

Rust and Renewal: A Cleveland Retrospective



FEDERAL RESERVE BANK *of* CLEVELAND

Industrial Heartland Series

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Executive Summary

This report examines the economic performance of the Cleveland metropolitan statistical area (MSA) from 1969 to 2016 in terms of employment, unemployment, population, and real per capita personal income levels. While comparisons are made to national averages, a more relevant peer group for the Cleveland MSA is that of the MSAs of the industrial heartland: areas located in and near the Midwest that, like Cleveland, also have historical concentrations in manufacturing. Even when the Cleveland MSA's performance is compared to that of the other industrial heartland MSAs rather than to that of the nation, it is often somewhat weaker; however, the shared timing of adverse economic developments, including multiple shocks to manufacturing employment, points to the significant challenges faced by most industrial heartland MSAs.

The key results of this analysis on the Cleveland MSA's economic performance are the following:

- Between 1969 and 2016, employment in the Cleveland MSA grew more than 20 percent. But this growth was much weaker than that in either the industrial heartland or the nation: The nation's employment grew by more than 100 percent, and the average industrial heartland MSA saw its employment level grow by 50 percent.
- Despite the weak employment growth in the Cleveland MSA, the unemployment rate in the MSA has again declined to levels similar to the national unemployment rate. The recovery in the Cleveland MSA's unemployment rate happened following two large declines in manufacturing that affected the Cleveland MSA and the broader industrial heartland by sharply raising unemployment rates.
- The recovery of the unemployment rate in the Cleveland MSA occurred in spite of slower employment growth because population growth was significantly lower in the Cleveland MSA than in other US MSAs.
- In 1969, the Cleveland MSA was among the top 10 percent of MSAs for per capita income. Despite declines in per capita income following the large shocks to manufacturing employment experienced in the late 1970s and early 1980s, Cleveland's per capita income remained above average until 2000. The decline in manufacturing experienced in the Cleveland MSA between 2001 and 2010 appears to have further dampened income growth; this experience is consistent with that of other industrial heartland MSAs that suffered income losses along with manufacturing losses. The Cleveland MSA is now notably below the national MSA average for per capita income.

Introduction

Cleveland's growth into one of the largest cities in the United States was supported by its early and rapid industrialization, particularly in the period from 1860 to 1930.¹ While industrialization was a key factor in the city's rise, innovation was also critical: "By the late nineteenth century, Cleveland was not only a center of production in second industrial revolution industries, it was also a hotbed of patenting. In 1900 it ranked eighth out of all US cities in the total number of patents granted to residents."² Cleveland ranked even higher when the focus was on patents deemed by official examiners to be important in the sense of these patents' being "significant contributions to the industrial art of the period."³ Prior research suggests that this strength in innovation was likely a key factor in the Cleveland MSA's relatively high per capita income nearly seven decades later in 1969.⁴

While Cleveland was still growing through the middle of the twentieth century and saw significant increases in manufacturing output during World War II, the city's relative growth had already peaked.⁵ Thus, long before "Rust Belt" entered the vernacular in the 1980s, Cleveland was already a mature industrial city with employment concentrations in mature industries: primary metals, fabricated metals, electrical equipment, and machinery.

This report assesses the economic performance of the Cleveland MSA⁶ from 1969 to 2016 in terms of employment, unemployment, population, and real per capita income levels. Comparisons are made not only to the performance of all metropolitan areas in the United States, but also to a subset of historically manufacturing-intensive metropolitan areas this report terms "the industrial heartland." This area includes MSAs that were part of a concentration of manufacturing activity bordered by the Great Lakes to the north, the Ohio River to the south, upstate New York to the east, and Wisconsin and Illinois to the west.⁷

Although the Cleveland MSA's success in manufacturing in earlier decades provided some valuable benefits to the community, it also created considerable headwinds that impeded its economic progress after 1969, as the mature sectors in which the MSA had concentrations tended to decline in the face of increased international trade, changing technology, and firms' decisions regarding where to locate production. These critical factors are interrelated, a fact which makes parsing their individual contributions difficult and discerning the causes of the manufacturing decline a challenge. This report draws on a related working paper⁸ that shows that the declines in manufacturing employment during two significant shock periods (1979 to 1983 and 2001 to 2009) were associated with substantially weaker economic performance in the affected MSAs, particularly within the industrial heartland, than in the nation.

Collectively, the industrial heartland MSAs serve as a more relevant comparison group for an MSA such as Cleveland than does the nation or other areas with their own unique histories and advantages and disadvantages for growth. It is not realistic to expect industrial heartland MSAs to match the economic performance of Sunbelt or coastal MSAs, which have little concentration in manufacturing, when the manufacturing-specific shocks were large and concentrated in the industrial heartland.

Cleveland's economic performance from 1969 to 2016

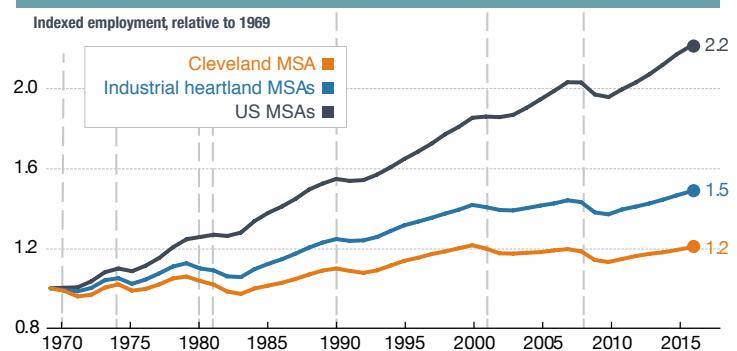
Employment growth

Employment in the Cleveland MSA has grown from 1.1 million jobs in 1969 to 1.3 million jobs in 2016. National employment grew much more quickly during the same period. This difference in part reflects the fact that the Cleveland MSA is part of a relatively slow-growing, manufacturing-intensive region of the United States that this report terms the “industrial heartland.” Most of the MSAs in the industrial heartland have also seen much slower employment growth than the nation has as a whole. Still, the Cleveland MSA has experienced weaker employment growth than the typical industrial heartland MSA during the last 47 years.

Figure 1 charts the employment levels of the Cleveland MSA, the industrial heartland MSAs, and the US MSAs relative to their 1969 levels. In this chart, a value of 1.5 means that an area has seen a 50 percent expansion of its employment level, while a value of 2.0 means a doubling of employment, or a 100 percent expansion. During this 47-year period, the Cleveland MSA has seen a 20.5 percent increase in employment levels, while the industrial heartland MSAs have seen an increase of 50 percent, and the nation experienced an increase of 118.5 percent.

Employment growth in all areas is uneven over time. The vertical dashed lines in figure 1 represent the years in which recessions began, and, clearly, these economic slowdowns alter employment growth trajectories in each of the three MSA groupings. That said, there are two periods in which employment growth in the Cleveland MSA is exceptionally slow, periods which, as this report will show, were tied to declines in national manufacturing. Specifically, the first period of particularly weak employment growth is around the 1979 and 1981 to 1982 recessions. Between 1969 and 1983, employment declined by 3 percent in the Cleveland MSA. The second period of relative weakness is from 2001 to 2010, when Cleveland MSA employment declined by 6 percent.

Figure 1. Employment, 1969–2016



Source: Bureau of Economic Analysis.

Note: Dashed vertical lines show years in which recessions began.

The MSAs of the industrial heartland experienced similar employment weakness during these two periods. Average employment levels in industrial heartland MSAs were down 8 percent during the first manufacturing shock in the late 1970s and early 1980s. However, they subsequently recovered 12 percent, for a gain of 4 percent over 1969 levels.⁹ During the second manufacturing shock, from 2001 to 2010, average employment levels in industrial heartland MSAs did not decline but grew more slowly than the nation: 2.6 percent growth versus a 9.3 percent average for all MSAs in the nation. The Cleveland MSA’s manufacturing employment losses were a little larger than typical in the industrial heartland MSAs in both episodes, but not by enough to explain fully the weaker employment growth.

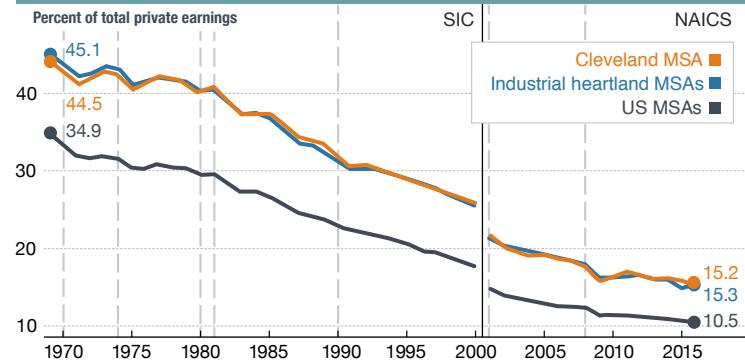
Manufacturing's decline

Over time, the size of the manufacturing sector in terms of its share of income has fallen nationally, in the industrial heartland MSAs, and in the Cleveland MSA (figure 2).¹⁰

Nationally, manufacturing's reduced share of income reflects a combination of employment losses in manufacturing, rising employment levels in nonmanufacturing sectors, and a decline in the relative income associated with manufacturing jobs versus other jobs within the MSA. A regression analysis, reported in the 2017 Cleveland Fed working paper "Manufacturing Employment Losses and the Economic Performance of the Industrial Heartland," revealed that while industrial heartland MSAs share in these national trends, they saw more than proportional effects of the manufacturing reductions. In particular, these MSAs had larger nonmanufacturing employment losses and weaker per capita income growth than other MSAs based on the size of their loss of manufacturing jobs. The analysis suggests that industrial heartland MSAs still face a substantial headwind in regard to their economic growth prospects despite the fact that these places have also diversified their economies away from manufacturing. In the case of the Cleveland MSA, employment losses in manufacturing have manifested as periods with lower nonmanufacturing employment growth as in the rest of the industrial heartland, but during the full period of the analysis—from 1969 to 2016—the Cleveland MSA's employment base has become gradually more service-focused, like the nation's.

Manufacturing employment has been declining as a share of the Cleveland MSA's economy, while employment in the services sector has been growing (figure 3). Growth has been greatest in professional and business services; management of companies; administrative support and waste management services; educational services; healthcare and social assistance; arts, entertainment, and recreation; accommodation and food services; other services; and government and government enterprises. Some of this apparent growth in services can be attributed to the change to the North American Industry Classification System (NAICS) coding. The management of companies is

Figure 2. Manufacturing Share of MSA Earnings, 1969–2016

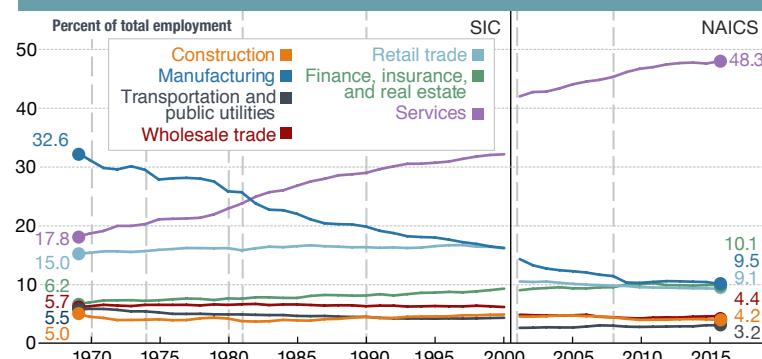


Source: Bureau of Economic Analysis.

Notes: Dashed vertical lines show years in which recessions began. Group averages are weighted by population. The solid vertical line indicates the shift in industry coding from Standard Industrial Codes (SIC) to the North American Industry Classification System (NAICS).

a new category created with the switch to NAICS coding that treats a company's headquarters as a distinct activity rather than assigning each headquarters to the sector that was associated with most of the business's output. This and other coding changes substantially boosted services as a category in the Cleveland MSA, though it is clear that the services sector has held a rising share of employment for some time.

Figure 3. Sector Shares of Employment in Cleveland MSA, 1969–2016



Source: Bureau of Economic Analysis.

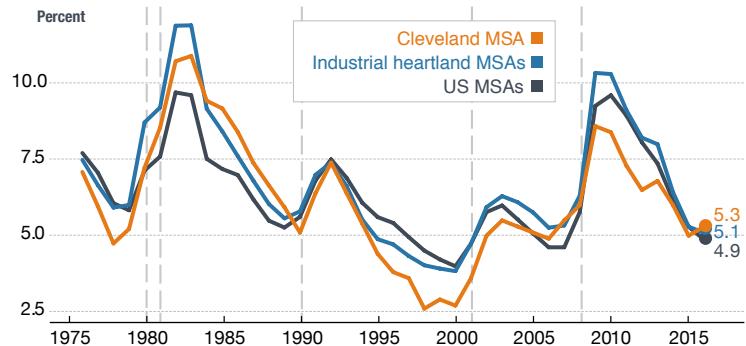
Notes: Dashed vertical lines show years in which recessions began. The solid vertical line indicates the shift in industry coding from Standard Industrial Codes (SIC) to the North American Industry Classification System (NAICS). Some data are imputed. See the appendix.

Unemployment rates

While employment growth in the Cleveland MSA and the industrial heartland has systematically deviated from national employment growth over time, unemployment rates have remained closer to national levels despite the shocks that are evident in all of the unemployment rates shown in figure 4.^{11,12} Beginning in the late 1970s, the Cleveland MSA saw rising unemployment that largely tracked the sharp rise in unemployment seen across the industrial heartland. However, the Cleveland MSA previously had experienced relatively low unemployment rates, and when unemployment peaked in 1983, the MSA's rate was still about a percentage point lower than the average for industrial heartland MSAs. A long, slow decline in unemployment in the late 1980s brought the Cleveland MSA back to roughly national levels of unemployment. The 1990s saw further declines in unemployment relative to the industrial heartland's and the nation's rates, declines that brought the Cleveland MSA's unemployment rate down to about 3 percent in the late 1990s—roughly 1 percentage point lower than the nation's. These rates were the lowest in recent years for both the Cleveland MSA and the nation.

The 2001 recession prompted a rise in unemployment rates in the industrial heartland, the nation, and the Cleveland MSA, as shown in figure 4, but during the expansion that followed, unemployment rates in the Cleveland MSA and the industrial heartland also saw smaller declines. In 2007, the Cleveland MSA's unemployment rate was relatively high compared to the average unemployment rate of the nation's MSAs and almost 2 percentage points higher than it was at the end of the 1990s expansion. The 2007 to 2009 recession bumped up unemployment substantially in the Cleveland MSA, in the industrial heartland, and in the nation, though the Cleveland MSA's increase was smaller than the industrial heartland's. All three unemployment rates converge during the 2010s to be near 5 percent in 2016. So, just like after the early 1980s recession, weaker employment growth, again, does not show up in the form of persistently higher unemployment rates.

Figure 4. Unemployment Rate, 1976–2016



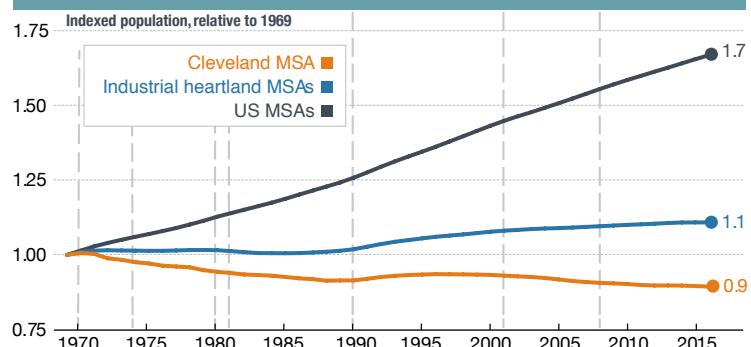
Source: Bureau of Labor Statistics.

Notes: Dashed vertical lines show years in which recessions began. Group averages are weighted by population.

Population

Given the relatively weak employment growth in the Cleveland MSA, as seen in figure 1, along with the ongoing decline of manufacturing's share of income exhibited in figure 2, it is surprising that the Cleveland MSA's unemployment rate is not weaker. Instead, at times, Cleveland has seen sharper declines in unemployment rates than the nation has. What adjusts to keep unemployment rates from rising further? Significantly slower population growth, shown in figure 5, provides the answer. Cleveland has experienced a 10 percent decline in population since 1969, while the nation's population in 2015 was 70 percent larger than in 1969. Even the average industrial heartland MSA's population is more than 12 percent larger than it was in 1969.

Figure 5. Population, 1969–2016



Source: Bureau of Economic Analysis.

Note: Dashed vertical lines show years in which recessions began.

The time pattern of Cleveland's population loss also fits with the periods of relatively weak employment growth. Much of the population decline occurred in the late 1970s and 1980s when both manufacturing and Cleveland struggled. The 1990s actually saw some growth in population in the MSA as economic performance improved and as unemployment in the MSA was relatively low. Further declines in population were seen following the 2001 recession, when manufacturing was weak and unemployment rates in the region rose relative to those of the nation.

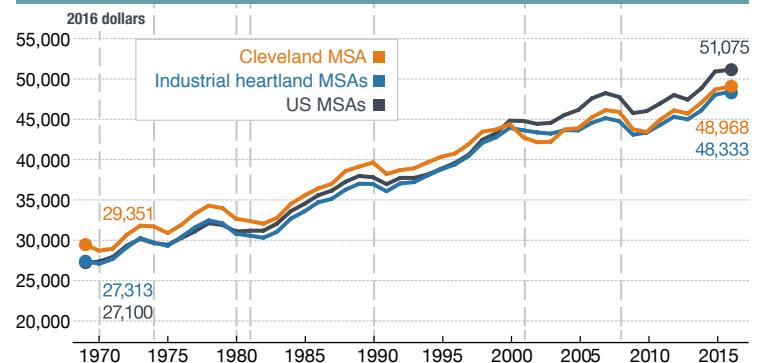
Real per capita personal income

In many ways, the best indicator of the economic performance of a region is its real per capita income. After all, income levels should reflect the ability of local residents to consume products and services. In addition, a region with relatively high earnings should be attractive to other workers.

As noted earlier, the Cleveland MSA was in the top 10 percent of MSAs for per capita income in 1969, and it largely maintained its substantial income differential over national per capita income levels until the 1979 recession, when employment and, notably, manufacturing in the region declined (figure 6).¹³ Through both the relatively weak period for the Cleveland MSA economy in the 1980s and the relatively low unemployment years of the 1990s, the MSA maintained a small but still positive differential with national per capita income figures. As the industrial heartland experienced weaker per capita income growth from 2000 to 2010 than the nation, the Cleveland MSA hewed more closely to the industrial heartland's per capita income level, seeing its per capita income drop substantially below the national level. In the most recent expansion, income growth has been similar to the nation's and to the industrial heartland's, though the Cleveland MSA's disadvantage relative to the nation is unchanged.

Productivity growth supports income growth, at least in the longer run. Data on productivity growth at the MSA level are not available in the form provided at the national level because of lack of hours of work data at the local level. However, even in the absence of official productivity data we can infer broadly how much productivity has

Figure 6. Real Per Capita Personal Income, 1969–2016

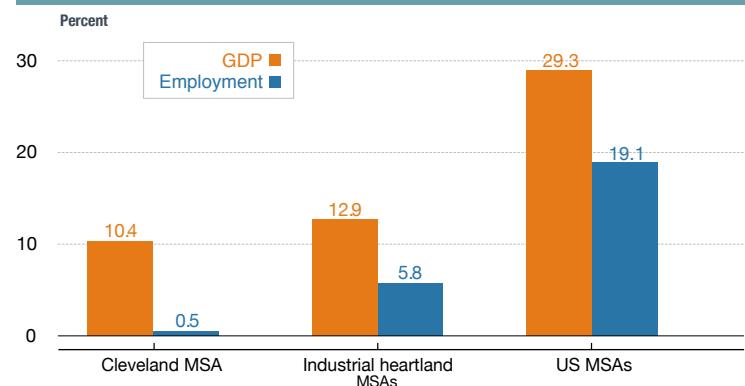


Sources: Bureau of Economic Analysis and Bureau of Labor Statistics via Haver Analytics.

Notes: Dashed vertical lines show years in which recessions began. Group averages are weighted by population.

likely driven local growth by comparing output growth to employment growth of multiyear spans. Figure 7 shows growth in output relative to employment growth for the nation, the industrial heartland, and the Cleveland MSA.¹⁴

Figure 7. Percentage Change in GDP and Employment, 2001–2016



Source: Bureau of Economic Analysis.

It is not surprising to see substantially larger output growth from 2001 to 2016 in the nation's MSAs relative to the Cleveland MSA or to the industrial heartland MSAs. After all, employment also grew more rapidly in the nation. What is more informative is the relative growth of output (GDP) per worker, which can be seen (roughly) in the difference between output growth and employment growth in figure 7. If we assume unchanged average hours of output per worker in each geographical grouping of MSAs, this difference is a fair measure of productivity growth.

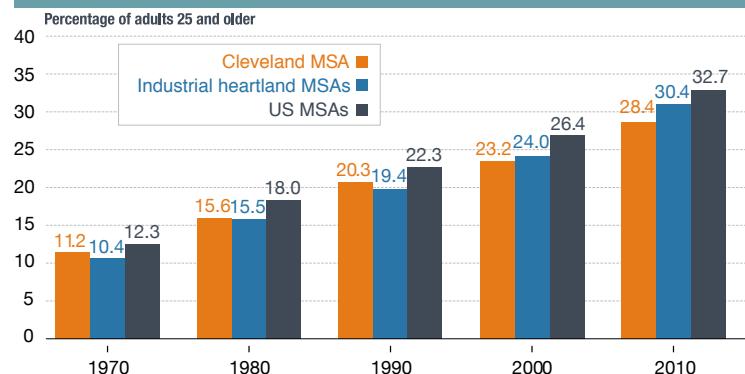
The Cleveland MSA saw about a 9.9 percent increase in output per worker between 2001 and 2016, supported by 10.4 percent output growth minus employment change of 0.5 percent, a figure that is roughly equivalent to the national MSA's average growth of 10.2 percent and considerably better than the industrial heartland's of 7.1 percent.

Comparing real per capita income levels, we see the Cleveland MSA's stronger performance of output per worker relative to the industrial heartland MSAs is reflected in a little higher growth in per capita incomes in the Cleveland MSA than in the industrial heartland MSAs (figure 6).

Educational attainment is a key determinant of longer-run productivity and income; this is true at an individual level, and it also holds true on a regional level: MSAs with more highly educated people tend to have higher incomes. Industrial heartland MSAs might be expected to have residents with lower education levels in part because manufacturing was viewed as a path to "good jobs" that often did not require education beyond a high school diploma. It is the case that the average educational attainment rates in the industrial heartland and the Cleveland MSA were lower than the national MSA average in 1970, but this difference is slight (figure 8). However, between 1970 and 2010, industrial heartland MSAs, including the Cleveland MSA, began to lag behind the nation. As education levels throughout the country rose substantially during this 40-year period (by 20.4 percentage points nationally), increases in the Cleveland MSA and the industrial heartland MSAs were generally smaller. While college completion is just one measure of educational attainment, lower college completion rates represent a significant challenge for the Cleveland MSA and many other industrial heartland MSAs, as negative education wage differentials have tended to increase during the same period.

Another key factor supporting productivity and income growth is innovation.¹⁵ Historically, innovation was a key factor in the Cleveland MSA's strong growth, and the number of patents issued per resident has been rising in recent years (figure 9). This patenting is primarily driven by companies that continue to conduct significant research and development in the Cleveland MSA.¹⁶

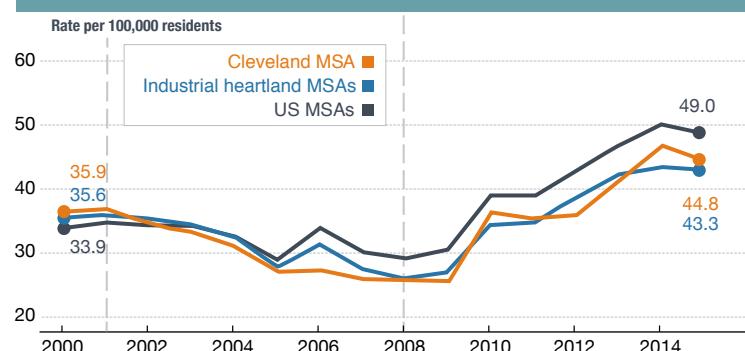
Figure 8. Percentage of Adults with a Bachelor's Degree or Higher, 1970–2010



Source: Integrated Public Use Microdata Series.

Among the patents assigned to a particular entity rather than an individual, private companies predominate, although the Cleveland Clinic, Case Western Reserve University, and NASA all make the list of the top 15 patent owners in the Cleveland MSA (table 1). While patenting activity in the Cleveland MSA has risen, it has also risen in many other parts of the nation, such that Cleveland is now a below-average contributor to patenting activity.

Figure 9. Patents per 100,000 Residents, 2000–2015



Sources: US Patent and Trademark Office and Bureau of Economic Analysis.

Notes: Dashed vertical lines show years in which recessions began. Group averages are weighted by population.

Table 1. Top Patent Awardees in Cleveland MSA, 2000–2015

	Total
Individually owned patent	1,532
Lincoln Global, Inc.	391
Rockwell Automation Technologies, Inc.	365
The Cleveland Clinic Foundation	357
General Electric Company	326
Case Western Reserve University	296
Lubrizol Corporation	285
Eveready Battery Company, Inc.	247
National Aeronautics and Space Administration	215
Bendix Commercial Vehicle Systems, LLC	158
Koninklijke Philips Electronics N.V.	140
Avery Dennison Corporation	123
Invacare Corporation	120
Nordson Corporation	120
Goodyear Tire & Rubber Company	91

Source: US Patent and Trademark Office.

Manufacturing job losses and the Cleveland MSA's economic performance

Stepping back to interpret these relative performance trends, manufacturing employment has been a critical underpinning of most industrial heartland MSAs, and the Cleveland MSA is no exception. A regression analysis examining the effects of manufacturing shocks in two periods, 1979 to 1983 and 2001 to 2010, shows that MSAs experiencing a larger manufacturing shock have larger changes in nonmanufacturing employment, unemployment, population, and real per capita personal income. Unfortunately for the Cleveland MSA and other industrial heartland MSAs, these effects are even larger in the industrial heartland.¹⁷

The effects from the second manufacturing shock range from somewhat smaller to quite substantive, particularly for real per capita incomes.

As one of the larger industrial heartland cities, Cleveland experienced significant manufacturing shocks. In fact, the Cleveland MSA experienced above-average manufacturing shocks as measured by the relative change in manufacturing employment during the multiyear period of both manufacturing shocks. In the first shock period, 1979 to 1983, Cleveland is measured at -0.287, while the average industrial heartland MSA was -0.270 and the average impact nationally was -0.107. Cleveland's shock is almost three times as large as the nation's and roughly comparable to the average industrial heartland MSA's. In the second shock period, 2001 to 2010, Cleveland is measured at -0.417, while the average industrial heartland MSA was -0.405 and the average impact nationally was -0.285. The second manufacturing shock was more widely experienced than the first, but the industrial heartland and the Cleveland MSA were again more impacted than most MSAs.

One key takeaway from the regression results is that both manufacturing shocks were associated with persistent negative effects on total and nonmanufacturing employment. In addition, the second manufacturing shock was associated with persistent negative income effects during the period and after.¹⁸ It is in many ways surprising to see that manufacturing employment losses continue to affect industrial heartland MSAs such as Cleveland, even as these MSAs have significantly reduced their shares of employment in the manufacturing sector. Many industries are essentially “population serving,” with employment in the sector dependent on local consumers and therefore largely proportional to the population in the MSA. Sectors that export their goods or services outside of the MSAs in which they are produced can have large impacts on economic performance if declines in these sectors reduce the population and employment in other sectors and ultimately reduce the per capita income of the area. This situation appears to have happened in the industrial heartland MSAs and in the Cleveland MSA following both manufacturing shocks.

The changing composition of Cleveland's economy and its future prospects

Cleveland's industrial heritage has had a lasting impact on the Cleveland MSA's industrial specialties. In 1900, more than 6,000 men worked in primary metals in Cuyahoga County (where Cleveland is located), which ranked "fifth nationally (behind Allegheny County, PA; Cook County, IL; Mahoning County, OH; and Jefferson County, AL) in iron and steel production."¹⁹ While employment in the sector has been far higher historically, employment in primary metal businesses is, at 7,138 employees in 2016, only a little above its 1900 figure even though total employment in the Cleveland MSA is more than eight times higher in 2016 than it was in 1900.²⁰ This reflects national trends, so despite being a smaller fraction of total employment, primary metals remains one of the industries that for the Cleveland MSA is unusually concentrated.

Similarly, innovations of the late nineteenth century such as the arc lamp, electric generation equipment, and dry-cell batteries led to the formation of major industries that remain relatively concentrated in the Cleveland MSA, including electric lighting (NELA Park-General Electric), batteries (Union Carbide), arc welding (Lincoln Electric), engineering (Brush Wellman), and electrical generation (Cleveland Municipal Light). But there are also new specialties that have developed more recently.

In order to identify the Cleveland MSA's current specialties, more detailed industrial data are used to find all cases in which the MSA has a high "location quotient," or the local share of total employment in a given industry relative to the national share of total employment in that industry. Location quotients above 1.1 generally describe a local specialty. The top 15 Cleveland MSA specialties (at the three-digit NAICS coding level) all have location quotients above 1.25, indicating a significant concentration (table 2).

The Cleveland MSA of today has specialties in both manufacturing and services. Several of these contemporary specialties involve sectors that were early contributors to Cleveland's rise as a major city, including primary metals (which includes iron and steel), fabricated metals (which involves working with metals), and electrical equipment and appliances (which includes lighting equipment). Other sectors reflect the legacy of service institutions that can serve residents outside of the local area, including hospitals, management of companies, and performing arts and spectator sports. The largest employers on the list are health institutions. While health institutions are often large employers, in most MSAs they typically don't have location quotients much above one; the location quotient of 1.92 for hospitals in the Cleveland MSA means that almost half of the employment in hospitals in the area is beyond what is typical for MSAs. This high level of employment indicates Cleveland MSA hospitals serve a significantly broader population than just those who live in the Cleveland MSA.

The growth of new industrial specialties is an important source of future growth. The development of insurance carrier specialties (such as Progressive Insurance) has boosted Cleveland MSA employment, with an average growth rate of 1.1 percent per year since 1990. Insurance also has relatively high weekly average earnings, at \$1,493. Insurance, the management of companies, and hospitals are the current expanding centers for higher earnings in the Cleveland MSA.

Addressing the negative aspects of the Cleveland MSA's long-run decline in manufacturing will be difficult. While still a very important sector in the MSA, manufacturing is largely beyond the policy influence of local officials, and, in many cases, its decline is the result of long-term technological shifts that cannot be reversed. The National Academy of Engineering explored policies that should be considered in light of ongoing technology shifts in its recent report titled *Making Value for America: Embracing the Future of Manufacturing, Technology, and Work*.²¹ The report encourages local governments to support, rather than resist, change in the manufacturing sector. The report's authors recommend that, to achieve better outcomes, local governments take the following actions:

Table 2. Top 15 Manufacturing and Services Sectors in Cleveland MSA
by Location Quotient, 2016

Rank	NAICS industry	Location quotient	2016 employment	Average annual growth (%)	Average weekly wage (\$)
1	Primary metal manufacturing	2.63	7,138	-5.1	1,382
2	Fabricated metal product manufacturing	2.60	26,676	-1.6	1,044
3	Electrical equipment and appliance manufacturing	2.04	5,647	-2.8	1,353
4	Machinery manufacturing	1.94	15,047	-2.2	1,220
5	Hospitals	1.92	68,923	1.4	1,234
6	Chemical manufacturing	1.82	10,719	-1.6	1,526
7	Management of companies and enterprises	1.61	26,101	2.6	2,116
8	Performing arts and spectator sports	1.51	5,152	-5.1	2,255
9	Plastics and rubber products manufacturing	1.49	7,585	-1.3	936
10	Printing and related support activities	1.42	4,600	-2.1	836
11	Miscellaneous manufacturing	1.39	5,947	-1.0	913
12	Nursing and residential care facilities	1.35	32,446	1.8	543
13	Insurance carriers and related activities	1.32	21,789	1.1	1,493
14	Merchant wholesalers, durable goods	1.27	27,060	-0.5	1,273
15	Educational services	1.27	25,473	1.7	752

Source: Bureau of Labor Statistics' Quarterly Census of Employment and Wages.

Notes: Average annual growth is calculated between 1990 and 2016, except for primary metals, electrical equipment, and management of companies, all of which are only available in the Cleveland MSA starting in 2001, so the annual average is from 2001 to 2016 for these industries. Industries are defined at the 3-digit North American Industry Classification System (NAICS) level.

- Local school districts should form partnerships with businesses and community colleges to help students graduate from high school, earn an associate or bachelor's degree, and take part in continuing education in the workplace.
- Metro area governments should partner with state governments, industry, higher education, investors, and economic development organizations to create local innovation networks.
- Metro area governments should work with state governments to optimize the decision-making process for urban development investments and siting in order to facilitate the creation of innovation networks.
- Local governments, with state government and Congressional support, should invest in a world-leading wireless infrastructure.

While these are useful recommendations to help local communities adapt to the changing economic environment and to support the adoption of new technologies, these suggestions are unlikely to shift the long-run trend of employment in manufacturing.²²

While the shifting industrial composition of an MSA attracts considerable attention and can certainly affect the area's economic performance, many economists recommend focusing on improving the skills of its residents. In a recent report on the Great Lakes states, an area that substantially overlaps with most of the industrial heartland, the Urban Institute notes that the outlook for the region inherently rests on improving the prospects for current and future residents.²³ While this conclusion may appear obvious, it shifts the focus to people rather than a strategy centered on business attractions. This approach follows from the fact that current residents and their children will be the workforce on which local businesses likely will need to draw given the historically weak patterns of in-migration experienced in the region. This is likely the case for Cleveland, too, as the city and its MSA have historically underperformed the industrial heartland in population growth. Focusing on the future workforce means focusing on improving educational attainment rates and increasing

workforce training throughout the population, particularly in urban school districts with low graduation rates. The low graduation rate has been an issue for the Cleveland Metropolitan School District, although the district has made strides toward improving educational outcomes. The Urban Institute also recommends policies that both encourage young families to stay in the region and promote immigration.

The experiences of the Cleveland MSA in income growth are also consistent with the findings of the Federal Reserve Bank of Cleveland's 2005 annual report, findings which point to education levels and innovation as the ultimate sources of longer-term income growth for states and regions.²⁴ The Cleveland MSA was once a major innovation center, an advantage it has gradually ceded over the past several decades. Also, in recent decades, the Cleveland MSA has not been an education leader, while other MSAs have stepped up their advantages in both attracting and producing workers with more advanced degrees. As also highlighted in the Urban Institute analysis of Great Lakes states, data showing weak in-migration in the region suggest a need to focus efforts on improving educational outcomes in the Cleveland MSA to support the MSA's workforce for today and into the future.

Long-run change is not simple to effect. Part of the purpose of this report is to examine the patterns of development in the Cleveland MSA and related MSAs in order to identify reasonable targets to strive for. These results suggest that industrial heartland MSAs, such as the Cleveland MSA, have seen distinct development patterns. It may be worthwhile to target local economic policies to more reasonable benchmarks in line with the region's prior development as an industrial center.

¹ See Darwin H. Stapleton, "Industry." *The Encyclopedia of Cleveland History*, an online resource collection located at <https://case.edu/ech/articles/i/industry/>.

² Stapleton, "Industry."

³ Michael S. Fogarty, Gasper S. Garofalo, and David C. Hammack. *Cleveland from Startup to the Present: Innovation and Entrepreneurship in the 19th and Early 20th Centuries*. Center for Regional Economic Issues, Weatherhead School of Management, Case Western Reserve University (2017).

⁴ Paul W. Bauer, Mark E. Schweitzer, and Scott A. Shane, "Knowledge Matters: The Long-Run Determinants of State Income Growth." *Journal of Regional Science*, 52: 240–255, (2011). doi:10.1111/j.1467-9787.2011.00729.x

⁵ See Jon Teaford, *Cities of the Industrial Heartland*. Indiana University Press (1993, 174–176).

⁶ A metropolitan statistical area (MSA) is a collection of counties defined by the Census Bureau as a single labor market that incorporates both urban and suburban residential and business areas by accounting for commuting patterns. The Cleveland–Elyria MSA (which for brevity this report refers to as the Cleveland MSA) includes Cuyahoga, Lorain, Lake, Geauga, and Medina Counties. The 2010 US Census estimates this MSA to have a population of 2,077,240. The Bureau of Economic Analysis (BEA) provides data on several key economic performance measures at the MSA level from 1969 to 2016. While the commuting patterns and the officially designated counties in the Cleveland MSA have evolved over time, the BEA provides data aggregated from the counties that are currently in the MSA.

⁷ For more information on the included MSAs and the economic performance of the region, see Mark E. Schweitzer, "Manufacturing Employment Losses and the Economic Performance of the Industrial Heartland," Federal Reserve Bank of Cleveland, Working Paper no. 17-12 (2017).

⁸ Schweitzer (2017).

⁹ Bureau of Economic Analysis, MSA personal income dataset.

¹⁰ Industry coding changed in 2000 from Standard Industrial Codes (SIC) to the North American Industry Classification System (NAICS), a change that significantly altered the set of business activities that were coded as "manufacturing." Notably, activities falling under "the management of companies that produce goods" were classified as "manufacturing" under SIC but not NAICS. This shift from SIC to NAICS codes, indicated in each figure by the solid vertical line, limits comparisons between information coded in these two distinct manners. Nonetheless, it remains clear that manufacturing as a share of local incomes fell substantially both before and after the coding shift.

¹¹ The Bureau of Labor Statistics does not publish a US metropolitan average unemployment, so figure 4 shows the national unemployment rate, which includes both MSAs and rural areas.

¹² The Bureau of Labor Statistics publishes unemployment rates at the MSA level beginning only in 1990. For this analysis, we use data no longer publicly available that were provided by the BLS along with a description of known problems in the data. Incompatibilities with the current approach to unemployment statistics were examined, and data were dropped for certain MSAs whose population changes made the unemployment rates unreliable.

¹³ While figure 6 adjusts for national prices, it does not account for cost-of-living differences among regions. It is typically the case that the cost of living, notably due to housing, is lower in lower-income areas, but we all face national prices when we travel or bring goods into the region.

¹⁴ The data on MSA GDP are available beginning in only 2001; nevertheless, 2001 is a reasonable starting point for the period in which Cleveland and the industrial heartland end up with lower per capita incomes.

¹⁵ Bauer, Schweitzer, and Shane (2011).

¹⁶ Patents are associated with the Cleveland MSA based on the residence of the first listed inventor rather than on the location of the headquarters of the company or nonprofit that owns the patent.

¹⁷ Schweitzer (2017).

¹⁸ Schweitzer (2017).

¹⁹ Carol Poh Miller, "Iron and Steel Industry." *The Encyclopedia of Cleveland History*. <https://case.edu/ech/articles/i/iron-and-steel-industry/>

²⁰ Employment outside "principal cities" was not available in 1900, but the city of Cleveland would have represented the vast majority of 1900 employment levels in the counties and stood at 154,356 for all occupations in the 1900 census [United States Census Bureau, *Census of Population and Housing, Special Report: Occupations at the Twelfth Census (1900, table 42)*]. The BEA reports a total employment level of 1,328,367 for the Cleveland MSA in 2016.

²¹ National Academy of Engineering, *Making Value for America: Embracing the Future of Manufacturing, Technology, and Work*. National Academies Press (2015).

²² National Academy of Engineering (2015, 9).

²³ See Rolf Pendall, Erika C. Poethig, Mark Treskon, and Emily Blumenthal, *The Future of the Great Lakes Region*. Urban Institute (2017). http://www.urban.org/research/publication/future-great-lakes-region/view/full_report

²⁴ *Altered States: A Perspective on 75 Years of State Income Growth*. Federal Reserve Bank of Cleveland 2005 Annual Report. <https://www.clevelandfed.org/en-newsroom-and-events/publications/annual-reports/ar-2005-perspective-on-75-years-of-state-income-growth/ar-200502-altered-states-essay.aspx>