FINDING THE NEXT NASHVILLE

Q4 2021

JOB GROWTH AND JOB SECTOR DIVERSITY IN CITIES

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RESEARCH SPONSORED BY ALEX. BROWN REALTY, INC.

INTRODUCTION

Cities are dynamic places where populations and jobs rise and fall over time. In 1950, St. Louis was the eighth largest city in the U.S. with a population over 850,000. Today, the "Gateway to the West" is home to just over 300,000 people making it the 65th largest city in the U.S. In the 1960s, Philadelphia was home to over 260,000 jobs in manufacturing, accounting for over a quarter of all jobs in the city. By 2018, it had just over 21,000 manufacturing jobs, accounting for just over two percent of all jobs in the city, and dropped from the fourth to the seventh largest city in the U.S. National and global economic shocks can cause large numbers of people and jobs to relocate or be displaced in response to changing incentives and competitive advantages. While New York and Chicago have remained among the top three largest cities in the U.S. for over 100 years, few places have enjoyed such long run success and few job sectors have thrived in the same place for such a long period of time. Given the dynamic nature of cities and the uncertainty over future economic turns, could diversity in job sectors help ensure the long run success and growth of cities?

This report is the third in a series (*Finding the Next Nashville*) that examines long-term trends that could be contributing to the success of metropolitan areas and cities across the U.S. In this report, we focus on job sector diversity in metropolitan areas as an important factor in economic growth and resilience. We examine the relationship between job sector diversity and job growth in the 150 largest metropolitan areas in the U.S. from 2000 to 2019.

Image: St. Louis, MO

CONTEXT & QUESTIONS

Why might job sector diversity be an important factor for the economic success and resilience of a city or region? Job sector diversity could help protect regions against negative economic shocks by spreading out localized investments in human capital and physical infrastructure. During the COVID-19 pandemic, cities such as New Orleans with a high concentration of employment in the arts, entertainment, and hospitality job sectors suffered more from lockdowns that discouraged tourism and social interaction than cities whose economies were less concentrated in those sectors. Job sector diversity could also encourage long term economic growth. The urban theorist Jane Jacobs posited that a diversity of firms leads to growth and contributes to knowledge spillovers between different sectors, citing the example of innovation in engine design and manufacturing in the shipbuilding sector as a precursor to growth in the auto sector in Detroit.[i] Diversity could benefit cities by both increasing resilience to economic shocks to particular sectors and by increasing innovation and inter-sector knowledge spillovers.

For cities, job sector diversity can be a tradeoff with specialization and agglomeration. If a city focuses on one sector, there could be a greater chance of increasing productivity in that sector. The concentration of tech sector jobs in San Francisco and Seattle is well known and those cities have experienced significant growth in recent decades as businesses and workers seek to be "where the action is". If labor and input markets become thicker for highly concentrated sectors, there could be intra-sector knowledge spillovers and agglomeration economies.[ii] On the other hand, the potential benefits of specialization are conditional on market demand and comparative advantage. If another city or region in the world gains a comparative advantage relative to the city in question, as happened with steel production from China displacing demand for steel from Pittsburgh, or if the whole sector is displaced, as green energy is displacing coal generated energy and the economies of those places that produce it, then the shock is very large in a city with a concentrated economy. If a city invests heavily in human and physical capital in one sector and the conditions change, it can be difficult to adapt.

In the U.S., the decline of Rust Belt cities is perhaps the best illustration of the potential pitfalls of concentration. A large part of that region's decline in jobs can be attributed to its loss of a comparative advantage in manufacturing. The loss of jobs and population in Detroit and its concentration in auto manufacturing is one of the best known examples.[iii] Another example of the problems posed by industrial concentration can be seen in Russia where Soviet planning created "monotowns" or one-company towns where employment was dominated by a single employer in a single sector.[iv] Companies located in these types of towns in Russia are less productive and more financially vulnerable.[v] The Russian city of Norilsk has a long history of being one of the largest producers of nickel in the world, with more than a quarter of its population working in the sector in recent

Image: Seattle, WA

Image: Detroit, MI

years. The city lost more than 25 percent of its population from the early 1980s to the early 2000s, following the collapse of the Soviet Union and the decline in the global price of nickel from around $9,000 per metric ton in 1990 to a low of $5,000 per metric ton in 2001. Norilsk's lack of diversity in job sectors made it highly vulnerable to such a negative economic shock.

In this report, we will examine the relationship between job growth and job sector diversity in cities by exploring the following questions for the 150 largest metropolitan areas from 2000 to 2019. First, which metro areas grew fastest in the U.S. from 2000 to 2019? Second, did metropolitan areas with more diversity in job sector employment in 2000 experience higher rates of job growth by 2019? Third, did job sectors that were more or less heavily concentrated than the national average grow more between 2000 and 2019? And finally, what sectors saw the most job growth nationally between 2000 and 2019 and how are these sectors distributed across cities?

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METROPOLITAN AREA JOB GROWTH

From 2000 to 2019, the United States experienced a net increase of over 16.5 million private sector jobs for a 15 percent growth rate bringing the total number of U.S. jobs in the private sector to over 126 million in 2019. During this period, some metropolitan areas fared much better than the national average, while others fared much worse, as detailed in Table I.

By 2019, the U.S.'s 150 largest metropolitan areas (measured by total employment in 2000) accounted for almost 75 percent of all private sector jobs in the nation, up from 71 percent in 2000. Among those 150 metropolitan areas, the median employment growth rate was 17.8 percent. New York City added almost 1.2 million jobs from 2000 to 2019, the largest real increase among metropolitan areas. The Provo, Utah metropolitan area experienced the largest percentage growth in employment, nearly doubling its workforce by adding over 105,000 jobs. On the other end of the spectrum, 20 metropolitan areas lost jobs, with Youngstown, Ohio experiencing the largest percentage decrease of nearly 14 percent, representing over 28,000 lost jobs. Detroit experienced the largest real decrease of over 92,000 jobs lost, for a five percent decline from 2000. Nashville had the 11th highest rate of job growth with 55 percent and, as we explored in the first report in this series, the city had one of the highest levels of job sector diversity among its peers.

Was Nashville an anomaly in this respect or was job sector diversity in 2000 associated with higher rates of job growth in large cities by 2019? How is the diversity of employment across job sectors in a metropolitan area associated with job growth? Did metropolitan areas with higher job diversity across sectors experience higher rates of job growth than those that were more concentrated? Did cities whose job sector mix more closely matched the national average in 2000 experience higher rates of job growth by 2019?

Image: Provo, UT

Rank		Area	Total Employment		Change	
%	#		2000	2019	%	#
		US	**109,704,416**	**126,358,752**	**15.2%**	**16,654,336**
1	33	Provo, UT	114,929	220,503	91.9%	105,574
2	41	McAllen, TX	120,947	206,947	71.1%	86,000
3	12	Austin, TX	516,105	879,294	70.4%	363,189
4	37	Cape Coral – Fort Myers, FL	133,258	226,765	70.2%	93,507
5	47	Fayetteville – Springdale – Rogers, AR – MO	115,837	185,896	60.5%	70,059
6	34	Charleston – North Charleston, SC	177,384	282,254	59.1%	104,870
7	23	Raleigh, NC	338,674	536,959	58.5%	198,285
8	8	Riverside, CA	804,940	1,271,312	57.9%	466,372
9	10	Orlando, FL	727,202	1,145,820	57.6%	418,618
10	51	Ogden – Clearfield, UT	118,420	185,947	57.0%	67,527
11	16	Nashville, TN	528,762	819,610	55.0%	290,848
141	136	Atlantic City, NJ	116,446	107,803	-7.4%	(8,643)
142	146	Dayton, OH	335,078	309,403	-7.7%	(25,675)
143	149	Cleveland – Elyria, OH	957,655	880,621	-8.0%	(77,034)
144	145	Toledo, OH	275,024	252,549	-8.2%	(22,475)
145	158	Bridgeport – Stamford – Norwalk, CT	383,328	349,901	-8.7%	(33,427)
146	140	Canton – Massillon, OH	157,566	142,995	-9.2%	(14,571)
147	138	Charleston, WV	105,512	93,582	-11.3%	(11,930)
148	141	Flint, MI	131,364	114,622	-12.7%	(16,742)
149	143	Hickory – Lenoir – Morganton, NC	138,707	119,950	-13.5%	(18,757)
150	147	Youngstown – Warren – Boardman, OH – PA	204,586	176,248	-13.9%	(28,338)

Table I:

Top 10 and bottom 10 metropolitan areas for private sector job growth from 2000 to 2019 among the 150 largest metropolitan areas.

Source:
Bureau of Labor Statistics (BLS)
Quarterly Census of Employment and Wages (QCEW), 2000 and 2019.

JOB SECTOR DIVERSITY & GROWTH IN CITIES

There are several ways to measure the diversity of a region's jobs, many of which follow similar methods. The index we will use in this report as a measure of diversity is the Hachman Index. The Hachman Index is a measure of the diversity of employment across sectors relative to the national average. The index uses a scale of 0 to 1, with 1 being a metropolitan area whose share of employment in each sector exactly matches that of the nation and 0 being a metro area whose employment in sectors is completely dissimilar to the national average. In 2000, Nashville had the third highest Hachman Index value of 0.897, just behind Chicago (0.907) and Buffalo (0.906), while Hickory, North Carolina had the lowest Hachman Index value of 0.086, Atlantic City, New Jersey had the second lowest at 0.094, and Salinas, California had the third lowest at 0.105.

Hachman Index Example

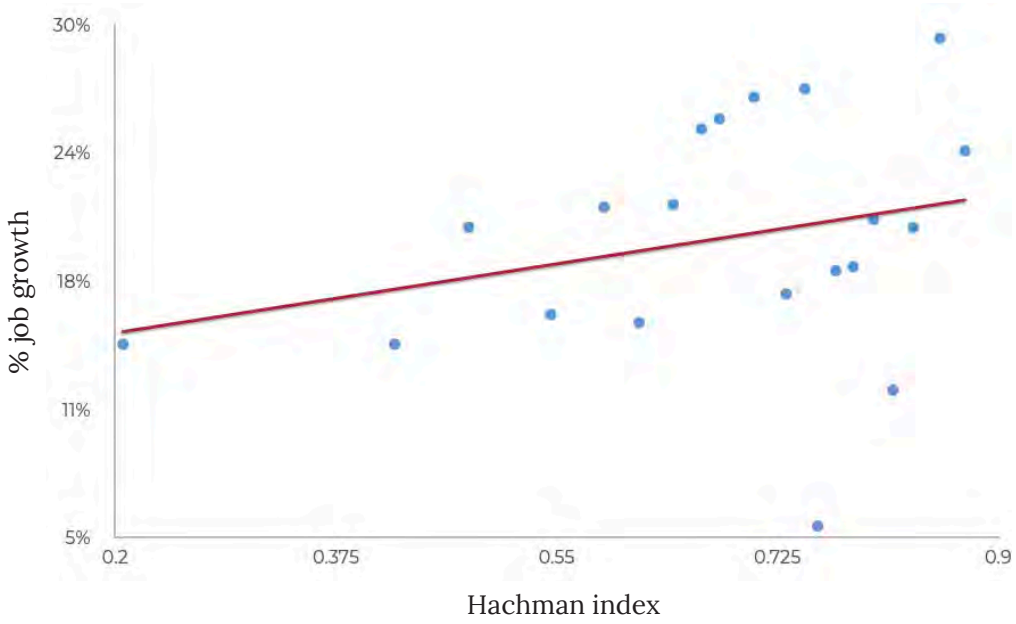
If Boston has three job sectors with 25% of jobs in sector A, 50% of jobs in sector B, and 25% of jobs in sector C and the U.S. has 30% of jobs in sector A, 40% of jobs in sector B, and 30% of jobs in sector C, the Hachman Index for Boston equals Y where $Y = 1 / \sum ((EMsaI / EUsI) * EMsaI)$, EMsaI is the share of employment E in city Msa in sector I and EUsI is the share of employment E in sector I in the U.S. In this example of Boston, Y is equal to 0.96 and would be equal to 1 if the shares were the same in all three sectors.

On its own, the Hachman Index is not directly correlated with job growth in metropolitan areas during our period of interest. However, after controlling for several important growth factors, the Hachman Index is positively and significantly correlated with job growth rates. These growth factors are regional growth trends, wages in 2000, and concentration of employment in health and manufacturing industries in 2000. Since the 1960s, employment growth rates have been higher in cities located in warmer climates in the South and West, on average, than cities located in the colder Northeast and Midwest.[vi] This well-documented long-term regional growth trend, which we explored in our previous report on quality of life and economic growth, holds true for the period 2000 to 2019. Cities with lower average wages in 2000 had higher rates of job growth by 2019. While it makes logical sense that businesses would want to relocate to areas with lower labor costs, all else equal, there is an ongoing debate among economists about the causal impact of policies such as minimum wage laws on job growth.[vii] Finally, in recent decades, cities with higher shares of employment in manufacturing and healthcare job sectors saw slower job growth rates in subsequent decades.[viii] While the story of manufacturing decline and job loss in U.S. cities due to global competition is well-known, the fact that healthcare job concentration is also associated with job loss is more surprising. One possible explanation could be that once all other industries leave a city, what is left is healthcare and public sector employment, especially in post-industrial cities where legacy residents have health issues related to their former occupations. The resulting environment is not conducive to economic growth.[ix] After controlling for these important growth factors, job sector diversity as measured by the Hachman Index is positively associated with job growth.

Chart I shows the relationship between the Hachman Index in 2000 and job growth from 2000 to 2019 in the 150 largest metropolitan areas. The chart groups metro areas into 20 equal-sized bins and plots their average job growth rate and Hachman Index after controlling for the factors described above. Cities with high Hachman diversity index scores and job growth rates include Nashville (0.897 and 55 percent growth), San Antonio (0.866 and 49 percent growth), Phoenix (0.85 and 37 percent growth), and Denver (0.81 and 31 percent growth). On the opposite side of the spectrum, cities with

Chart I:

Binned scatter plot of Hachman diversity index in 2000 and job growth from 2000 to 2019 for the 150 largest metropolitan areas



Note:
The above chart is a binned scatter plot where metro areas are grouped in 20 bins by their Hachman index and their average percent job growth and Hachman index is shown for each bin.

Source: QCEW and author's calculation of Hachman Index

low Hachman index scores and job growth rates include Hickory, North Carolina (0.086 and -14 percent growth); Atlantic City, New Jersey (0.094 and -7 percent growth); Youngstown, Ohio (0.39 and -14 percent growth); and Flint, Michigan (0.39 and -13 percent growth).

While job sector diversity alone is not directly associated with job growth, if we account for local differences in health and manufacturing concentration, average wages in 2000, and regional growth trends, greater industrial diversity as measured by the Hachman Index is positively associated with job growth in the 150 largest U.S. metropolitan areas from 2000 to 2019. This means that after accounting for the aforementioned factors, metropolitan areas whose share of employment in different job sectors more closely matched that of the U.S. experienced greater job growth rates than those that were less similar to the national average. It also means that after accounting for other growth factors, metropolitan areas whose share of employment was more evenly spread out across sectors experienced greater growth than cities where employment was concentrated in one or a small number of sectors. Sectors that had a much higher share of a metropolitan area's employment than the national average also experienced lower rates of growth than those that more closely matched the national average. This suggests that job sector diversity could be an important factor in the economic growth of metro areas over time.

The story of Hickory, North Carolina, the metro area with the lowest Hachman Index score in 2000 and the second lowest job growth rate between 2000 and 2019, is particularly insightful into how high levels of job concentration in a single sector can lead to job loss. In Hickory, the self-proclaimed "Furniture Manufacturing Capital of the World", the Furniture and Related Product Manufacturing sector employed over 32,000 people and accounted for 23 percent of employment in the metropolitan area in 2000, compared to the national average of 0.6 percent, meaning that the share of jobs in Hickory that were in that sector was 37 times higher than the national average. From 2000 to 2019, the sector lost almost 18,000 jobs in the metro area for a 55 percent decline in employment, as global competition increased and jobs went overseas. Overall, the metro area of Hickory lost 13.5 percent of its jobs by 2019. While the story of economic decline in Hickory might seem a familiar one, with metro areas in the U.S. that were highly concentrated in manufacturing industries losing jobs due to globalization, the importance of job sector diversity to resilience and reduced risk to economic shocks extends beyond manufacturing sectors, which we control for in the relationship shown in Chart I. How did other negative economic schocks affect metro areas whose job sector mix lacked diversity?

LOCAL JOB SECTOR CONCENTRATION & RISK

As seen in the example of Hickory, North Carolina, negative economic shocks can be particularly harmful to cities if a high share of their employment is concentrated in a single sector. There are a variety of reasons why a metro area could lose its competitive advantage in a given sector and experience job loss. There could be a local skill shortage, a labor shortage due to changes in immigration patterns, a loss of competitiveness in wages relative to other regions, a disruption of inputs due to supply chain difficulties, technological innovations that make a sector relatively less productive, or a decline in demand for a given product or service. While a metropolitan area might benefit from high concentration in a booming sector for a given period of time, it will be at high risk if a negative economic shock occurs in the sector. Conversely, metro areas whose job sector concentration more closely matches the national average will be more resilient to such shocks.

The most common method of measuring a region's job sector concentration in a single sector relative to the national average in that same sector is to look at its location quotient. A region's location quotient in a given job sector is calculated by dividing a sector's share of regional employment by the sector's share of national employment. For example, in 2000, 2.7 percent of jobs in Akron, Ohio were in the Machinery Manufacturing sector compared to just 1.35 percent nationwide, giving it a location quotient of two, meaning Akron's concentration in the sector was twice as high as the national average. This meant the city was at greater risk from negative economic shocks that impacted the sector than the average metropolitan area due to the relatively high level of concentration in the sector. Akron lost over 2,300 jobs in the sector between 2000 and 2019, as it declined by 23 percent nationally, and the metro area experienced a job growth rate of three percent, much lower than the median metropolitan area.

Another job sector that experienced a negative economic shock in the last two decades is coal mining, which became a less profitable sector due to competition from natural gas and green energy as well as heightened regulation of coal fired power plants. Nationally, the mining sector[x] declined by over 14 percent from 2000 to 2019, resulting in the loss of almost 32,000 jobs. Mining was a particularly concentrated job sector in Charleston, West Virginia, with a location quotient of over 17 in 2000. By 2019, the metro area lost over 1,600 jobs in the sector for a 43 percent decline, while Charleston as a whole lost 11 percent of all private sector jobs, the fourth largest decline among metro areas.

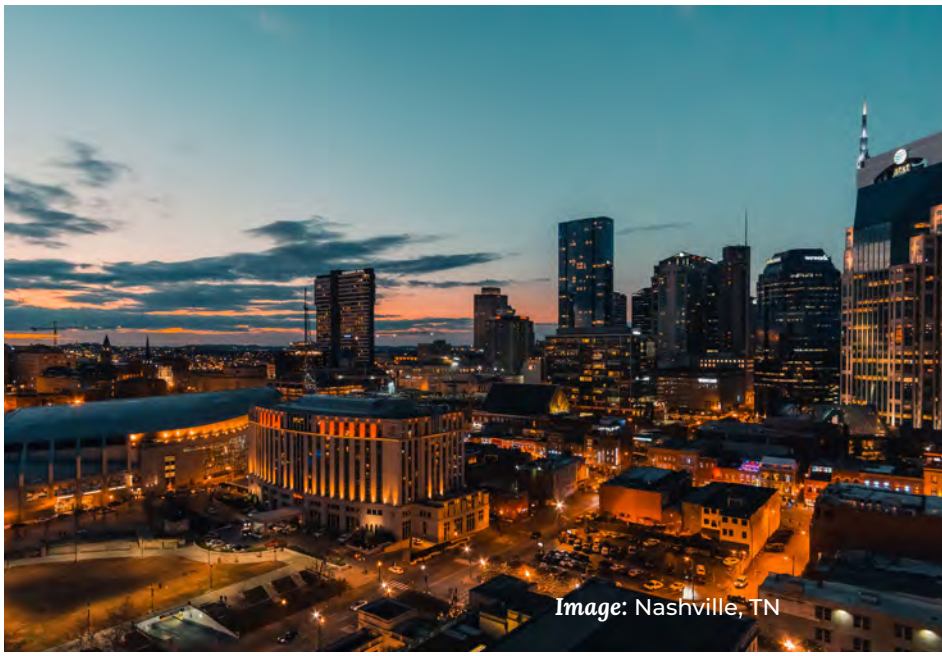


Image: Nashville, TN

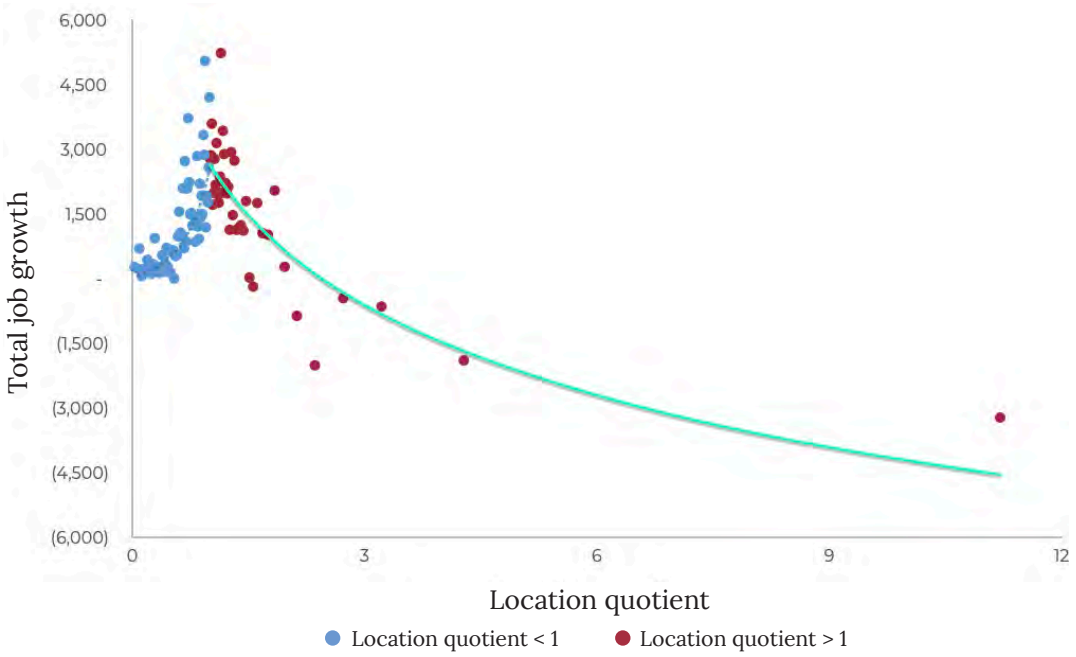
Cities can also experience job loss when they lose their comparative advantage in a sector. The recent experience of Atlantic City, New Jersey and job sectors related to gambling highlights the risk that cities face when a large number of jobs are concentrated in a small number of sectors. Following its post-World War II decline, New Jersey sought to revitalize Atlantic City by legalizing casino gambling, making it the first place on the east coast that offered the entertainment option. Hotels and resorts began opening up and offering games of chance, creating thousands of jobs in the accommodation sector. By 2000, the city's accommodation sector employed over 41 percent of

the entire metropolitan area, resulting in a location quotient of over 24 for the sector. However, by the early 2000s, the so-called "Monopoly City" was facing increased competition as casino gambling was legalized in Pennsylvania and casinos opened in nearby Philadelphia, while casino resorts in Connecticut began increasing their share of the market. This increased competition and the shock of the 2008 financial crisis hit the city hard. From 2000 to 2019, Atlantic City lost 21,800 jobs in the accommodation sector for a 45 percent decline. The job sector had the sixth highest location quotient of any sector among the largest 150 metropolitan areas in 2000, and its decline proved difficult for the city to overcome.

An examination of Nashville's job sector history and location quotients is also revealing. As discussed in the first report in this series, Nashville stands out as a city that has had a high level of job sector diversity for many years. Among the 78 job sectors present in Nashville in 2000, only one of them had a location quotient greater than two, meaning that there was only one job sector where the share of employment in that job sector in Nashville was more than twice the national share of employment in that sector. That sector, the lessors of nonfinancial intangible assets, accounted for just 0.1 percent of employees in Nashville in 2000 compared to 0.02 percent nationally and lost 471 jobs in the city by 2019. Nashville's high level of job sector diversity in 2000 may have been a contributing factor to its job growth in the subsequent decades.

Chart II:

Job sector location quotients in 2000 and real job growth from 2000 to 2019 in the 150 largest metro areas



Source: QCEW

Table II:

Metropolitan areas with job loss, top sectors for job loss, and location quotients in 2000

Metro Area	2000 Empl.	2019 Empl.	% Change	Sector with most lost jobs	Jobs lost in sector	Location quotient
Youngstown – Warren – Boardman, OH – PA	204,586	176,248	-13.9%	Primary Metal Manufacturing	-10,989	15.7
Hickory – Lenoir – Morganton, NC	138,707	119,950	-13.5%	Furniture and Related Product Manufacturing	-17,968	37.4
Flint, MI	131,364	114,622	-12.7%	Transportation Equipment Manufacturing	-16,548	9.2
Charleston, WV	105,512	93,582	-11.3%	Chemical Manufacturing	-3,825	5.5
Canton –Massillon, OH	157,566	142,995	-9.2%	Fabricated Metal Product Manufacturing	-4,654	4.9
Bridgeport – Stamford – Norwalk, CT	383,328	349,901	-8.7%	Credit Intermediation and Related Activities	-13,498	1.5
Toledo, OH	275,024	252,549	-8.2%	General Merchandise Stores	-3,911	1.6
Cleveland – Elyria, OH	957,655	880,621	-8.0%	Credit Intermediation and Related Activities	-15,348	1.4
Dayton, OH	355,078	309,403	-7.7%	Transportation Equipment Manufacturing	-12,697	3.2
Atlantic City – Hammonton, NJ	116,446	107,803	-7.4%	Accommodation	-21,844	24.4
Greensboro – High Point, NC	310,367	291,729	-6.0%	Textile Mills	-11,146	14.3
Syracuse, NY	234,966	222,508	-5.3%	Hospitals	-6,836	0.8
Fort Wayne, IN	176,851	167,583	-5.2%	Hospitals	-6,659	1.1
Detroit – Warren – Dearborn, MI	1,844,901	1,752,260	-5.0%	Transportation Equipment Manufacturing	-75,960	5.5
New Orleans – Metairie, LA	475,966	455,622	-4.3%	Transportation Equipment Manufacturing	-10,161	1.3
Rockford, IL	131,296	127,459	-2.9%	Machinery Manufacturing	-6,153	7.6
Lansing – East Lansing, MI	139,611	136,397	-2.3%	Transportation Equipment Manufacturing	-6,827	5.4
South Bend – Mishawaka, IN – MI	119,478	117,143	-2.0%	Transportation Equipment Manufacturing	-3,330	2.7
Ann Arbor, MI	128,089	125,874	-1.7%	Transportation Equipment Manufacturing	-10,436	6.3
Milwaukee – Waukesha – West Allis, WI	746,231	742,545	-0.5%	Machinery Manufacturing	-10,170	3.0

Source: QCEW

Table III:

Top 20 metropolitan areas for job growth, top sectors for job growth, and location quotients in 2000

Metro Area	2000 Empl.	2019 Empl.	% Change	Sector with most job growth	Jobs gained in sector	Location quotient
Provo, UT	114,929	220,503	91.9%	Professional, Scientific, and Technical Services	13,268	1.2
McAllen, TX	120,947	206,947	71.1%	Ambulatory Health Care Services	28,892	2.9
Austin, TX	516,105	879,294	70.4%	Professional, Scientific, and Technical Services	67,379	1.4
Cape Coral – Fort Myers, FL	133,258	226,765	70.2%	Food Services and Drinking Places	16,537	1.3
Fayetteville – Springdale – Rogers, AR – MD	115,837	185,896	60.5%	Food Services and Drinking Places	12,342	1.1
Charleston – North Charleston, SC	177,384	282,254	59.1%	Food Services and Drinking Places	16,351	1.5
Raleigh, NC	338,674	536,959	58.5%	Professional, Scientific, and Technical Services	35,779	1.4
Riverside, CA	804,940	1,271,312	57.9%	Warehousing and Storage	71,035	1.8
Orlando, FL	727,202	1,145,820	57.6%	Food Services and Drinking Places	58,500	1.1
Ogden – Clearfield, UT	118,420	185,947	57.0%	Professional, Scientific, and Technical Services	8,952	0.7
Nashville – Davidson – Murfreesboro – Franklin, TN	528,762	819,610	55.0%	Food Services and Drinking Places	39,626	1.2
Boise City, ID	189,651	285,236	50.4%	Food Services and Drinking Places	11,881	1.1
San Antonio – New Braunfels, TX	572,213	850,717	48.7%	Food Services and Drinking Places	47,473	1.3
Las Vegas – Henderson – Paradise, NV	626,695	920,437	46.9%	Food Services and Drinking Places	58,300	1.0
Charlotte – Concord – Gastonia, NC – SC	627,691	896,461	42.8%	Food Services and Drinking Places	43,671	1.0
Bakersfield, CA	187,108	265,433	41.9%	Support Activities for Agriculture and Forestry	17,945	45.1
Houston – The Woodlands – Sugar Land, TX	1,866,531	2,619,324	40.3%	Food Services and Drinking Places	128,456	1.0
Pensacola – Ferry Pass – Brent, FL	107,475	149,308	38.9%	Food Services and Drinking Places	9,472	1.4
Huntsville, AL	124,977	173,499	38.8%	Professional, Scientific, and Technical Services	15,971	2.8
Salem, OR	97,257	134,816	38.6%	Ambulatory Health Care Services	5,100	1.2

Source: QCEW

Looking more broadly at job sector concentration in cities, what was the relationship between a given job sector's location quotient in a metropolitan area and subsequent job growth? Chart II shows a binned scatter plot of the location quotients of every job sector in the top 150 largest metropolitan areas in 2000 and their total job growth (or loss) by 2019. The average metro area had around 73 job sectors in 2000. A total of 10,933 job sector/metro area location quotients are grouped in 100 equal sized bins and their average location quotient and job growth numbers are shown.

The chart shows that the highest real job growth occured in sectors in metro areas that had a location quotient of around one. Sectors that had location quotients lower than one or between one and two had slower growth, while sectors that had location quotients much higher than two experienced job loss on average. Metropolitan areas that had job sectors that were highly concentrated in 2000 were at much higher risk for job loss in those sectors than cities that had more diverse job sectors.

A total of 20 metropolitan areas lost jobs between 2000 and 2019. Among these areas, the greatest job losses mostly came from job sectors that were highly concentrated. The median location quotient for the job sector with the largest number of jobs lost in these 20 metropolitan areas was just over five. As shown in Table II, only one metropolitan area's primary sector for job loss had a location quotient below one, the hospital sector in Syracuse, New York, with a location quotient of 0.8 and over 6,800 jobs lost. The Transportation Equipment Manufacturing sector in Detroit, Michigan had the second largest job loss of any sector in the largest 150 metropolitan areas between 2000 and 2019, with almost 76,000 jobs lost, and had a location quotient of 5.5 in the city in 2000.

The opposite story emerges when looking at the top 20 metropolitan areas for job growth, as shown in Table III. In these fast growing cities, most job growth occurred in sectors that had location quotients slightly higher than one, with a median location quotient of 1.2 among the 20 cities. From 2000 to 2019, Provo, Utah was the top metropolitan area for job growth. The top five growth sectors in the city had location quotients ranging from 0.9 in Ambulatory Health Care Services to 1.7 in Specialty Trade Contractors. Provo saw some of its greatest job growth in sectors that were not heavily concentrated. It gained over 13,000 jobs in the Professional Services sector, where it had a location quotient of 1.2 in 2000. Bakersfield, California was an outlier in that its top sector for growth, the Support Activities for Agriculture and Forestry, had a location quotient of 45. Eighty percent of the top sectors for job growth in the top 20 metro areas had location quotients equal to or less than 1.5.

What becomes clear is that job growth in metropolitan areas is mostly occurring in sectors that are not heavily concentrated while the reverse is true for job loss. Metropolitan areas with a lot of jobs concentrated in a small number of sectors will be at risk for job loss when negative economic shocks occur and markets change. Cities with higher levels of job diversity will be more resilient to these shocks and experienced higher levels of growth between 2000 and 2019, after controlling for several larger trends. Appendix I presents the top sectors for job growth nationally between 2000 and 2019 and includes a discussion of how they were distributed across metropolitan areas.

Image: Nashville, TN

CONCLUSION

In an uncertain world where people and businesses are increasingly able to move and relocate in response to changing circumstances and incentives, cities face a host of challenges. Facing risks ranging from fluctuating markets, a changing climate, pandemics, and competition from their peers, cities must be resilient and able to adapt if they are to achieve long term growth. One factor that could help cities be more sustainable and resilient to negative shocks is job sector diversity.

In this report, we find that after controlling for wages, concentration in health and manufacturing, and regional growth trends, metropolitan areas whose share of employment across job sectors more closely matched the national average in 2000 had higher rates of job growth by 2019. Further, we find that job growth within metro areas was more likely to occur in job sectors whose share of jobs locally closely matched the national average. Job sectors that are highly concentrated in a city were more likely to lose jobs over time, suggesting that high levels of concentration in a given sector could put cities at greater risk for future job loss and instability. This is borne out when looking at the top 20 and bottom 20 metropolitan areas for job growth. The median location quotient (a city's share of employment in a sector divided by the national share in the sector) for the sectors that gained the most jobs in the top 20 cities for growth was 1.2, while the median location quotient for the sectors that lost the most jobs in the bottom 20 cities for growth was just over five.

Over-concentration in a job sector can put a city at considerable risk for future job loss. The well known example of the decline of Rust Belt cities that specialized in auto manufacturing and steel production highlight this risk. The COVID-19 pandemic lockdowns were a negative shock to cities such as New Orleans that relied on tourism and entertainment dollars. The rise in Work From Home arrangements due to the pandemic became a growing concern for traditional tech hubs like San Francisco as several high profile companies relocated to lower priced metro areas such as Austin and Salt Lake City. The risk that comes from a lack of job sector diversity might not result in the long term decline of a city, but it can make adaptation more difficult.

In recent decades, Nashville's high rate of job growth and third highest level of sector diversity stands in contrast to cities experiencing large job losses such as Hickory, North Carolina. The metro area saw large job gains in sectors whose job concentration closely matched the national average in 2000 and in sectors that had high national growth rates, including an increase of almost 40,000 jobs in the food services and drinking places sector, almost 37,000 jobs in the professional services sector, almost 27,000 jobs in the ambulatory health care services industry, and almost 17,000 jobs in the hospital sector. In 2021, what cities feature the most diverse economies?

Table V shows the top 10, bottom 10, and Nashville ranks for economic diversity as measured by the Hachman Index. While there are many well known growing cities on the top of the list, including Miami, San Diego, Tampa, Tucson, Columbus, and North Port-Sarasota-Bradenton, Florida, Buffalo might come as a surprise at the top of the list. Yet, after four decades of continued population loss, the metropolitan area recorded its first decade of growth since 1970 in the recently released 2020 Census enumeration, possibly pointing to the resilience of the region's economy. Nashville fell from the third most diverse economy to the 15th as it now has five job sectors with a location quotient greater than two, up from just one in 2000. The city has three times the share of employment in the motion picture industry than the national average and 2.6 times the share of employment in theater and dance companies than the national average.

At the bottom of the ranking are some declining metro areas as well as some heavily agricultural regions in California. The biggest surprise might be Provo, Utah, which has been one of the fastest growing cities in the past two decades. The city's employment base is heavily concentrated in specialty trade contractors, which account for almost 20 percent of employment in the metro area

compared to just four percent nationwide. Provo also has more than two and a half times the national average of employees in the nursing and residential care facility industry, with over 6,400 jobs. Will Provo continue its high rate of growth or will it suffer from a future negative economic shock due to its heavily concentrated economy? Ultimately, cities are dynamic places where comparative advantages will change over time and an important factor in long term sustainability and growth could be job sector diversity.

Table V:

Job sector diversity in the largest 150 metropolitan areas, Q1 2021.

Rank	City	Hachman Index	Total Jobs
1	Buffalo – Cheektowaga – Niagra Falls, NY	0.874	393,690
2	Miami – Fort Lauderdale – West Palm Beach, FL	0.872	2,148,413
3	San Diego – Carlsbad, CA	0.870	1,134,646
4	Tampa – St. Petersburg – Clearwater, FL	0.859	1,100,926
5	Tucson, AZ	0.848	280,392
6	Pittsburgh, PA	0.840	877,595
7	Dayton, OH	0.834	281,938
8	Sacramento – Roseville – Arden – Arcade, CA	0.824	706,314
9	Columbus, OH	0.815	826,301
10	North Port – Sarasota – Bradenton, FL	0.806	266,567
15	Nashville –Davidson – Murfreesboro – Franklin, TN	0.776	742,694
141	Provo – Orem, UT	0.354	98,665
142	Green Bay, WI	0.336	88,817
143	Santa Maria – Santa Barbara, CA	0.307	161,187
144	Fresno, CA	0.307	303,362
145	Kennewick – Richland, WA	0.290	96,172
146	Hickory – Lenoir – Morganton, NC	0.107	88,096
147	Elkhart – Goshen, IN	0.106	125,293
148	Bakersfield, CA	0.101	243,184
149	Visalia – Porterville, CA	0.084	119,184
150	Salinas, CA	0.063	123,665

Source: QCEW

APPENDIX

TOP SECTORS FOR JOB GROWTH: 2000 TO 2019

Nationally, among 91 subsectors, the highest real job growth was in the Food Services and Drinking Places sector, the Ambulatory Health Care Services sector, and the Professional, Scientific, and Technical Services sector, as shown in Table IV. These three industry sectors were among the top four employers in 2000 and remained among the top four employers in 2019. Combined, these three sectors account for 60 percent of all U.S. job growth from 2000 to 2019, and grew from accounting for 17.6 percent of all U.S. private sector jobs in 2000 to over 23 percent of all U.S. jobs in 2019. Among the 10 sectors where the U.S. lost the highest number of jobs, all but three were in manufacturing subsectors, with the largest losses coming from the Computer and Electronic Product Manufacturing sector, which lost more than 730,000 jobs over the period. However, the top three sectors that experienced the largest real job declines only accounted for 3.3 percent of all U.S. jobs in 2000, so they were not sectors that were particularly concentrated in the U.S. at that time. This means that most of the job growth that occurred in the U.S. during this period was concentrated in sectors that already accounted for a large share of employment.

Among the 150 largest metropolitan areas the top three growth sectors in the nation referenced above were mostly well represented. The Food Services and Drinking Places sector was among the top three growth sectors in 130 metropolitan areas, while the Ambulatory Health Care Services industry was among the top three growth sectors in 112 metropolitan areas. However, the Professional, Scientific, and Technical Services sector (hereafter Professional Services) was only among the top three growth sectors in 46, or less than a third, of the metropolitan areas. Median total job growth was much higher (27 percent) among metropolitan areas that had the Professional Services sector among their top three growth sectors than the median job growth rate for metropolitan areas that had Food Services and Drinking Places (18 percent growth) or had Ambulatory Health Care Services (also 18 percent growth) among their top three growth sectors.

Image: Nashville, TN

Table IV:

Top 10 and bottom 10 job sectors for real job growth, U.S., 2000 to 2019.

Rank	Industry	Job Growth	% Growth	Jobs, 2000	Jobs, 2019	Share of Jobs, 2000	Share of Jobs, 2019
1	Food Services and Drinking Places	3,807,489	47%	8,164,758	11,972,247	7.4%	9.5%
2	Ambulatory Health Care Services	3,372,296	78%	4,313,020	7,685,316	3.9%	6.1%
3	Professional, Scientific, and Technical Services	2,735,760	40%	6,806,552	9,542,312	6.2%	7.6%
4	Social Assistance	2,252,256	128%	1,759,807	4,012,063	1.6%	3.2%
5	Hospitals	1,210,734	31%	3,915,032	5,125,766	3.6%	4.1%
6	Educational Services	1,130,670	63%	1,806,564	2,937,234	1.6%	2.3%
7	Administrative and Support Services	1,104,125	14%	7,732,489	8,836,614	7.0%	7.0%
8	Nursing and Residential Care Facilities	783,737	30%	2,577,174	3,360,911	2.3%	2.7%
9	Warehousing and Storage	733,655	142%	515,490	1,249,145	0.5%	1.0%
10	Management of Companies and Enterprises	623,376	35%	1,783,807	2,407,183	1.6%	1.9%
82	Computer and Electronic Product Manufacturing	-732,804	-41%	1,806,140	1,073,336	1.6%	0.8%
83	Telecommunications	-553,710	-44%	1,268,221	714,511	1.2%	0.6%
84	Apparel Manufacturing	-394,702	-78%	503,118	108,416	0.5%	0.1%
85	Printing and Related Support Activities	-384,754	-48%	808,065	423,311	0.7%	0.3%
86	Machinery Manufacturing	-333,345	-23%	1,456,980	1,123,635	1.3%	0.9%
87	Transportation Equipment Manufacturing	-324,809	-16%	2,055,985	1,731,176	1.9%	1.4%
88	Furniture and Related Product Manufacturing	-300,840	-44%	685,665	384,825	0.6%	0.3%
89	Fabricated Metal Product Manufacturing	-292,970	-17%	1,773,470	1,480,500	1.6%	1.2%
90	Publishing Industries (except Internet)	-273,237	-27%	1,028,514	755,277	0.9%	0.6%
91	Textile Mills	-270,343	-71%	378,420	108,077	0.3%	0.1%

Source: BLS QCEW, 3-digit NAICS industries, 2000 and 2019.

ENDNOTES

i Jane Jacobs (1969). The Economy of Cities.

ii Kline, P., Moretti, E. (2014). Local Economic Development, Agglomeration Economies, and the Big Push: 100 Years of Evidence from the Tennessee Valley Authority. Quarterly Journal of Economics.

iii Yoon, C. (2017). Estimating a Dynamic Spatial Equilibrium Model to Evaluate the Welfare Implications of Regional Adjustment Processes: The Decline of the Rust Belt. International Economic Review, (58) 2: 473-497.

iv Markevich, A., Mikhailova, T. (2012). Economic Geography of Russia. New Economic School, Moscow.

v Commander, S., Nikoloski, Z., Plekhanov, A. (October 2011). Employment Concentration and Resource Allocation: One-Company Towns in Russia. IZA Discussion Paper No. 6034.

vi Glaeser, Edward. "Human Capital Follows the Thermometer". Economix blog. New York Times. April 19, 2011.

vii Neumark, D., Shirley, P. (May 2021) Myth or Measurement: What Does the New Minimum Wage Research Say about Minimum Wages and Job Loss in the United States? NBER Working Paper 28388.

Dube, A., Lindner, A. (Winter 2021). City Limits: What Do Local-Area Minimum Wages Do? Journal of Economic Perspectives. 35(1): 27-50.

viii Glaeser, E., Shapiro, J. (2001). Is There a New Urbanism? The Growth of U. S. Cities in the 1990s. Harvard Institute of Economic Research Working Papers 1925.

ix Winant, G. (2021). The Next Shift: The Fall of Industry and the Rise of Health Care in Rust Belt America. Harvard University Press.

x The Bureau of Labor Statistics defines the mining sector as "Mining (except oil and gas)" to separate those sectors.

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