FEDERAL RESERVE BANK OF NEW YORK Volume 7 Number 1

CURRENT ISSUES IN ECONOMICS AND FINANCE

Second district highlights

January 2001

Declining Manufacturing Employment in the New York–New Jersey Region: 1969-99

Jason Bram and Michael Anderson

Between 1969 and 1999, manufacturing employment in the New York–New Jersey region plunged 51 percent—a drop that far exceeded the 8.4 percent decline in manufacturing jobs nationwide. Some areas within the region were especially hard hit by the employment losses: New York City shed more than two-thirds of its manufacturing jobs, while neighboring northern New Jersey lost 55 percent. Inflation-adjusted, or real, income from manufacturing also fell in the region, although less dramatically than employment.

While New York and New Jersey lagged the United States in job growth in virtually all major industry sectors during the period, regional manufacturing employment trailed by an even wider margin. In 1969, manufacturing accounted for 28 percent of both national and regional employment. By 1999, its share of total employment had fallen to 14 percent at the national level and 11 percent in the region.

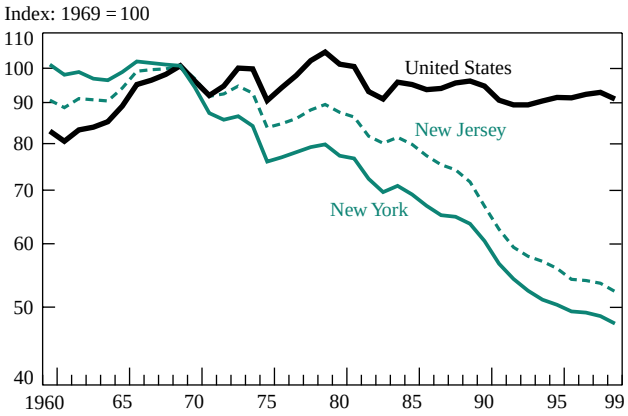
In this edition of *Second District Highlights*, we investigate why manufacturing employment contracted so much more rapidly in New York and New Jersey than in the rest of the country between 1969 and 1999. After determining that cross-state variations in industry mix cannot account for this difference, we pursue an alternative hypothesis—the idea that much of the weakness in the New York–New Jersey region can be explained by a general dispersion of manufacturing activity from the older, more manufacturing-intensive states of the Northeast to the less industrially developed states in the South and West. We construct a simple model to test this hypothesis and find that dispersion can in fact explain almost all of the decline in manufacturing employment in New Jersey and much of it in New York. Refinements to the model suggest that New York's subpar performance in manufacturing also reflected a more general weakness in employment that prevailed across many sectors of the state's economy during the period.

What Was behind the Manufacturing Losses?

Between 1969 and 1999, New York State lost 52 percent of its manufacturing jobs—a larger percentage than any other state; New Jersey ranked second, with a decline of 48 percent (Chart 1). Since manufacturing employment nationwide fell less than 9 percent during the same period, factors unique to New York and New Jersey most likely accounted for the steep decline.

One factor that might help explain the considerable difference between the national and the regional experience is industry mix, or the precise types of manufacturing that have been concentrated in the region. Researchers have shown that such industry effects can strongly influence trends in state employment (Rissman 1999; Clark 1998). Thus, if a region had a disproportionately large share of declining manufacturing industries and a below-average share of expanding industries over the 1969-99 period, its manufacturing sector as a whole would very likely have underperformed manufacturing nationwide, even in the absence of any other adverse forces.

Chart 1
Trends in Manufacturing Employment: New York, New Jersey, and the Nation



Source: U.S. Department of Labor, Bureau of Labor Statistics.

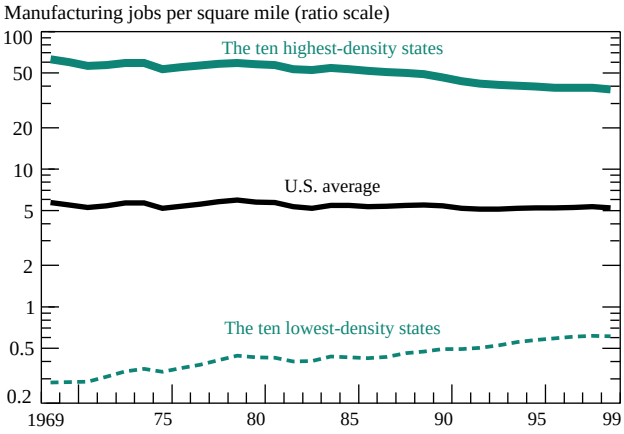
Nevertheless, when we consider the full spectrum of manufacturing industries, we find that the New York–New Jersey region's industry mix was essentially "neutral" between 1969 and 1999.[1] On the one hand, New York and New Jersey had a high concentration of the apparel, leather, and jewelry industries, all rapidly shrinking types of manufacturing. On the other hand, these states had a sufficient number of growth industries—most notably, publishing and pharmaceuticals—to offset the adverse effects from the declining sectors. The region also benefited from a low exposure to such key contracting industries as steel, textiles, and tobacco. Thus, industry mix appears to shed little light on the large gap between regional and national job losses in manufacturing during the 1969-99 period. Indeed, the fact that almost all manufacturing industries in New York and New Jersey saw larger declines in their share of total employment than did the corresponding industries nationwide suggests that the fortunes of individual industries ultimately counted for little in the region's overall job picture.

A more likely explanation for the region's weak manufacturing performance centers on *dispersion* in manufacturing activity, a process that began at the start of the last century. In the early 1900s, manufacturing was highly concentrated in a few major port cities in the Northeast. A large labor force and ready access to land and water transportation accounted for the northeastern states' dominance as manufacturing centers. As the decades passed, however, several developments relaxed the locational constraints on this kind of industry and eroded the region's unique advantages. The gradual migration of the U.S. population to the South and West, the construction of a cross-country network of railroads and highways, and the widespread implementation of a variety of technological advances made it possible for manufacturing, and commerce more generally, to take root in other parts of the country. At the same time, high labor, land, and energy costs increasingly put the Northeast at a disadvantage.[2] As a result of these developments, the past few decades witnessed a steady convergence in "manufacturing density"—the average number of manufacturing jobs per square mile of land—across states (Chart 2).

Modeling the Effects of Dispersion

To examine whether manufacturing dispersion can at least partially account for the steep job losses experienced by New York and New Jersey, we construct a simple statistical model. The model seeks to explain 1999 manufacturing employment in each state as a function of two variables—manufacturing employment in 1969 and state land area. Including 1969 manufacturing employment as an explanatory variable implies that we are examining the 1999 level of manufacturing employment after controlling for the 1969 level. We are therefore essentially predicting the percentage change in manufacturing employment across states, conditional on 1969 manufacturing density.[3]

Chart 2
The Dispersion of Manufacturing Employment, 1969-99



Source: Authors' calculations, based on data from the U.S. Bureau of the Census and the U.S. Department of Labor, Bureau of Labor Statistics.

Note: The converging lines in the chart show that manufacturing employment has been shifting from those states with the highest density of manufacturing jobs to those with the lowest.

Tests of the model reveal that 1969 manufacturing employment and state land area explain much of the state-by-state variation in 1999 levels of employment. States with a high density of manufacturing jobs tend to experience larger percentage losses (or smaller percentage gains) in manufacturing employment.[4] This result suggests that dispersion was indeed a driving force behind changes in manufacturing employment across states.

How should we understand the relationship established by the model? One plausible interpretation is that heavily urbanized states with high-density manufacturing employment tend to have higher land prices and higher labor costs. Since land and labor costs figure importantly in firms' overall operating costs, manufacturers have an incentive to relocate to other states.

Manufacturing density may also serve as a proxy for some explanatory variables that, while difficult to measure, might contribute significantly to the dispersion of manufacturing activity. For example, states with high manufacturing density tend to be older states with a long history of industrial development. These states may have an aging infrastructure that could pose problems for manufacturing firms. In addition, the steady population migration away from the older states could weaken customer markets and reduce labor supply—other conditions that might discourage manufacturers. According to a recent Federal Reserve Bank of New York study (Deitz and De Mott 1999), low unemployment rates across upstate New York in 1997 and 1998 suggest that weakness in manufacturing employment during these years may have stemmed in part from labor shortages created by the steady net outmigration of the population. Although the adverse conditions we have described may not be the direct result of manufacturing density, they could clearly motivate manufacturing firms to establish their businesses in other areas of the country. Thus we do not claim that manufacturing density necessarily *causes* subsequent changes in manufacturing employment, but only that it helps *predict* them.

Although the model is generally successful in forecasting the extent of gains and losses in manufacturing employment across states, its predictions for New Jersey prove more accurate than those for New York. New Jersey experienced a 47.7 percent drop in manufacturing employment over the 1969-99 period; our model predicts a 42.3 percent drop and thus explains most of the decline. New York experienced a 52.3 percent decline in manufacturing employment from 1969 to 1999, but our model predicts a much milder 22.7 percent drop. Thus, in New York's case, we can explain less than half of the decline. To explore other factors that may have contributed to New York's employment losses, we need to refine our model.

Taking Account of Broad Job Trends

Our statistical analysis thus far suggests that the geographic dispersion of manufacturing activity can account in significant measure for the 1969-99 manufacturing job declines in New York and New Jersey. It is also possible, however, that a broad decline in employment across all sectors of the two states' economies contributed to the sharp cutback in manufacturing employment. Although some might argue the reverse—that is, that manufacturing employment drives total employment—our model assumes that any such effect is minimal.[5] Indeed, recent research suggests that a variety of demographic and economic forces determine regional growth, affecting both manufacturing and nonmanufacturing employment.[6] In the case of the New York–New Jersey region, for example, the gradual movement of the population from the Northeast to other parts of the country most likely dampened job growth in all sectors.

To test the importance of overall employment trends, we respecify our model to include total nonmanufacturing employment as an explanatory variable. Thus, we seek to explain 1999 manufacturing employment in each state as a function of 1969 manufacturing employment, state land area, and the change in state nonmanufacturing employment between 1969 and 1999.[7]

When we estimate the respecified model, we find that all of these variables are statistically significant. Consistent with our earlier results, states with a high density of manufacturing jobs tend to experience steeper declines in manufacturing employment. In addition, states with the weakest growth in total employment tend to sustain the sharpest contractions in manufacturing employment.[8]

The respecified model performs much better than the original model in explaining New York State's manufacturing job loss. While the original model forecast only a 22.7 percent decline in manufacturing employment, the amended model forecasts a 40.3 percent drop—a value much closer to the actual decline of 52.3 percent (see table). Thus, by factoring in changes in nonmanufacturing employment, we are able to account for more than 75 percent of New York's manufacturing job loss. These results suggest that the 1969-99

Explaining Regional Manufacturing Job Loss, 1969-99

	Job Loss (Percent)	
	New York	New Jersey
Actual loss	-52.3	-47.7
Predicted loss, based on		
U.S. trends[a]	-8.4	-8.4
U.S. trends + density	-22.7	-42.3
U.S. trends + density + state nonmanufacturing employment	-40.3	-43.0

[a]Nationwide decline in manufacturing employment between 1969 and 1999.

decline in New York's manufacturing employment stemmed from two developments—the dispersion of manufacturing activity and the state's slow overall employment growth relative to that of the nation.

In the case of New Jersey, the respecified model explains roughly 90 percent of the state's manufacturing job decline. Nevertheless, the gain in explanatory power over the original model is quite small. The amended model predicts a manufacturing job decline of 43.0 percent, only slightly closer to the actual decline of 47.7 percent than the 42.3 percent decline predicted by the original model (see table). Thus, dispersion alone can account for almost all of the state's manufacturing job losses; growth in nonmanufacturing employment had little effect because it closely tracked the national average.

Local Industry Trends

Thus far, we have examined manufacturing employment for the region as a whole. In order to get a more detailed picture of employment changes within New York and New Jersey, we now review 1969-99 developments in specific metropolitan areas and their key local industries (Chart 3).

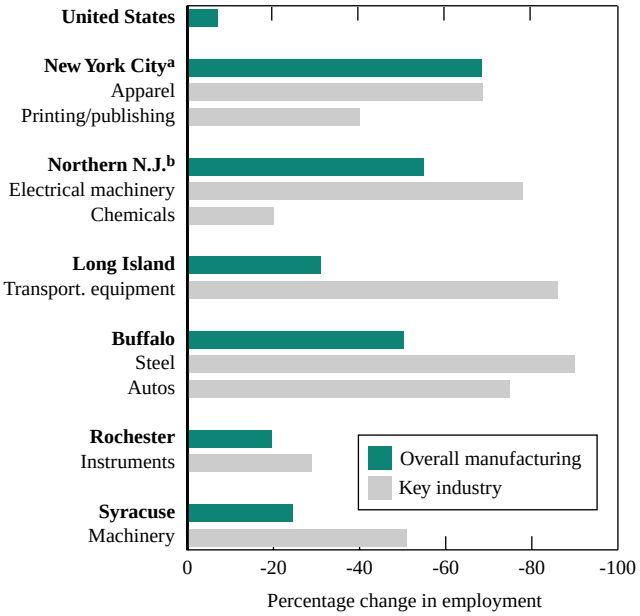
Of the major metropolitan areas in the region, New York City experienced the sharpest cutbacks in manufacturing jobs. In 1969, the city was credited with a sizable 30 percent of the region's manufacturing employment. Over the next thirty years, manufacturing employment fell 68 percent—a drop that accounts for a full two-fifths of the region's net manufacturing job losses. Manufacturing's share of city employment also declined dramatically during the period, from 22 percent to just 7 percent.

In 1969, New York City was a major hub of apparel manufacture; indeed, well over a quarter of local manufacturing jobs were tied to this industry. The printing and publishing industry was another leading employer. Between 1969 and 1999, however, the city experienced steep percentage losses in employment in all of its manufacturing industries, and employment tumbled 69 percent in the apparel business and 40 percent in printing and publishing.[9] Despite these setbacks, both industries continued to be important employers in the region: printing and publishing's share of local employment in 1999 was still nearly twice the national average, and apparel's share was nearly four times the average.

Because New York City has always been a top location for corporate headquarters, one might conjecture that the city's sharp employment losses were driven largely by the downsizing of head offices, as opposed to cuts in production jobs. However, data from the U.S. Bureau of the Census (1971, 2000) indicate that manufacturing job losses in New York City between 1967 and

Chart 3

Percentage Decline in Manufacturing Employment: New York–New Jersey Metro Areas and Their Key Industries, 1969-99



Sources: U.S. Department of Labor, Bureau of Labor Statistics; New York State Department of Labor; New Jersey Department of Labor.

[a]New York City comprises the five boroughs of the Bronx, Brooklyn, Manhattan, Queens, and Staten Island.

[b]Northern New Jersey is defined here as Bergen, Essex, Hudson, Morris, Passaic, Sussex, and Union Counties.

1997 were slightly greater among production workers than among nonproduction, or supervisory, workers.

Like the New York metro area, the densely populated cities of northern New Jersey were especially hard hit by the decline of manufacturing employment. In 1969, Jersey City, Newark, and Patterson together represented a major manufacturing center. Over the next three decades, manufacturing employment in this area fell more than 50 percent as steep job losses in electrical machinery—a critical local industry—and almost all other durable goods industries eclipsed relatively mild losses in the area's sizable chemicals industry.

In Long Island, manufacturing employment underwent a more moderate 30 percent decline during the 1969-99 period. Strong growth in chemicals and in printing and publishing mitigated the effects of an 86 percent drop in the area's key aircraft and transportation equipment industry.

In upstate New York, employment trends differed across metropolitan areas. While most upstate cities were alike in relying strongly on the manufacturing sector, each has traditionally had its own distinct and highly specialized industries. Thus, much of the variation in performance across the metropolitan areas appears to be a function of how key local industries fared.

Buffalo's relatively high-paying steel and auto industries contracted dramatically over the 1969-99 period, causing the city's manufacturing employment to plummet 50 percent. In Rochester, by contrast, employment in the instruments industry fell less than 30 percent between 1969 and 1999, moderating overall manufacturing job losses. Almost all of the job losses occurred in the 1990s, and metropolitan Rochester still had the highest concentration of manufacturing jobs in the region at the end of the decade. Finally, while Syracuse weathered a steep 50 percent job loss in its machinery industry, overall manufacturing employment in the 1969-99 period declined by a relatively modest 25 percent. In this city, smaller manufacturing industries such as transportation equipment and printing and publishing chalked up outright job gains, largely offsetting the losses in machinery.

Conclusion

The 1969-99 manufacturing job losses in both New York and New Jersey clearly owed much to the nationwide decline in the importance of manufacturing. Our statistical model, however, suggests that the unusually steep nature of the losses in these two states reflected another phenomenon—the geographic dispersion of manufacturing activity in recent decades. Employment has been shifting from northeastern states that have historically had a high density of manufacturing jobs to southern and western states with a low density of such jobs. Together with national trends, dispersion explains almost all of New Jersey's manufacturing job loss and nearly half of New York's. Below-average growth in total employment can largely account for the remainder of New York's job loss in this sector.

While much recent concern about manufacturing cutbacks has focused on upstate New York, the greatest job losses in the 1969-99 period occurred in the most densely populated areas of the region—New York City and parts of northern New Jersey. Although Buffalo saw considerable shrinkage in its manufacturing sector, job losses were decidedly more moderate in most upstate cities. Nevertheless, because upstate New York has historically relied on the manufacturing sector much more heavily than New York City, the overall impact of the employment changes may, in fact, have been more pronounced.

Despite the sharp decline in overall manufacturing employment, some moderating trends were evident in this sector during the past three decades. Certain industries—New York City's publishing and apparel industries, Rochester's instruments industry, and northern New Jersey's pharmaceuticals business—maintained a fairly strong presence in the region. Moreover, while the number of manufacturing workers in the region dropped sharply during the 1969-99 period, aggregate real earnings held up somewhat better. As a result, average real earnings per manufacturing worker grew 55 percent in New Jersey and 37 percent in New York State, significantly outpacing the 26 percent rise in worker earnings for the nation as a whole.

In the years ahead, the manufacturing sector should place less drag on the region's economy. Manufacturing's diminished share of employment will make New York and New Jersey less vulnerable to ongoing weakness in this sector. Moreover, while manufacturing job losses can be expected to continue, the rate of employment decline has slowed considerably in the past few years, bringing the states' job trends more closely in line with those of the nation.

Notes

1. We examine the twenty manufacturing industries identified at the 2-digit level in the Standard Industrial Classification code. Of course, the characteristics of a given industry at the regional level may differ from those of the same industry at the national level, leading to differential growth rates.

2. For example, a Federal Reserve Bank of New York study by Howe and Leary (1996) attributed much of New York's manufacturing export decline in the 1990-95 period to high energy and urban housing costs as well as physical infrastructure weaknesses.

3. In our model, we use an exponential functional form that allows the explanatory variables to interact with each other to create a measure of state manufacturing density in 1969. To estimate the model empirically, we take the natural log of the data. This procedure transforms our model into one that is linear in its parameters, enabling us to estimate the model using least squares.

4. We use a weighted least squares procedure to correct for heteroskedastic errors; a White test rejected the null hypothesis of homoskedasticity at the 0.001 significance level. The weights are the inverse of the predicted standard errors taken from a White regression. Our exact results are

$$Mfg99 = 0.26 \cdot Mfg69^{0.81} \cdot Area^{0.24},$$

with all parameters statistically significant at the 0.001 level. This equation can be rewritten as

$$\frac{Mfg99}{Mfg69^{1.05}} = 0.26 \cdot \left(\frac{Mfg69}{Area}\right)^{-0.24},$$

indicating the negative relationship between manufacturing density and changes in manufacturing employment. Controlling for climate (as measured by mean temperature) and geographic location (as determined by census division) did not add to the explanatory power of the model or affect the significance of the original explanatory variables.

5. If manufacturing employment did drive nonmanufacturing employment, then nonmanufacturing employment would become an endogenous variable in our model. In that case, the weighted least squares procedure that we use would be biased and inconsistent.

6. See Glaeser et al. (1992) and Hansen (1990).

7. As before, we use an exponential functional form, allowing the variables to interact with one another.

8. Our exact results are

$$Mfg99 = 0.20 \cdot Mfg69^{1.06} \cdot \left(\frac{Mfg69}{Area}\right)^{-0.22} \cdot \frac{NonMfg99^{0.58}}{NonMfg69^{0.61}},$$

with all parameters statistically significant at the 0.001 level.

9. Interestingly, all the net job loss was in printing; publishing (which is being reclassified as a nonmanufacturing industry under the government's new North American Industry Classification System) registered job gains.

References

Clark, Todd E. 1998. "Employment Fluctuations in U.S. Regions and Industries: The Roles of National, Region-Specific, and Industry-Specific Shocks." *Journal of Labor Economics* 16, no. 1 (January): 202-29.

Crandall, Robert. 1993. *Manufacturing on the Move*. Washington, D.C.: Brookings Institute.

Deitz, Richard, and Mike De Mott. 1999. "Is Upstate New York Showing Signs of a Turnaround?" Federal Reserve Bank of New York *Current Issues in Economics and Finance* 5, no. 6 (May).

Glaeser, E. L., et al. 1992. "Growth in Cities." *Journal of Political Economy* 100, no. 6: 1126-52.

Hansen, Niles. 1990. "Do Producer Services Induce Regional Economic Development?" *Journal of Regional Science* 30, no. 4 (November): 465-76.

Howe, Howard, and Mark Leary. 1996. "New York State's Merchandise Export Gap." Federal Reserve Bank of New York *Current Issues in Economics and Finance* 2, no. 12 (November).

Rissman, Ellen. 1999. "Regional Employment Growth and the Business Cycle." Federal Reserve Bank of Chicago *Economic Perspectives* 23, no. 4 (fourth quarter): 21-39.

U.S. Bureau of the Census. 1971. *1967 Census of Manufactures*. Vol. 3. November.

———. 2000. *1997 Economic Census, Manufacturing*. Geographic Area Series. May.

About the Authors

Jason Bram is an economist in the Business Conditions Function of the Research and Market Analysis Group; Michael Anderson is an assistant economist in the Domestic Research Function.

The views expressed in this article are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

Second District Highlights, a supplement to *Current Issues in Economics and Finance*, is published by the Research and Market Analysis Group of the Federal Reserve Bank of New York. Dorothy Meadow Sobol is the editor.