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Economic Reliance on Anchor Institutions

An Analysis of New Data from the Anchor Economy Initiative at the Federal Reserve Bank of Philadelphia

COMMUNITY DEVELOPMENT & REGIONAL OUTREACH

By: Patrick Harker, Deborah Diamond, Theresa Dunne, Sisi Zhang[1]

Introduction

The United States saw a major shift in its industrial makeup from the 1950s to today, marked most notably by a decline in manufacturing and an increase in professional service occupations. The transformation of the U.S. economy away from manufacturing has, at the same time, been a story of the ascendance of health care and higher education as anchors of many regional economies. In 1950, manufacturing accounted for 25.9 percent of U.S. jobs, while hospital and higher education jobs accounted for just 5.4 percent. By 2019, manufacturing accounted for only 10.0 percent of jobs in the United States, while health-care and higher education institutions accounted for 15.2 percent of jobs in the country.[2]

The growing reliance of regions on hospitals and higher education institutions is captured in data collected and analyzed by the Anchor Economy Initiative at the Federal Reserve Bank of Philadelphia. The Anchor Economy Dashboard includes measures of economic impact of hospitals and higher education institutions[3] in 2019 and 2004 for 524 regions (394 metropolitan regions and 130 nonmetropolitan regions) that compose the United States. Included in the economic impact analysis are measures for employment, income, and gross domestic product (GDP) attributable to higher education institutions and hospitals.

Recognizing that impact measures alone do not capture how dependent regions are on anchor hospital and higher education institutions, the Anchor Economy Dashboard includes a *reliance index* that measures this dependence. The reliance index captures the share of economic activity from "eds and meds" in a region relative to the U.S. economy as a whole. For the United States, this relationship is defined as 1 on the reliance index. If a region has a higher concentration of its economic activity attributable to higher education institutions and hospitals than the United States, then it is above 1 on the reliance index, whereas regions with a lower concentration of hospital and higher education institution economic activity than the United States are below 1 on the reliance index. The index ranges from a high of 3.71 (Ithaca, NY) to a low of 0.18 (Midland, TX) in 2019.[4] An earlier research brief[5] detailed how anchor institution reliance differed across regions in the country in 2019.

New data on anchor institution impacts and regional reliance on anchor institutions are now available and allow us to understand how regional economic change and reliance on anchor institutions intersect. In this brief,

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[2] Employment data for 1950 are from the U.S. Census Bureau, and we select this starting point because it demonstrates how dramatically manufacturing has declined and health care and higher education have increased. We identify manufacturing, higher education, and hospital employment in 2019 because it is the most recent year of the Anchor Economy Dashboard data discussed in this paper. In 2004, the other year for which we have anchor economy dashboard data, manufacturing accounted for only 12.6 percent of jobs in the United States, while health-care and higher education institutions accounted for 14.1 percent of jobs in the country. Employment data for 2019 and 2004 are from the American Community Survey.

[3] The dashboard defines hospital and higher education institutions using the North American Industry Classification System (NAICS) industry codes 622 for hospitals and 6112 and 6113 for higher education institutions.

[4] The reliance index is calculated by dividing each region's employment, income, and GDP impact from anchor institutions by its total regional employment, income, and GDP from all sectors in the regional economy. Each of these ratios is then divided by the equivalent ratio calculated for the U.S. economy as a whole, yielding a separate location quotient for employment, income, and GDP. The location quotients are then averaged together to yield the reliance index.

[5] Patrick Harker, Deborah Diamond, and Davin Reed, *Anchor Impact: Understanding the Role of Higher Education and Hospitals in Regional Economies*, Philadelphia: Federal Reserve Bank of Philadelphia, 2022.

we examine change in anchor institution reliance across the nation, with a focus on regions that have increased and decreased the most in anchor reliance within their population categories between 2004 and 2019.[6] Our interest is to see whether increasing reliance on anchor institutions has been good or bad for regional economies. On the one hand, universities and hospitals are often linked to innovation, talent production, and regional economic investments, all of which can fuel regional economic growth. That may lead regions with growing reliance on anchor institutions to see economic growth over time.[7] On the other hand, increasing reliance on anchor institutions may be a result of other firms and sectors leaving a region, resulting in hospitals and higher education institutions as the "last sectors standing" in regions that have seen general economic decline.[8]

Our approach to the question of how anchor reliance change is related to positive or negative economic conditions in regions is to relate anchor reliance change to four economic measures: population change, change in total anchor institution GDP impact, change in total regional GDP, and change in the regional GDP of four sectors that represent the *knowledge economy*, sectors that a strong presence of higher education and academic medical centers are thought to impact.[9] For each of these economic measures, we describe how they correlate with change in anchor institution reliance for all metropolitan regions in the anchor economy data set. We then focus specifically on 15 regions that have increased the most in anchor reliance in their population category and 15 regions that have decreased the most in reliance in their population category.

Our goal in presenting change in anchor reliance in relation to other economic factors is twofold: first, to suggest a roadmap for regions interested in using the Anchor Economy Dashboard to examine what role their anchor institutions have played in regional economic development and second, to understand by looking at regions that have changed the most, if consistent trends emerge in regions that are either declining or increasing in anchor institution reliance.

We sum up our findings as follows:

- There is a large heterogeneity across regions between change in reliance and the measures of economic growth that we have selected.

- At the national level, there is no significant correlation between a change in anchor reliance and population, regional GDP, or knowledge sector GDP change.

- Although correlations between anchor reliance and economic growth measures do not appear at the national level, examining the 30 regions that have experienced the most reliance change between 2004 and 2019 reveals examples where some Rust Belt cities display growing reliance and declining economic measures, while Sun Belt and West Coast cities display declining reliance and growing economic measures.

We conclude that the question of whether anchor reliance is a strength or vulnerability for regional economies needs to be determined in the context of additional factors at the regional level.

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[6]   See the following section for an explanation of why the years 2004 and 2019 are being used for this analysis.

[7]   One indication of the significance of anchor institutions as catalyst for economic development are the awards for the Federal CHIPS and Science Act and Build Back Better grants for regional innovation. Universities have been central organizing partners in every regional award.

[8]   A 1999 Brookings Institution report outlines the case for anchor institution engagement in cities that have "been struggling over the last three decades because of a shrinking job base, loss of middle-class families, and rising unemployment and crime rates." Ira Harkavy and Harmon Zuckerman, *Eds and Meds: Cities' Hidden Assets*, Washington, D.C.: Center on Urban and Metropolitan Policy, Brookings Institution, 1999.

[9]   There is extensive work examining the relationship between "eds and meds" and spillover effects for talent production, entrepreneurship, and building an innovation economy. Some examples include Natee Amornsiripanitch, Paul A. Gompers, George Hu, Kaushik Vasudevan, "Getting Schooled: The Role of Universities in Attracting Immigrant Entrepreneurs," Federal Reserve Bank of Philadelphia Working Paper 22-19, 2022, available at www.philadelphiafed.org/the-economy/regional-economics/getting-schooled-the-role-of-universities-in-attracting-immigrant-entrepreneurs; Martina Fromhold-Eisebith and Claudia Werker, "Universities' Functions in Knowledge Transfer: A Geographical Perspective," Annals of Regional Science 51 (2013): pp. 621–43, available at doi.org/10.1007/s00168-013-0559-z; Gerald A. Carlino and Robert M. Hunt, "What Explains the Quantity and Quality of Local Inventive Activity?" Federal Reserve Bank of Philadelphia Working Paper 09-12, 2009, available at www.philadelphiafed.org/the-economy/regional-economics/what-explains-the-quantity-and-quality-of-local-inventive-activity.

Data and Methods

Our analysis of regional reliance uses 2004 and 2019 data available through the Anchor Economy Dashboard to compare regions that experienced shifts in reliance on higher education institutions and hospitals over a span of 15 years. The initial dashboard included data from 2019 to which we have now added data from 2004. We focus on these two years for a couple of reasons. The Anchor Economy Initiative was launched in 2021, when the most recently available data on higher education institutions and hospitals were from 2020. Because the COVID-19 pandemic affected higher education and hospitals so significantly in 2020, we did not want to rely on that year for economic impact data, hence we used 2019 as our starting point for the analysis. In measuring the change in impact over time, we selected 2004 because it was the furthest back we could go and still maintain consistency in the Bureau of Labor Statistics (BLS) and Department of Education databases that are inputs for the construction of the dashboard. Mirroring the initial data set, the Anchor Economy Dashboard now includes 2004 data capturing direct, indirect, induced, and total impacts of anchor institutions for employment, income, and GDP. A reliance index number is calculated for each region for 2004, allowing for comparison of regional anchor institution reliance in 2004 and 2019.

As we described in our earlier research brief introducing the Anchor Economy Dashboard, the reliance index provides a summary measure of how dependent a regional economy is on higher education institutions and hospitals. It differs from economic impact in two important ways. First, it adjusts economic impact by the size of the regional economy, allowing us to compare the role of anchors in regional economies of various sizes. Second, it incorporates measures of impact in terms of employment, income, and GDP, which are separate measures within economic impact analysis. The reliance index is an average of each region's location quotients — measures of the concentration of economic activity in a region relative to the country as a whole — that are separately calculated for employment, income, and GDP.[10]

To compare regional reliance in 2004 and 2019, we measure change in reliance by subtracting the 2004 reliance index number from the 2019 reliance index number. This simple calculation allows us to identify regions that have experienced the greatest absolute changes in reliance during the study period.[11] In this brief, we outline the 15 regions with the greatest increases in reliance and the 15 regions with the greatest declines in reliance by population size. In addition to the absolute change in reliance, we present percent change in population, total anchor GDP impact, regional GDP, and knowledge sector GDP for these 30 regions to understand changes in anchor reliance alongside other changes in the broader regional economy from 2004 and 2019. We limit our analysis of anchor reliance to metro regions, since nonmetro regions tend to be rural areas that generally have less broad industry composition and specializations, making the interpretation of economic trends more challenging.

Throughout the analysis, we focus on GDP as our metric of regional economic growth. We use total anchor GDP as a measure of the value of goods and services related to the specific sectors of higher education and hospitals.

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[10] Specifically, the reliance index is calculated by dividing each region's employment, income, and GDP impact from anchor institutions by its total regional employment, income, and GDP from all sectors in the regional economy. Each of these ratios is then divided by the equivalent ratio calculated for the U.S. economy as a whole, yielding a separate location quotient for employment, income, and GDP. The location quotients are then averaged together to yield the reliance index.

[11] We use absolute change in reliance instead of percent change as in the four outcome measures. The reliance index value is an average of three location quotients, and each location quotient is a relative measure of the regional ratio over national ratio, thus it is not straightforward to interpret the economic meaning of its percentage change. The two measures could differ in regions starting with low reliance indices but with high percent changes in reliance, although the index value did not change substantially. Nevertheless, we look at how absolute change and percentage change differ in selecting the 30 regions with the greatest increases and decreases in reliance. We find that the rankings in large regions mostly agree, and those rankings that disagree are concentrated in regions with small populations.

Total anchor GDP[12] includes all direct, indirect, and induced anchor institution GDP impacts. Regional GDP is a measure of the overall value of goods and services of a region.[13] In order to incorporate information on regional and knowledge sectors' GDP, we use county-level industry totals generated by the same IMPLAN input-output model used to produce the Anchor Dashboard data set.[14] The industry-specific data draw upon GDP values from the BLS Quarterly Census of Employment and Wages (QCEW), a nationwide data source that captures 95 percent of jobs available, divided into 19 broad industry sectors.[15] We define knowledge sectors as the following NAICS 2-digit industries: finance and insurance; professional, scientific, and technology services; information; and management of companies and enterprises.[16] These industries often require a highly specialized skill set or subject knowledge, execute research and development activities, and can benefit from the talent and research-driven innovation emerging from regional anchor institutions.[17]

[12]   In the Anchor Economy Dashboard data, total anchor GDP is labeled under the variable name, 'impact_gdp_total,' which is the sum of direct, indirect, and induced anchor GDP impacts.

[13]   Total anchor GDP and regional GDP outcomes are presented in 2019 dollars.

[14]   It should be noted that NAICS industries outside of higher education and hospitals are not displayed in the online Anchor Dashboard.
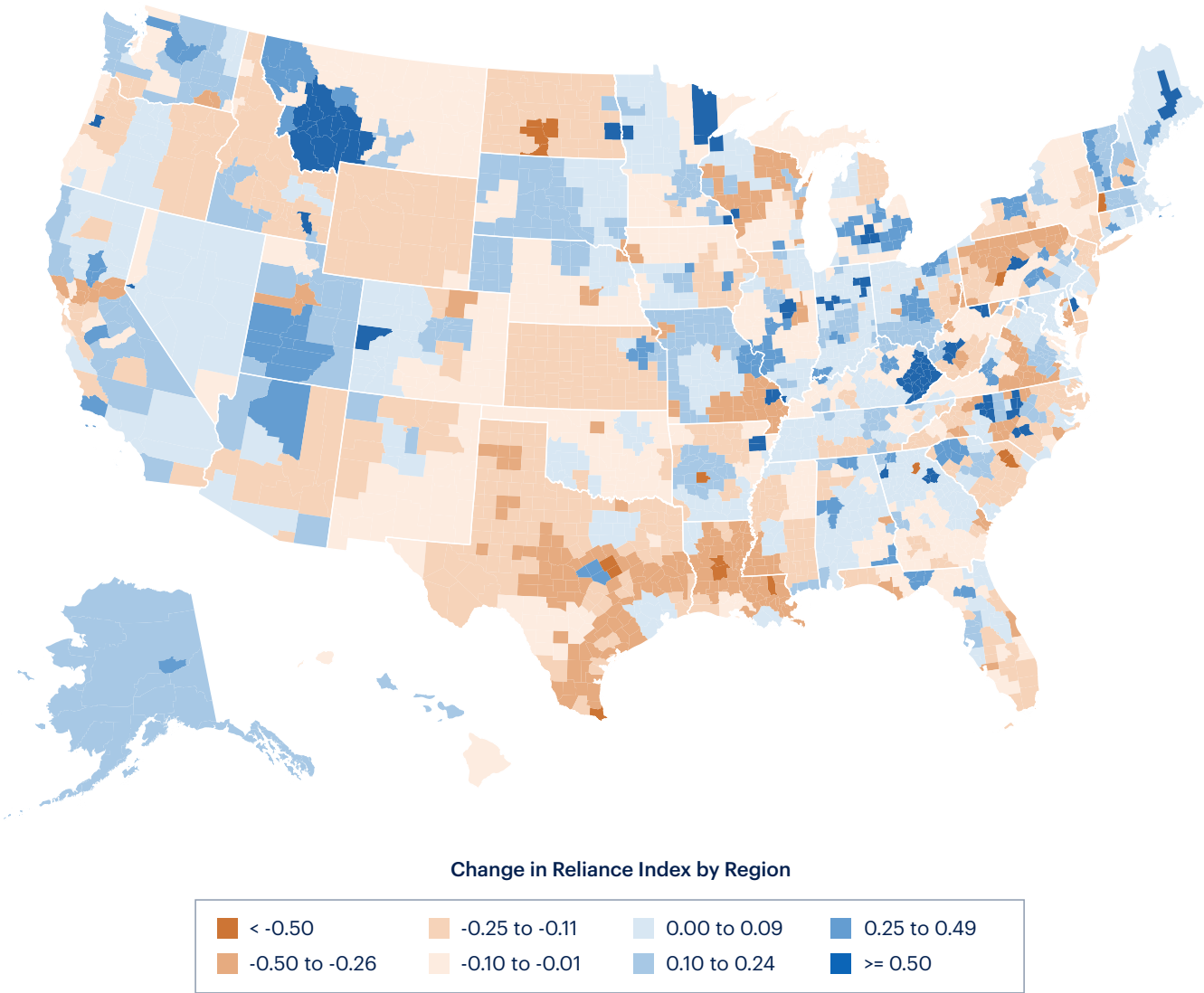
[15]   The IMPLAN data contain industry employment and GDP totals for two-digit NAICS industries. This list of industries can be found at www.census.gov/naics/?58967?yearbck=2017. Note that the two-digit NAICS industry codes for education services and healthcare and social assistance encompass a broader set of institutions than the higher education institutions and hospitals included in the anchor impact modeling.

[16]   Note that GDP from knowledge sectors may contain GDP included in total anchor GDP as indirect or induced impacts. For example, an accounting firm may open in a region because of a university's and its employees' need for tax services. Because accounting is under the NAICS industry code for professional, scientific, and technical services and the firm provides services to a university, GDP resulting from the firm would be included in knowledge sector GDP and indirect anchor GDP impacts.

[17]   While our classification of knowledge sectors is not exclusive to the following, we referred to the National Science Foundation's definition of knowledge- and technology-intensive industries to help define these sectors: Ledia Guci and Abigail Okrent, "Production and Trade of Knowledge- and Technology-Intensive Industries," *Science and Engineering Indicators,* Alexandria, VA: National Science Board, 2022. Available at ncses.nsf.gov/pubs/nsb20226/.

Change in Anchor Institution Reliance Between 2004 and 2019

Change in Anchor Institution Reliance by Region Between 2004 and 2019

Change in Reliance Index by Region

< -0.50	-0.25 to -0.11	0.00 to 0.09	0.25 to 0.49
-0.50 to -0.26	-0.10 to -0.01	0.10 to 0.24	>= 0.50

We begin our analysis of anchor institution reliance by identifying the change that has occurred in regions' reliance index values between 2004 and 2019.

**FIGURE 1** displays the absolute change in reliance values for all 524 regions (metro and nonmetro) across the country. Blue shading indicates an increase in regional reliance, whereas red shading indicates a decline in reliance. Increases in reliance are more prominent in the West, Midwest, and Northeast, while decreases in reliance are more prominent in the Plains states and south-central portion of the United States.

Among the 394 metropolitan regions in the Anchor Economy Dashboard, there are 210 metro regions that experienced an increase in reliance, with an average increase of 0.21. Among the 184 metro regions that experienced declining reliance, the average decline was 0.19.

Regional variation in reliance on higher education institutions and hospitals is important to consider, given the importance of these sectors to regional economies. For example, while hospital closures have increased, the impacts of these closures is felt more acutely in rural communities than in dense urban ones.[18] College enrollments have declined nationally, leading to some higher education closures, but this phenomenon is also felt unevenly across geographies.[19] At the same time, new federal programs like the Build

Back Better Regional Challenge intentionally focus on regions that have academic research institutions but are underperforming on economic growth measures in order to leverage those institutions to drive innovation and commercialization that can bolster a regional economy.[20] Whether anchors function as a source of regional economic stability and growth or are at risk and threaten regional economic conditions is something that has to be understood in the context of multiple conditions at the regional level.

The analysis that follows focuses specifically on the 30 metro regions with the largest numerical increases and decreases in reliance within their population categories. These regions and their reliance values in 2004 and 2019, alongside their change in reliance values over that time, appear in Table 1.
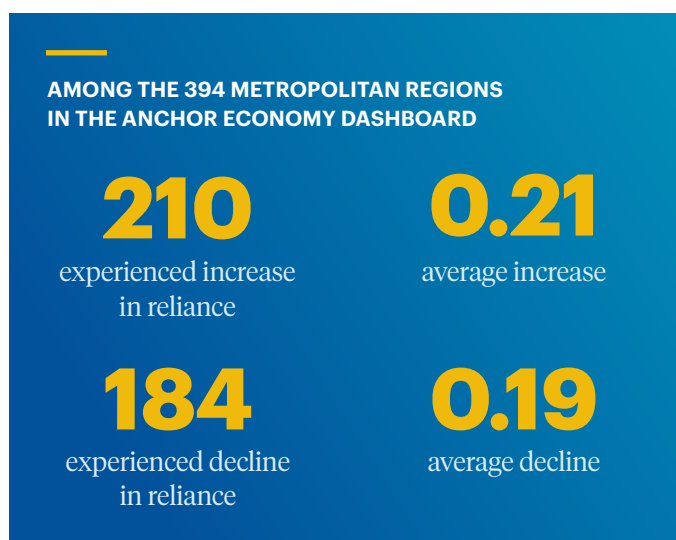
Geographic trends identified by Figure 1 are evident in this list of most changed in reliance in Table 1, with the Midwestern and Rust Belt regions of Cleveland, OH; St. Louis, MO; and Detroit, MI displaying increases in reliance, and western regions of Sacramento, CA; Phoenix, AZ; and San Francisco, CA among those in their population categories with the largest decreases in reliance. Among regions with increasing reliance, we see some college towns, like Columbus, OH (the Ohio State University) and New Haven, CT (Yale University) intensifying as centers of health care and high education. California and Louisiana are more heavily represented than other states among regions with declining reliance, although as we see later in the paper, the economies of the seven regions with declining reliance in California and Louisiana show very different trajectories.

AMONG THE 394 METROPOLITAN REGIONS IN THE ANCHOR ECONOMY DASHBOARD

210
experienced increase in reliance

0.21
average increase

184
experienced decline in reliance

0.19
average decline

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[18]   The Sheps Center at the University of North Carolina has tracked rural hospital closures since 2005. The American Hospital Association issued a recent report on the health-care consequences of rural hospital closures, *Rural Hospital Closures Threaten Access: Solutions to Preserve Care in Local Communities,* Washington, D.C.: American Hospital Association, 2022. The economic consequences of rural hospital closures is also a subject of concern: George M. Holmes, Rebecca T. Slifkin, Randy K. Randolph, and Stephanie Poley, "The Effect of Rural Hospital Closures on Community Economic Health," *Health Services Research* 41:2 (2006), pp. 467–85.

[19]   Nathan Grawe describes the uneven geographic impacts of declining college enrollment in the United States in his recent monograph, *Demographics and the Demand for Higher Education,* Baltimore: Johns Hopkins University Press, 2018.

[20]   As a recent Brookings Institution report pointed out, "In a nation plagued by regional economic divides, research universities are a uniquely distributed innovation asset. Unlike innovation sector employment, high-growth startups, and venture capital, research universities are spread across the entire nation." Brookings is studying regions that have been awarded EDA Build Back Better Regional Challenge Grants to understand how regional research universities can drive economic growth through improved connections to regional industry, talent, and policymaking. Joseph Parilla and Glencora Haskins, *How Research Universities Are Evolving to Strengthen Regional Economies,* Washington, D.C.: Brookings Institution. Available at www.brookings.edu/articles/how-research-universities-are-evolving-to-strengthen-regional-economies/.

Regions with Largest Increase in Reliance			
Region	2004	2019	Change
United States	1.00	1.00	-
Regions >= 2 Million			
Cleveland-Elyria, OH	1.32	1.72	0.40
St. Louis, MO-IL	1.24	1.55	0.30
Detroit-Warren-Dearborn, MI	1.05	1.31	0.26
Regions 1–2 Million			
Rochester, NY	1.39	1.88	0.49
Columbus, OH	0.93	1.19	0.25
Kansas City, MO-KS	1.00	1.22	0.22
Regions 500,000–1 Million			
Winston-Salem, NC	1.29	1.93	0.64
New Haven-Milford, CT	1.38	1.85	0.47
Grand Rapids-Wyoming, MI	0.95	1.33	0.38
Regions 250,000–500,000			
Duluth, MN-WI	1.51	2.20	0.69
Lansing-East Lansing, MI	1.34	1.94	0.60
Fort Wayne, IN	1.08	1.64	0.56
Regions <250,000			
Morgantown, WV	2.49	3.57	1.08
Corvallis, OR	2.22	3.06	0.84
Pocatello, ID	0.82	1.61	0.78

TABLE 1B Metro Regions with the Greatest Change in Reliance, 2004 and 2019

Regions with Largest Decrease in Reliance			
Region	2004	2019	Change
United States	1.00	1.00	-
Regions >= 2 Million			
Sacramento–Roseville–Arden-Arcade, CA	1.32	0.93	-0.39
Phoenix-Mesa-Scottsdale, AZ	1.24	1.00	-0.24
San Francisco-Oakland-Hayward, CA	0.76	0.60	-0.17
Regions 1–2 Million			
New Orleans-Metairie, LA	1.46	1.16	-0.30
San Jose-Sunnyvale-Santa Clara, CA	0.86	0.68	-0.17
Austin-Round Rock, TX	0.83	0.68	-0.15
Regions 500,000–1 Million			
Baton Rouge, LA	1.27	0.79	-0.48
Palm Bay-Melbourne-Titusville, FL	1.07	0.79	-0.28
Scranton—Wilkes-Barre—Hazleton, PA	1.31	1.06	-0.25
Regions 250,000–500,000			
Brownsville-Harlingen, TX	1.40	0.76	-0.64
Provo-Orem, UT	1.48	1.12	-0.36
Vallejo-Fairfield, CA	1.01	0.67	-0.35
Regions <250,000			
Hammond, LA	2.47	1.42	-1.05
Johnstown, PA	1.63	0.82	-0.81
Bismarck, ND	1.67	0.90	-0.78

Notes

Reliance for the U.S. is 1 by definition; hence, there is no change over time in U.S. reliance from 2004 to 2019.

Anchor Institution Reliance and Population Change

We focus next on the relationship between change in anchor institution reliance and change in regional population. Based on regional differences in reliance change displayed in Figure 1, we might hypothesize that there is a correlation between faster-growing regions (in California and Texas, for instance) and a decrease in anchor institution reliance within the national data set. However, in analyzing regional population change and change in anchor institution reliance, we see no significant correlation. The correlation coefficient between population changes and reliance change is 0.006 and statistically insignificant. Even when we break down regions by their population category, there is no significant correlation between population change and change in reliance. About 51.1 percent of all metros with decreasing reliance experienced population growth rates below that of the nation, compared with 53.3 percent of all metros with increasing reliance.

While there may be no relationship between population change and change in anchor reliance when we look at all metro regions in the United States, among those regions that have changed the most in their reliance on anchor institutions, nine of the 15 regions with anchor increases have below-average population growth, and 11 of the 15 regions with anchor decreases have above-average population growth. This is our first indication that an economic growth indicator — in this case population — can bear some relationship to anchor institution reliance

FIGURE 2 Correlation Between Percent Change in Population and Anchor Reliance Change Between 2004 and 2019

PERCENT CHANGE IN POPULATION BETWEEN 2004 AND 2019

VALUE CHANGE IN RELIANCE BETWEEN 2004 AND 2019
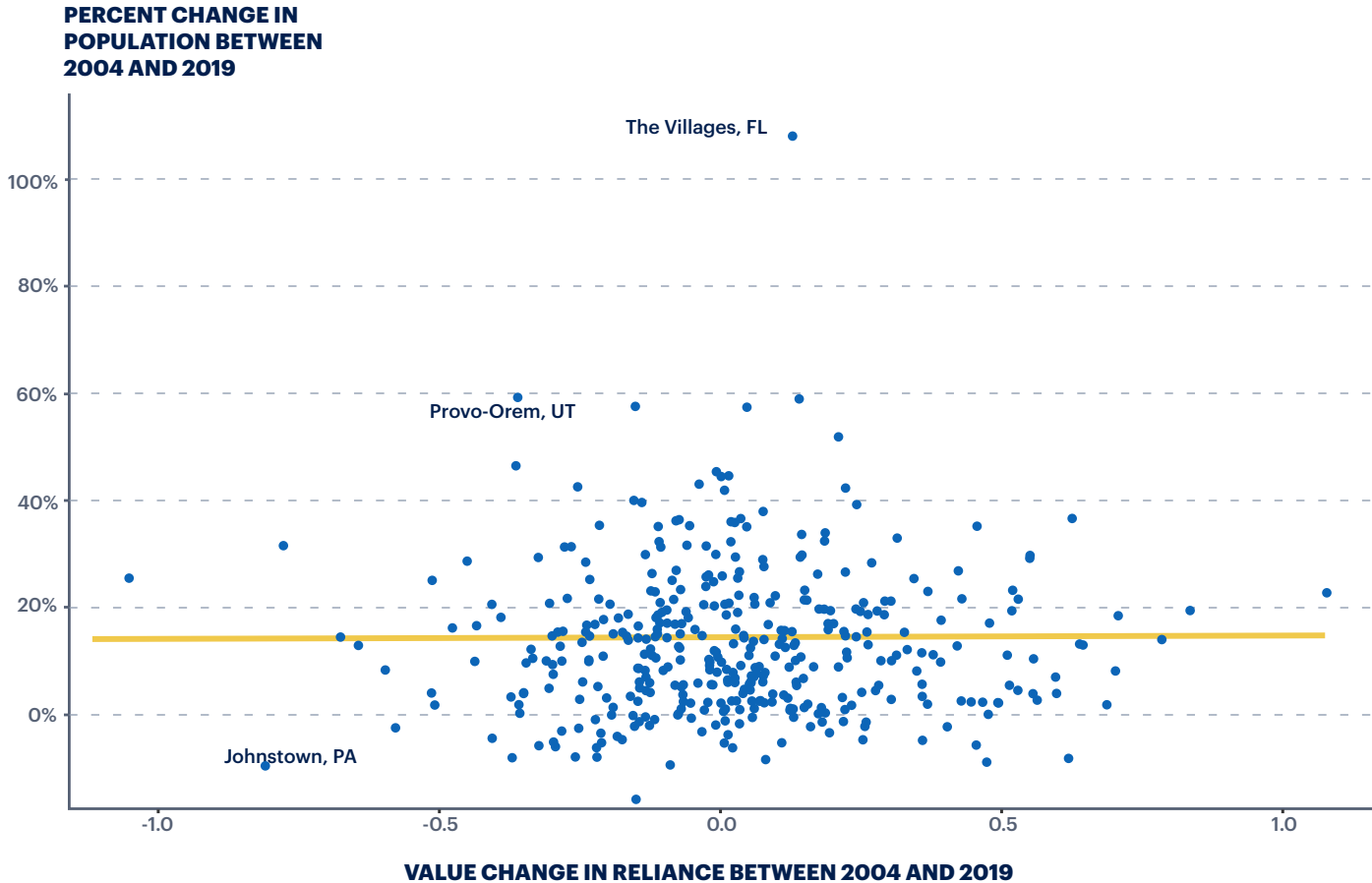
Notes
The Villages, FL, is a region with a population of less than 250,000 that contains a retirement community that has experienced rapid population growth over the last two decades. Virtually all anchor impacts in The Villages is driven by the growth of hospitals in that area, serving the growing older population.

in particular cases. In the largest regions with the largest anchor institution reliance increases, Cleveland, St. Louis, and Detroit all display population growth far below the national average of 12.3 percent (at -2.2, 2.9, and -2.2

percent, respectively). While the largest regions with anchor institution decline — Sacramento, Phoenix, and San Francisco — all show above-average population growth (at 18.2, 28.5, and 14.7 percent, respectively).

TABLE 2 **Metro Regions with the Greatest Increases in Reliance and Population Change, 2004 and 2019**

Region	Reliance			Population		
	2004	2019	Value Change	2004	2019	% Change
United States	1.00	1.00	-	293,790,119	330,043,548	12.3%
Regions >= 2 Million						
Cleveland-Elyria, OH	1.32	1.72	0.40	2,137,073	2,089,550	-2.2%
St. Louis, MO-IL	1.24	1.55	0.30	2,740,099	2,819,125	2.9%
Detroit-Warren-Dearborn, MI	1.05	1.31	0.26	4,493,165	4,396,122	-2.2%
Regions 1–2 Million						
Rochester, NY	1.39	1.88	0.49	1,066,168	1,089,837	2.2%
Columbus, OH	0.93	1.19	0.25	1,757,784	2,125,698	20.9%
Kansas City, MO-KS	1.00	1.22	0.22	1,899,270	2,179,448	14.8%
Regions 500,000–1 Million						
Winston-Salem, NC	1.29	1.93	0.64	595,382	672,969	13.0%
New Haven-Milford, CT	1.38	1.85	0.47	845,694	865,625	2.4%
Grand Rapids-Wyoming, MI	0.95	1.33	0.38	969,247	1,077,995	11.2%
Regions 250,000–500,000						
Duluth, MN-WI	1.51	2.20	0.69	275,820	281,013	1.9%
Lansing-East Lansing, MI	1.34	1.94	0.60	455,929	474,144	4.0%
Fort Wayne, IN	1.08	1.64	0.56	402,086	444,126	10.5%
Regions <250,000						
Morgantown, WV	2.49	3.57	1.08	113,774	139,690	22.8%
Corvallis, OR	2.22	3.06	0.84	79,357	94,806	19.5%
Pocatello, ID	0.82	1.61	0.78	75,672	86,303	14.0%

TABLE 3 **Metro Regions with the Greatest Declines in Reliance and Population Change, 2004 and 2019**

| Region	Reliance			Population		
	2004	2019	Value Change	2004	2019	% Change
United States	1.00	1.00	-	293,790,119	330,043,548	12.3%
Regions >= 2 Million						
Sacramento–Roseville–Arden-Arcade, CA	1.32	0.93	-0.39	2,016,702	2,383,596	18.2%
Phoenix-Mesa-Scottsdale, AZ	1.24	1.00	-0.24	3,715,360	4,773,857	28.5%
San Francisco-Oakland-Hayward, CA	0.76	0.60	-0.17	4,153,870	4,764,147	14.7%
Regions 1–2 Million						
New Orleans-Metairie, LA	1.46	1.16	-0.30	1,340,735	1,272,745	-5.1%
San Jose-Sunnyvale-Santa Clara, CA	0.86	0.68	-0.17	1,741,431	2,009,525	15.4%
Austin-Round Rock, TX	0.83	0.68	-0.15	1,412,271	2,225,179	57.6%
Regions 500,000–1 Million						
Baton Rouge, LA	1.27	0.79	-0.48	728,731	846,933	16.2%
Palm Bay-Melbourne-Titusville, FL	1.07	0.79	-0.28	519,387	600,379	15.6%
Scranton–Wilkes-Barre–Hazleton, PA	1.31	1.06	-0.25	551,531	567,500	2.9%
Regions 250,000–500,000						
Brownsville-Harlingen, TX	1.40	0.76	-0.64	371,825	420,005	13.0%
Provo-Orem, UT	1.48	1.12	-0.36	412,361	656,640	59.2%
Vallejo-Fairfield, CA	1.01	0.67	-0.35	412,970	452,985	9.7%
Regions <250,000						
Hammond, LA	2.47	1.42	-1.05	105,158	131,984	25.5%
Johnstown, PA	1.63	0.82	-0.81	148,496	134,358	-9.5%
Bismarck, ND	1.67	0.90	-0.78	103,940	136,758	31.6%

Anchor Institution Reliance and Change in Total Anchor Institution GDP Impact

Understanding the economic role that anchor institutions play in regions involves separating the total economic impacts that universities and hospitals produce in a region from that region's dependence on universities and hospitals for economic output. As we showed in our first research brief on the data in the Anchor Economy Dashboard, anchor institution reliance and economic impact are distinct measures.[21] There are places with large economic impacts from anchor institutions, although the "eds and meds" sectors don't particularly stand out or dominate in the regional economy. For instance, the New York City metro has the largest anchor employment impacts of any region in the country, with employment attributable to eds and meds at 1.2 million jobs in 2019, but the New York City metro is not particularly reliant on eds and meds, with a reliance index of 0.98 in 2019.

As Figure 3 shows, in general, there is a strong positive correlation between total anchor GDP increase and anchor reliance increase. The correlation coefficient is 0.63 and significant at the 1 percent level. In other words, across all metro regions, the tendency is for anchor reliance

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FIGURE 3 — Correlation Between Percent Change in Anchor GDP Impacts and Anchor Reliance Change Between 2004 and 2019
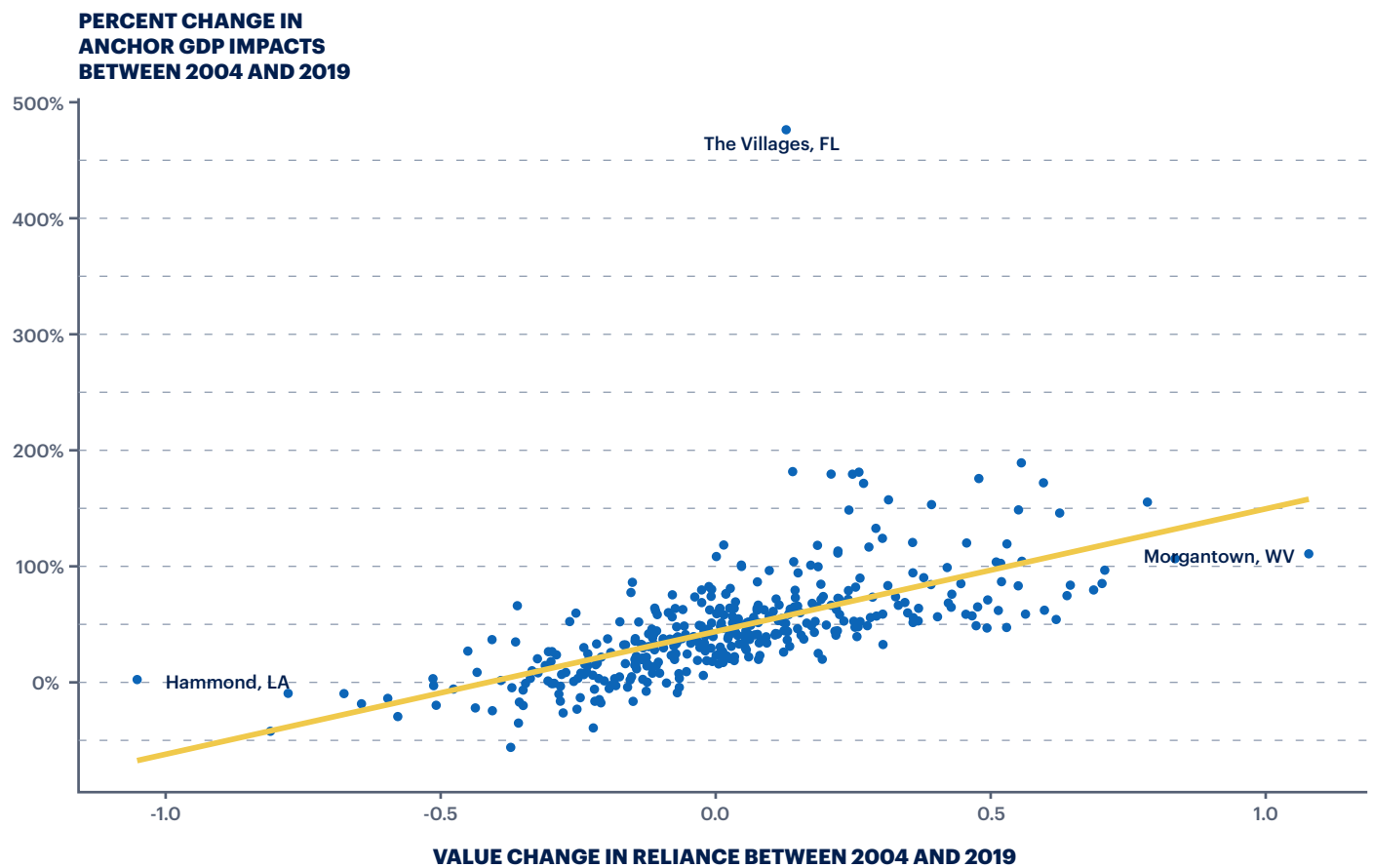
[21] Another way of saying this is that reliance is an index relative to the national average, while economic impact is an absolute value and not relative to the national average. See page 5 of *Anchor Impact: Understanding the Role of Higher Education Institutions and Hospitals in Regional Economies.*

to increase in places where total anchor GDP is rising, although this is not the case for every region.[22] The strong positive correlation is partly because total anchor GDP is one of the input variables in calculating the reliance index. Recall that the reliance index is the average of three location quotients: anchor GDP, income, and employment. Therefore, an increase in anchor GDP is expected to increase a reliance score.

For the regions that have changed the most in their anchor institution reliance between 2004 and 2019, this relationship is extremely clear. Overall, total anchor GDP in the U.S. increased 45.9 percent between 2004 and 2019. In the 15 regions with the largest growth in anchor institution reliance, every region except one has seen anchor institution GDP rise more than the national figure of 45.9 percent. The exception is Detroit, which saw anchor institution GDP rise

TABLE 4   **Metro Regions with Greatest Increases Reliance and Their Anchor GDP Impacts, 2004 and 2019**

Region	Reliance			Anchor GDP Impact Total (millions of $)		
	2004	2019	Value Change	2004	2019	% Change
United States	1.00	1.00	-	$1,181,160	$1,722,752	45.9%
Regions >= 2 Million						
Cleveland-Elyria, OH	1.32	1.72	0.40	$12,267	$19,201	56.5%
St. Louis, MO-IL	1.24	1.55	0.30	$14,440	$22,931	58.8%
Detroit-Warren-Dearborn, MI	1.05	1.31	0.26	$20,371	$28,405	39.4%
Regions 1–2 Million						
Rochester, NY	1.39	1.88	0.49	$5,904	$10,097	71.0%
Columbus, OH	0.93	1.19	0.25	$7,155	$13,027	82.1%
Kansas City, MO-KS	1.00	1.22	0.22	$8,282	$14,283	72.5%
Regions 500,000–1 Million						
Winston-Salem, NC	1.29	1.93	0.64	$3,066	$5,634	83.7%
New Haven-Milford, CT	1.38	1.85	0.47	$5,418	$8,524	57.3%
Grand Rapids-Wyoming, MI	0.95	1.33	0.38	$3,625	$6,894	90.2%
Regions 250,000–500,000						
Duluth, MN-WI	1.51	2.20	0.69	$1,471	$2,642	79.6%
Lansing-East Lansing, MI	1.34	1.94	0.60	$2,357	$3,821	62.2%
Fort Wayne, IN	1.08	1.64	0.56	$1,665	$3,403	104.4%
Regions <250,000						
Morgantown, WV	2.49	3.57	1.08	$1,033	$2,177	110.8%
Corvallis, OR	2.22	3.06	0.84	$579	$1,196	106.6%
Pocatello, ID	0.82	1.61	0.78	$179	$457	155.3%

[22]   Detroit, for instance, has grown significantly in anchor reliance, while total anchor GDP growth is slower than the national average. Austin, TX, on the other hand, is decreasing in reliance but shows above-average anchor GDP growth.

by 39.4 percent. For regions declining in anchor institution reliance, 12 have seen total anchor institution GDP grow more slowly than the national average, but three — San Jose, Austin, and Provo — display larger than average total anchor GDP growth combined with declining anchor reliance. These exceptions speak to the importance of examining anchor impacts for regions individually despite the strong correlation between total anchor GDP and anchor reliance in the data. Total anchor GDP may tend to increase in a region with increasing reliance, but increasing anchor GDP could also be a sign of growth in a regional economy on the whole. As we see in the following, the large growth in anchor impacts in San Jose, Austin, and Provo are accompanied by extraordinarily large GDP and knowledge sector GDP growth, perhaps an indication that their growing anchor sectors are contributing to economic growth across the board and thereby diminishing the overall reliance on the anchors themselves as other sectors grow even more.

TABLE 5   **Metro Regions with Greatest Declines in Reliance and Their Anchor GDP Impacts, 2004 and 2019**

| Region	Reliance			Anchor GDP Impact Total (millions of $)		
	2004	2019	Value Change	2004	2019	% Change
United States	1.00	1.00	-	$1,181,160	$1,722,752	45.9%
Regions >= 2 Million						
Sacramento–Roseville–Arden-Arcade, CA	1.32	0.93	-0.39	$11,404	$11,585	1.6%
Phoenix-Mesa-Scottsdale, AZ	1.24	1.00	-0.24	$17,615	$22,893	30.0%
San Francisco-Oakland-Hayward, CA	0.76	0.60	-0.17	$19,602	$25,923	32.3%
Regions 1–2 Million						
New Orleans-Metairie, LA	1.46	1.16	-0.30	$7,843	$7,758	-1.1%
San Jose-Sunnyvale-Santa Clara, CA	0.86	0.68	-0.17	$9,639	$14,670	52.2%
Austin-Round Rock, TX	0.83	0.68	-0.15	$4,750	$8,845	86.2%
Regions 500,000–1 Million						
Baton Rouge, LA	1.27	0.79	-0.48	$3,394	$3,198	-5.8%
Palm Bay-Melbourne-Titusville, FL	1.07	0.79	-0.28	$1,734	$1,852	6.8%
Scranton–Wilkes-Barre–Hazleton, PA	1.31	1.06	-0.25	$2,388	$2,470	3.4%
Regions 250,000–500,000						
Brownsville-Harlingen, TX	1.4	0.76	-0.64	$1,048	$855	-18.5%
Provo-Orem, UT	1.48	1.12	-0.36	$1,706	$2,833	66.0%
Vallejo-Fairfield, CA	1.01	0.67	-0.35	$1,380	$1,368	-0.9%
Regions <250,000						
Hammond, LA	2.47	1.42	-1.05	$582	$596	2.4%
Johnstown, PA	1.63	0.82	-0.81	$634	$366	-42.2%
Bismarck, ND	1.67	0.90	-0.78	$684	$619	-9.5%

Anchor Institution Reliance and Regional GDP

We next look at a more general measure of regional economic growth, regional GDP, examining how change in anchor institution reliance is related to change in regional GDP. In fact, whether anchor institutions are fueling growth through talent production and innovation or shoring up regional economies that have seen other sectors depart, both these scenarios suggest a negative correlation between regional GDP growth and increasing anchor reliance. In the former scenario, reliance would fall as innovation and talent production strengthen other sectors. In the latter case, reliance would rise as other sectors falter. In each of these scenarios, the correlation between reliance increase and GDP growth would be negative. Do regions that are growing or declining in their reliance on anchor institutions tend to see a consistent pattern in GDP change as well?

As with population change and change in anchor institution GDP, we first look at the correlation coefficient between regional GDP and change in anchor institution reliance for all metro regions in the Anchor Economy Dashboard data set. Figure 4 shows the correlation between the percent change in anchor institution reliance and the percent change in regional GDP for all metro regions in the Anchor Economy Dashboard data for the years 2004 and 2019. Although Figure 4 shows a slightly

FIGURE 4 Correlation Between Reliance Anchor Change and Regional GDP Between 2004 and 2019
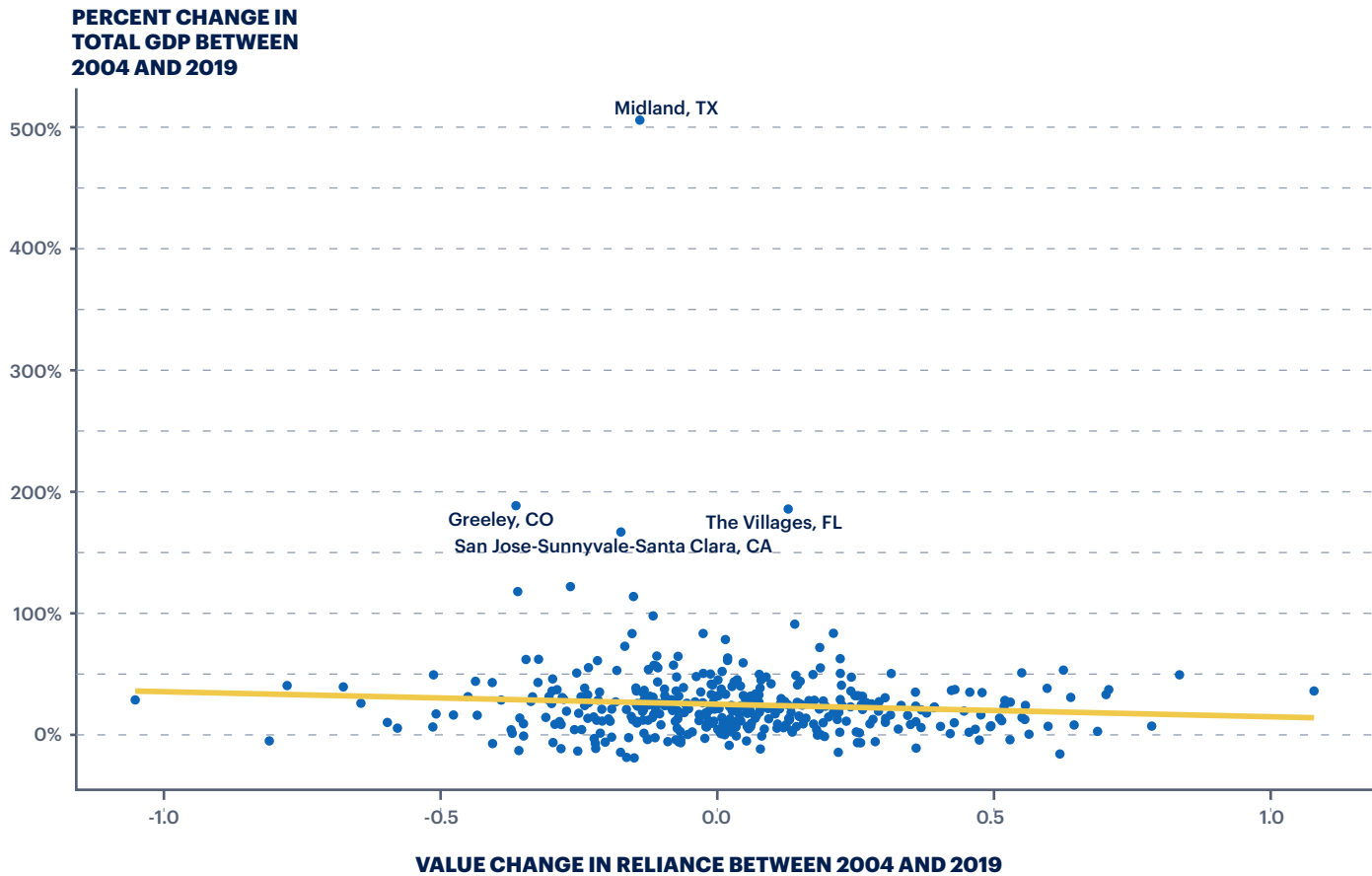
Notes
Midland, TX, is a smaller metro region with a population under 250,000 that experienced substantial growth in its mining sector during the study period, resulting in regional GDP growth of over 500 percent.

negative trend between GDP growth and anchor reliance change, this correlation at the national level is only -0.08 and is statistically insignificant.

The relationship between change in anchor reliance and change in GDP appears to be more robust in larger places, where the correlation coefficient between GDP and anchor reliance is -0.37 for regions with between 1 and 2 million residents and -0.42 for regions with more than 2 million residents (see Table 6). In analyzing the relationship between change in anchor institution reliance and change in other economic conditions in regions — first population, then anchor institution GDP — this is the first time we have seen a negative correlation between a growth metric — regional GDP — and anchor institution reliance change. It suggests that, on the whole, an increasing reliance on anchor institutions is not part of a growth story for regional economies.

Our analysis of regions with the largest anchor reliance change (Tables 7 and 8) bears this out. Among regions with the largest anchor institution reliance increase, only one region — the small region of Corvallis, OR, notably home to Oregon State University — shows larger than average GDP growth. Among large regions seeing the most increase in anchor institution reliance, GDP growth is decidedly slow (Cleveland at 6.9 percent, St. Louis at 10.3 percent, and Detroit at 1.6 Percent). GDP growth is generally larger in the regions with decreasing anchor reliance, with San Jose, Austin, and Provo showing skyrocketing GDP growth (166.9 percent, 113.8 percent, and 117.9 percent, respectively).

TABLE 6   Correlation Coefficient Between Reliance Change and Outcomes

Population in 2004	% Population Change	% Anchor Impact GDP Change	% GDP Change	% GDP Change in Knowledge Sector
Over 2 million	-0.322	0.600 •••	-0.418 ••	-0.305
1–2 million	-0.164	0.435 ••	-0.366 •	-0.344
500,000–1 million	-0.047	0.665 •••	-0.019	-0.121
250,000–500,000	-0.132	0.677 •••	-0.249 ••	-0.146
<250,000	0.058	0.632 •••	-0.046	0.097
All	0.006	0.633 •••	-0.080	0.010

Notes
••• significant at the 1 percent level, •• significant at the 5 percent level, and • significant at the 10 percent level.

Do regions that are growing or declining in their reliance on anchor institutions tend to see a consistent pattern in GDP change?

TABLE 7 **Metro Regions with the Greatest Increases in Reliance and Total GDP Change, 2004 and 2019**

Region	Reliance			GDP (millions of $)		
	2004	2019	Value Change	2004	2019	% Change
United States	1.00	1.00	-	$16,031,873	$20,883,117	30.2%
Regions >= 2 million						
Cleveland-Elyria, OH	1.32	1.72	0.40	$124,119	$132,730	6.9%
St. Louis, MO-IL	1.24	1.55	0.30	$155,794	$171,826	10.3%
Detroit-Warren-Dearborn, MI	1.05	1.31	0.26	$254,732	$258,901	1.6%
Regions 1–2 Million						
Rochester, NY	1.39	1.88	0.49	$59,198	$63,628	7.5%
Columbus, OH	0.93	1.19	0.25	$100,725	$133,202	32.2%
Kansas City, MO-KS	1.00	1.22	0.22	$109,093	$140,810	29.1%
Regions 500,000–1 Million						
Winston-Salem, NC	1.29	1.93	0.64	$31,893	$34,489	8.1%
New Haven-Milford, CT	1.38	1.85	0.47	$49,683	$51,977	4.6%
Grand Rapids-Wyoming, MI	0.95	1.33	0.38	$51,639	$60,915	18.0%
Regions 250,000–500,000						
Duluth, MN-WI	1.51	2.20	0.69	$13,674	$14,066	2.9%
Lansing-East Lansing, MI	1.34	1.94	0.60	$22,743	$24,349	7.1%
Fort Wayne, IN	1.08	1.64	0.56	$19,862	$24,677	24.2%
Regions <250,000						
Morgantown, WV	2.49	3.57	1.08	$5,585	$7,601	36.1%
Corvallis, OR	2.22	3.06	0.84	$3,165	$4,728	49.4%
Pocatello, ID	0.82	1.61	0.78	$2,693	$2,887	7.2%

Notes
GDP values are adjusted for inflation to 2019 dollars.

Metro Regions with the Greatest Declines in Reliance and Total GDP Change, 2004 and 2019

| Region	Reliance			GDP (millions of $)		
	2004	2019	Value Change	2004	2019	% Change
United States	1.00	1.00	-	$16,031,873	$20,883,117	30.2%
Regions >= 2 Million						
Sacramento–Roseville–Arden-Arcade, CA	1.32	0.93	-0.39	$108,854	$140,007	28.6%
Phoenix-Mesa-Scottsdale, AZ	1.24	1.00	-0.24	$194,228	$268,935	38.5%
San Francisco-Oakland-Hayward, CA	0.76	0.60	-0.17	$342,282	$591,826	72.9%
Regions 1–2 Million						
New Orleans-Metairie, LA	1.46	1.16	-0.30	$89,808	$84,120	-6.3%
San Jose-Sunnyvale-Santa Clara, CA	0.86	0.68	-0.17	$134,655	$359,399	166.9%
Austin-Round Rock, TX	0.83	0.68	-0.15	$75,842	$162,182	113.8%
Regions 500,000–1 Million						
Baton Rouge, LA	1.27	0.79	-0.48	$50,672	$58,953	16.3%
Palm Bay-Melbourne-Titusville, FL	1.07	0.79	-0.28	$20,624	$26,955	30.7%
Scranton–Wilkes-Barre–Hazleton, PA	1.31	1.06	-0.25	$23,707	$27,912	17.7%
Regions 250,000–500,000						
Brownsville-Harlingen, TX	1.40	0.76	-0.64	$8,849	$11,151	26.0%
Provo-Orem, UT	1.48	1.12	-0.36	$13,979	$30,462	117.9%
Vallejo-Fairfield, CA	1.01	0.67	-0.35	$17,632	$28,568	62.0%
Regions <250,000						
Hammond, LA	2.47	1.42	-1.05	$3,373	$4,343	28.8%
Johnstown, PA	1.63	0.82	-0.81	$5,057	$4,806	-5.0%
Bismarck, ND	1.67	0.90	-0.78	$5,387	$7,572	40.6%

Notes
GDP values adjusted for inflation to 2019 dollars.

Anchor Institution Reliance and Knowledge Sector GDP

Anchor institutions are often seen as a value to regions because of the impact they have on innovation, talent, and knowledge sector growth.[23] Therefore, we take our analysis of anchor institution reliance and overall GDP change one step further, by analyzing the GDP change in knowledge sectors nationally and for those regions that have experienced a large change in anchor institution reliance. The direction of the relationship between reliance change and knowledge sector change is uncertain: On the one hand, we might expect knowledge sector growth in regions that started with strong anchor institution reliance in 2004, with the

FIGURE 5 Correlation Between Reliance Anchor Change and Knowledge Sector GDP Between 2004 and 2019

PERCENT CHANGE IN KNOWLEDGE SECTOR GDP BETWEEN 2004 AND 2019

VALUE CHANGE IN RELIANCE BETWEEN 2004 AND 2019
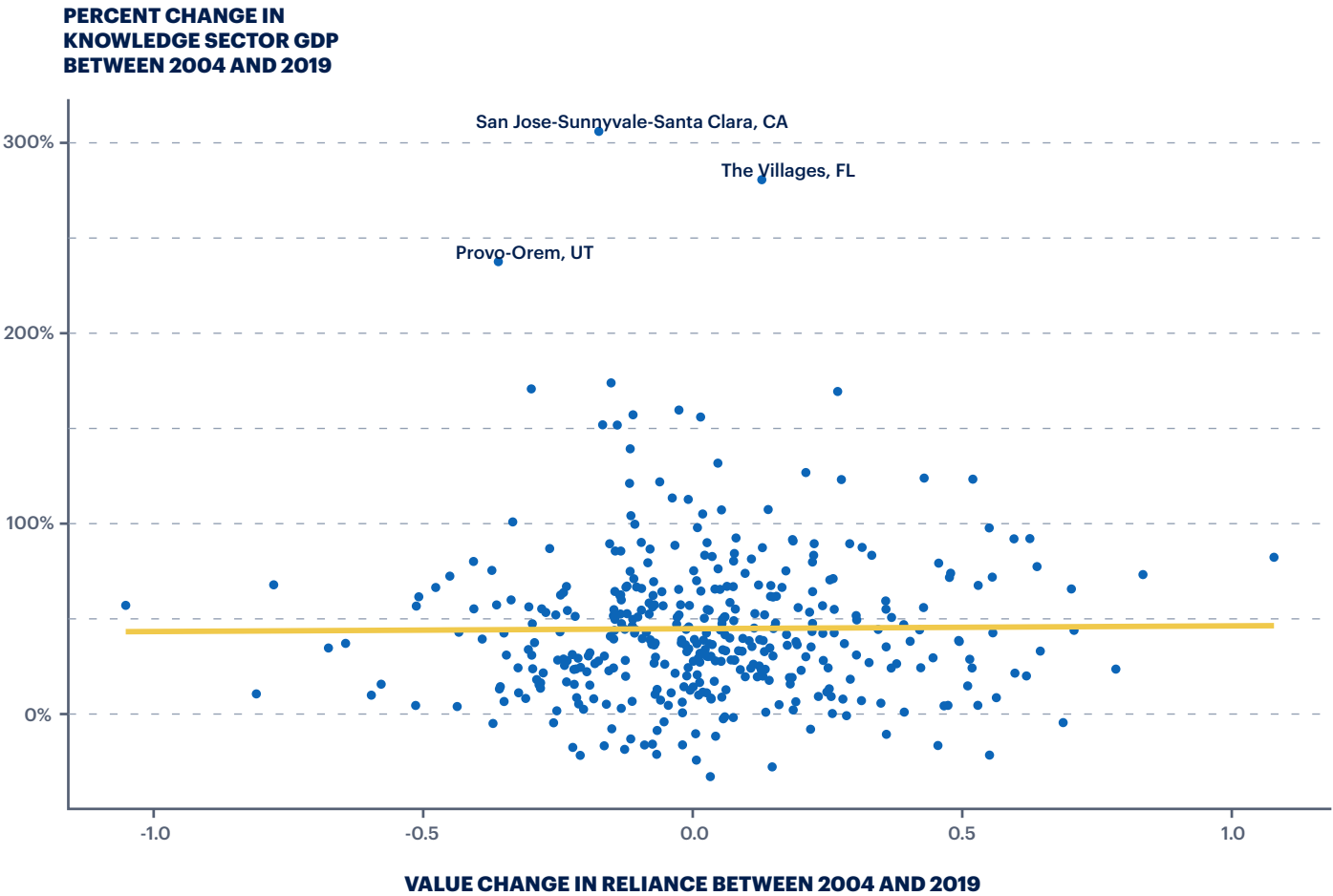
[23]   The literature here is extensive, and we point out a few representative studies on the link between anchor institutions and the economy: Anna Valero and John Van Reenen, "The Economic Impact of Universities: Evidence from Across the Globe," *Economics of Education Review* 68 (2019), pp. 53–67; Timothy J. Bartik and George A. Erickcek, "Higher Education, the Health Care Industry, and Metropolitan Regional Economic Development: What Can 'Eds & Meds' Do for the Economic Fortunes of a Metro Area's Residents?" Upjohn Institute Working Paper No. 08-140, 2007; and the classic by AnnaLee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Cambridge, MA: Harvard University Press, 1996.

effect of driving down anchor reliance in 2019. On the other hand, if the cause of strong anchor reliance is other industries departing a region, there might not be enough regional economic attractiveness and dynamism to generate knowledge sector growth from the existing anchor assets.[24]

We identify four NAICS[25] sectors as knowledge sectors: Finance and Insurance, Professional, Scientific, and Technical Services, Management of Companies and Enterprises, and Information. It is important to note that GDP from these sectors grew substantially on a national level during the 2004–2019 time period, by 62.4 percent.[26] We choose to examine these industries because they typically require highly specialized skill sets and can benefit from the research and workforce generated by anchor institutions.[27]

As Figure 5 shows, there is basically no trend between reliance anchor change and knowledge sector GDP growth. The correlation coefficient at the national level is 0.01 and statistically insignificant. When we look at the relationship for regions with larger populations or smaller populations, we do not find a significant relationship in any population categories (Table 6).

Examining knowledge sector change alongside change in anchor institution reliance among the 30 regions with the largest anchor reliance change, we do see

trends from previous sections reinforced. Regions that started out as highly reliant on anchors in 2004 and increased in their anchor reliance tend to show below-average knowledge sector growth. The combination of high anchor reliance in 2004 that grew in 2019 and below-average knowledge sector growth is characteristic of Cleveland, OH; St. Louis, MO; Rochester, NY; Kansas City, MO; Winston-Salem, NC; New Haven, CT; Duluth, MN; and Lansing, MI. In these cases, the strong reliance on anchor institutions does not appear to be driving economic growth in the knowledge sectors. The exceptions are the college towns of Columbus, OH; Morgantown, WV; and Corvallis, OR, which all saw above-average knowledge sector growth.

The trend is slightly different in regions with declining reliance, with about half (seven) of those regions showing greater than average knowledge sector growth. San Francisco, CA; San Jose, CA; and Austin, TX — which, it should be noted, were all below average on anchor institution reliance in 2004 — all saw explosive knowledge sector growth with declining reliance on anchor institutions. Despite below-average reliance on anchor institutions in both 2004 and 2019, each of these regions is home to academic powerhouses established long before 2004. Phoenix, AZ; Baton Rouge, LA; Provo, UT; and Bismarck, ND, on the other hand, all had above-average reliance in 2004, but saw knowledge sector growth and anchor reliance decline between 2004 and 2019.

[24]   See the debate in *Economic Development Quarterly* regarding the relationship between anchor institutions and economic growth in Pittsburgh and Cleveland: Timothy Bartik, "Policy Versus Luck in Pittsburgh and Cleveland's Economies," *Economic Development Quarterly*, 35:3 (2021), pp. 179–80. Available at doi.org/10.1177/08912424211029374.

[25]   The North American Industry Classification System (NAICS) provides standard classification codes for business establishments. We use two-digit NAICS codes to define knowledge industry sectors, which is the broadest tier of classification codes.

[26]   It should be noted that there is some overlap in jobs and impact in the reliance index figures and knowledge sector GDP. The reliance index is constructed based on the location quotients of anchor impact, and that calculation includes multiple layers of anchor impact, including direct, indirect, and induced. Those impacts in the indirect and induced categories (businesses and jobs supported by/dependent on anchor institutions) may also be included in knowledge sector GDP. For instance, the job of a lawyer whose primary client is a university is embedded in the reliance index calculation and also counted as a knowledge sector job.

[27]   One of the most illustrative examples of a strong knowledge-based economy resulting from the relationship between a local anchor institution and industry is the role Stanford University played in the development of Silicon Valley's entrepreneurial ecosystem in the San Jose metro. Stephen B. Adams, "Stanford and Silicon Valley: Lessons on Becoming a High-Tech Region," *California Management Review* 48:1 (2005), pp. 29–51. Available at doi.org/10.2307/41166326.

TABLE 9

Metro Regions with Greatest Increases in Reliance and Knowledge Sector GDP Growth, 2004 and 2019

Region	Reliance			Knowledge Sector GDP (millions of $)		
	2004	2019	Value Change	2004	2019	% Change
United States	1.00	1.00	-	$3,025,967	$4,920,024	62.6%
Regions >= 2 Million						
Cleveland-Elyria, OH	1.32	1.72	0.40	$25,139	$34,741	38.2%
St. Louis, MO-IL	1.24	1.55	0.30	$32,884	$43,082	31.0%
Detroit-Warren-Dearborn, MI	1.05	1.31	0.26	$56,961	$62,205	9.2%
Regions 1–2 Million						
Rochester, NY	1.39	1.88	0.49	$9,731	$13,442	38.1%
Columbus, OH	0.93	1.19	0.25	$21,919	$37,361	70.5%
Kansas City, MO-KS	1.00	1.22	0.22	$24,756	$36,542	47.6%
Regions 500,000–1 Million						
Winston-Salem, NC	1.29	1.93	0.64	$4,948	$6,584	33.1%
New Haven-Milford, CT	1.38	1.85	0.47	$8,515	$8,881	4.3%
Grand Rapids-Wyoming, MI	0.95	1.33	0.38	$7,053	$8,917	26.4%
Regions 250,000–500,000						
Duluth, MN-WI	1.51	2.20	0.69	$1,509	$1,441	-4.5%
Lansing-East Lansing, MI	1.34	1.94	0.60	$3,993	$4,851	21.5%
Fort Wayne, IN	1.08	1.64	0.56	$3,194	$4,557	42.6%
Regions <250,000						
Morgantown, WV	2.49	3.57	1.08	$423	$771	82.3%
Corvallis, OR	2.22	3.06	0.84	$457	$791	73.2%
Pocatello, ID	0.82	1.61	0.78	$317	$391	23.6%

Notes
GDP values adjusted for inflation from 2019 dollars.

Region	Reliance			Knowledge Sector GDP (millions of $)		
	2004	2019	Value Change	2004	2019	% Change
United States	1.00	1.00	-	$3,025,967	$4,920,024	62.6%
Regions >= 2 Million						
Sacramento–Roseville–Arden-Arcade, CA	1.32	0.93	-0.39	$17,212	$23,989	39.4%
Phoenix-Mesa-Scottsdale, AZ	1.24	1.00	-0.24	$34,187	$56,002	63.8%
San Francisco-Oakland-Hayward, CA	0.76	0.60	-0.17	$90,705	$228,489	151.9%
Regions 1–2 Million						
New Orleans-Metairie, LA	1.46	1.16	-0.30	$9,477	$11,731	23.8%
San Jose-Sunnyvale-Santa Clara, CA	0.86	0.68	-0.17	$40,634	$164,983	306.0%
Austin-Round Rock, TX	0.83	0.68	-0.15	$16,373	$44,849	173.9%
Regions 500,000–1 Million						
Baton Rouge, LA	1.27	0.79	-0.48	$4,576	$7,618	66.5%
Palm Bay-Melbourne-Titusville, FL	1.07	0.79	-0.28	$2,585	$4,013	55.2%
Scranton–Wilkes-Barre–Hazleton, PA	1.31	1.06	-0.25	$3,301	$4,236	28.3%
Regions 250,000–500,000						
Brownsville-Harlingen, TX	1.40	0.76	-0.64	$656	$900	37.1%
Provo-Orem, UT	1.48	1.12	-0.36	$2,566	$8,664	237.6%
Vallejo-Fairfield, CA	1.01	0.67	-0.35	$1,244	$1,629	31.0%
Regions <250,000						
Hammond, LA	2.47	1.42	-1.05	$235	$369	57.1%
Johnstown, PA	1.63	0.82	-0.81	$704	$779	10.6%
Bismarck, ND	1.67	0.90	-0.78	$750	$1,260	67.9%

Notes
GDP values adjusted for inflation to 2019 dollars.

Discussion and Conclusion

While the reliance index is not a normative scale — it's not necessarily "better" or "worse" for a regional economy to be highly or lightly reliant on anchor institutions — higher education institutions and hospitals can be significant economic assets in a region. Research institutions produce and attract highly educated workers, spin off ventures based on commercialized research, and motivate other businesses to locate near them because of the positive effects of being close to talent and innovation. Higher education and health care are labor-intensive endeavors and, unlike manufacturing, for instance, have not experienced technology-related employment declines.[28] As stable sources of employment for regional residents, anchor institutions provide job opportunities for residents at multiple levels of the skill and pay scales, offering the potential to create pathways to opportunity for local residents. Finally, anchor institutions, as the name suggests, persist in place over decades. Because they are slow to move or close, universities and hospitals can have a stabilizing effect on regional economies that are feeling the impacts of economic disruptions, including the decline in manufacturing employment.

At the same time, high reliance on anchor institutions can pose a challenge for regional economies. In our earlier research brief we referenced disruptions in both higher education and health care that may transform once-stabilizing institutions into less reliable ones.[29] For a number of Rust Belt cities where higher education and health care have essentially replaced manufacturing, including Cleveland, St. Louis, and Detroit, as highlighted in this paper, the question is whether these nonprofit service industries are a robust enough substitute when it comes to job creation and economic growth. A number of regions have also found that a tax base of nonprofit hospitals or higher education institutions is not sufficient to provide adequate public services to the local population.[30]

With the addition of anchor institution impact and reliance data for 2004, we now have the opportunity to examine the connection between anchor institution growth and economic trends in regions. In this paper, we focus specifically on the change in anchor institution reliance and a select number of economic growth indicators. The new data also allow for an analysis of how anchor institution impact change (employment, income, or GDP) is related to regional economic conditions, although that is not the analysis we conduct in this research brief. One can now also compare anchor reliance or impact change with myriad regional indicators beyond the four we have selected to see how anchor institutions interact with other dimensions of their regional economies.[31]

Our results show that of the four economic measures we examine, only anchor GDP is correlated with anchor reliance at the national level, something to be expected, since anchor GDP is a component of the reliance index. The lack of correlation between change in anchor reliance and population, regional GDP and knowledge sector GDP change holds at the national level. However, when we examine the 30 regions that have changed the most in

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[28]   Drew DeSilver, "Most Americans Unaware that as U.S. Manufacturing Jobs Have Disappeared, Output Has Grown," Pew Research Center, 2017. Available at www.pewresearch.org/short-reads/2017/07/25/most-americans-unaware-that-as-u-s-manufacturing-jobs-have-disappeared-output-has-grown/.

[29]   A good example is presented in a recent story depicting the impact on Tuscon's economy as the University of Arizona at Tuscon faces budget cuts: Jack Healy, "As U. of Arizona Confronts Budget Cuts, Workers and Students Brace for the Worst," *The New York Times*, February 21, 2024. Available at www.nytimes.com/2024/02/21/us/university-arizona-budget-deficit.html.

[30]   LeeAnne Rogers, Lynne Shedlock, Patricia Moorhead, and Gerald Cross, it's *Not 1965 Anymore: State Tax Laws Fail to Meet Municipal Revenue Needs*, Harrisburg, PA: Pennsylvania Economy League, 2022. Available at www.pml.org/wp-content/uploads/2023/01/PEL-2022-PML-Report-1-9-23.pdf.

[31]   A number of initiatives and organizations, including the Anchor Economy Initiative at the Federal Reserve Bank of Philadelphia, are focusing on the relationship between anchor institutions and economic and health equity, for instance. The Healthcare Anchor Network has produced toolkits for anchor institutions to conduct inclusive hiring and purchasing to advance economic equity, the Robert Wood Johnson Foundation funds research and action based on anchor-led health equity initiatives, and the Anchor Institution Task Force convenes anchor institutions to foster economic, social, and civic health and equity in communities.

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reliance on anchor institutions between 2004 and 2019, we do begin to see some trends emerge:

- The Rust Belt regions of Cleveland, St. Louis, and Detroit see anchor reliance increase in conjunction with below-average performance on population, GDP, and knowledge sector GDP.

- The West Coast and Sun Belt regions of San Francisco, San Jose, and Austin, TX, show declining anchor reliance and increasing economic growth metrics for population, GDP, and knowledge sector GDP.

These regions exemplify negative correlations between anchor reliance and economic growth, with anchor reliance increasing as other sectors falter (in the cases of Cleveland, St. Louis, and Detroit) and anchor reliance decreasing as other sectors strengthen (in the cases of San Francisco, San Jose, and Austin). But they are examples, and other regions tell a different story:

- While increased anchor reliance in Cleveland is consistent with declining economic indicators, nearby Pittsburgh, with a similar set of anchor institutions, has shown significant economic resilience.[32]

- Phoenix has seen shrinking anchor reliance, accompanied by larger than average population and GDP growth, but its knowledge sector growth has been just average.

- Some college towns where anchor reliance began at a high level and grew have shown strong GDP and knowledge sector growth (Columbus, OH; Morgantown, WV; and Corvallis, OR), while New Haven, CT, has seen below-average performance on the metrics examined, despite being home to Yale University and being a highly reliant region in both 2004 and 2019.

We return, therefore, to our original claim that, overall, the reliance index moves independently of other economic measures in regions and cannot be considered a normative scale for regions. There is a great heterogeneity and diversity across regions, regarding the relationship between reliance and demographic or economic outcomes. At the same time, in specific cases, we see regional stories that are consistent and coherent and provide insight for regional economic development planners about how and when reliance on anchor institutions is a condition of economic growth and when it is an indicator of economic decline. The role of anchor institution reliance in a larger story of economic or knowledge sector growth is a highly specific one, dependent on multiple dimensions of a place. There is emerging research[33] on the conditions that contribute to regional strengths relative to anchor institutions, and it is our hope that this analysis of anchor institution reliance change over time adds to that body of knowledge.

Universities and hospitals can have a stabilizing effect on regional economies that are feeling the impacts of economic disruption.

[32]   Paul Flora, "Smart Growth for Regions of All Sizes," *Economic Insights*, Federal Reserve Bank of Philadelphia, 2019. Available at www.philadelphiafed.org/-/media/frbp/assets/economy/articles/economic-insights/2019/q2/eiq219_rs-smart-growth.pdf.

[33]   Luisa Gagliardi, Enrico Moretti, and Michel Serafinelli, "The World's Rust Belts: The Heterogeneous Effects of Deindustrialization on 1,993 Cities in Six Countries," NBER Working Paper No. 31948, available at www.nber.org/papers/w31948; and Greg Howard, Russell Weinstein, and Yuhao Yang, "Do Universities Improve Local Economic Resilience?" working paper, 2022, available at publish.illinois.edu/russellweinstein/files/2022/02/HowardWeinsteinYang_Resilience.pdf.