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Manufacturing Job Loss in U.S. Deindustrialized Regions—Its Consequences and Implications for the Future: Examining the Conventional Wisdom

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Abstract

The loss of manufacturing jobs in the United States has been widely noted in the popular press as well as in public policy debate. We examine several of the most prominently made assertions about manufacturing decline and its consequences for deindustrializing metropolitan areas and find not all of them supported by the data. In particular, we find that, given their industrial structure some of these areas performed better than expected, that long-term economic distress was not inevitable, that manufacturing remains an important component in many metropolitan area economies, and that much of the growth in the service sector is based upon or complementary to the existence of manufacturing. We also find that low growth in these deindustrialized areas was due more to these regions losing their market share of individual industries to other U.S. regions than it was to the areas having an adverse industrial structure, that economies that were more diversified in 1980 did not have greater employment growth from 1980-2011 than those that were less diverse, and that declines in manufacturing did result in a movement of jobs from relatively high-wage to relatively low-wage industries and thus a decline in earnings per jobs.

Keywords

manufacturing, jobs, state and local economic development policy

Between 1979 and 2010, the United States lost 7.9 million manufacturing jobs, about 42% of its 1979 manufacturing base. It lost 42.8% of these jobs (3.4 million jobs) between 2000 and 2007 prior to the Great Recession, and then lost another 29.7% (2.4 million) from 2007 to 2010, during and after the recession. The sector has slowly gained employment after hitting its employment trough in 2010.

Although scholars, policy makers, and journalists have extensively analyzed and debated the causes of this decline in manufacturing (popularly termed deindustrialization) in regions that previously were heavily dominated by manufacturing as well as its consequences for displaced workers, they have paid much less attention to the kinds of jobs that have replaced lost manufacturing jobs, to the consequences that industrial shifts have had for metropolitan areas, and to the uneven geographical distribution of these changes. As a result, assertions about these phenomena have abounded. Some of these have been supported with evidence, whereas others have been backed up only with theory or have simply been asserted without support. In this study we examine the following six widely held beliefs that are widely acknowledged as conventional wisdom and assess the extent to which they are supported by our factual analysis.

1. The economies of metropolitan areas that had been dominated by manufacturing employment were not resilient in the face of manufacturing decline; they were doomed to inevitable economic hardship (Longworth, 2010; Maciag, 2013).
2. Deindustrialized metropolitan areas have stagnated economically because they were too dependent on slow-growing industries (Koenig, 2019; Longworth, 2010; McCoy, 2009).
3. Deindustrialized metropolitan areas with diversified economies are fundamentally healthier and are likely

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to grow faster than those with more concentrated economics (Glaeser, 2009; Jacobs, 1969).

4. The loss of manufacturing jobs combined with the changing composition of manufacturing jobs toward lower-wage manufacturing industries has resulted in lower earnings for the average worker in deindustrialized metropolitan areas (Evanoff, 2009).
5. Manufacturing employment no longer plays an important role in deindustrialized metropolitan economics (Clark & Clavel, 2012; Fisman, 2012; Reich, 2009; Ward & Dadayan, 2010).[1]
6. It is unwise or impossible to foster manufacturing jobs as part of a metropolitan economic development strategy (Fisman, 2012; Florida, 2012; Reich, 2009). Services, especially advanced services, are the key to metropolitan economic health (Drennan, 2002; Florida, 2012; Glazer & Grimes, 2004; Ratcliffe, 2009).[2]

To examine these assertions, we rely primarily on a data set that we constructed for a study we conducted on metropolitan-area manufacturing job loss from 1980–2005 (Wial, Friedhoff, & Wolman, 2010) that we have updated to 2011. The study was designed to examine the economic performance of those metropolitan economies whose industrial structure, prior to 1980, had been disproportionately dominated by manufacturing (i.e., had a location quotient in 1980 of at least 1.05), and that had also experienced an absolute loss of manufacturing jobs between 1980 and 2011. Applying these criteria led to a study universe of 114 metropolitan areas, and we term these 114 areas "deindustrialized regions." We stress that our analysis applies only to these deindustrialized regions; when we deviate from the use of this data set to describe all metropolitan areas, we explicitly point out that we are doing so. We also note that, for this study, our presentation and discussion of the data set is descriptive rather than analytical; we do not engage in econometric analysis in this study to explore causation or effects of individual variables in a multivariate context.

Since, as described above, our data set for the 114 areas is not a representative sample of all metropolitan areas but instead consists of those metropolitan areas whose industrial structure was heavily dominated by manufacturing in 1980 and then lost manufacturing employment, we begin by presenting some basic information about these 114 deindustrialized areas. Of the 114 areas, 47 were in the midwest, 34 in the south, 30 in the northeast, and only 3 in the West. Nearly 54% of the total jobs lost in manufacturing between 1980 and 2011 were in these 114 industrial metropolitan areas. The mean loss of manufacturing jobs in these 114 metropolitan areas from 1980–2011 was 48.2% and the median loss was 47.2%, both substantially greater than the overall national manufacturing job loss of 38.2% during the same time period. Average manufacturing earnings per job (referred to as "earnings" in the remainder of this article) for the 114 areas increased by an inflation-adjusted 34.5%. When examined within the context of manufacturing employment loss, this suggests that manufacturing productivity increased and was reflected in earnings gains and/or that manufacturing employment loss was disproportionately in low-wage industries.[3]

These large declines in manufacturing were accompanied by adverse economic outcomes for most of these metropolitan areas. Between 1980 and 2011, 82 of the 114 deindustrialized metropolitan areas experienced both job and earnings growth below the national rates. These 82 regions had median job growth of 14.8% (vs 40.5% nationwide), and median inflation-adjusted earnings growth of 10.8% (vs 31.6% percent nationwide). Only seven of the metropolitan areas, Athens (GA), Auburn (AL), Charlotte (NC-SC), Greenville (SC), Johnson City (TN), Lancaster (PA), and Portland (ME) performed better than the national average on both job growth and earnings growth.

We decomposed the employment and earnings changes for each of the 114 metropolitan areas into those due to the composition of its two-digit North American Industry Classification System (NAICS) industries at the beginning of the period (in shift/share terms, the sum of the national and industry growth effects) and those due to change in the region's "market share" of those industries (in shift/share terms, the local competitive effect) from 1980–2011.[4] For the sake of simplicity, we term the sum of the national and industry growth effects a region's "expected growth"—the growth that would have occurred in the region had each of its two-digit industries grown at the same rate as that industry grew nationally. "Actual growth" is as implied—the growth that actually occurred over the time period for area economy. We define a region's 2011 expected employment (or earnings) as the employment (or earnings) that would have existed in 2011 if the region's actual employment (or earnings) growth had equaled its expected growth.

Total 2011 actual employment in the 114 metropolitan areas was an average of 13% less than total 2011 expected employment; that is, than would have been the case had each industry grown at the same rate as that industry grew nationally over the 31-year period (the median region employment was 13% less). Earnings per job were 8% lower (4.6% in the median region) (see Table 1).

Evaluating the Assertions

1. The economies of metropolitan areas that had been dominated by manufacturing employment were not resilient in the face of manufacturing decline; they were doomed to inevitable economic hardship.

To evaluate this assertion, we define *resilient* to mean growth in total employment and/or average earnings at least equal to that which would have been expected had each three-digit

Table 1. Ratio of Actual to Expected Total Metropolitan Employment and Earnings per Job, 2011, for the 114 Deindustrialized Metropolitan Areas (expected based on national change by industry, 1980–2011).

	Ratio actual to expected total metropolitan employment	Ratio of actual to expected metropolitan earnings per job
Mean	0.87	0.92
Median	0.85	0.92
25th percentile	0.76	0.88
75th percentile	0.96	0.95
Standard deviation	0.16	0.07

Source. Authors' estimates based on 1980–2011 data obtained from Moody's Analytics.

Table 2. Regional Employment and Earnings Resilience for the 114 Deindustrialized Metropolitan Areas.

	Employment resilient	Employment nonresilient	Total
Earnings resilient	25	4	29
Earnings nonresilient	12	73	85
Total	37	77	114

Source. Authors' estimates based on 1980–2011 data obtained from Moody's Analytics.

NAICS industry grown at the same rate locally as it did nationally over the 1980–2011 time period (i.e., whose actual growth exceeded its expected growth). Those metropolitan areas that experienced actual growth in employment at least equal to their expected growth we call *employment-resilient*, whereas metropolitan areas with actual growth in average earnings at least equal to that which would have been expected we term *earnings-resilient*.

We can thus construct a 2 × 2 typology of regional resilience. Of the 114 deindustrialized metropolitan economies, 37 were employment-resilient—their ratio of actual to expected employment in 2011 was above that which would have been expected had each of their industries grown at the same rate as that industry grew nationally between 1980 and 2011 - and 29 were earnings-resilient. However, only 25 of the metropolitan areas were both employment- and earnings-resilient, and 73 were nonresilient with respect to both jobs and earnings (see Table 2).

For the 37 employment resilient metropolitan areas, the median actual total employment in 2011 was 12% higher than its expected value, compared to −23% for the 77 nonresilient metropolitan areas. Median growth in earnings per job was below expectations for both employment resilient metropolitan areas (6%) and employment nonresilient ones (9%), indicating that even the resilient metropolitan areas,

Table 3. Ratios of Actual to Expected 2011 Jobs and Earnings per Job by Jobs Resilience Status (expected based on national change by industry, 1980–2011).

	Resilient (37)		Nonresilient (77)	
	Jobs	Earnings per job	Jobs	Earnings per job
Mean	1.19	0.94	0.78	0.90
Median	1.12	0.94	0.77	0.91
25th percentile	1.06	0.90	0.69	0.87
75th percentile	1.30	1.00	0.87	0.93
Standard deviation	0.17	0.08	0.13	0.06

Source. Authors' estimates based on 1980–2011 data obtained from Moody's Analytics.

despite their greater than expected employment gains, had lower earnings per job than expected. This suggests that the overall employment structure in the metropolitan areas that were dominated by manufacturing in 1980 and lost manufacturing jobs between 1980 and 2011 shifted during that period more toward relatively lower-paid jobs, and this shift occurred even in employment resilient metropolitan areas (see Table 3).

We conclude that, although whereas a majority of the 114 deindustrialized metropolitan areas indeed did prove nonresilient in both employment and earnings when faced with manufacturing job loss, a substantial minority of these areas were resilient, outperforming expected levels in either or both employment and earnings. A deindustrialized metropolitan area's job loss in manufacturing did not inevitably doom it to overall economic hardship.

The econometric literature does not give a consistent answer to the question of how manufacturing job losses affect metropolitan economic growth. Glaeser, Scheinkman, and Shleifer (1995) find that manufacturing's prior share of employment reduces subsequent economic growth rates. This finding indicates that regions that began the period with lower shares of employment in manufacturing are more likely to experience economic growth over the next period. Drennan (2002) finds that manufacturing's share of earnings is positively relateed to subsequent growth (implying that manufacturing job and/or wage losses are harmful to growth) for all but very large metropolitan areas. The results of other studies are inconclusive, varying by econometric specification, the variable used to measure economic growth, or time period, and sometimes statistically insignificant (Glaeser & Saiz, 2004; Gottlieb & Fogarty, 2003; Simon, 1998).

This should, however, not be taken to imply that the decline in manufacturing as a proportion of an area's employment and gross metropolitan product (GMP) did not have adverse impacts. Declines in manufacturing are likely to have a disproportionate impact on city nonresidential property tax revenues, because manufacturing establishments are likely to be capital intensive and often utilize large parcels of

property (Shone, 2009). The decline in manufacturing has meant both a fall in local property tax revenue from that source (Wolfson & Frisken, 2002) and a shift of the property tax burden from business property to residential property (with associated increased resistance to property taxes, given that households vote, whereas businesses do not). In addition, the decline in manufacturing employment, to the extent it resulted from layoffs of older workers with lower levels of human capital, may have rendered large numbers of workers unemployable or employable only in jobs at much lower wages.

2. Deindustrialized metropolitan areas have stagnated economically because they were too dependent on slow-growing industries.

A metropolitan area may have rapid (or slow) job growth because its industries gained or lost jobs quickly (or slowly) throughout the nation. These national job gains or losses presumably reflect national or international economic conditions that affect the industry no matter where its firms are located. It may also have rapid (or slow) job growth because its industries gained or lost jobs more quickly (or slowly) in that area than they did in the nation as a whole. The latter job gains or losses result from conditions that are specific to the industries or employers in that particular metropolitan area (e.g., firms with faster or slower productivity growth, better or poorer ability to innovate, greater or lesser propensity to offshore jobs) or to the metropolitan area as a whole (e.g., workforce skills, infrastructure, financial incentives for industrial recruitment).

The fact that nearly all of the 114 deindustrialized metropolitan areas actually gained total jobs from 1980–2011 obscures the actual nature of their performance. Breaking each deindustrialized metropolitan area's 1980–2011 job growth down into growth because of the metropolitan area's industry mix (at the three-digit level) and growth because of metropolitan area–specific factors provides insight into metropolitan strengths and weaknesses that are not apparent from the area's overall job change. In particular, it allows us to assess whether slow growth of the area's industries at the national level was responsible for the economic problems of metropolitan areas that lost manufacturing employment.

Only 22 of the 114 deindustrialized metropolitan areas (19%) experienced total job growth greater than the national growth rate of 40.5% between 1980 and 2011. In the median deindustrialized metropolitan area, the total job growth rate was 19.8%, 20.7 percentage points below the national rate. If all of their industries had grown at their respective national rates (what we term expected rates of growth), 101 of the 114 deindustrialized metropolitan areas (89%) would have had 1980–2011 job growth below the overall national rate of 40.5%. This indicates that those 101 metropolitan areas had their 1980 employment concentrated in industries that grew slowly throughout the nation. The median expected job growth that would have occurred in the 114 metropolitan areas was 8.9 percentage points less than the overall national rate. Thus, industry composition was partly responsible for the slow job growth that occurred in most of the metropolitan areas. However, this varied substantially by census region, with the south losing the most employment as a result of its industrial composition (median of 16.8 percentage points below the national rate) and the west actually gaining employment (median of 4.4 percentage points above the national rate) as a result of its favorable composition.

Despite the overall gain in employment, the 1980–2011 job growth rates of most (77 or 68%) of the 114 deindustrialized metropolitan areas were lower than their expected rate. Of the 114 deindustrialized metropolitan regions, the median total job growth rate was 13 percentage points lower. This indicates that factors specific to each metropolitan area or to its industries were largely responsible for the sluggish job growth that most of the metropolitan areas experienced; however, the situation varied by census region. In the midwest, the median deindustrialized metropolitan area's job growth rate was 25 percentage points lower than it would have been if all its industries had grown at their respective national rates, whereas in the south the median metropolitan area's growth rate was 10.7 percentage points higher.

The overwhelming majority of our 114 deindustrialized metropolitan areas, then, grew more slowly than the national average, both because they inherited an industrial composition disproportionately composed of slower-growing industries and because, on average, even these industries grew more slowly than the same industries did nationally. In colloquial terms, they were placed on a slow horse and they rode it poorly. Our analysis, however, makes clear that the median loss of jobs because of metropolitan area–specific factors (–10.7 percentage points) was greater than the loss because of the original industrial composition of the metropolitan area (–7.5 percentage points). The only census region where the opposite was the case was the south.

Even those Great Lakes deindustrialized metropolitan areas that depend heavily on the auto and auto parts manufacturing industries (and depended on them even more in 1980) did not experience slow job growth primarily because of that dependence. For example, Buffalo's total job growth rate was 33.4 percentage points lower than its expected rate, Cleveland's was 37.2 percentage points lower, Dayton's was 30.9 percentage points lower, and Detroit's was 40.7 percentage points lower. If all industries in all metropolitan areas had grown at their respective national rates, Detroit would have had the fastest 1980–2011 total job growth rate of all 114 metropolitan areas, 47.6%, rather than the 88th-fastest rate, 6.8%. Cleveland would have had the 23rd-fastest rate of job growth, 39.3%, and not the 97th-fastest rate, 2.1%. Thus, the high concentrations of auto and auto parts manufacturing industries, per se, were not the major problem for job growth

in these metropolitan areas; the performance of the particular firms and plants in those areas and/or the relative unattractiveness of those areas to firms seeking to open, grow, or relocate, were the problem. (Relative unattractiveness, of course, may be the result of public policies pursued elsewhere, such as aggressive industrial recruitment or right-to-work laws. State and local governments in metropolitan areas that are disadvantaged by such policies need not mimic those policies but, in the absence of federal intervention, need to compensate for them with other policies.)

Likewise, some metropolitan areas had rapid job growth even though they specialized in industries that grew slowly nationwide. For example, Charlotte's overall job growth rate was 78.7 percentage points higher than its expected rate of growth. If all industries in all metropolitan areas had grown at their respective national rates, Charlotte would have had the 86th-fastest job growth rate among the 114 metropolitan areas, 24.9%, rather than the fastest rate, 103.5%.

Even within manufacturing, similar patterns prevailed. Metropolitan area–specific factors accounted for greater manufacturing job losses in the 114 metropolitan areas between 1980 and 2011 than did concentration of manufacturing employment in hard-hit industries. Those losses were more severe than they would have been if all manufacturing industries in those areas had declined (or, in a few some cases, grown) at their respective national rates. The median metropolitan area's 1980–2011 manufacturing job growth rate (which, given the criterion for our sample, by definition was negative) was 2.6 percentage points lower than expected had all of the area's NAICS three-digit manufacturing industries grown at their respective national rates. In all regions except the south, job growth was slower than it would have been if national industry job growth rates had prevailed; however, this was truer of the northeast than of the other regions.

Thus, while the assertion that deindustrialized metropolitan areas lost jobs because their economic portfolios were disproportionately concentrated within industries that were slow growing nationally is true, they lost even more jobs because they performed less well within these industries than these industries performed at the national level. The jockey was more at fault than the horse.

Given that, it would be useful to know what was wrong with the jockey. Or, to be fair, what factors existent in the region might account for its poorer than predicted performance, since some of these factors were likely to be out of control of the jockey, no matter how skillful? As we have noted, our study was descriptive rather than analytical; however, there is a rich literature that can be drawn upon to speculate on that question. Conceptually, negative shifts may result from regional characteristics that place the region at a competitive disadvantage relative to other regions or from changing requirements for firms previously locating in the region.

With respect to the former, multiple studies of the determinants of regional growth[5] suggest possibilities peculiar to the region, such as poor labor force skills relative to other regions, higher wages (controlling for industry composition) that are not accompanied by higher productivity, lower amenity or higher disamenity levels (particularly crime), or public policies that place the region at a disadvantage relative to other regions. Such public policies could include high taxes relative to the quality of service demanded and provided to businesses, poorly maintained infrastructure, poor labor-management relations, and sclerotic and inefficient local governments whose activities (or lack thereof) impede firms. Blumenthal, Wolman, and Hill (2009) examined change in regional employment and GMP from 1990–2000 utilizing a large number of factors specific to each region while controlling for industrial structure and region. They found that higher wage levels (controlling for the industry composition of employment), lower human capital (percentage of residents over age 25 with at least a bachelor's degree), fewer agglomeration economies (lower population), and poorer connectivity to the national and international economies (measured by number of scheduled airport departures) were all significantly related to poor regional economic performance.

Erickcek and McKinney (2006) estimated growth equations for small and medium-sized regions in the United States. They found that characteristics peculiar to a region that contributed to poor regional economic performance (measured by change in personal income) included low human capital, a high burglary rate, increases in the poverty rate, and population decline. In addition, they attempted to explain why some regions, even after accounting for industrial structure, region *and* region-specific factors included in their model performed more poorly than their model predicted. They did this by regressing residuals from their model on proxies for the activity of governments within the region. They found that, controlling for taxes collected by local governments within the region, regions whose local governments increased public expenditures less from 1992–1997 performed more poorly than did those regions with greater increases in local government expenditures.

Negative shifts may also result from changing requirements for firms previously locating in the region. Circumstances unrelated to a region's competitive advantage may result from the movement of firms through the product cycle (Markusen, 1985). Firms that may have begun in the area as a result of local product innovation will have different locational requirements if they move through the cycle toward more routinized production processes.

3. Deindustrialized metropolitan areas with diversified economies are fundamentally healthier and are likely to grow faster than those with more concentrated economies.

To assess this proposition we used the Herfindahl index, a standard measure of industrial concentration, to measure the degree to which a metropolitan area's employment is concentrated in a small number of industries or diversified among many.[6] We divided the 114 metropolitan areas into thirds according to their degree of concentration in 1980. We found no meaningful difference in the median 1980–2011 *job* growth rate between the most and least industrially diverse set of metropolitan areas in 1980. However, among the 114 metropolitan areas, those whose economies were more industrially diverse in 1980 had faster *earnings* growth during the subsequent 31 years than those with less industrial diversity. The one third of metropolitan areas (38 metropolitan areas) that were most industrially diverse in 1980 had median inflation-adjusted earnings growth of 20.5% between 1980 and 2011, whereas the one third that were least industrially diverse had median inflation-adjusted earnings growth of only 7.7%.

During the 1980–2011 period, the industrial structure of 75 (66%) of the 114 deindustrialized metropolitan areas became more diverse, while in the remaining 39 the industrial structure became less diverse. There was virtually no difference between the group that became more diverse and the one that became less diverse with respect to either median job growth or median earnings growth per job. This indicates that whether or not a metropolitan area's economy diversified during the 31-year period was not associated with growth in either employment or earnings.

These findings do not resolve the ongoing academic debate about whether specialization or diversification is better for metropolitan economies, as they are not based on an analysis that controls for other influences on the growth of metropolitan earnings and employment (Glaeser, Kallal, Scheinkman, & Shleifer, 1992; Harrison, Kelley, & Gant, 1996; Henderson, 2003; Henderson, Kuncoro, & Turner, 1995). The findings reported here are consistent with the finding of Glaeser et al. (1992) that industrial diversity increases average metropolitan earnings but not with their finding that diversity also increases employment.[7] They provide some suggestive evidence that deindustrializing metropolitan areas whose economies are more diverse at the outset of deindustrialization will have faster wage growth than those whose economies are less diverse.

4. The loss of manufacturing jobs combined with the changing composition of manufacturing jobs toward lower-wage industries has resulted in lower earnings for the average worker in deindustrialized metropolitan areas.

Changes in industrial composition over the 1980–2011 period, including the loss of manufacturing jobs, put downward pressure on metropolitan earnings in deindustrialized metropolitan areas, even in those areas where overall average earnings increased during that period. We classified high-wage industries as those three-digit NAICS industries whose 1980 average earnings were above the nationwide average earnings in 1980 and low-wage industries as three-digit NAICS industries whose 1980 average earnings were below the nationwide average earnings in 1980. We found that total jobs in industries that were low wage in 1980 grew much more rapidly between 1980 and 2011 than did those that were high wage in 1980. In the median metropolitan area of the 114 areas, high-wage industries had 7.0% job growth between 1980 and 2011, whereas low-wage industries expanded much more rapidly (26.3% job growth). The results are similar though not quite as dramatic if high- and low-wage industries are defined as of 2011; using this alternative definition, the median metropolitan area high-wage industries had 10.3% job growth between 1980 and 2011, whereas low-wage industries experienced job growth of 35.5%.

With the industrial composition of the 114 metropolitan areas shifting toward low-wage industries, it is not surprising that the median metropolitan area's 2011 real earnings per job was 2.4% lower than it would have been if its industry composition had not changed since 1980.[8] In contrast, the average earnings in the United States as a whole was 2.7% lower than it would have been if it had maintained its 1980 industry composition. Therefore, the industry shifts that occurred between 1980 and 2011 had a less severe impact on the 114 metropolitan areas than on the nation as a whole. Indeed, the changes in industry composition that occurred nationwide, not those that were idiosyncratic to the 114 metropolitan areas, were primarily responsible for lowering earnings in those 114 areas. Among the 114 areas, the median metropolitan area's earnings per job in 2011 was only 4.5% lower than if all the industries in all 114 metropolitan areas had experienced job growth at their respective national rates. Thus, the nationwide industry shifts that lowered the U.S. average earnings by 28.9% had a much more severe impact on earnings in most of our 114 metropolitan areas.

Industry shifts that were unfavorable to earnings growth occurred in nearly all the 114 metropolitan areas. Low-wage industries had more rapid job growth than did high-wage industries between 1980 and 2011 in all but 27 metropolitan areas, 20 of which were in the south. In all but 14 metropolitan areas, again mainly in the south, the 2011 average earnings were lower than they would have been if metropolitan industry composition had remained unchanged since 1980. Industry shifts thus accounted for the greatest percentage declines in average earnings in the west, the midwest, and the northeast, and for the smallest percentage declines in the south.

These findings do not necessarily mean that manufacturing job losses caused earnings declines. The research literature on the causal impact of manufacturing job losses on earnings shows that workers displaced from manufacturing jobs suffer substantial earnings losses (e.g., Kletzer, 2000).

However, this literature does not consider the impacts of metropolitan-level manufacturing job loss of metropolitan-level earnings.

5. Manufacturing employment no longer plays an important role in deindustrialized metropolitan economies.

Contrary to popular views that manufacturing uniformly declined from the 1980s through the early 2000s and no longer matters in the United States, many manufacturing industries continued to grow, even in areas of overall manufacturing decline. Of the 114 metropolitan areas, all but 7 (Bridgeport, CT; Cincinnati, OH-KY-IN; Hartford-West, CT; Los Angeles, CA; Poughkeepsie, NY; Springfield, MA; Weirton-Steubenville, WV-OH) gained manufacturing jobs in at least one NAICS three-digit industry. Some metropolitan areas gained jobs even in such beleaguered industries as apparel manufacturing, fabricated metal product manufacturing, furniture and related product manufacturing, machinery manufacturing, primary metal manufacturing, textile mills, textile product mills, and transportation equipment manufacturing. Although losses of generally low-wage nondurable manufacturing jobs occurred in southern deindustrialized metropolitan areas—the historic home of textile manufacturing—there were nonetheless gains in nondurable manufacturing in parts of the midwest, whereas losses of generally high-wage durable manufacturing jobs in the midwest—the historic home of the auto industry and its suppliers—were accompanied by gains in some southern metropolitan areas (Klier & Rubenstein, 2008).[9]

Even Great Lakes metropolitan areas hit hard by recent job losses in auto and auto parts manufacturing gained manufacturing jobs in some industries, although those gains were not comparable in employment size or earnings to the lost auto jobs. For example, Cleveland gained jobs in wood products. Detroit gained jobs in furniture and related products, textile mills, and plastics and rubber products. Indeed, there were job gains in at least one of the 21 NAICS three-digit manufacturing industries in all but 7 of the 114 metropolitan areas. In more than half of the areas (66), there were job gains in four or more of the industries, and in 17 of the areas there were gains in at least eight of the industries.

Manufacturing remains an important part of the economic base of many metropolitan areas. Notwithstanding large manufacturing job losses nationwide, a substantial minority of all metropolitan areas in the country continue to have an important presence in manufacturing. In 1980, the national share of employment in manufacturing was 18.7%. By 2011, that share had fallen to 8.2%. However, nearly half (52) of the 114 metropolitan areas had more than 18.7% of their employees in the manufacturing sector in 2011, an amount exceeding the national share in 1980. Similarly, Helper, Krueger, and Wial (2012) found that manufacturing's share of total metropolitan employment exceeded its share of total national employment by at least 5% in nearly half of all U.S. metropolitan areas in 2010.

6. It is unwise or impossible to foster manufacturing jobs as part of a metropolitan economic development strategy. Services, especially advanced services, are the key to metropolitan economic health.

All 114 metropolitan areas included in our study of deindustrialized metropolitan areas gained nonmanufacturing jobs between 1980 and 2011, even as they lost manufacturing jobs. In all but 15 metropolitan areas (Anderson, IN; Binghamton, NY; Danville, IL; Danville, VA; Decatur, IL; Flint, MI; Johnstown, PA; Kokomo, IN; Mansfield, OH; Muncie, IN; Niles-Benton Harbor, MI; Saginaw- Township, MI; Springfield, OH; Weirton-Steubenville, WV-OH; and Youngstown-Warren-Boardman, OH-PA), the number of nonmanufacturing jobs gained exceeded the number of manufacturing jobs lost (i.e., total employment rose). Twelve of the 15 metropolitan areas where nonmanufacturing jobs gained did not exceed manufacturing losses were at least partly in the midwest. This long-term growth of nonmanufacturing jobs and long-term decline of manufacturing jobs has contributed to the view that the only reasonable economic development strategy is the attraction and growth of nonmanufacturing jobs, especially those in advanced services (i.e., financial activities, information, and professional and business services) and in "eds and meds," and that the retention or expansion of manufacturing jobs is either undesirable or impossible (Reich, 2009).

The data, however, suggest that the retention of manufacturing jobs and the growth of nonmanufacturing jobs are complementary rather than competitive processes. Metropolitan areas that lost smaller percentages of their manufacturing job base also had more rapid growth of nonmanufacturing jobs. The one third of our 114 metropolitan areas that had the smallest percentage losses of manufacturing jobs (with a median manufacturing job loss of 38%) had more than a 41% median gain in nonmanufacturing jobs and a greater than 37% median gain in advanced service employment.[10] In contrast, the one third of the metropolitan areas that had the greatest percentage losses of manufacturing jobs (with a median loss of 61%) had a median nonmanufacturing job gain of just under 27% and a median advanced service job gain of slightly more than 40% (see Table 4).

There are several possible reasons for the positive relationship between job changes in manufacturing and nonmanufacturing industries, each of which has a different implication for economic development policy. Because most nonmanufacturing jobs are in businesses that serve local residents (such as dentist offices, local restaurants, grocery stores, and hardware stores), whereas nearly all manufacturing jobs are in firms that make products for export to other

Table 4. Median Percentage Job Change by Industry by Decentralized Metropolitan Areas With Most and Least Manufacturing Job Loss.

Industry	Top third % manufacturing loss deindustrialized areas	Bottom third % manufacturing loss deindustrialized areas	Difference top and bottom thirds
Manufacturing	−61	−38	23
Nonmanufacturing	27	41	−14
Advanced services	40	37	3

Source. Authors' estimates based on 1980–2011 data obtained from Moody's Analytics.

regions, many of the former jobs depend for their existence on the latter ones. This is still the case, albeit to a lesser extent, for advanced service jobs; although some advanced services jobs (e.g., those in major law firms, corporate headquarters, and Internet services) provide services to residents and businesses in other regions, advanced services as a whole are, in most places, still more locally oriented than manufacturing.

Metropolitan areas that lose a large share of their manufacturing jobs would, therefore, be expected to have lower rates of nonmanufacturing and advanced service job creation than those that lose a smaller share of their manufacturing base. This line of reasoning implies that manufacturing jobs spur the growth of nonmanufacturing jobs, including most of those in advanced services. In that case, economic development policy makers should try to retain and foster manufacturing jobs (to the extent that it is possible to do so) even if their main interest is in nonmanufacturing jobs. In most cases, the connection between manufacturing and advanced services is true for "eds and meds" as well; gains in employment in these sectors are likely to reflect changes in local income derived from manufacturing as the major export sector, although changes in area demographics and preferences may also play a role in increasing local demand for these services. It is only when these nonmanufacturing industries serve as export sectors attracting "customers" from outside of the region that they will fuel regional economic growth by increasing the demand for locally produced goods and services (Bartik & Erickcek, 2007). Examples are a university within the region that brings in substantial students or research funding from outside of the region, or a hospital or health clinic that attracts patients or research funding from outside of the region. Nonmanufacturing job growth, especially in advanced services, could also depend on the presence of manufacturing because of outsourcing by manufacturers to temporary help services, which are part of the broad industry category that we term "advanced services." Manufacturers use many workers supplied by temporary help services to perform the same kinds of production work that their own employees perform, and their use of these workers grew during the late 20th century (Dey, Houseman, & Polivka, 2006). Manufacturers may do this to reduce wage costs and/or screen new workers before putting them on their own payrolls. If manufacturers' ability to use temporary help services helps them expand their production in a metropolitan area, then metropolitan areas with less severe losses of manufacturing jobs would be expected to have more outsourced temporary workers, boosting, albeit somewhat misleadingly, nonmanufacturing and advanced services employment.

Another possible reason why smaller manufacturing job losses are associated with greater nonmanufacturing job growth is that the presence of some nonmanufacturing jobs, especially in advanced services, could make a metropolitan area more attractive to manufacturers. For example, manufacturers may want to locate some of their production, especially production of new products or of those that use new technologies, near their research and development facilities or near engineering firms or other business service providers. If this is the case, then the growth of nonmanufacturing jobs, including those in advanced services, helps a metropolitan area retain manufacturing jobs. In that case, economic development policy makers should emphasize nonmanufacturing jobs, especially in the advanced services, even if their main concern is with manufacturing jobs.

Yet another possibility is that metropolitan regional characteristics, such as a skilled labor force or good access to interstate highways, promote both the growth of nonmanufacturing jobs and the retention of manufacturing. If this is the case, then there is no direct relationship between manufacturing and nonmanufacturing jobs, and economic development policy makers, who are interested in retaining the former or growing the latter, should focus their attention on the growth-enhancing regional characteristics rather than on manufacturing or nonmanufacturing jobs, per se (Glaeser & Saiz, 2004; Glaeser et al., 1995; Gottlieb & Fogarty, 2003; Simon, 1998).[11]

The above discussion suggests that an economic development strategy for deindustrialized metropolitan areas does not require a choice between manufacturing and advanced services jobs. Jobs in these two industries are likely to be complementary; the most likely relationship is that advanced services jobs are to some extent dependent upon the presence of jobs in manufacturing.

Conclusion

We have examined six common assertions about manufacturing job loss in deindustrialized metropolitan areas and its effects and have found that some are strongly supported by the evidence, while others are supported less so or not at all.

With respect to the six propositions with which we began the study:

1. *The economies of metropolitan areas that had been dominated by manufacturing employment were not resilient in the face of manufacturing decline; they were doomed to inevitable economic hardship.*

We found that this was not the case: A region's job loss in manufacturing did not inevitably doom it to overall economic hardship. A substantial minority of the 114 metropolitan areas were resilient in that their overall economy exceeded expected performance in either or both employment and earnings. These metropolitan areas were resilient in the sense that, given their industrial structure as of 1980, their performance at least equaled that of the nation as a whole in either their employment growth rate or their earnings growth rate or both.

2. *Deindustrialized metropolitan areas have stagnated economically because they were too dependent on slow-growing industries.*

It is true that most of the 114 metropolitan areas underperformed partly because their economic portfolio was concentrated disproportionately in slow-growing industries at the national level. Their underperformance, however, was due even more to the fact that, given their industrial structure, their industries performed less well than those industries did nationally. This was true even in automobile-dominated metropolitan areas in the Great Lakes region, where job growth in the major export industries in these areas was substantially slower than job growth in the same industries nationwide.

3. *Deindustrialized metropolitan areas with diversified economies are fundamentally healthier and are likely to grow faster than those with more concentrated economies.*

This is a common assertion, but one for which research findings have been ambiguous. We found those manufacturing economies that were more diversified in 1980 did not experience faster employment growth but did experience more rapid earnings growth than those that were less diversified. Metropolitan areas whose economic portfolios became more diverse from 1980–2011 did not have faster job or earnings growth than those metropolitan areas whose portfolios became less diverse. However, although most of these findings do not lend support to the "diversification matters" argument, they are not determinative because they were not tested in a multivariate framework that controlled for other possible effects.

4. *The loss of manufacturing jobs combined with the changing composition of manufacturing jobs toward lower-wage manufacturing industries has resulted in lower earnings for the average worker in deindustrialized metropolitan areas.*

We found this assertion to be largely true. Between 1980 and 2011, jobs in low-wage industries grew much more rapidly than did jobs in high-wage industries in the 114 areas; however, the same dynamic occurred within the U.S. economy as a whole. The decline in earnings per job in the 114 areas was only slightly greater than it otherwise would have been had all of its industries grown at the same rate as the industries did nationally.

5. *Manufacturing employment no longer plays an important long-term role in deindustrialized metropolitan economies.*
6. *It is unwise or impossible to foster manufacturing jobs as part of a metropolitan economic development strategy. Services, especially advanced services, are the key to metropolitan economic health.*

Because 5 and 6 are so closely intertwined, we consider them together. Our analysis indicates this assertion reflects a serious misinterpretation of the dynamics of manufacturing and its role in the American economy. First, as we show, while the number of manufacturing jobs as a whole was indeed declining during the period covered by our analysis, the number of manufacturing jobs did not decline uniformly in every area or in all industries. Indeed, in virtually all of the 114 deindustrialized areas, there were some manufacturing industries that experienced growth even as manufacturing jobs as a whole declined. The argument that advanced services are replacing manufacturing jobs misconstrues the relationship between manufacturing and advanced services. We believe that these two sectors are complementary rather than competitive and that most jobs in advanced services exist in an area primarily to serve manufacturing. With the exception of those regions that are home to large universities or health facilities that serve clients throughout the state or nation, attempting to build a regional economy through focusing on advanced services, health care, or higher education jobs in the absence of manufacturing is an unlikely path to success.

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Notes

1. It is widely acknowledged as conventional wisdom that manufacturing is dead (Clark & Clavel, 2012; Fisman, 2012; Hegelson, 2011; Levett & Dwyer, 1994; Perry, 2011; Stewart, 2010; Ward & Dadayan, 2010).
2. For an extended argument about and evidence for the importance of advanced services to metropolitan economic growth, see Drennan (2002).
3. 1980 dollars are inflation-adjusted to 2011 dollars using the Bureau of Labor Statistics (BLS) Consumer Price Index (CPI-U-RS).
4. While shift/share analysis is a well-known and frequently utilized technique for analyzing regional economic change, it does suffer from problems related to the level of aggregation that is used. For example, employment in the two-digit NAICS manufacturing sector consists of all employment in manufacturing. But if a region's manufacturing portfolio in terms of what it produces (i.e., manufacturing at the three, four, or even greater level of disaggregation) is disproportionate in slow-growing sectors, conclusions drawn about a negative competitive shift from decomposing its two-digit manufacturing employment may be wrong. As a simple test, suggested by one of the reviewers, we compared our decomposition results from two-digit NAICS manufacturing to those of using the three-digit NAICS. We found no substantive differences between the two- and three-digit analysis.
5. For reviews of these, see, for example, Glaeser et al. (1992); Malpezzi (2001); Weissbourd and Berry (2004); Glaser and Saiz (2004); and Blumenthal, Wolman, and Hill (2009).
6. The Herfindahl index equals the sum of the squares of the employment shares of the metropolitan area's industries. The index has a maximum value of 1 and a minimum value that approaches 0 as the number of industries increases, with 1 indicating that all of the metropolitan area's employment is in one industry and that the minimum value indicating that employment is equally distributed among all industries. Thus, lower values of the index indicate more industrial diversity. We conduct all analysis at the NAICS three-digit level as modified in the Moody's Analytics data; our period of analysis is 1980–2011.
7. The literature in that debate includes Glaeser (1992); Harrison, Kelley, and Gant (1996); Henderson (2003); and Henderson, Kuncoro, and Turner (1995).
8. The median metropolitan area for this statistic is an average of the values for Cincinnati and San Jose. The extremes are found in Flint, where the average wage was 25.9% lower than if than if industrial composition had remained unchanged since 1980, and Bridgeport, where it was 9.1% higher. Changes in the relative wages of different industries also contributed to the change in a metropolitan area's average wage, but the finding reported in the text does not take this into account. In general, industries that paid above-average (below-average) wages in 1980 also paid above-average (below-average) wages in 2011. However, average wages in 9 of the 90 three-digit NAICS industries (mining, specialty trade contractors, food manufacturing, beverage and tobacco product manufacturing, plastics and rubber products manufacturing, electronics and appliance stores, couriers and messengers, warehousing and storage, and private household services) were above the nationwide average in 1980 but below it in 2011, whereas average wages in six industries (monetary authorities, credit intermediation, real estate, lessors of nonfinancial intangible assets, hospitals, and performing arts/spectator sports/related industries) were below the nationwide average in 1980 but above it in 2011.
9. Klier and Rubenstein (2008) have documented the movement of auto plants from the central Great Lakes region to the adjoining areas of the south.
10. Advanced services are defined as the two-digit NAICS codes for (1) financial activities (NAICS 51), (2) information (NAICS 52-53), and (3) professional and business services (NAICS 54).
11. The contemporary literature emphasizes the importance of metropolitan regional characteristics, especially an educated or skilled workforce, as more important than the presence of any particular industry in promoting metropolitan economic growth. See, that is, Glaeser and Saiz (2004); Glaeser, Scheinkman, and Shleifer (1995); Gottlieb and Fogarty (2003); and Simon (1998).

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