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Restructuring in the Manufacturing Workforce: New York State and the Nation

The U.S. economy has lost more than 2.5 million manufacturing jobs since 2000. Although the recent losses, compounded by the 2001 recession, have been particularly heavy, manufacturing employment has been declining over many years. In New York State, more than 1 million jobs, representing half the state's manufacturing employment, have disappeared since the 1960s.

The protracted decline in manufacturing jobs is, however, only half the story. Within manufacturing, the composition of the workforce has been changing dramatically. High-skilled manufacturing jobs are growing in almost every part of the country, including many areas where manufacturing job loss has been particularly severe. And even in the few areas where high-skilled manufacturing jobs are not growing—such as New York State—intensive loss in low-skilled jobs is causing the makeup of the remaining manufacturing workforce to shift toward high-skilled employment.

In this issue of *The Regional Economy of Upstate New York*, we analyze the restructuring of the manufacturing workforce over the past two decades by investigating how the occupational distribution of workers has changed. We identify important regional differences in the nature and degree of this restructuring, and give particular attention to New York State's experience in relation to that of other states in the Northeast.

Our analysis reveals that in all parts of the country the decline in manufacturing jobs since the 1980s has been accompanied by a shift in the remaining workforce composition toward high-skilled occupations, and away from mid- and low-skilled occupations. The mix of skill groups in New York's manufacturing workforce is now virtually identical to the nation's, although the state has lost high-skilled jobs while the nation has gained them. In New York State, the shift toward high-skilled jobs results from significant loss in low-skilled occupations, coupled with a relatively mild loss in high-skilled occupations. Our analysis also shows that despite significant employment loss, New York's manufacturing workforce has undergone a mild degree of restructuring compared with that experienced by the workforces of peer states in the Northeast.

The Long-Term Decline in Manufacturing Employment

Since 1979, manufacturing employment has been in decline across the nation.¹ Analysts commonly attribute this decline to two forces: an increase in labor productivity and the expansion of international trade. Productivity growth reduces the overall need for workers by allowing manufacturers to utilize less labor in the production process. The liberalization of international trade increases global competition, causing less competitive domestic manufacturers to cut back their operations or close. Globalized trade has also led some domestic manufacturers to relocate part or all of their operations to other countries in order to be closer to international customers or to take advantage of less expensive labor.

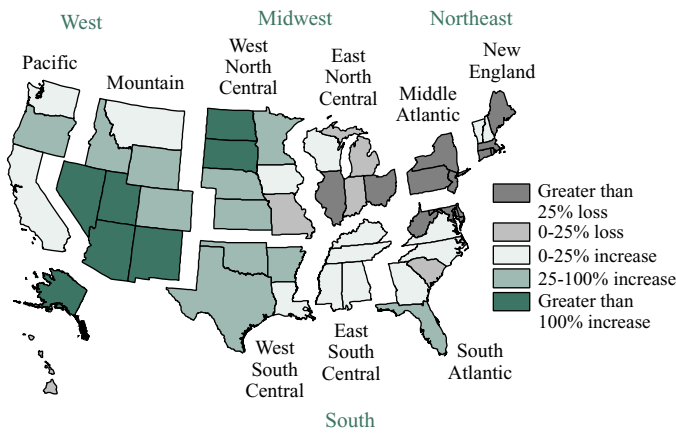
These forces are likely to affect lower-wage, and hence lower-skilled, U.S. workers disproportionately. Productivity gains are often achieved by substituting machinery and technology for human labor, and low-skilled workers are particularly vulnerable to such displacement. The types of jobs relocated abroad also tend to be at the low end of the skill spectrum, where labor is most plentiful and least expensive. Thus, industries that rely heavily on low-skilled workers will be hit particularly hard by these forces.

However, the forces of productivity growth and globalization also create jobs, both in the manufacturing sector and in other sectors of the economy. Technology advances promote the development of high-skilled jobs, including jobs in research and development and in fields such as engineering. Liberalized trade can also lead to the creation of specialized, high-skilled domestic jobs in those markets where the U.S. labor force has a competitive edge.

Together, the job-creating and job-displacing effects of these forces are causing a restructuring of the manufacturing workforce—a permanent change in the types of jobs performed in the manufacturing industry. On net, however, at least since 1979, manufacturing job losses have outweighed manufacturing job gains.

Despite the nationwide net loss in manufacturing jobs, manufacturing employment has not been declining in every region of the country—long-term

Regional Changes in Manufacturing Employment: 1969-2002



Source: Bureau of Economic Analysis, Standard Industrial Classification (SIC) definition of manufacturing employment.

losses have been limited almost exclusively to the Northeast. Within the United States, manufacturing employment has been migrating to the South and West (see map). Research suggests that this domestic migration stems in part from the shift of the population out of the Northeast to the South and West, with employers following. In addition, it appears that manufacturing companies are relocating in order to take advantage of the lower priced resources—land, labor, and energy—available in these areas.²

Thus, while the U.S. manufacturing workforce is undergoing significant change everywhere, regional disparities in job loss suggest that restructuring is taking different forms in different parts of the nation. In the sections that follow, we examine these trends in restructuring in more detail. We begin by looking at the current makeup of the manufacturing workforce in the country as a whole and in various regions.

Composition of the Manufacturing Workforce

We analyze the existing composition of the manufacturing workforce using data on occupations and wages from the Current Population Survey, a monthly household survey conducted by the Bureau of the Census for the Bureau of Labor Statistics. We separate workers into three skill classes – high, mid, and low – based on median wages of broad occupational aggregations. The high-skilled group, accounting for about one-quarter of all manufacturing workers nationwide, contains managerial and professional specialty occupations, with a national median hourly wage of about \$24. The mid-skilled group, accounting for roughly 35 percent of manufacturing workers, contains technical, sales, administrative, precision production, craft, and repair occupations, with a median hourly wage of \$14.60. The low-skilled group, representing about 40 percent of manufacturing workers, contains service occupations, as well as operators, fabricators, and laborers, with a median hourly wage of about \$11.³

The mix of these occupational categories in the manufacturing labor force differs significantly across regions (Table 1).⁴ In the West – the Pacific and Mountain regions – high-skilled workers make up more than 30 percent of the total manufacturing workforce, well above the national share of 25

Table 1

Share of Employment by Occupation Skill Groups: 2002 (Percent)

| | High-Skilled | Mid-Skilled | Low-Skilled |
|----------------------|--------------|-------------|-------------|
| New England | 32.1 | 36.8 | 31.0 |
| Mountain | 31.2 | 36.5 | 32.3 |
| Pacific | 30.1 | 37.9 | 32.0 |
| West South Central | 26.6 | 39.4 | 33.9 |
| Middle Atlantic | 26.5 | 33.7 | 39.8 |
| West North Central | 24.0 | 35.3 | 40.7 |
| East North Central | 23.3 | 32.7 | 43.9 |
| South Atlantic | 23.2 | 33.6 | 43.2 |
| East South Central | 15.3 | 33.5 | 51.1 |
| New York | 25.7 | 34.8 | 39.4 |
| United States | 25.3 | 35.0 | 39.7 |

Sources: Bureau of the Census and Bureau of Labor Statistics; *Current Population Survey*; author's calculations.

percent. Low-skilled workers in the West account for about 32 percent of manufacturing employment—a share several points below the national share—while mid-skilled workers claim a slightly higher share of manufacturing employment than their counterparts across the nation. The New England region has a similar structure, with high-skilled workers representing about 32 percent of its manufacturing workforce. With the exception of the East South Central region, the remaining regions have a mix of skill groups roughly equivalent to that of the nation. The East South Central region has a very low share of high-skilled workers – only 15 percent, fully 10 percentage points below the national share, and more than half of its manufacturing workforce is low-skilled.

The composition of the manufacturing workforce has not been constant—at either the regional or the national level. To analyze the restructuring of the workforce at both levels, we look at the growth and decline of individual occupational groups. We then assess the extent of restructuring by measuring the overall change in the occupational composition of manufacturing employment.

Restructuring of the Manufacturing Workforce

For our analysis of restructuring, we again draw on occupation and wage data from the Current Population Survey. These data are available only for the years 1983-2002, a period that roughly coincides with the national decline in manufacturing employment that began in 1979. It is clear that since 1983, the nation’s manufacturing workforce has become increasingly high-skilled: Employment in high-skilled manufacturing occupations increased 37 percent between 1983 and 2002, while employment in low-skilled occupations fell 25 percent and employment in mid-skilled occupations dropped 18 percent (Table 2).

The change in occupational groups varies among regions. For the most part, the growth in high-skilled manufacturing occupations bypassed the Northeast – the region hit hardest with manufacturing employment losses – and was concentrated instead in and near the West. High-skilled occupations grew rapidly in the West South Central and Mountain regions. Losses in mid- and low-skilled occupations were most severe in the Middle Atlantic, New England, and East North Central regions. The Pacific region

Table 2

Regional Employment Changes by Occupation Skill Groups: 1983-2002 (Percentage Change)

| | Total | High-Skilled | Mid-Skilled | Low-Skilled |
|----------------------|-------------|--------------|--------------|--------------|
| Mountain | 24.3 | 91.7 | 24.1 | 27.3 |
| West North Central | 12.1 | 60.9 | -7.3 | -5.5 |
| West South Central | 5.0 | 144.2 | 11.5 | -23.0 |
| East South Central | 3.5 | 29.2 | -4.0 | -20.1 |
| East North Central | 0.2 | 37.2 | -20.9 | -18.5 |
| Pacific | -1.9 | 18.8 | -18.6 | -17.1 |
| South Atlantic | -8.8 | 63.4 | -12.0 | -29.5 |
| Middle Atlantic | -33.5 | -0.2 | -37.5 | -39.5 |
| New England | -34.4 | 12.8 | -42.1 | -54.6 |
| United States | -9.3 | 36.6 | -18.2 | -25.0 |

Sources: Bureau of the Census and Bureau of Labor Statistics, *Current Population Survey*; Bureau of Economic Analysis; author's calculations.

gained high-skilled manufacturing jobs at a slower rate than the nation, while its losses in mid- and low-skilled employment were similar to the nation's.

These trends are changing not only the number of workers in different occupations, but also the composition of the manufacturing workforce. For the nation as a whole, high-skilled workers now represent a larger share of employment, while the shares of mid- and low-skilled workers have been shrinking. In 1983, high-skilled workers accounted for 16 percent of all manufacturing workers; by 2002, their share had increased to 25 percent. Over the same interval, the share of low-skilled manufacturing workers fell from 46 percent to 40 percent, and the mid-skilled group's share dropped marginally, from 37 percent to 35 percent. This changing composition is evidence of a significant and long-term restructuring of the manufacturing workforce away from low-skilled occupations and toward high-skilled occupations.

Virtually every part of the country is undergoing a similar restructuring. However, the Northeast has borne much of the manufacturing employment decline, so we focus on the changes in its workforce composition. This focus allows us to examine restructuring in New York State relative to that in peer states experiencing similar broad-based employment declines.

Restructuring in the Northeast

Over the past two decades, the Northeast suffered a loss of manufacturing employment more than triple the loss experienced by the nation as a whole (Table 2). We take a closer look at restructuring in the Northeast and in several states adjacent to the region (Table 3).

Only five states in the nation lost high-skilled manufacturing jobs over the period, and three of these states are in the Northeast – New York, New Jersey, and Connecticut. All Northeast states lost

low-skilled employment, and all but Vermont lost mid-skilled employment. Clearly, Maryland, Vermont, and Rhode Island saw the largest gains in high-skilled employment. The largest losses in mid-skilled employment were in Massachusetts and Maryland, and the largest low-skilled losses were in Maine and Connecticut.

Differing rates of growth and decline in these skill groups have resulted in a shift in the composition of each state's workforce. We compare the shares of total manufacturing employment held by the three occupation groups at the beginning of the period with their shares at the end of the period; the difference enables us to assess the nature and extent of workforce restructuring in the individual states (Table 3). Despite the loss of high-skilled employment in some states, the composition of employment shifted toward high-skilled employment in every state in the Northeast; each state increased its share of high-skilled employment and reduced its share of low-skilled employment, and the share of mid-skilled employment shrank in all states except Vermont. This shift occurred even in states which lost high-skilled employment, such as New York, because the percentage losses in mid- and low-skilled employment were much greater than the percentage loss in high-skilled employment.

Although restructuring shifted every state's composition toward high-skilled employment, some states have undergone more restructuring than others. For example, Connecticut experienced a net loss in manufacturing jobs nearly identical to New York's, but it underwent much more significant restructuring. While high-skilled workers in New York increased their share of manufacturing employment 6.6 percentage points during the period, Connecticut's high-skilled workers increased their share 12.1 points. And while New York's low-skilled workers saw their share of employment decline 2.8 percentage points, the employment share of Connecticut's low-skilled workers fell more than 12 points. Connecticut's greater degree of restructuring resulted primarily from its very large—63 percent—loss in low-skilled employment, as compared with New York's 41 percent loss, coupled with roughly similar high-

Table 3

State Employment Changes by Occupation Skill Groups: 1983-2002

| | Percentage Change | | | | Percentage Point Change in Shares | | |
|----------------------|-------------------|--------------|--------------|--------------|-----------------------------------|-------------|-------------|
| | Total | High-Skilled | Mid-Skilled | Low-Skilled | High-Skilled | Mid-Skilled | Low-Skilled |
| Rhode Island | -42.0 | 62.9 | -40.8 | -43.5 | 16.1 | -5.8 | -10.3 |
| New Jersey | -40.6 | -4.3 | -38.7 | -48.8 | 10.2 | -1.8 | -8.4 |
| Connecticut | -40.1 | -10.3 | -42.8 | -63.0 | 12.1 | 0.3 | -12.4 |
| New York | -38.8 | -14.3 | -42.4 | -40.5 | 6.6 | -3.7 | -2.8 |
| Massachusetts | -36.1 | 22.2 | -50.7 | -55.5 | 18.1 | -7.3 | -10.9 |
| Maine | -30.7 | 0.1 | -34.5 | -66.5 | 9.4 | 10.0 | -19.4 |
| Pennsylvania | -22.5 | 25.9 | -29.8 | -33.4 | 9.6 | -2.9 | -6.7 |
| Delaware | -20.9 | 7.6 | -36.9 | -22.6 | 8.9 | -8.2 | -0.8 |
| Maryland | -19.5 | 108.5 | -48.3 | -52.3 | 26.6 | -11.3 | -15.3 |
| New Hampshire | -12.2 | 14.5 | -17.2 | -34.2 | 8.9 | -0.5 | -8.4 |
| Vermont | -6.5 | 63.3 | 5.7 | -15.7 | 8.6 | 0.6 | -9.2 |
| Ohio | -6.2 | 24.0 | -37.1 | -22.4 | 8.1 | -7.8 | -0.3 |
| Michigan | 3.1 | 39.3 | -8.5 | -10.7 | 6.8 | -2.3 | -4.5 |
| United States | -9.3 | 36.6 | -18.2 | -25.0 | 9.1 | -2.4 | -6.6 |

Sources: Bureau of the Census and Bureau of Labor Statistics, *Current Population Survey*; Bureau of Economic Analysis; author's calculations.

and mid-skilled employment declines. Massachusetts underwent an even more striking restructuring, despite a manufacturing job loss roughly equivalent to New York's. The employment share of its high-skilled workers rose 18.1 percentage points, while the employment share of its low-skilled workers dropped 10.9 points and the share of its mid-skilled workers fell 7.3 points.

Although New York's manufacturing employment losses were similar in percentage terms to those of much of the Northeast between 1983 and 2002, its restructuring was the least pronounced of any state in the region. Like its peer states, New York saw its employment composition shift toward high-skilled occupations, but it did not experience the growth in high-skilled manufacturing jobs that resulted in the much sharper shift toward high-skilled employment observed in other states.

Conclusion

The U.S. manufacturing workforce is undergoing significant restructuring. Despite a net loss of manufacturing jobs over the past two decades, gains in high-skilled occupations, coupled with losses of mid- and low-skilled occupations, are shifting the workforce composition, resulting in a greater percentage of workers in high-skilled occupations and a lower percentage in mid- and low-skilled occupations. The Northeast, which has suffered the brunt of the long-term decline in manufacturing employment, is very much a part of this national pattern. New York is one of only a few states to lose high-skilled manufacturing

jobs, but since losses in mid- and low-skilled occupations are large in relation to high-skilled employment losses, its remaining labor force composition has a greater percentage of high-skilled workers.

Although attention has focused on the dramatic nationwide decline in manufacturing jobs over the past few years, it is important to recognize that the existing workforce has been undergoing long-term restructuring. And while all regions are going through a similar form of workforce restructuring, the magnitude of these changes differs significantly across regions—an important observation too frequently overlooked amid the statistics on nationwide manufacturing job loss.

Notes:

¹ We use the Standard Industrial Classification (SIC) definition of manufacturing since the new North American Industry Classification System (NAICS) definition is much narrower, and includes primarily production workers. We are interested in all occupations within the industry, including high-skilled occupations such as managers, which are excluded from NAICS. In addition, historical NAICS data are limited.

² See, for example, Robert Crandall, *Manufacturing on the Move*, Brookings Institution, 1993; and Howard Howe and Mark Leary, "New York State's Merchandise Export Gap," Federal Reserve Bank of New York *Current Issues in Economics and Finance* 2, no. 12 (May 1996).

³ Bureau of the Census and Bureau of Labor Statistics, *Current Population Survey*, 2002.

⁴ We do not refer to statistically significant differences here or elsewhere in this article since such tests were not performed; we point to general differences that illustrate broad trends.

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