Workforce Services (Utah counties) employment data

Table 2: Hachman Index Scores for Utah Counties, 2021

State	Hachman Index	State	Hachman Index
Salt Lake	94.1	Kane	44.8
Weber	87.1	Grand	44.6
Davis	85.2	Sevier	43.0
Utah	83.4	San Juan	41.4
Washington	82.3	Garfield	39.4
Iron	79.9	Summit	37.5
Tooele	77.3	Daggett	36.8
Cache	73.3	Millard	33.7
Wasatch	68.3	Carbon	31.4
Juab	66.3	Piute	25.3
Sanpete	63.1	Uintah	25.1
Box Elder	55.4	Beaver	22.2
Morgan	52.3	Emery	18.8
Wayne	50.2	Duchesne	12.9
Rich	49.7		

Source: Kem C. Gardner Policy Institute analysis of Bureau of Labor Statistics (United States) and Utah Department of Workforce Services (Utah counties) employment data

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