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**Working Paper 2008-03**



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# **The Changing Industrial Composition of Manufacturing-Based Regions, 1980-2005**

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## **The Changing Industrial Composition of Manufacturing-Based Regions, 1980-2005**

Howard Wial, *The Brookings Institution*

The United States lost 4.5 million manufacturing jobs, about 24 percent of its manufacturing base, between 1980 and 2005. This loss, its causes, and its consequences for displaced workers and the nation as a whole, have been extensively studied and debated. Yet researchers have paid little attention to the kinds of jobs that have replaced the lost manufacturing jobs in manufacturing-based metropolitan areas that lost manufacturing jobs. These metropolitan areas, located primarily in the Great Lakes region, the Northeast, and the upper South, are the places in which the impacts of manufacturing job loss on the regional economy were, and generally still are, of greatest public concern. Policymakers in these regions need to understand how the industrial structures of their regional economies have changed if they are to craft effective industry-level policies to rebuild those economies. Such policies may be designed either to accommodate the changes that have occurred or to alter the growth pattern of the regional economy.

### **Research Method**

This paper describes patterns of industrial change in the 114 metropolitan areas that met both of the following criteria: (1) manufacturing's share of metropolitan employment in 1980 exceeded its share of national employment by at least 5 percent and (2) the number of manufacturing jobs and manufacturing's share of metropolitan employment declined between 1980 and 2005. Unlike analyses of aggregate metropolitan job growth, it shows how the employment growth rates of different industries vary together in different groups of metropolitan areas. This co-variation reflects production- and consumption-side linkages among industries; those linkages may differ among metropolitan areas. The paper uses cluster analysis to group

together metropolitan areas that had similar employment growth rates in each of 16 broad industries (defined using the 2003 North American Industry Classification System (NAICS)) between 1980 and 2005. The cluster analysis shows which metropolitan areas had high, low, or moderate job growth rates in each industry relative to the job growth rates of the same industry in other metropolitan areas. In so doing, it shows which regions are becoming relatively more or less attractive to which industries. Purely local industries (construction and local government), primarily non-metropolitan industries (natural resources and mining), and the very heterogeneous “local services” are excluded from the analysis.

The cluster analysis produced a set of five clusters that were large enough not to be sensitive to the inclusion or exclusion of individual regions. These clusters showed patterns of industrial change that were robust to a change to a higher level of industry aggregation (NAICS supersectors), to the use of total regional employment rather than industry-specific regional employment as a base from which to measure industry job growth, and to the inclusion of purely local industries, although there were some differences in the particular regions included in each cluster. However, two of the clusters had long right tails in their wage distributions. Given the relatively aggregated nature of the industry categories, this may be evidence of very different patterns of change in more disaggregated industries not captured in the data. Therefore, I separated from each of these clusters the regions in which the overall growth rate of the average wage was at least twice that of the original cluster. This reduced the within-cluster variation in employment growth rates for the original 16 industries. The results reported below are, therefore, based on a total of seven clusters.

## **Results**

Table 1 lists the metropolitan areas in each cluster. For each cluster during the period 1980-2005, table 2 shows the unweighted average employment growth rate in each of the sixteen industries, the unweighted average metropolitan-wide employment and real wage growth rates, and the corresponding U.S. average growth rates. Nationwide, the fastest growing industries were administrative services, health care, education, and professional services, all of which more than doubled their employment during the period of analysis.

[TABLES 1 AND 2 ABOUT HERE]

#### *Low-growth cluster*

This cluster contains regions that lost large shares of their large durable manufacturing job bases and have not recovered. Its metropolitan areas are overwhelmingly in the Midwest. It is characterized by job growth rates well below the national rate in all industries except corporate management and warehousing (which grew at above-national rates) and transportation. Job losses in durable manufacturing were severe compared to the nation as a whole. This is the only cluster in which the average region lost information jobs. Total employment growth and average annual wage growth were the lowest among all clusters.

#### *Advanced services low-growth cluster*

The regions in this cluster are located overwhelmingly in the Northeast. They were very specialized in durable manufacturing in 1980 but less so than in the low-growth cluster. They lost even larger shares of their large durable manufacturing job bases than those in the low-growth cluster but had slightly more job growth and had wage growth above the national rate. The cluster's pattern of industry change is similar to that of the low-growth cluster but with much slower growth in management, warehousing, and administrative services, much higher growth in professional services, and growth in information. NAICS three-digit employment data

show that the job gains in information were very heterogeneous within this cluster (e.g., motion pictures in Los Angeles, Internet publishing in Boston). (Disaggregation of the professional services job gains is not possible at this level.) The high wage growth in this cluster probably results from the growth of very high-wage, narrowly defined industries (such as biotechnology and software) that differ across regions and cannot be detected in the data.

#### *Moderate-growth cluster*

This cluster consists of almost equal numbers of regions in the Northeast and South and only two in the Midwest. Its average metropolitan area specialized strongly in both durables (though less so than in the previous two clusters) and nondurables in 1980. It subsequently lost more of both kinds of manufacturing than the nation as a whole but less in durables than the previous two clusters. It gained jobs in transportation, management, and professional and administrative services at well above national rates. The result was moderate overall job growth but fairly slow wage growth.

#### *Advanced services moderate-growth*

The four regions in this cluster, all in the Northeast or West, had the strongest average initial specialization in durable manufacturing of those in any cluster and suffered severe losses of durable manufacturing jobs about equal to those of the low-growth cluster, as well as above-national losses of nondurables. The most notable features of this cluster are well above national wage growth and extremely strong growth in professional services and management. The three-digit NAICS data also reveal above-national growth in both securities and commodities and funds and trusts in three of the cluster's regions. Overall job growth was moderate, though below the national rate.

#### *Southern growth clusters*

The Southern high- and moderate-growth clusters contain about two-thirds of the Southern metropolitan areas studied in this paper and, with the exception of one Midwestern region, nothing else. Both clusters specialized extremely strongly in nondurable manufacturing (primarily textiles) in 1980 and subsequently had above-national losses of nondurable manufacturing jobs. Both had small gains in durable manufacturing and well above national gains in transportation, warehousing, leisure and hospitality, health care, administrative services, and government. The Southern high-growth cluster had more rapid gains than its moderate-growth counterpart in almost all industries. In particular, the Southern high-growth cluster gained jobs in education and all the advanced services (finance, information, and professional services) at above-national rates, while the Southern low-growth cluster had below-national growth rates in these industries. Despite this difference, both clusters had moderate (though below-national) wage growth.

#### *Midwest peripheral cluster*

This cluster consists mainly of metropolitan areas in the Midwest outside of the immediate Great Lakes area. In 1980 its average metropolitan area specialized in durable manufacturing about as much as the low growth cluster and also specialized to a lesser extent in nondurables. Its durable manufacturing job losses were moderate compared to other non-Southern clusters, and it suffered little loss of nondurables. Its job gains in other industries followed a diversified pattern similar to those in the Southern high-growth cluster (i.e., well above national gains in administrative services, transportation, and advanced services) but at somewhat lower growth rates and without strong growth in the more local service industries. Unlike the Southern high-growth cluster, it had a very strong gain in warehousing. Total job growth was near the national rate but wage growth was very slow.

## **Accounting for the Growth Patterns: Some Hypotheses from Case Studies**

Attempts to use logit analysis to identify initial conditions associated with the various growth patterns identified in this paper were unsuccessful because of convergence problems or because models based on standard regional growth theories produced few meaningful results. However, preliminary case study research conducted in the Charlotte, Cleveland, Rochester (NY), and Scranton metropolitan areas suggests that patterns of regional export-industry growth depended on at least two things. They depended in part on shocks external to individual regions, particularly trade shocks, that affected the regions' major export firms. They also depended on the extent to which those leading export firms were vertically integrated within their home regions. The domination of regional labor markets, suppliers, R&D pipelines, or channels of informal business association and communication by a few large, vertically integrated firms may inhibit the growth of other firms (cf. Chinitz 1961, Christopherson and Clark 2007). Regions in which major export firms were less vertically integrated within their home regions may have been more likely to escape the low-growth pattern. Those without any leading export firms (e.g., Scranton, which was a branch-plant location rather than a corporate headquarters or specialized production site in 1980) may have experienced highly variable growth patterns depending on their other advantages and disadvantages for particular industries. (For example, proximity to major highways and metropolitan centers may have led to the growth of the transportation industry in Scranton.) Further elaboration and testing of these hypotheses is beyond the scope of this paper.

## **Conclusion**

This paper has identified seven growth patterns that accompanied the loss of manufacturing jobs in industrial regions. All present tradeoffs for the well-being of workers,

especially less educated workers. One is characterized by low job growth except in management and transportation/warehousing, as well as low wage growth. Two depend mainly on high job growth rates in advanced services, generally high-wage industries with limited opportunities for less educated workers. They have high wage growth but low aggregate job growth. Two (the moderate growth and Midwest peripheral) depend strongly on high growth in a balance of advanced services, transportation (generally a moderately low-wage industry relative to durable and nondurable manufacturing), and administrative services (a low-wage industry). They produce at least moderate job growth but slow wage growth. The two Southern patterns depend on strong growth in transportation and warehousing and a range of more local industries, while the Southern high-growth pattern also depends on rapid growth in advanced services. Both produce moderate wage growth.

Some economic development analysts and practitioners view an economic base in high technology and/or advanced service employment as the only or most desirable alternative to economic stagnation for industrial regions that have lost manufacturing jobs (e.g., Drennan 2002). However, the paper shows that some of these regions have escaped stagnation while following other growth paths. These alternative growth paths seem to include smaller durable manufacturing job losses than those experienced by the low-growth regions. Although this association between smaller durable manufacturing job losses and avoidance of the low-growth pattern does not by itself indicate causation, it does at least suggest that there is no tradeoff between the retention of durable manufacturing jobs and the rapid growth of employment in a range of service industries.

The paper also shows that a relatively small number of regional economies that experienced severe manufacturing job losses became relatively more attractive to advanced

service industries. These regions are quite heterogeneous in their patterns of industrial change below the NAICS supersector level. This heterogeneity leaves open the possibility that there may be no single “recipe” for promoting a transition from a regional economy based on manufacturing to one based on advanced services.

An important limitation of the analysis presented here is its dependence on NAICS industry categories, which do not make it possible to infer the extent to which a region’s service job gains are related (either directly through value chains or indirectly through export-base multipliers) to its manufacturing job losses. Thus, we cannot tell whether new jobs in transportation or professional services were related to a region’s pre-existing manufacturing base or were even created within manufacturing firms. Such knowledge, however, is potentially important for regional manufacturing retention, workforce development, and small business development policies.

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TABLE 1. Metropolitan composition of the clusters

Low-growth	Akron, OH; Altoona, PA; Anderson, IL; Beaumont, TX; Binghamton, NY; Buffalo, NY; Canton, OH; Cleveland, OH; Danville, IL; Davenport, IA; Dayton, OH; Decatur, IL; Detroit, MI; Elmira, NY; Erie, PA; Fort Wayne, IN; Gadsden, AL; Jackson, MI; Johnstown, PA; Kankakee, IL; Kokomo, IN; Lima, OH; Longview, WA; Mansfield, OH; Michigan City, IN; Milwaukee, WI; Muncie, IN; Niles, MI; Racine, WI; Reading, PA; Saginaw, MI; Springfield, OH; St. Louis, MO; Utica, NY; Weirton, WV; Wichita, KS; Youngstown, OH
Advanced services low-growth	Boston, MA; Chicago, IL; Hartford, CT; Los Angeles, CA; New Haven, CT; Norwich, CT; Pittsfield, MA; Springfield, MA; Vineland, NJ; York, PA
Moderate-growth	Allentown, PA; Bangor, ME; Chattanooga, TN; Danville, VA; Florence, AL; Kalamazoo, MI; Lewiston, ME; Louisville, KY; Lynchburg, VA; Muskegon, MI; Peoria, IL; Portland, ME; Poughkeepsie, NY; Providence, RI; Roanoke, VA; Rochester, NY; Sandusky, OH; Scranton, PA; Sherman, TX; Williamsport, PA; Winston-Salem, NC
Advanced services moderate-growth	Bridgeport, CT; Manchester, NH; San Jose, CA; Worcester, MA
Southern high-growth	Asheville, NC; Athens, GA; Auburn, AL; Blacksburg, VA; Burlington, NC; Charlotte, NC; Greenville, SC; Johnson City, TN; Parkersburg, WV
Southern moderate-growth	Anderson, SC; Cumberland, MD; Decatur, AL; Dothan, AL; Florence, SC; Greensboro, NC; Hickory, NC; Kingsport, TN; Rockford, IL; Rocky Mount, NC; Rome, GA; Spartanburg, SC; Tyler, TX
Midwest peripheral	Appleton, WI; Cedar Rapids, IA; Cincinnati, OH; Dubuque, IA; Janesville, WI; La Crosse WI; Lancaster, PA; Pascagoula, MS; Waterloo, IA

Note: Ann Arbor, MI; Bay City, MI; Cleveland, TN; Flint, MI; Glens Falls, NY; Hagerstown, MD; Indianapolis, IN; Lebanon, PA; South Bend, IN; and Toledo, OH did not fall into any of the above clusters.

TABLE 2. Growth rates of employment and wages, by cluster, 1980-2005

	1	2	3	4	5	6	7	U.S. average
Administrative & waste management services	1.84	1.34	2.76	1.78	4.48	2.90	3.02	<b>2.05</b>
Durable manufacturing	-0.42	-0.52	-0.34	-0.43	0.02	0.09	-0.29	<b>-0.22</b>
Education	0.90	1.03	1.07	0.71	2.10	0.71	0.68	<b>1.22</b>
Federal & state government	0.09	0.01	0.07	0.21	0.38	0.45	0.08	<b>0.17</b>
Finance & insurance	0.23	0.12	0.56	0.63	0.84	0.40	0.94	<b>0.53</b>
Health care	0.90	0.87	1.22	1.04	2.28	1.70	1.23	<b>1.50</b>
Information	-0.08	0.04	0.17	0.31	0.60	0.18	1.51	<b>0.30</b>
Leisure & hospitality	0.49	0.61	0.85	0.76	1.88	1.33	0.86	<b>0.90</b>
Management of companies & enterprises	1.16	0.33	0.92	0.57	2.27	0.65	1.02	<b>0.12</b>
Nondurable manufacturing	-0.24	-0.34	-0.42	-0.46	-0.45	-0.44	-0.02	<b>-0.27</b>
Professional/scientific/technical services	0.74	0.97	1.50	2.08	2.16	1.08	1.30	<b>1.11</b>
Real estate & rental/leasing	0.47	0.60	1.30	0.87	1.79	0.78	0.72	<b>0.92</b>
Trade	0.16	0.23	0.40	0.40	0.72	0.47	0.47	<b>0.42</b>
Transportation	0.33	0.34	0.82	0.42	1.12	1.00	1.02	<b>0.34</b>
Utilities	-0.13	-0.09	-0.27	0.08	-0.13	0.21	0.08	<b>-0.14</b>
Warehousing & storage	0.80	0.63	0.90	0.15	1.06	1.77	4.10	<b>0.75</b>
<b>TOTAL EMPLOYMENT</b>	<b>0.11</b>	<b>0.17</b>	<b>0.29</b>	<b>0.28</b>	<b>0.54</b>	<b>0.30</b>	<b>0.37</b>	<b>0.43</b>
<b>REAL AVERAGE ANNUAL WAGE</b>	<b>0.04</b>	<b>0.38</b>	<b>0.16</b>	<b>0.70</b>	<b>0.21</b>	<b>0.19</b>	<b>0.11</b>	<b>0.28</b>

Notes: 1=Low-growth, 2=Advanced services low-growth, 3=Moderate-growth, 4=Advanced services moderate-growth, 5=Southern high-growth, 6=Southern moderate-growth, 7=Midwest peripheral.





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