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The Consequences of Metropolitan Manufacturing Decline:
Testing Conventional Wisdom

Alec Friedhoff, Howard Wial, and Harold Wolman[1]

"What replaces lost manufacturing jobs in industrial-oriented metropolitan areas has important implications for economic development."

An analysis of employment and wage data for 114 metropolitan areas that specialized in manufacturing in 1980 and lost manufacturing jobs from 1980 to 2005 finds that:

- **Two-thirds (76) of the 114 metropolitan areas, mostly in the Midwest, performed worse than the nation as a whole in both job growth and average wage growth from 1980–2005.** Only three (Charlotte, Manchester, and Portland, ME) performed better than the national average on both. In general, metropolitan areas in the Northeast had slow job growth but relatively rapid wage growth, those in the South had rapid job growth but slow wage growth, and those in the Midwest had slow growth of both jobs and wages.
- **The metropolitan areas that lost the fewest manufacturing jobs gained the most non-manufacturing and advanced service jobs.** Regardless of whether there is a cause-and-effect relationship between manufacturing and non-manufacturing jobs, the two are complementary rather than competitive.
- **Between 1980 and 2005, the 114 metropolitan areas typically had faster growth in transportation and warehousing and slower growth in advanced services, tourism, and government than the nation as a whole.** The shift of employment toward transportation and warehousing accords with popular perceptions of employment change in these metropolitan areas, although it is uncertain whether that shift contributed to job or wage growth.
- **Of the 114 metropolitan areas, the typical region's 1980–2005 job growth rate was 12.8 percentage points lower than it would have been if all its industries had grown at their respective national rates.** The sluggish job growth in many of the 114 metropolitan areas, including those that specialized in autos and auto parts, was due more to slow job growth within the areas' existing industries than to their specialization in industries that grew slowly throughout the nation.
- **Of the 114 metropolitan areas, the typical region's 2005 average wage was 6.1 percent lower than it would have been if its industry composition had not changed since 1980.** In the typical metropolitan area, employment in low-wage industries grew by 42.5 percent from 1980–2005, while employment in high-wage industries increased by only 11.7 percent. Because of changes in the industrial composition of employment, including the loss of manufacturing jobs, wages in most of the 114 metropolitan areas were lower than they would otherwise have been, but these wage-lowering industry shifts were similar to those that occurred nationwide.
- **The inflation-adjusted average wage grew by 16.9 percent between 1980 and 2005 in the 38 metropolitan areas that were most industrially diverse in 1980 but by only 9.5 percent in the 38 that were least industrially diverse.** However, there was no difference in job growth between the most and least industrially diverse metropolitan areas.

The findings hold implications for economic development policy in deindustrialized metropolitan areas. By allowing us to examine and analyze common conceptions of American manufacturing, the findings reveal a solid baseline for economic development policymakers.

Introduction

Between 1980 and 2009 the United States lost 7.1 million manufacturing jobs, about 38 percent of its manufacturing base.[2] It lost most (two-thirds) of these jobs between 1980 and 2005, prior to the Great Recession. More than 61 percent of these lost jobs were in 114 industrial metropolitan areas—metropolitan areas that strongly specialized in manufacturing in 1980. This report examines the ways in which the industrial composition of those areas changed during the 1980–2005 period and the consequences that those changes have had for wage and employment levels in those areas.

Although scholars, policymakers, and journalists have extensively analyzed and debated the causes of deindustrialization and its consequences for displaced workers, they have paid much less attention to the kinds of jobs that have replaced lost manufacturing jobs and to the consequences that industrial shifts have had for metropolitan areas. As a result, assertions about these phenomena have abounded. Some of these have been supported with evidence while others have been backed up only with theory or have simply been asserted without support. In this report we examine the following seven widely held beliefs—what we term the "conventional wisdom"—and assess the extent to which they are supported by our factual analysis.

1. Southern and Western metropolitan economies have grown while those in the Northeast and Midwest have stagnated.[3]
2. Services, especially advanced services, are the key to metropolitan economic development. Growing a knowledge-based, advanced service economy is a better economic development strategy than attempting to retain or replace manufacturing jobs.[4]
3. Manufacturing employment no longer plays an important long-term role in metropolitan economies, and it is unwise or impossible to foster manufacturing jobs as part of a metropolitan economic development strategy.[5]
4. The growth of logistics, warehousing, and distribution activities has helped turn around the economies of many deindustrialized metropolitan areas.[6]
5. Deindustrialized metropolitan areas in the Midwest have stagnated economically because they were too dependent on slow-growing industries, especially the auto industry.[7]
6. The loss of manufacturing jobs lowered wages in deindustrialized areas.[8]
7. Metropolitan areas with diversified economies are fundamentally healthier and likely to grow faster than those with more concentrated economies.[9]

This report examines the facts about these and other commonly held beliefs about the economic evolution of industrial metropolitan areas that deindustrialized between the 1980s and early 2000s. We return to these commonly held beliefs in our concluding section and evaluate their validity in light of these facts. We find that some popular beliefs are true while others are false. The findings will help state and local economic development policymakers craft policies and strategies that are based on facts rather than myths.

Methodology

This report covers the 114 metropolitan areas that satisfy two criteria.[10] First, each metropolitan area had a strong specialization in manufacturing in 1980, as evidenced by manufacturing making up at least 20.1 percent of its total 1980 employment. This 20.1 percent share was 5 percent greater than the 19.1 percent of total national employment that was in manufacturing in 1980.[11] Second, each metropolitan area lost manufacturing jobs between 1980 and 2005, both in absolute number and as a percentage of total metropolitan employment. (Among metropolitan areas that satisfy the first criterion, the ones that lost manufacturing jobs in absolute number from 1980–2005 were identical to the ones in which manufacturing's share of total employment fell during that time period.) Nearly all these metropolitan areas are located in the Great Lakes region, New England, or the Southeast; 30 are in the Northeast, 47 are in the Midwest, 34 are in the South, and 3 are in the West. The tables in Appendix A provide detailed employment and wage data for all 114 metropolitan areas.

The report describes changes in employment and wages in these 114 metropolitan areas that occurred between 1980 and 2005. We focus on a 25-year period to capture long-term, structural changes in metropolitan economies rather than changes that may result from business cycles or other short-term influences. However, by choosing only the single 1980–2005 period for our analyses we are unable to say anything about structural economic changes that may have occurred during or after that period. We begin the analysis in 1980 because the 1980s were the first decade in which the nation as a whole lost manufacturing jobs.[12] Nationwide, the number of manufacturing jobs continued to decline through the 1990s, although at a lower rate than in the 1980s, and then plummeted after 2000.[13] We conclude our analysis in 2005, before the peak of the nationwide housing bubble and the subsequent Great Recession, both of which were large enough that they could potentially have affected our results.

In addition to presenting results for the entire group of 114 metropolitan areas, we break our findings down by broad region of the country (Northeast, Midwest, South, and West) to show important differences in growth patterns on those dimensions. We use the median metropolitan area in each category (i.e., the metropolitan area whose employment or wage growth rate is in the middle of the growth rates of those in its category) to represent that category. The median represents the experience of the typical metropolitan area more accurately than the weighted or unweighted average.[14]

Appendix B provides additional details about the report's methodology.

Findings

A. Two-thirds (76) of the 114 metropolitan areas, mostly in the Midwest, performed worse than the nation as a whole in both job growth and average wage growth from 1980–2005.

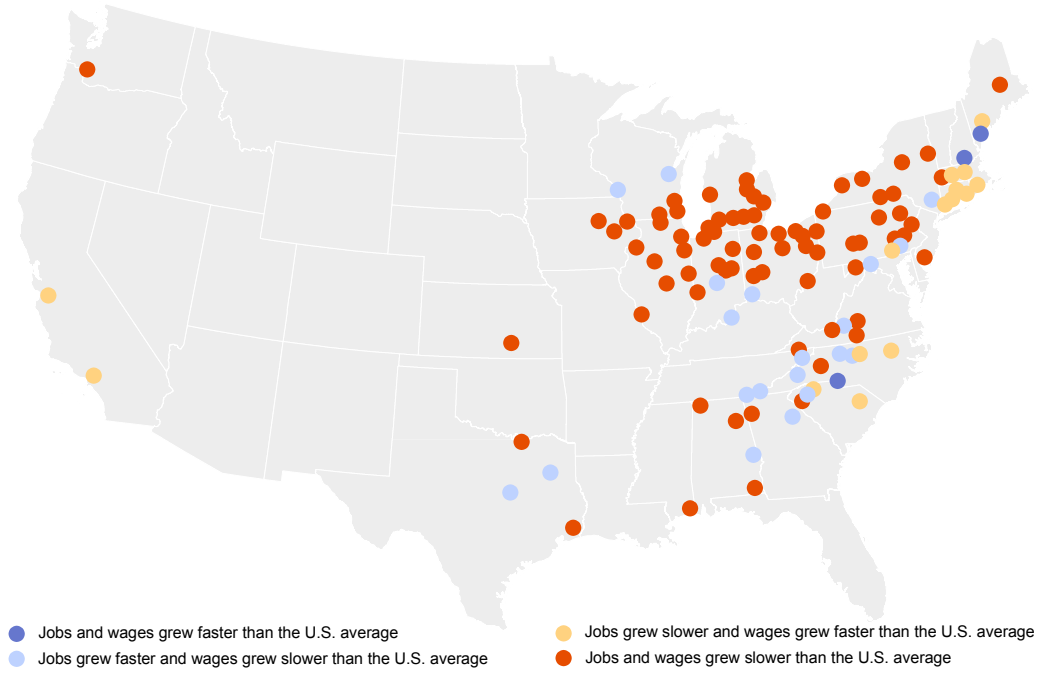
It was difficult for industrial metropolitan areas to recover from long-term manufacturing job loss. Between 1980 and 2005, 76 of the 114 metropolitan areas experienced both job and wage growth below the national average rates. They had median job growth of 19.3 percent (versus 42.6 percent nationwide) and median inflation-adjusted average wage growth of 5.4 percent (versus 28.4 percent nationwide). Only three of the metropolitan areas, Charlotte, Manchester, and Portland (ME), performed better than the national average on both job growth and wage growth.

The regional patterns of job and wage growth accord with popular perceptions of the Midwest as a region whose industrial metropolitan areas had slow growth of both wages and employment. Figure 1 shows that 43 of the 47 Midwestern metropolitan areas included in this report had job and wage growth below the national average rates from 1980–2005. Median job growth in the 47 Midwestern metropolitan areas was 18.4 percent while median inflation-adjusted average wage growth was 4.5 percent. Only four of the 47 areas had job growth in excess of the national average rate, while none had wage growth that exceeded the national average rate.

Compared with other regions of the country, the Southern metropolitan areas included in this report had rapid job growth (median of 39.7 percent), supporting the idea that Southern metropolitan areas were typically fast growing. Nevertheless, more than half (19) of the 34 Southern metropolitan areas in this report had job growth below the national average. Wage growth was typically slow in the South, with only five of the Southern metropolitan areas experiencing inflation-adjusted wage growth above the national rate. (The median inflation-adjusted wage growth rate for the Southern areas was 15.6 percent.)

Metropolitan areas in the Northeast experienced relatively rapid wage growth but slow job growth. Median inflation-adjusted average wage growth for the 30 Northeastern metropolitan areas included in this report was 21.0 percent, which was greater than the typical Midwestern and Southern growth rate, though was still well below the national average. Only 11 of the 30 Northeastern metropolitan areas had wage growth above the national rate. Median job growth stood at 19.1 percent for the Northeastern metropolitan areas, just higher than the median Midwestern rate but below the national average. Only four Northeastern metropolitan areas had job growth above the national average rate.

Figure 1. Job and Inflation-Adjusted Average Wage Growth, 1980–2005, Relative to the U.S. Average, in Industrial Metropolitan Areas that Lost Manufacturing Jobs



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980–2005.

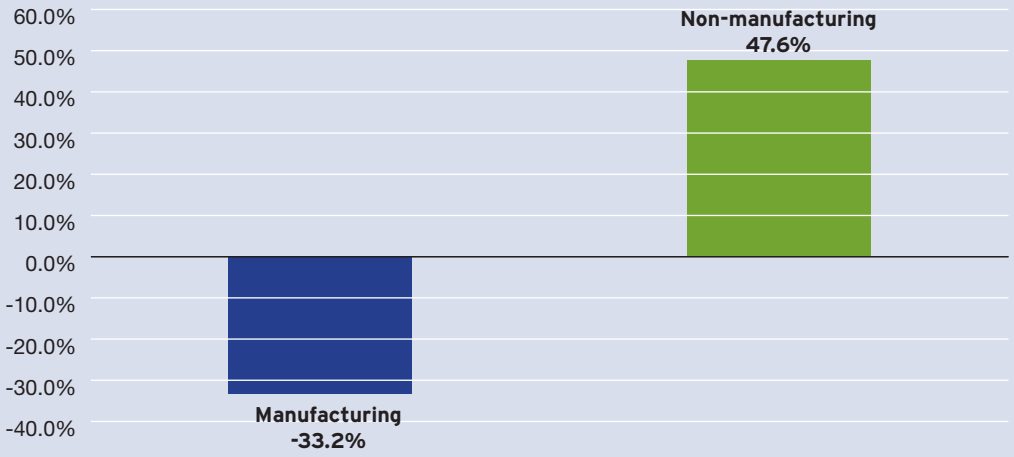
Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

B. The metropolitan areas that lost the fewest manufacturing jobs gained the most non-manufacturing and advanced service jobs.

All 114 metropolitan areas included in this report gained non-manufacturing jobs between 1980 and 2005, even as they lost manufacturing jobs. (Figure 2 shows the median percent changes in manufacturing and non-manufacturing jobs.) In all but seven metropolitan areas (Anderson, IN; Danville, IL; Decatur, IL; Flint, MI; Johnstown, PA; Weirton, WV; and Youngstown, OH) the number of non-manufacturing jobs gained exceeded the number of manufacturing jobs lost (i.e., total employment rose). The long-term growth of non-manufacturing jobs and long-term decline of manufacturing jobs has led some to view the attraction and growth of non-manufacturing jobs, especially those in advanced services (i.e., financial activities, information, and professional and business services), as desirable for economic development and the retention of manufacturing jobs as undesirable or impossible.[15]

However, the data show that the retention of manufacturing jobs and the growth of non-manufacturing jobs are complementary rather than competitive processes. Metropolitan areas that lost smaller percentages of their manufacturing job base also had more rapid growth of non-manufacturing jobs.[16] The one-third of our 114 metropolitan areas that had the smallest percentage losses of manufacturing jobs (with a median manufacturing job loss of 20 percent) had more than a 60 percent median gain in non-manufacturing jobs and a greater than 110 percent median gain in advanced service employment. In contrast, the one-third of the metropolitan areas that had the greatest percentage losses of manufacturing jobs (with a median loss of nearly 50 percent) had a median non-manufacturing job gain of just under 35 percent and a median advanced service job gain of slightly more than 60 percent (Figure 3).

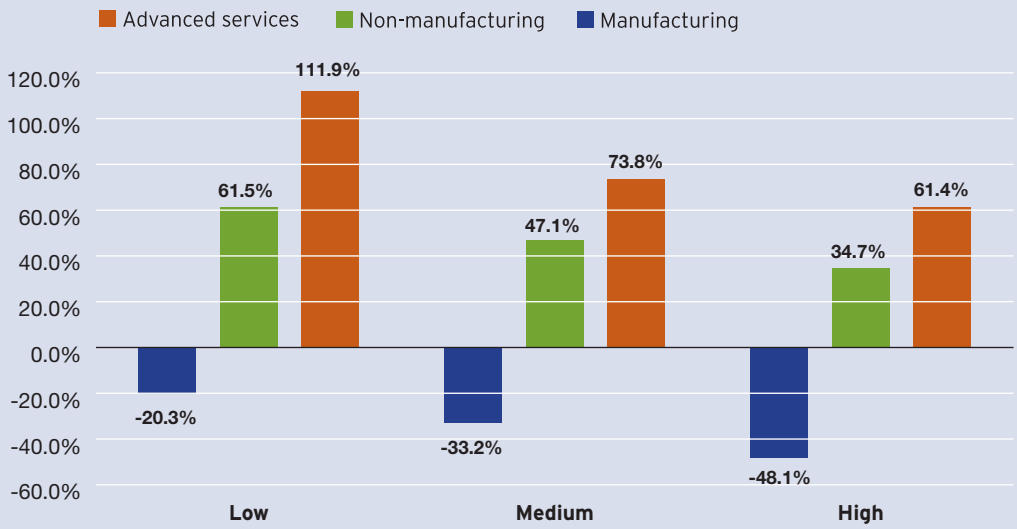
Figure 2. Median Manufacturing Job Loss and Non-Manufacturing Job Gain in Industrial Metropolitan Areas that Lost Manufacturing Jobs, 1980–2005



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

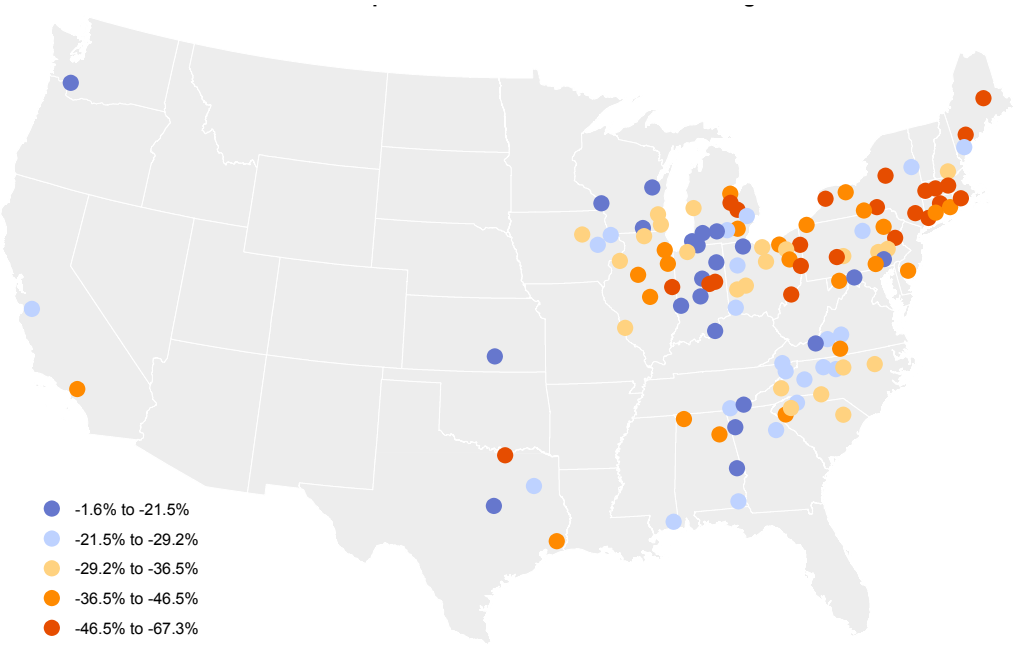
Figure 3. Median Percent Change in Manufacturing, Non-Manufacturing, and Advanced Service Jobs, 1980–2005, by Extent of Manufacturing Job Loss, in Industrial Metropolitan Areas that Lost Manufacturing Jobs



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005. Advanced service jobs include jobs in financial activities, information, and professional and business services.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

Figure 4. Manufacturing Job Loss, 1980–2005, in Industrial Metropolitan Areas that Lost Manufacturing Jobs



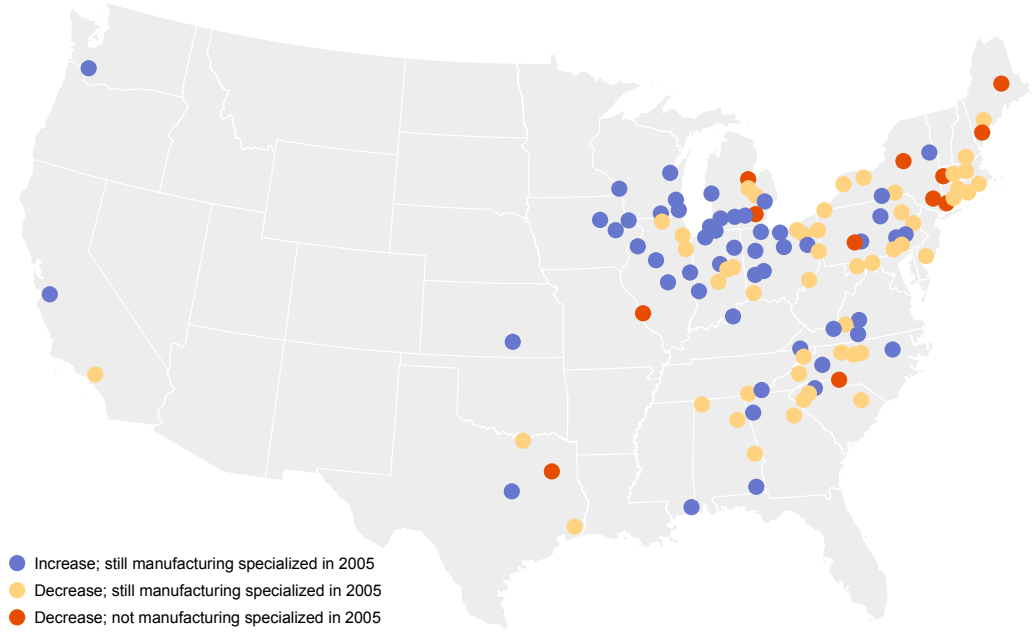
Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980–2005.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

There are several possible reasons for the positive relationship between job changes in manufacturing and non-manufacturing industries, each of which has a different implication for economic development policy. Because most non-manufacturing jobs are in businesses that serve local residents (such as dentists' offices, local restaurants, and hardware stores) while nearly all manufacturing jobs are in firms that make products for export to other regions, many of the former jobs depend for their existence on the latter ones. This is still the case, although to a lesser extent, for advanced service jobs; although some advanced service 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 non-manufacturing 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 non-manufacturing jobs, including those in advanced services. In that case, economic development policymakers 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 non-manufacturing jobs.

Non-manufacturing 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.[17] Manufacturers may do this to reduce wage costs and/or to 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 non-manufacturing and advanced service employment.

Figure 5. Change in Manufacturing's Share of Employment Relative to Its Share of U.S. Employment, 1980–2005, in Industrial Metropolitan Areas that Lost Manufacturing Jobs



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980–2005.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

Another possible reason why smaller manufacturing job losses are associated with greater non-manufacturing job growth is that the presence of some non-manufacturing 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 non-manufacturing jobs, including those in advanced services, helps a metropolitan area retain manufacturing jobs. In that case, economic development policymakers should emphasize non-manufacturing jobs 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 non-manufacturing jobs and the retention of manufacturing.[18] If this is the case, then there is no direct relationship between manufacturing and non-manufacturing jobs and economic development policymakers 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 non-manufacturing jobs per se.

Manufacturing job losses by region. Although the auto- and auto parts-producing metropolitan areas of the central Great Lakes region, especially large ones such as Detroit and Cleveland, have been the focus of recent public policy concern because of their huge losses of auto and auto parts jobs over the last decade, these auto-dependent metropolitan areas were mostly not the ones that experienced the most severe manufacturing job losses over the entire 1980–2005 period. In fact, the metropolitan areas that lost the largest percentages of their manufacturing jobs during that period were mainly smaller metropolitan areas and were mainly located in the Northeast. The metropolitan areas that lost the smallest percentages of their manufacturing jobs were also mainly smaller metropolitan areas and were located predominantly in the South, Indiana, Wisconsin, and western Michigan (Figure 4).

How manufacturing specializations have changed as a result of manufacturing job loss. Manufacturing's share of total employment fell between 1980 and 2005 in all 114 metropolitan areas included in this report, but that does not mean that all those metropolitan areas became less specialized in manufacturing. The extent to which a metropolitan area is specialized in manufacturing depends on the relationship between manufacturing's share of the metropolitan area's employment and its share of nationwide employment. Manufacturing's share of nationwide employment fell from 19.1 percent in 1980 to 10.2 percent in 2005, but its share of metropolitan employment did not fall proportionally in all of our 114 metropolitan areas. Only metropolitan areas in which manufacturing's share of employment fell relative to its share of nationwide employment became less specialized in manufacturing during the 1980–2005 period. In some metropolitan areas manufacturing job loss was so severe that those areas no longer strongly specialized in manufacturing in 2005 (using our criterion of manufacturing making up at least 5 percent more of metropolitan employment than of nationwide employment). On the other hand, metropolitan areas in which manufacturing's share of employment rose relative to its share of nationwide employment actually became more specialized in manufacturing (and, hence, more dependent on manufacturing relative to other regions) even as the share of its jobs that were in manufacturing fell.

Figure 5 shows that 62 of the 114 metropolitan areas, mostly in the Northeast and South, became less specialized in manufacturing between 1980 and 2005. Twelve of these metropolitan areas (Ann Arbor, Bangor, Bay City, Bridgeport, Charlotte, Johnstown, Pittsfield, Portland (ME), Poughkeepsie, St. Louis, Tyler, and Utica) were no longer strongly specialized in manufacturing in 2005; seven of those 12 were in the Northeast, However, 52 metropolitan areas, overwhelmingly in the Midwest, became more specialized in manufacturing even as they deindustrialized. The latter include such large metropolitan areas as Detroit, Louisville, and Milwaukee.

C. Between 1980 and 2005, the 114 metropolitan areas typically had faster growth in transportation and warehousing and slower growth in advanced services, tourism, and government than the nation as a whole.

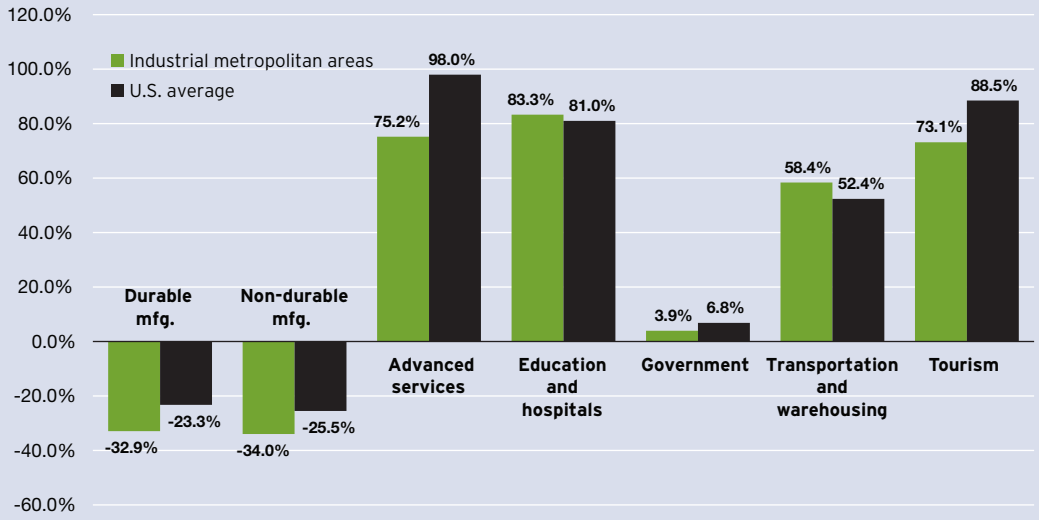
The median metropolitan area among the 114 included in this report gained jobs in advanced services, education and hospitals, transportation and warehousing, government, and tourism and lost jobs in both durable and nondurable manufacturing from 1980–2005, just as the entire United States did. However, its job growth rates were much slower than those of the nation as a whole in advanced services, tourism, and government and much more rapid in transportation and warehousing. It gained jobs in education and hospitals at a rate similar to that of the entire nation and lost jobs in durable and nondurable manufacturing at rates above the national average (Figure 6).

There were important regional differences in the growth and decline of important industry groups (Figure 7). Metropolitan areas in the South diverged the most from the general pattern that the 114 metropolitan areas exhibited. In percentage terms, Southern metropolitan areas lost jobs in durable manufacturing more slowly than the nation as a whole and gained jobs more rapidly in advanced services, education and hospitals, government, and tourism. Metropolitan areas in the Midwest lost jobs more slowly in nondurable manufacturing (but lost them at about the same rate in durable manufacturing), lost government jobs, and, despite a few high-profile examples (Indianapolis and Cincinnati), gained transportation and warehousing jobs at a slower rate than the nation as a whole. Northeastern metropolitan areas lost government jobs and had steeper losses of both durable and nondurable manufacturing jobs than the entire United States.

Despite the overall losses of durable and nondurable manufacturing jobs in the 114 metropolitan areas, not all manufacturing industries lost jobs in all places. Employment typically grew in wood product manufacturing (5.0 percent gain in the median metropolitan area) and plastics and rubber products manufacturing (4.0 percent gain). Every NAICS three-digit manufacturing industry gained jobs in at least 10 of the 114 metropolitan areas.

Some metropolitan areas gained jobs even in such beleaguered industries as textile mills, textile product mills, apparel manufacturing, primary metal manufacturing, fabricated metal product manufacturing, machinery manufacturing, transportation equipment manufacturing, and furniture and related product manufacturing. In general, losses of generally low-wage nondurable manufacturing jobs in the South—the historic home of textile manufacturing—were accompanied by gains in parts

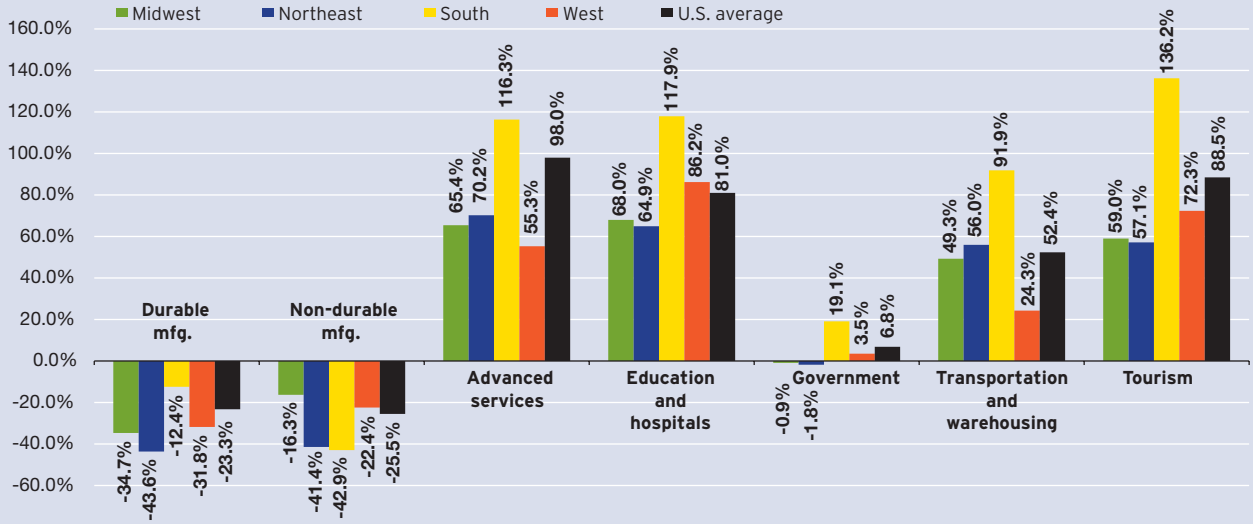
Figure 6. Median Percent Job Change in Selected Industry Groups in Industrial Metropolitan Areas That Lost Manufacturing Jobs and in the Entire United States, 1980-2005



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005. Advanced services include financial activities, information, and professional and business services. Education and hospitals includes the private sector only. Transportation and warehousing excludes transit and ground passenger transportation. Government includes federal and state government and military.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

Figure 7. Median Percent Job Change in Selected Industry Groups in Industrial Metropolitan Areas That Lost Manufacturing Jobs, by Region, 1980-2005



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Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

of the Midwest, while 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.[19]

Of the 114 metropolitan areas, all but one (Binghamton) gained manufacturing jobs in at least one NAICS three-digit industry. 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 wages to the lost auto jobs. For example, Cleveland gained jobs in wood product, paper, and plastics and rubber products manufacturing. Detroit gained jobs in apparel, leather and allied product, and plastics and rubber products manufacturing.

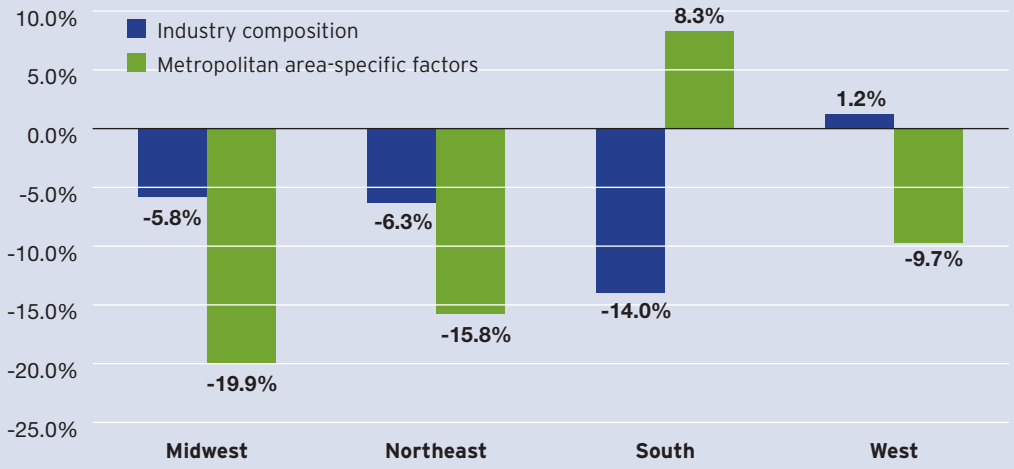
D. Of the 114 metropolitan areas, the typical region's 1980–2005 job growth rate was 12.8 percentage points lower than it would have been if all its industries had grown at their respective national rates.

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). If a metropolitan area's job growth is due primarily to the fact that its industries grew rapidly (or slowly) throughout the nation, then growth is mainly the result of its industrial mix, and economic development policymakers seeking to increase the employment base should focus on maintaining that mix if it is favorable or changing it if it is unfavorable. However, if job growth is due primarily to metropolitan area-specific factors, then policymakers who are concerned about job growth should focus more on those factors than on the area's industry composition.

The fact that nearly all of the 114 metropolitan areas actually gained jobs from 1980–2005 obscures the actual nature of their performance. Breaking each metropolitan area's 1980–2005 job growth down into nationwide job growth, growth due to the metropolitan area's industry mix, and growth due to metropolitan area-specific factors provides insight into metropolitan strengths and weaknesses that are not apparent from the area's overall job change.

- Only 23 of the 114 metropolitan areas experienced job growth greater than the national rate of 42.6 percent between 1980 and 2005. In the median metropolitan area, the job growth rate was 22.6 percent, 20.1 percentage points below the national rate.
- If all their industries had grown at their respective national rates, 94 of the 114 metropolitan areas would have had 1980–2005 job growth below the overall national rate of 42.6 percent. This indicates that those 94 metropolitan areas had their 1980 employment concentrated in industries that grew slowly throughout the nation. The median job growth that would have occurred in the 114 metropolitan areas if all their industries had grown at their respective national rates was 7.4 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 region, with the South losing the most employment as a result of its industrial composition (median of 14.0 percentage points below the national rate) and the West actually gaining employment (median of 1.2 percentage points above the national rate) as a result of its favorable composition (Figure 8).
- Despite the overall gain in employment, the 1980–2005 job growth rates of most (80) of the 114 metropolitan areas included in this report were lower than they would have been if all their industries had grown at their respective national rates. For the median metropolitan area the job growth rate was 12.8 percentage points lower.[20] This indicates that factors specific to the industries in each metropolitan area or to the area as a whole were largely responsible for the sluggish job growth that most of the metropolitan areas experienced. However, the situation varied by region. In the Midwest, the median metropolitan area's job growth rate was 19.9 percentage points lower than it

Figure 8. Median Percent Change in Jobs Attributable to Industry Composition and Metropolitan Area-Specific Factors, 1980–2005 by Region, in Industrial Metropolitan Areas that Lost Manufacturing Jobs



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

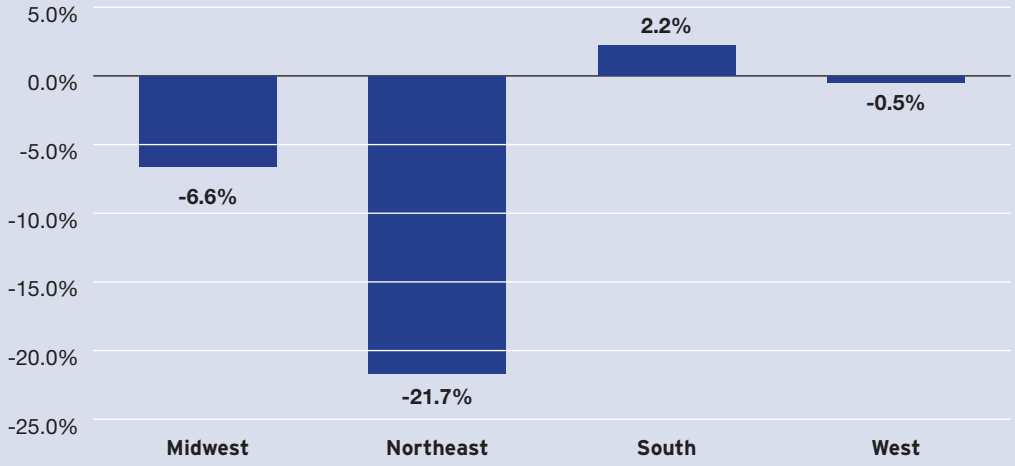
would have been if all its industries had grown at their respective national rates, while in the South the median metropolitan area's growth rate was 8.3 percentage points higher (Figure 8).

The overwhelming majority of our 114 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. However, our analysis makes clear that the loss of jobs due to metropolitan area-specific factors (-12.8 percentage points) was greater than the loss due to the original industrial composition of the metropolitan area (-7.4 percentage points). The only region where the opposite was the case was the South.

Even Great Lakes metropolitan areas that depend heavily on the auto and auto parts manufacturing industries (and that depended on them even more in 1980) did not experience slow job growth primarily because of that dependence. For example, Buffalo's job growth rate was 35.6 percentage points lower than it would have been if all its industries had grown at national rates, Cleveland's was 32.6 percentage points lower, Dayton's was 19.9 percentage points lower, and Detroit's was 26.0 percentage points lower. If all industries in all metropolitan areas had grown at their respective national rates, Detroit would have had the fastest 1980–2005 job growth rate of all 114 metropolitan areas, 49.6 percent, rather than the 54th-fastest rate, 23.5 percent. Cleveland would have had the 18th-fastest rate of job growth, 42.7 percent, not the 92nd-fastest rate, 10.2 percent. 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 regions 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 job growth rate was 65.0 percentage points

Figure 9. Median Percentage Point Difference Between 1980–2005 Actual Manufacturing Job Growth Rate and Manufacturing Job Growth Rate If All Manufacturing Industries Had Grown at National Rates, by Region, in Industrial Metropolitan Areas that Lost Manufacturing Jobs



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

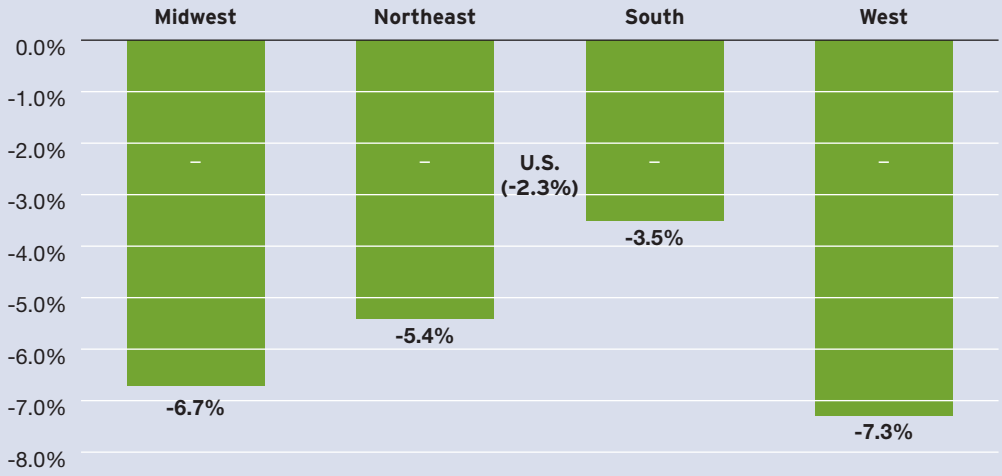
higher than it would have been if all its industries had grown at national rates.. If all industries in all metropolitan areas had grown at their respective national rates, Charlotte would have had the 77th-fastest job growth rate among the 114 metropolitan areas, 31.3 percent, rather than the fastest rate, 96.3 percent.

Even within manufacturing, similar patterns prevailed. Metropolitan area-specific factors accounted for greater manufacturing job losses in the 114 metropolitan areas between 1980 and 2005 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 1980–2005 manufacturing job growth rate (which by definition was negative) was 6.1 percentage points lower than it would have been if all the area's NAICS three-digit manufacturing industries had 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 other regions (Figure 9).

E. Of the 114 metropolitan areas, the typical region's 2005 average wage was 6.1 percent lower than it would have been if its industry composition had not changed since 1980.

Changes in industrial composition over the 1980–2005 period, including the loss of manufacturing jobs, put downward pressure on metropolitan wages even in metropolitan areas where the average wage increased during that period. In the median metropolitan area covered in this report, high-wage industries (defined as three-digit NAICS industries whose 1980 average wage was above the nationwide average wage) had 7.4 percent job growth between 1980 and 2005, while low-wage industries (defined as three-digit NAICS industries whose 1980 average wage was below the nationwide average wage) expanded much more rapidly (39.2 percent job growth).[21] With the industrial composition of the 114 metropolitan areas shifting toward low-wage industries, it is not surprising that the median metropolitan area's 2005 average wage was 6.1 percent lower than it would have been if its industry composition had not changed since 1980.[22] In contrast, the average wage in the United States as a

Figure 10. Median Percent by Which Changes in Industry Composition Between 1980 and 2005 Lowered Metropolitan Average Wages, by Region, in Industrial Metropolitan Areas that Lost Manufacturing Jobs



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

whole was 2.3 percent lower than it would have been if it had maintained its 1980 industry composition. Therefore, the industry shifts that occurred between 1980 and 2005 had a more severe impact on the 114 metropolitan areas than on the nation as a whole.

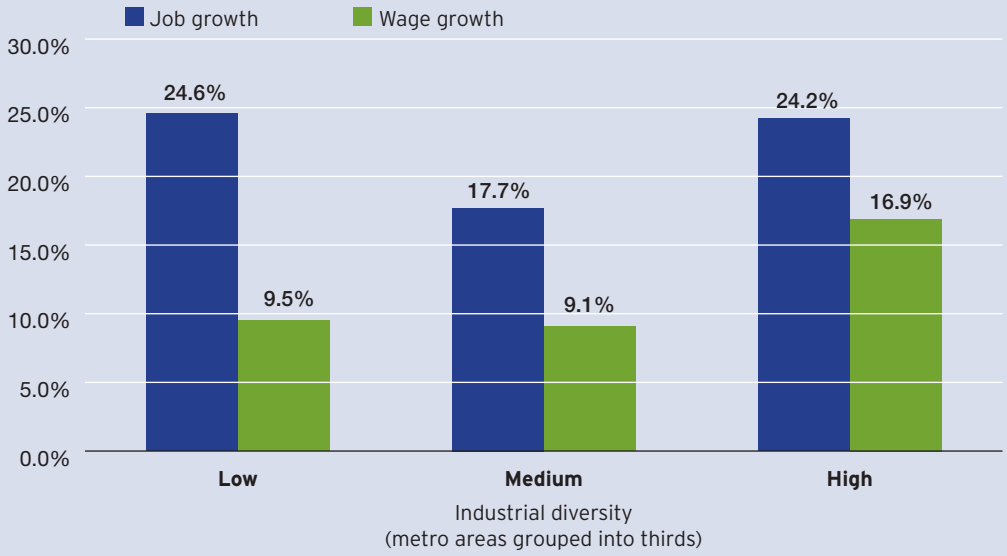
Notably, however, the changes in industry composition that occurred nationwide, not those that were idiosyncratic to the 114 metropolitan areas, were primarily responsible for lowering wages in those 114 areas. Among the 114 areas, the median metropolitan area's average wage in 2005 was only 0.8 percent 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 wage by 2.3 percent had a much more severe impact on wages in most of our 114 metropolitan areas.

Industry shifts that were unfavorable to wage growth occurred in nearly all the metropolitan areas covered in this report. Low-wage industries had more rapid job growth than did high-wage industries between 1980 and 2005 in all but 10 metropolitan areas, nearly all of which were in the South (Anderson (SC), Burlington, Charlotte, Chattanooga, Greensboro, Hickory, Longview, Rocky Mount, Rome, and Spartanburg). In all but 12 metropolitan areas, again mainly in the South (Akron, Bridgeport, Burlington, Charlotte, Danville (VA), Dothan, Hickory, Norwich, Peoria, Rocky Mount, Rome, and Waco), the 2005 average wage was lower than it would have been if metropolitan industry composition had remained unchanged since 1980. As figure 10 shows, industry shifts accounted for the greatest percentage declines in the average wage in the West, Midwest and Northeast and for the smallest percentage declines in the South.

F. The inflation-adjusted average wage grew by 16.9 percent between 1980 and 2005 in the 38 metropolitan areas that were most industrially diverse in 1980 but by only 9.5 percent in the 38 that were least industrially diverse.

Among the 114 metropolitan areas, those whose economies were more industrially diverse in 1980 had faster wage growth during the subsequent 25 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 average wage growth of 16.9 percent between 1980 and 2005, while the one-third that were least industrially diverse had median wage growth of only 9.5 percent. However,

Figure 11. Median Percent Change in Jobs and Inflation-Adjusted Average Wage, 1980–2005, by 1980 Industrial Diversity, in Industrial Metropolitan Areas that Lost Manufacturing Jobs



Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005. Industrial diversity is measured using the Herfindahl index applied to employment in NAICS three-digit industries, as explained in Appendix B.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

there was no meaningful difference in the median job growth rate between the most and least industrially diverse metropolitan areas (Figure 11).

During the 1980–2005 period the industrial structure of 60 of the 114 metropolitan areas became more diverse, while in the remaining 54 it became less diverse. There was virtually no difference between the two groups with respect to either median job growth or median average wage growth. This indicates that whether or not a metropolitan area's economy diversified during the 25-year period was not associated with growth in either employment or wages.

This finding does not resolve the ongoing academic debate about whether specialization or diversification is better for metropolitan economies, as it is not based on an analysis that controls for other influences on metropolitan wage and employment growth.[23] However, it provides 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. This could be because diversity improves productivity and, hence, wages throughout the metropolitan economy as a result of the communication of new ideas across industry lines.[24] Yet those widespread productivity gains, if they exist, do not appear to lead to employment gains. (Perhaps those gains do not occur because demand for the metropolitan area's products and services does not expand fast enough to offset the job losses that would otherwise occur as a result of productivity growth. Or perhaps job gains occur in other, lower-wage metropolitan areas, either in the U.S. or abroad.)

Another possibility, however, is that more diverse metropolitan economies attract higher-wage industries, leading to increases in the overall wage in a metropolitan area. If that is the case, then those industries do not generate enough jobs to create employment growth rates that exceed those found in less diverse areas. Or declining industries may lay off their lower-wage workers first, leading to an increase in the average metropolitan wage without any job growth.[25]

Testing Conventional Wisdom

Our findings show that some of the widely held beliefs set forth at the beginning of this report are accurate, others are inaccurate, and still others are partly accurate and partly inaccurate.

Belief 1: Southern and Western metropolitan economies have grown while those in the Northeast and Midwest have stagnated.

- ***Accurate:*** *Deindustrialized metropolitan areas in the Northeast and Midwest experienced slow job growth between 1980 and 2005, while those in the South had faster job growth.*

Belief 2: Services, especially advanced services are the key to metropolitan economic development. Growing a knowledge-based, advanced service economy is a better economic development strategy than attempting to retain or replace manufacturing jobs.

- ***Inaccurate:*** *Regardless of whether there is a cause-and-effect relationship between the retention of manufacturing jobs and the growth of advanced service jobs, the two are complementary rather than competitive.*

Belief 3: Manufacturing employment no longer plays an important long-term role in metropolitan economies, and it is unwise or impossible to foster manufacturing jobs part of a metropolitan economic development strategy.

- ***Inaccurate:*** *It is not impossible for deindustrialized metropolitan areas to retain or even expand some types of manufacturing, even as they lose manufacturing jobs overall. All but one of the 114 metropolitan areas experienced job growth in at least one NAICS three-digit manufacturing industry. Moreover, many of the metropolitan areas became more specialized in manufacturing relative to the rest of the nation even as they lost manufacturing jobs. Manufacturing remains important to the competitive advantage of those metropolitan areas.*

Belief 4: The growth of logistics, warehousing, and distribution activities has helped turn around the economies of many deindustrialized metropolitan areas.

- ***Partially accurate:*** *The economies of the 114 metropolitan areas generally shifted toward logistics and distribution activities, although it is not clear whether this shift improved rates of job or wage growth.*

Belief 5: The deindustrialized metropolitan areas in the Midwest have stagnated economically because they were too dependent on slow-growing industries, especially the auto industry.

- ***Mostly inaccurate:*** *The sluggish job growth of many deindustrialized metropolitan areas was only partly due to the fact that these metropolitan areas specialized in the wrong industries in 1980. Instead it came about primarily because these areas underperformed the rest of the nation with respect to the industries that they had. This was true even for areas that specialized strongly in auto and auto parts manufacturing.*

Belief 6: The loss of manufacturing jobs lowered wages in deindustrialized areas.

- ***Mostly accurate:*** *Because of changes in their industrial composition over the 25-year period, including the loss of manufacturing jobs, wages were lower than they would otherwise have been in nearly all the 114 metropolitan areas covered in this report compared to what wages would have been had all the metropolitan areas retained the same industrial composition in 2005 that they had in 1980. However, the changes in industrial composition that were primarily responsible for lowering wages in the 114 metropolitan areas were the same changes that occurred nationwide; changes in industrial structure that were unique to the 114 metropolitan areas played little role in lowering wages in those areas.*

Belief 7: Metropolitan areas with diversified economies are fundamentally healthier and likely to grow faster than those with more concentrated economies.

- ***Partially accurate, partially inaccurate:*** *A metropolitan area's industrial diversification or concentration was modestly related to growth in its average wage; more diversified regional economies in 1980 experienced somewhat higher growth in average wages between 1980–2005. However, a metropolitan area's industrial diversification or concentration had little to do with its job growth.*

"Despite the overall decline in manufacturing employment, all but one of the 114 metropolitan areas experienced some growth in manufacturing jobs in at least one manufacturing industry."

Conclusion and Implications

Our findings have several implications for economic development policy in deindustrialized metropolitan areas.

- Although we cannot say whether manufacturing causes or follows advanced services (or whether there is no direct connection between the two), economic development policymakers should not ignore or try to repel one of these industries even if their development strategy favors the other one.
- High-wage industries matter for metropolitan wages as a whole. Retaining such industries, or replacing them with other high-wage industries, should be part of a strategy to maintain high wages in general.[26]
- The fact that a metropolitan area specializes in slowly growing industries does not mean that the area is more likely to experience slow job growth, at least in the short term. Although most of the 114 metropolitan areas had slower job growth than the nation as a whole because of both an unfavorable industrial structure and metropolitan area-specific factors, the latter generally matter more for job growth than industrial composition. Economic development policy aimed at increasing a metropolitan area's employment growth rate should focus more on those factors that are fundamental to the economic health of the area as a whole or of existing industries in the area (e.g., workforce skills, infrastructure, innovation and productivity of firms) than on attracting firms in specific targeted new industries.
- Despite the overall decline in manufacturing employment, all but one of the 114 metropolitan areas experienced some growth in manufacturing jobs in at least one manufacturing industry. This suggests that a potentially productive strategy for economic development policymakers would be to identify these industries, attempt to determine why they are growing, and take steps to promote their continued growth.
- Some metropolitan areas have experienced rapid wage growth but slow job growth. This raises important distributive issues about who are the winners and who are the losers from such an outcome. It is possible that existing residents of the metropolitan area are the main beneficiaries of the rapid wage growth. Alternatively, newcomers may take most of the higher-wage jobs while existing residents leave the labor force or move out of the area.
- Absolute gains in employment can mask underlying problems and poor performance for a metropolitan area if the industries in which the area specializes are losing market share to the rest of the nation. Economic development officials ought to compare a metropolitan area's actual job growth to the job growth the area would have had if each of its industries had gained or lost employment at their respective national rates. If the result is underperformance, they should focus analysis and strategy on the factors related to the area or the firms located there (other than industrial structure) that resulted in the underperformance.

Appendix A. Detailed Employment and Wage Data for the 114 Metropolitan Areas

Appendix Table A1. Percent Job Changes in Industrial Metropolitan Areas that Lost Manufacturing Jobs, 1980-2005

Metropolitan area	Change in total jobs	Change in manufacturing jobs	Change in non-manufacturing jobs	Change in advanced services jobs*	Total job change attributable to industry composition**	Total job change attributable to to metropolitan area-specific factors**
Akron, OH	27.8%	-33.2%	50.8%	101.4%	3.9%	-18.7%
Allentown-Bethlehem-Easton, PA-NJ	24.6%	-56.1%	66.9%	101.8%	-13.4%	-4.6%
Altoona, PA	21.1%	-31.9%	36.8%	40.5%	-2.1%	-19.5%
Anderson, IN	-7.1%	-62.6%	23.5%	22.4%	-11.3%	-38.4%
Anderson, SC	21.4%	-40.4%	71.0%	69.5%	-29.2%	7.9%
Ann Arbor, MI	41.5%	-41.4%	69.5%	117.3%	-2.0%	0.8%
Appleton, WI	57.0%	-1.6%	83.6%	230.7%	-10.2%	24.6%
Asheville, NC	58.1%	-33.3%	96.3%	156.1%	-12.8%	28.2%
Athens-Clarke County, GA	70.6%	-23.3%	102.7%	150.5%	-13.8%	41.8%
Auburn-Opelika, AL	82.4%	-5.9%	112.1%	276.8%	-14.1%	53.9%
Bangor, ME	22.6%	-65.4%	48.0%	88.1%	-4.9%	-15.1%
Battle Creek, MI	23.2%	-18.8%	44.4%	42.5%	-9.0%	-10.5%
Bay City, MI	17.8%	-44.1%	35.8%	80.7%	-0.9%	-23.9%
Beaumont-Port Arthur, TX	3.2%	-45.6%	17.9%	22.5%	0.1%	-39.5%
Binghamton, NY	0.9%	-56.4%	31.9%	47.6%	-9.4%	-32.3%
Blacksburg-Christiansburg-Radford, VA	40.2%	-10.9%	62.5%	191.4%	-17.1%	14.7%
Bridgeport-Stamford-Norwalk, CT	15.9%	-61.1%	47.6%	74.5%	2.6%	-29.3%
Buffalo-Niagara Falls, NY	9.2%	-48.2%	27.8%	60.5%	2.2%	-35.6%
Burlington, NC	41.7%	-33.9%	103.9%	228.3%	-32.6%	31.7%
Canton-Massillon, OH	10.3%	-41.0%	34.9%	59.8%	-8.0%	-24.4%
Cedar Rapids, IA	36.8%	-25.6%	60.1%	120.9%	-5.6%	-0.2%
Charlotte-Gastonia-Concord, NC-SC	96.3%	-29.4%	147.4%	236.4%	-11.3%	65.0%
Chattanooga, TN-GA	48.2%	-28.8%	81.1%	112.2%	-8.8%	14.4%
Chicago-Naperville-Joliet, IL-IN-WI	26.1%	-41.0%	46.6%	72.7%	3.6%	-20.2%
Cincinnati-Middletown, OH-KY-IN	45.7%	-27.5%	68.1%	112.4%	0.1%	3.0%
Cleveland, TN	57.0%	-15.2%	110.3%	248.3%	-26.5%	40.9%
Cleveland-Elyria-Mentor, OH	10.2%	-42.5%	29.0%	51.7%	0.1%	-32.6%
Cumberland, MD-WV	15.6%	-44.0%	34.5%	65.7%	-3.1%	-23.9%
Danville, IL	-12.4%	-47.9%	3.6%	30.5%	-14.6%	-40.4%
Danville, VA	6.6%	-43.1%	40.9%	102.8%	-20.1%	-16.0%
Davenport-Moline-Rock Island, IA-IL	10.5%	-33.5%	22.9%	70.8%	-2.9%	-29.2%
Dayton, OH	16.6%	-31.6%	31.4%	72.8%	-6.2%	-19.9%
Decatur, IL	-3.0%	-37.9%	12.8%	-12.7%	-6.3%	-39.4%
Detroit-Warren-Livonia, MI	23.5%	-27.2%	39.3%	65.4%	7.0%	-26.0%
Dothan, AL	39.2%	-25.1%	58.9%	119.0%	-12.6%	9.2%
Dubuque, IA	22.5%	-26.5%	41.1%	103.4%	-3.2%	-16.9%
Elmira, NY	8.1%	-41.8%	27.0%	51.8%	-4.1%	-30.4%
Erie, PA	16.9%	-39.2%	47.0%	70.3%	-6.7%	-19.0%
Flint, MI	-9.3%	-67.3%	26.7%	66.6%	-10.1%	-41.9%
Florence, SC	24.0%	-34.6%	50.5%	107.6%	-15.8%	-2.8%
Florence-Muscle Shoals, AL	22.5%	-40.4%	44.7%	75.4%	-15.7%	-4.4%
Fort Wayne, IN	37.5%	-9.0%	53.5%	63.3%	-2.7%	-2.4%
Gadsden, AL	15.9%	-43.3%	42.8%	62.2%	-5.2%	-21.5%

Appendix Table A1. Percent Job Changes in Industrial Metropolitan Areas that Lost Manufacturing Jobs, 1980-2005 (continued)

Metropolitan area	Change in total jobs	Change in manufacturing jobs	Change in non-manufacturing jobs	Change in advanced services jobs*	Total job change attributable to industry composition**	Total job change attributable to to metropolitan area-specific factors**
Glens Falls, NY	34.9%	-22.0%	50.4%	108.6%	-4.4%	-3.4%
Greensboro-High Point, NC	50.4%	-25.0%	92.9%	115.3%	-14.2%	22.0%
Greenville, SC	56.3%	-34.7%	102.9%	147.7%	-13.5%	27.2%
Hagerstown-Martinsburg, MD-WV	69.6%	-20.2%	98.3%	239.9%	-14.0%	41.0%
Hartford-West Hartford-East Hartford, CT	11.4%	-49.7%	33.2%	32.1%	0.5%	-31.7%
Hickory-Lenoir-Morganton, NC	25.3%	-23.4%	80.1%	164.8%	-30.1%	12.7%
Indianapolis, IN	70.6%	-12.3%	93.7%	156.3%	0.1%	27.9%
Jackson, MI	13.6%	-25.5%	26.6%	31.4%	-4.2%	-24.8%
Janesville, WI	36.7%	-18.1%	64.5%	130.1%	-11.8%	5.9%
Johnson City, TN	56.0%	-24.6%	85.9%	168.8%	-14.3%	27.7%
Johnstown, PA	-0.1%	-63.8%	17.4%	58.7%	-10.1%	-32.7%
Kalamazoo-Portage, MI	33.5%	-20.5%	52.9%	104.7%	-3.9%	-5.3%
Kankakee-Bradley, IL	23.0%	-36.5%	39.5%	53.2%	-3.0%	-16.7%
Kingsport-Bristol-Bristol, TN-VA	29.2%	-25.1%	57.3%	82.7%	-17.3%	3.9%
Kokomo, IN	4.0%	-18.2%	19.2%	59.5%	-19.2%	-19.5%
La Crosse, WI-MN	45.6%	-14.0%	61.1%	132.3%	2.8%	0.2%
Lancaster, PA	49.2%	-21.3%	86.4%	160.3%	-13.3%	19.9%
Lebanon, PA	19.3%	-33.8%	47.2%	58.6%	-21.1%	-2.2%
Lewiston-Auburn, ME	21.9%	-46.5%	49.5%	134.4%	-5.4%	-15.4%
Lima, OH	19.3%	-27.5%	39.4%	103.5%	-7.2%	-16.1%
Longview, WA	27.7%	-14.4%	44.4%	35.4%	-5.2%	-9.7%
Los Angeles-Long Beach-Santa Ana, CA	24.3%	-41.9%	45.9%	55.3%	6.3%	-24.7%
Louisville, KY-IN	43.5%	-15.1%	59.3%	98.0%	1.7%	-0.9%
Lynchburg, VA	33.1%	-28.7%	62.7%	162.2%	-14.1%	4.6%
Manchester-Nashua, NH	46.3%	-32.7%	86.0%	101.2%	-6.3%	10.0%
Mansfield, OH	7.2%	-29.2%	25.8%	11.5%	-10.6%	-24.8%
Michigan City-La Porte, IN	10.9%	-32.0%	30.9%	58.3%	-9.9%	-21.8%
Milwaukee-Waukesha-West Allis, WI	23.9%	-32.2%	46.3%	74.8%	-0.7%	-18.1%
Muncie, IN	5.8%	-51.0%	25.3%	37.8%	-1.9%	-34.9%
Muskegon-Norton Shores, MI	23.6%	-30.5%	53.2%	61.8%	-13.2%	-5.9%
New Haven-Milford, CT	14.6%	-45.3%	33.1%	29.0%	4.5%	-32.5%
Niles-Benton Harbor, MI	3.7%	-18.7%	12.6%	33.7%	-7.2%	-31.8%
Norwich-New London, CT	28.8%	-41.6%	54.3%	52.3%	-13.1%	-0.7%
Parkersburg-Marietta, WV-OH	20.4%	-47.4%	46.5%	104.6%	-9.9%	-12.4%
Pascagoula, MS	26.0%	-21.5%	62.5%	202.4%	-24.6%	7.9%
Peoria, IL	2.7%	-40.1%	19.1%	65.7%	-10.9%	-29.1%
Pittsfield, MA	6.6%	-60.6%	30.8%	30.8%	2.1%	-38.1%
Portland-South Portland-Biddeford, ME	62.4%	-23.0%	84.0%	158.3%	-2.5%	22.3%
Poughkeepsie-Newburgh-Middletown, NY	43.4%	-47.0%	71.8%	113.4%	-6.5%	7.2%
Providence-New Bedford-Fall River, RI-MA	20.0%	-52.6%	52.5%	84.5%	-4.6%	-18.0%
Racine, WI	13.1%	-32.7%	41.1%	28.4%	-10.8%	-18.7%
Reading, PA	20.4%	-34.4%	47.6%	70.1%	-12.4%	-9.9%
Roanoke, VA	43.1%	-28.8%	64.2%	117.4%	-2.8%	3.3%
Rochester, NY	22.6%	-44.0%	54.7%	83.5%	-6.2%	-13.9%

Appendix Table A1. Percent Job Changes in Industrial Metropolitan Areas that Lost Manufacturing Jobs, 1980-2005 (continued)

Metropolitan area	Change in total jobs	Change in manufacturing jobs	Change in non-manufacturing jobs	Change in advanced services jobs*	Total job change attributable to industry composition**	Total job change attributable to to metropolitan area-specific factors**
Rockford, IL	28.0%	-35.4%	70.9%	123.4%	-11.2%	-3.4%
Rocky Mount, NC	21.6%	-30.8%	42.0%	75.0%	-20.1%	-0.9%
Rome, GA	33.2%	-20.1%	62.0%	119.7%	-18.1%	8.7%
Saginaw-Saginaw Township North, MI	6.3%	-52.2%	34.5%	52.8%	-10.6%	-25.7%
St. Louis, MO-IL	32.0%	-34.4%	49.3%	66.7%	3.5%	-14.1%
Sandusky, OH	13.5%	-36.0%	36.4%	68.4%	-5.2%	-23.9%
San Jose-Sunnyvale-Santa Clara, CA	34.7%	-22.7%	62.2%	105.2%	1.2%	-9.1%
Scranton--Wilkes-Barre, PA	22.5%	-45.4%	51.0%	90.5%	-9.4%	-10.7%
Sherman-Denison, TX	20.1%	-56.2%	65.1%	69.5%	-13.5%	-9.1%
South Bend-Mishawaka, IN-MI	35.3%	-15.8%	50.9%	58.9%	5.1%	-12.4%
Spartanburg, SC	27.8%	-26.8%	64.2%	97.5%	-22.5%	7.7%
Springfield, MA	9.2%	-51.8%	29.1%	33.7%	1.1%	-34.6%
Springfield, OH	4.1%	-34.2%	15.9%	-34.9%	-4.8%	-33.7%
Terre Haute, IN	8.5%	-15.3%	14.6%	14.5%	-5.8%	-28.3%
Toledo, OH	24.2%	-21.0%	38.3%	62.2%	1.5%	-20.0%
Tyler, TX	60.6%	-25.8%	84.5%	99.8%	-5.2%	23.1%
Utica-Rome, NY	10.5%	-53.4%	30.4%	70.1%	-8.2%	-24.0%
Vineland-Millville-Bridgeton, NJ	14.8%	-42.2%	38.8%	34.1%	-14.6%	-13.2%
Waco, TX	45.4%	-14.0%	64.6%	79.5%	-1.1%	3.9%
Waterloo-Cedar Falls, IA	18.3%	-30.3%	39.2%	85.9%	-10.6%	-13.7%
Weirton-Steubenville, WV-OH	-9.0%	-58.2%	25.4%	204.2%	-21.8%	-29.9%
Wichita, KS	27.6%	-11.2%	43.6%	57.2%	-7.6%	-7.5%
Williamsport, PA	13.9%	-25.5%	32.3%	54.4%	-12.6%	-16.2%
Winston-Salem, NC	50.9%	-25.2%	82.4%	123.6%	-3.0%	11.3%
Worcester, MA	18.8%	-55.5%	56.5%	87.7%	-5.9%	-17.9%
York-Hanover, PA	14.1%	-39.5%	49.5%	84.9%	-18.3%	-10.2%
Youngstown-Warren-Boardman, OH-PA	-3.2%	-53.5%	23.0%	37.5%	-12.5%	-33.3%
Entire United States	42.6%	-24.1%	58.4%	98.0%	NA	NA

**Advanced services jobs include jobs in financial activities, information, and professional and business services.*

***Job changes attributable to industry composition and to metropolitan area-specific factors are components of a shift-share analysis; see Appendix B for technical details of this procedure.*

Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

Appendix Table A2. Wage Changes in Industrial Metropolitan Areas that Lost Manufacturing Jobs

Metropolitan area	Percent change in the inflation-adjusted average wage, 1980-2005	Percent difference between the 2005 actual average wage and the average wage that would have occurred if industry composition had not changed since 1980*
Akron, OH	9.8%	1.7%
Allentown-Bethlehem-Easton, PA-NJ	21.1%	-5.3%
Altoona, PA	2.0%	-2.9%
Anderson, IN	-10.5%	-19.7%
Anderson, SC	18.2%	-4.2%
Ann Arbor, MI	19.9%	-7.4%
Appleton, WI	20.8%	-3.5%
Asheville, NC	16.2%	-3.5%
Athens-Clarke County, GA	23.4%	-8.8%
Auburn-Opelika, AL	9.0%	-10.0%
Bangor, ME	20.9%	-8.9%
Battle Creek, MI	-5.1%	-15.5%
Bay City, MI	0.0%	-10.6%
Beaumont-Port Arthur, TX	-0.6%	-13.5%
Binghamton, NY	5.7%	-11.9%
Blacksburg-Christiansburg-Radford, VA	18.5%	-1.7%
Bridgeport-Stamford-Norwalk, CT	87.1%	8.0%
Buffalo-Niagara Falls, NY	8.4%	-10.4%
Burlington, NC	30.2%	5.7%
Canton-Massillon, OH	-0.5%	-12.6%
Cedar Rapids, IA	18.3%	-0.9%
Charlotte-Gastonia-Concord, NC-SC	39.5%	3.4%
Chattanooga, TN-GA	6.7%	-5.8%
Chicago-Naperville-Joliet, IL-IN-WI	25.1%	-4.7%
Cincinnati-Middletown, OH-KY-IN	19.1%	-6.1%
Cleveland, TN	13.3%	-2.3%
Cleveland-Elyria-Mentor, OH	10.5%	-6.1%
Cumberland, MD-WV	-10.8%	-3.4%
Danville, IL	0.8%	-1.8%
Danville, VA	5.0%	0.4%
Davenport-Moline-Rock Island, IA-IL	-0.6%	-8.5%
Dayton, OH	9.5%	-7.2%
Decatur, IL	9.0%	-5.8%
Detroit-Warren-Livonia, MI	12.9%	-4.2%
Dothan, AL	20.8%	4.0%
Dubuque, IA	-5.9%	-9.7%
Elmira, NY	10.7%	-12.7%
Erie, PA	2.9%	-8.9%
Flint, MI	-10.0%	-23.1%
Florence, SC	31.2%	-0.7%
Florence-Muscle Shoals, AL	-11.1%	-8.6%
Fort Wayne, IN	2.0%	-8.7%
Gadsden, AL	-10.0%	-2.8%
Glens Falls, NY	17.8%	-7.7%
Greensboro-High Point, NC	15.5%	-2.7%
Greenville, SC	19.7%	-7.8%

Appendix Table A2. Wage Changes in Industrial Metropolitan Areas that Lost Manufacturing Jobs (continued)

Metropolitan area	Percent change in the inflation-adjusted average wage, 1980-2005	Percent difference between the 2005 actual average wage and the average wage that would have occurred if industry composition had not changed since 1980*
Hagerstown-Martinsburg, MD-WV	5.0%	-6.9%
Hartford-West Hartford-East Hartford, CT	50.1%	-6.6%
Hickory-Lenoir-Morganton, NC	23.6%	0.2%
Indianapolis, IN	13.2%	-6.4%
Jackson, MI	3.3%	-6.7%
Janesville, WI	9.6%	-8.2%
Johnson City, TN	15.8%	-6.8%
Johnstown, PA	-11.8%	-7.7%
Kalamazoo-Portage, MI	4.5%	-5.1%
Kankakee-Bradley, IL	5.4%	-4.4%
Kingsport-Bristol-Bristol, TN-VA	2.5%	-0.3%
Kokomo, IN	20.9%	-4.9%
La Crosse, WI-MN	12.3%	-2.5%
Lancaster, PA	24.2%	-1.4%
Lebanon, PA	8.9%	-2.7%
Lewiston-Auburn, ME	32.7%	-4.9%
Lima, OH	-6.8%	-8.0%
Longview, WA	-13.1%	-8.1%
Los Angeles-Long Beach-Santa Ana, CA	32.1%	-7.3%
Louisville, KY-IN	16.7%	-6.7%
Lynchburg, VA	10.7%	-3.5%
Manchester-Nashua, NH	59.5%	-4.0%
Mansfield, OH	1.7%	-1.3%
Michigan City-La Porte, IN	4.5%	-6.6%
Milwaukee-Waukesha-West Allis, WI	19.1%	-7.2%
Muncie, IN	0.5%	-10.2%
Muskegon-Norton Shores, MI	-7.5%	-10.9%
New Haven-Milford, CT	43.2%	-5.1%
Niles-Benton Harbor, MI	13.4%	-2.5%
Norwich-New London, CT	31.9%	1.5%
Parkersburg-Marietta, WV-OH	-9.1%	-11.5%
Pascagoula, MS	2.7%	-8.6%
Peoria, IL	13.9%	3.8%
Pittsfield, MA	25.4%	-8.9%
Portland-South Portland-Biddeford, ME	28.7%	-6.0%
Poughkeepsie-Newburgh-Middletown, NY	19.8%	-4.9%
Providence-New Bedford-Fall River, RI-MA	39.5%	-4.4%
Racine, WI	10.8%	-8.3%
Reading, PA	20.1%	-3.6%
Roanoke, VA	15.0%	-3.5%
Rochester, NY	5.4%	-8.8%
Rockford, IL	1.2%	-9.7%
Rocky Mount, NC	28.7%	5.8%
Rome, GA	18.6%	1.5%
Saginaw-Saginaw Township North, MI	-2.7%	-11.9%
St. Louis, MO-IL	17.2%	-5.3%

Appendix Table A2. Wage Changes in Industrial Metropolitan Areas that Lost Manufacturing Jobs (continued)

Metropolitan area	Percent change in the inflation-adjusted average wage, 1980-2005	Percent difference between the 2005 actual average wage and the average wage that would have occurred if industry composition had not changed since 1980*
Sandusky, OH	4.5%	-4.1%
San Jose-Sunnyvale-Santa Clara, CA	81.9%	-6.1%
Scranton--Wilkes-Barre, PA	17.9%	-2.8%
Sherman-Denison, TX	11.6%	-21.5%
South Bend-Mishawaka, IN-MI	5.9%	-4.2%
Spartanburg, SC	31.4%	-5.9%
Springfield, MA	34.0%	-5.5%
Springfield, OH	3.7%	-7.1%
Terre Haute, IN	3.1%	-6.1%
Toledo, OH	2.7%	-6.7%
Tyler, TX	20.2%	-6.5%
Utica-Rome, NY	9.3%	-8.5%
Vineland-Millville-Bridgeton, NJ	27.8%	-1.2%
Waco, TX	21.9%	0.0%
Waterloo-Cedar Falls, IA	-8.7%	-13.8%
Weirton-Steubenville, WV-OH	-32.1%	-13.2%
Wichita, KS	9.5%	-10.1%
Williamsport, PA	6.9%	-3.4%
Winston-Salem, NC	11.1%	-10.6%
Worcester, MA	47.7%	-7.8%
York-Hanover, PA	38.0%	-7.5%
Youngstown-Warren-Boardman, OH-PA	-7.5%	-15.9%
Entire United States	28.4%	-2.3%

**A negative value indicates the actual 2005 average wage was lower than it would have otherwise been if industry composition had not changed since 1980.*

Note: "Industrial metropolitan areas that lost manufacturing jobs" are metropolitan areas that had 1980 percentages of manufacturing jobs at least 5 percent above the national average and that lost manufacturing jobs from 1980-2005.

Source: Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com.

Appendix B. Technical Details

Employment and wage data are from the economic forecasting firm Moody's Economy.com. These employment data are based on the Bureau of Labor Statistics' (BLS) Current Employment Statistics and Quarterly Census of Employment and Wages surveys; for industries not covered by BLS data (e.g., private household services and the military) Economy.com makes use of data from the Bureau of Economic Analysis' (BEA) employment data series. Wage data are based on BEA's personal income data series and on BLS' Quarterly Census of Employment and Wages data series. The Economy.com data are more suitable for our analysis than the BLS data because they provide complete employment and wage data for a consistent set of relatively detailed industry categories (generally North American Industrial Classification System (NAICS) three-digit industries) for the entire 1980–2005 period.[27] BLS' Current Employment Statistics series goes back only to 1990 for metropolitan areas, does not include wage data for metropolitan areas, and does not have sufficiently detailed industry data for all metropolitan areas. BLS' Quarterly Census of Employment and Wages series uses NAICS industry categories only for 2001 and later years; it uses a different classification system for earlier years. It also suppresses many data items to preserve employer confidentiality.

Moody's Economy.com data have some limitations. First, for industries other than federal, state, and local government, and the military, they include only private sector employment. Public hospitals, schools, and colleges are classified as part of one of the levels of government (or the military) rather than as part of hospitals or educational services. This can have an important impact on industry-level employment and wage data in metropolitan areas where public hospitals or universities account for a large percentage of hospital or university employment.

Second, although the Economy.com data are consistent with BLS Current Employment Statistics data for industries reported in the latter series, their estimates of employment for NAICS three-digit industries not included in the Current Employment Statistics are based on a proprietary model. Therefore, Economy.com total employment does not always match the Current Employment Statistics estimates.

In this report, "employment" means the number of jobs in a metropolitan area. "Wage" means the average wage per job in each metropolitan area. We calculate the average wage per job as the ratio of the total wage bill to the number of jobs. Because it is an average, the wages of a few highly paid workers exert an important influence on it. Therefore, it will generally overstate the wage paid to a typical worker. However, it is the only measure of wages available at the industry level within metropolitan areas. We adjust all estimates of 1980–2005 wage change for inflation using the Consumer Price Index research series. Because we are interested in long-term trends rather than short-term fluctuations, we use annual average data for all employment and wage estimates.

For findings B and C we group NAICS three-digit industries into several more highly aggregated categories: manufacturing (with durable and nondurable manufacturing as subcategories), advanced services (defined as financial activities, information, and professional and business services), transportation and warehousing (defined as all transportation and warehousing industries except transit and ground passenger transportation, the Postal Service, and couriers and messengers), education and hospitals, tourism (defined as performing arts/spectator sports/related industries, museums/historical sites/similar institutions, amusement/gambling/recreation, accommodation, and food services and drinking places), and government (defined as federal and state government and the military). These industry groupings represent the major types of regional export industries in our 114 metropolitan areas, plus other industries that are closely related to export industries.[28] In finding B we pay special attention to growth in advanced services employment because advanced service industries have added jobs in recent years, are largely exportable, and pay relatively high wages; for these reasons they may have the potential to be a new foundation for regional economic development in metropolitan areas that have lost manufacturing jobs.[29]

Finding D makes use of shift-share analysis, a traditional technique of regional economics. Shift-share analysis breaks a change in employment down into three components, a "national growth" component that represents the change in employment that would have occurred in a metropolitan area if employment in all its industries had grown at the overall national employment growth rate, an "industry share" component that represents the difference between the change in employment that

"The economies of the 114 metropolitan areas generally shifted toward logistics and distribution activities, although it is not clear whether this shift improved rates of job or wage growth."

would have occurred in the metropolitan area if all the area's industries had grown at their respective national rates and the national growth component, and a "competitive shift" component that represents the difference between the actual employment change and the sum of the national growth and industry share components. The industry share component captures nationwide industry-specific influences on a metropolitan area's job growth, while the competitive shift captures the influence of factors that are specific to the metropolitan area or to industries or employers within the metropolitan area. Results of a shift-share analysis are sensitive to the beginning and ending years of the analysis and to the level of industry aggregation chosen. We conduct all analysis at the NAICS three-digit level as modified in the Economy.com data and our period of analysis is always 1980–2005.

For finding F we use the Herfindahl index to measure of the degree to which a metropolitan area's employment is concentrated in a small number of industries or diversified among many. 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 zero as the number of industries increases, with 1 indicating that all the metropolitan area's employment is in one industry and the minimum value indicating that employment is equally distributed among all industries. Thus lower values of the index mean more industrial diversity. As in findings D and E, we conduct all analysis at the NAICS three-digit level as modified in the Economy.com data and our period of analysis is always 1980–2005.

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Endnotes

1. Alec Friedhoff is a research analyst and Howard Wial is an economist and fellow in the Brookings Institution's Metropolitan Policy Program. Harold Wolman is director of the George Washington Institute of Public Policy (GWIPP) and a professor of political science and public policy at the George Washington University.
2. Authors' analysis of data supplied by the economic forecasting firm Moody's Economy.com..
3. Howard Wial and Alec Friedhoff, *MetroMonitor*. (Washington: Brookings Institution, March 2010).
4. Lou Glazer and Donald Grimes, "A New Path to Prosperity? Manufacturing and Knowledge-Based Industries As Drivers of Economic Growth," Institute for Research on Labor, Employment, and the Economy, The University of Michigan, July 2004; David Ratcliffe, "Atlanta Must Hone Its Efforts to Recover," *Atlanta Journal-Constitution*, July 19, 2009, p. 17-A. For an extended argument about and evidence for the importance of advanced services to metropolitan economic growth, see Matthew Drennan, *The Information Economy and American Cities* (Baltimore: Johns Hopkins University Press, 2002).
5. See, e.g., Robert B. Reich, "Manufacturing Jobs Are Never Coming Back," *Forbes.com*, May 28, 2009, **www.forbes.com/2009/05/28/robert-reich-manufacturing-business-economy.html**.
6. Lara Sowinski, "Logistics Resurrects the Rust Belt," *World Trade,* October 28, 2008, available at **www.worldtrademag.com/Articles/Feature_Article/BNP_GUID_9-5-2006_A_10000000000000455244**.
7. Richard C. Longworth, Thinking About Cities," *The Midwesterner*, April 19, 2010, available at **http://globalmidwest.typepad.com/global-midwest/2010/04/thinking-about-cities.html#more**. This claim has recently been made often with respect to Detroit's dependence on the auto industry. See Bill Koenig, "Detroit Forgets Auto Misery to Root for Michigan State Victory," *Bloomberg.com,* April 3, 2010, available at **www.bloomberg.com/apps/news?pid=20601079&sid=atWfH.m_L6a4&refer=home**; Barney McCoy, "The Big-Three Automakers: Echoes from the Past," *JournalCetera*. April 4, 2009, available at **http://barneymccoy.wordpress.com/2009/04/04/the-big-three-automakers-echoes-from-the-past/**.
8. Ted Evanoff, "Indiana Incomes: We're Stuck," *Indianapolis Star,* March 25, 2009, p. A1.
9. Edward L. Glaeser, "The Reinventive City," *City Journal*, Special Issue 2009, available at **http://www.city-journal.org/2009/nytom_reinventive-city.html;** Jane Jacobs, *The Economy of Cities* (New York: Vintage, 1969).
10. These 114 regions constitute the universe of regions that meet our criteria. They are not a sample of the full set of 366 metropolitan areas and conclusions from our analysis cannot be applied to all metropolitan areas.
11. Any metropolitan area in which manufacturing's share of employment exceeds its share of national employment is presumptively specialized in manufacturing. We chose a cutoff of 5 percent above the national average to represent a strong specialization in manufacturing. However, there is no consensus in the literature on a quantitative cutoff to represent a strong manufacturing specialization, and any such choice is inevitably a matter of judgment.
12. Bureau of Labor Statistics Current Employment Statistics data show that nationwide manufacturing employment peaked in 1979.
13. According to our analysis of Bureau of Labor Statistics Current Employment Statistics data, the nation lost 5.5 percent of its manufacturing jobs between 1980 and 1990, 2.4 percent between 1990 and 2000, and 17.6 percent between 2000 and 2005.
14. We do not weight our results by metropolitan area employment because the largest metropolitan areas would dominate the results for each region if we were to do so. In most NAICS three-digit industries there are a few metropolitan areas have very high rates of employment growth, which make unweighted averages inappropriate to represent regional differences. Therefore, we use medians.
15. Reich, "Manufacturing Jobs."
16. The simple correlation between the percentage change in manufacturing employment and the percentage change in non-manufacturing employment was 0.41, while that between percentage changes in manufacturing and advanced service employment was 0.38.
17. Matthew Day, Susan Houseman, and Anne Polivka, "Manufacturers' Outsourcing to Employment Services," Upjohn Institute Working Paper 07-132 (Kalamazoo, MI: Upjohn Institute for Employment Research, 2006).
18. 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, e.g., Edward L. Glaeser and Albert Saiz, "The Rise of the Skilled City," in *Brookings-Wharton Papers on Urban Affairs* 2004, pp. 47-94; Edward L. Glaeser, Jose A Scheinkman, and Andrei Shleifer, "Economic Growth in a Cross-Section of Cities," *Journal of Monetary Economics* 36 (1995): 117-43; Paul D. Gottlieb and Michael Fogarty, "Educational Attainment and Metropolitan growth," *Economic Development Quarterly 17* (2003): 325-36; Curtis J. Simon, "Human Capital and Metropolitan Employment Growth," *Journal of Urban Economics* 43 (1998): 223-43. The literature's emphasis on general regional characteristics rather than industry composition may be motivated in part by the results of shift-share analysis, such as that presented in finding D of this report, that industry composition accounts for a relatively small portion of overall employment change n most metropolitan areas. However, the shift-share analysis does not tell policymakers whether the relevant regional characteristics are those of the metropolitan area as a whole or those of

particular industries in the metropolitan area.

19. Klier and Rubenstein have documented the movement of auto plants from the central Great Lakes region to the adjoining areas of the South. See Thomas Klier and James Rubenstein, *Who Really Made Your Car?* (Kalamazoo, MI: Upjohn Institute for Employment Research, 2008).
20. The median metropolitan area for this statistic is an average of South Bend, IN, and Vineland, NJ. The extremes are found in Flint, where job growth was 41.9 percent lower than if all industries had grown at their respective national rates, and Charlotte, where it was 65.0 percent higher.
21. The results are similar though not quite as dramatic if high- and low-wage industries are defined as of 2005; using this alternative definition, in the median metropolitan area high-wage industries had 10.3 percent job growth between 1980 and 2005 while low-wage industries experienced job growth of 35.5 percent.
22. The median metropolitan area for this statistic is an average of Cincinnati and San Jose. The extremes are found in Flint, where the average wage was 23.1 percent lower than if industrial composition had remained unchanged since 1980, and Bridgeport, where it was 8.0 percent 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 2005. However, average wages in nine 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 2005, while 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 2005.
23. The literature in that debate includes Edward L. Glaeser and others, "Growth in Cities," *Journal of Political Economy 100* (1992): 1126-52.; Bennett Harrison, Maryellen Kelley, and Jon Gant, "Specialization versus Diversity in Local Economies: The Implications for Innovative Private-Sector Behavior," *Cityscape 2* (1996): 61-93; Vernon Henderson, "Marshall's Scale Economies," *Journal of Urban Economics* 53 (2003): 1-28; Vernon Henderson, Ari Kuncoro, and Matt Turner, "Industrial Development in Cities," *Journal of Political Economy* 103 (1995): 1067-90. The finding reported in the text is consistent with the finding of Glaeser and others that industrial diversity increases average metropolitan wages but not with their finding that diversity also increases employment.
24. See Glaeser and others, "Growth in Cities," and Jacobs, *Economy of Cities*.
25. See Glaser and others, "Growth in Cities," for this speculation.
26. This is consistent with the finding of Bartik and Eberts that shifts in the composition of available jobs toward manufacturing and other industries that pay high wages relative to the skills they demand tend to benefit existing residents of a metropolitan area. See Timothy J. Bartik and Randall W. Eberts, "Urban Labor Markets," in *A Companion to Urban Economics*, edited by Richard J. Arnott and Daniel P. McMillen, (Malden, MA: Blackwell, 2006), pp. 389-403.
27. For example, transportation equipment manufacturing is a NAICS three-digit industry, while the corresponding, less detailed NAICS two-digit industry is simply manufacturing as a whole. Credit intermediation and related activities (i.e., banking) is a NAICS three-digit industry, while finance and insurance is the corresponding NAICS two-digit industry. In the Economy.com data, employment and wages in farming, forestry, hunting, and logging are available only at the NAICS two-digit level.
28. By "export industries" we mean industries that generate income for a metropolitan area because they are consumed largely by people who live elsewhere. Those people may live in other parts of the United States or abroad. Education and hospitals can be export industries to the extent that they serve students or patients from outside the metropolitan areas in which they are located, and the fact that these industries account for a much larger percentage of employment in some metropolitan areas (e.g., Springfield, MA, for higher education and Johnstown, PA, for medical care) than in the nation as a whole is presumptive evidence that they are export industries in those metropolitan areas. See Timothy J. Bartik and George Erickcek, "'Eds and Meds' and Metropolitan Economic Development," in *Urban and Regional Policy and Its Effects*, vol. 1, edited by Margery Austin Turner, Howard Wial, and Harold Wolman, pp. 21-59 (Washington: Brookings Institution Press, 2008).
29. Alec Friedhoff and Howard Wial, "Bearing the Brunt: Manufacturing Job Loss in the Great Lakes Region, 1995-2005" (Washington: Brookings Institution, 2006). For more on advanced services see Drennan, *Information Economy*.

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For More Information

Howard Wial
The Brookings Institution
1775 Massachusetts Avenue NW
Washington, DC 20036
hwial@brookings.edu
(202) 797-6412

For General Information

The Brookings Institution Metropolitan Policy Program
(202) 797-6139
www.brookings.edu/metro

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- *The Local Economic Impact of "Eds & Meds": How Policies to Expand Universities and Hospitals Affect Metropolitan Economies*
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BROOKINGS

1775 Massachusetts Avenue, NW
Washington D.C. 20036-2188
telephone 202.797.6000
fax 202.797.6004
web site www.brookings.edu

Metropolitan Policy Program
at BROOKINGS

telephone 202.797.6139
fax 202.797.2965
web site www.brookings.edu/metro