Current Issues

IN ECONOMICS AND FINANCE

SECOND DISTRICT HIGHLIGHTS

The Evolution of Commuting Patterns in the New York City Metro Area

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Has the migration of jobs to the suburbs changed the commuting patterns in the New York City metro area? An analysis of current commuting trends suggests that Manhattan remains the region's undisputed employment center and that workers are actually traveling farther to their jobs. Two factors appear to account for the longer commutes: the dispersion of people and jobs and a greater tolerance for long-distance travel among employers and employees.

With the emergence of the American suburb in the 1940s and its growing prominence in the 1950s and 1960s, the expectation arose that the suburbs would eventually become independent of their central, or "host," cities. In this view, the suburbs would over time surpass their host cities in population and become employment centers in their own right. Closely associated with this view was the belief that the monocentric pattern of commuting—in which workers commute to a central city from outlying areas—would give way to a pattern in which suburban residents would commute to suburban jobs. City jobs, in turn, would be filled by city residents, who could also "reverse commute." As the distribution of jobs across cities and suburbs came to conform more closely to the distribution of the population, the length of the typical commute would decline (see Crane and Chatman [2003]).

Looking back from the vantage point of the new century, we can assess whether events have borne out these

expectations. There is little doubt that "edge cities" or suburbs[1] have grown faster than their host cities and that some have developed into formidable commercial centers. It is less clear, however, that commuting patterns have evolved in the direction foreseen in the 1950s and 1960s.

In this issue of *Second District Highlights*, we track the changes in commuting patterns in one metropolitan region—the twenty-seven-county area that centers on New York City—from 1980 to 2000. Our examination suggests that throughout the New York metro region, commuters are traveling farther and spending more time in transit than in the recent past. Moreover, the monocentric pattern of commuting, though not as dominant as it once was, still prevails in the region. While the suburbs are attracting growing numbers of commuters, workers traveling into New York City still greatly outnumber those who commute to any of the outlying areas.

Our inquiry into the reasons for longer commutes suggests that the ongoing dispersion of jobs and people has

played a role. Also important, however, are behavioral changes: A reduced sensitivity to distance is evident among both employers and employees—attributable, perhaps, to increased job specialization, the quest for residential amenities, and the rise of flexible work schedules.

Commuter Flows: Changing Patterns?

Historically, the most prevalent form of commuting has involved workers traveling from their homes in the suburbs to their jobs in a single central city. In the New York metro region, this monocentric pattern has translated into a flow of people from New York City's outer boroughs and the suburbs of New York State, New Jersey, and Connecticut into Manhattan. The commuting trends reflect the economic relationships within the region: Manhattan has been the engine of growth for the entire metro area, claiming the highest concentration of jobs and most of the best-paying jobs in the region. The economies of the outer boroughs and suburbs, by contrast, have largely benefited from spin-off effects.

To assess the extent to which the growth of the region's outlying areas in recent decades has altered the historical commuting pattern, we examine the U.S. Census Bureau's County-to-County Worker Flow Files. For each county in the United States, this data set captures the number of workers commuting to every county at the time of the decennial census.[2] For our analysis, we track the changes in commuter flows across the twenty-seven counties of the metro region between the census years of 1980 and 2000.[3]

While the Worker Flow Files reveal that a majority of the region's jobs are filled by same-county residents, our focus is on those jobs that attract workers from other counties. Significantly, the data show an increasing dispersion of such jobs across the metro area counties (see table). The number of workers commuting to Hunterdon, Sussex, Monmouth, Somerset, and Morris counties in New Jersey and to Putnam and Orange counties in New York State rose more than 100 percent between 1980 and 2000. By contrast, the number of workers commuting into Manhattan—New York County—rose less than 5 percent over the same period.

However, despite the gains made by other metro area counties, the monocentric pattern of commuting remains the norm in the region. As the table shows, the absolute number of commuters into Manhattan has continued to eclipse the numbers traveling into the metro region's other counties. Nassau County drew 195,000 commuters in 2000, more than any other county outside New York City, but this number falls far short of the nearly 1.5 million workers who commuted to Manhattan in that year.

Further evidence of Manhattan's continued dominance as an employment center is found in the high percentage of residents from key suburban areas who commute to Manhattan (Figure 1). In 2000, as many as 22 percent of working residents of Long Island, 19 percent of those in the lower Hudson Valley, and 11 percent of those in nearby northern New Jersey worked in Manhattan. These proportions changed only modestly from 1980.

Even if we broaden our concept of the central city to include all five of the boroughs that make up New York City—the Bronx, Brooklyn, Queens, and Staten Island as well as Manhattan—we find that the monocentric pattern prevails. Between 1980 and 2000, the number of people commuting into New York City increased from 655,000 to 775,000,[4] while the number of people "reverse commuting" out of the city grew from 171,000 to 242,000. Although the reverse commuters showed a much larger percentage increase—
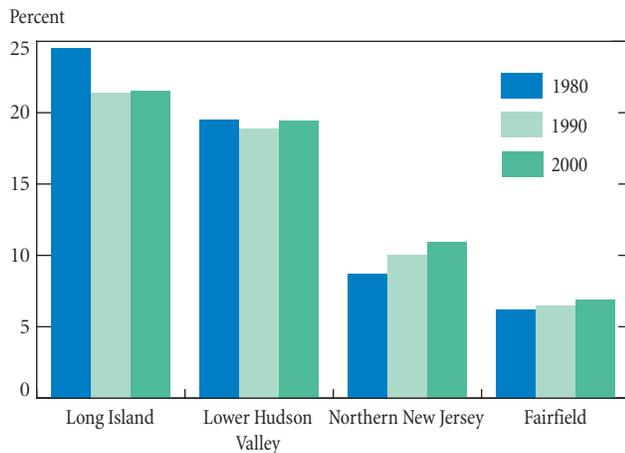
Inbound Commuters by County

Thousands of Workers Commuting into Each County

	1980	2000	Percentage Change
Manhattan, N.Y.	1,395	1,459	4.6
Brooklyn, N.Y.	192	236	22.7
Queens, N.Y.	178	229	28.8
Nassau, N.Y.	150	195	30.2
Bergen, N.J.	132	188	43.0
Essex, N.J.	151	179	18.5
Middlesex, N.J.	96	168	75.4
Morris, N.J.	65	138	114.0
Westchester, N.Y.	88	134	51.7
Union, N.J.	111	116	4.0
Hudson, N.J.	80	113	40.8
Bronx, N.Y.	93	112	20.1
Fairfield, Conn.	61	109	77.3
Somerset, N.J.	43	96	125.4
Passaic, N.J.	65	77	19.3
New Haven, Conn.	41	72	77.7
Suffolk, N.Y.	44	71	62.3
Monmouth, N.J.	29	67	126.5
Staten Island, N.Y.	18	34	88.0
Rockland, N.Y.	15	29	88.0
Orange, N.Y.	14	28	103.8
Dutchess, N.Y.	15	25	64.4
Hunterdon, N.J.	9	24	160.3
Litchfield, Conn.	11	19	72.2
Warren, N.J.	10	16	69.0
Sussex, N.J.	4	10	143.9
Putnam, N.Y.	4	10	130.7

Source: U.S. Bureau of the Census, County-to-County Worker Flow Files.

Note: The table uses the borough names *Manhattan, Brooklyn,* and *Staten Island* in place of the less familiar county names—*New York, Kings,* and *Richmond,* respectively.

Figure 1

Commuters to New York City as a Percentage of Working Residents: 1980–2000

Percent

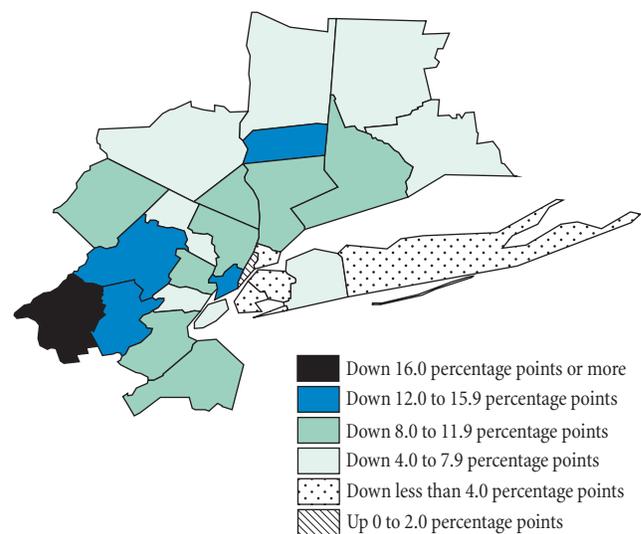Source: U.S. Bureau of the Census, County-to-County Worker Flow Files.

outside the county. Our finding on the increased time spent in transit contrasts with recent research at the national level, which concludes that commutes tend to be faster than in the past. Glaeser, Kolko, and Saiz (2000) argue that the migration of jobs to outlying areas, where congestion is much lighter than in the cities, has reduced the ratio of commuting time to distance.

Exploring the Reasons for Longer Commutes

If jobs in the metro area are more dispersed now—as the growing number of commuters to outlying counties would suggest—why have commutes become longer? Early commentators on the suburbs predicted that workers would be traveling shorter distances once jobs moved out from the cities to the suburbs. More recently, Crane and Chatman (2003), in a comprehensive study of commuting patterns across U.S. metropolitan areas in 1985-97, provide support for this view with their finding that job decentralization tends to *shorten* the average journey to work, holding everything else constant.[5]

One way to understand the longer commutes in the New York City metro area is to consider that job decentralization may cause, or at least make possible, a further dispersion of

42 percent compared with 18 percent—the inbound commuters outnumbered them three to one.

Longer Commutes

Although jobs in the New York metro area have clearly become more dispersed, the prediction that suburbs would soon rival their central city as employment centers has not proved true in this region. Similarly, events in the metro area have not borne out the prediction that commutes would become shorter as more workers found jobs in the suburbs.

Drawing again on the County-to-County Worker Flow Files, we find that people appear to be commuting longer distances. Between 1980 and 2000, the proportion of jobs filled by residents of the same county declined in every county except Manhattan (Figure 2). And between 1990 and 2000, the proportion declined in all twenty-seven counties. Moreover, all of the net increase in intercounty commuting has been to nonadjacent, as opposed to neighboring, counties. While a relatively modest proportion of metro area commuters travel more than one county away, that proportion has been rising steadily, particularly in the 1990s (Figure 3). Only in Suffolk County did the proportion decline. Together, these findings suggest that the average commute to work has grown longer over the past two decades.

In addition, Census Bureau data indicate that the duration of the average commute has lengthened to roughly the same degree as the distance covered. Mean travel time to work shows a substantial rise throughout the metro area—even in Suffolk, where a declining share of commuters works
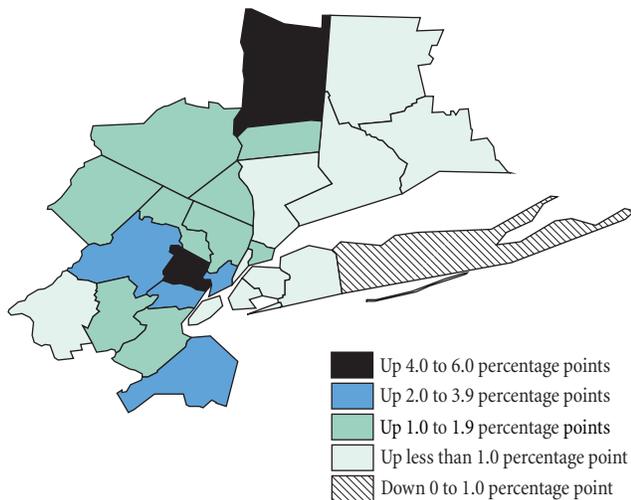
Figure 2

Change in Proportion of Jobs Filled by Same-County Residents: 1980 to 2000

Source: U.S. Bureau of the Census, County-to-County Worker Flow Files.

Note: Warren County, New Jersey, which is included in our analysis, is technically not part of the New York City Combined Metropolitan Statistical Area and is not included on this map. The percentage of Warren County's jobs filled by county residents has decreased by 13 percentage points.

Figure 3

Change in Proportion of Residents Commuting beyond Adjacent Counties: 1990 to 2000

Up 4.0 to 6.0 percentage points
Up 2.0 to 3.9 percentage points
Up 1.0 to 1.9 percentage points
Up less than 1.0 percentage point
Down 0 to 1.0 percentage point

Source: U.S. Bureau of the Census, County-to-County Worker Flow Files.

Note: Warren County, New Jersey, which is included in our analysis, is technically not part of the New York City Combined Metropolitan Statistical Area and is not included on this map. The percentage of Warren County's working residents commuting beyond adjacent counties increased by 2.9 percentage points.

the population. That is, as jobs migrate to the suburbs, people may be induced to move farther out, to homes in more distant suburbs or even to areas once considered rural. Such an interaction between the migration of jobs and people could contribute to the longer commutes observed in the data.

A second possible reason for the longer commutes is a change in behavior—a reduced sensitivity to, or increased tolerance for, distance. Workers may simply be more willing to travel far to their jobs, just as employers may be readier to pay a premium to attract workers who live at a distance.

To assess the contribution that these two factors may have made to longer commutes, we use a gravity model—a tool used by economists and geographers to assess the relationship between distance and flows of goods, services, or people (see box). Our model expresses the number of commuters from one county to another as a function of the number of workers in the home county, the number of jobs in the destination county, and the distance between the two counties. By observing how this relationship has changed over time, we can break down the change in commuting patterns into two sources: changes in the geographic distribution of workers and jobs and changes in commuter behavior—that is, changes in the sensitivity of commuting to long distances.

Gravity Model of Commuting

The gravity model of commuting presents a more formal, quantitative way to explain the relationship among the number of commuters from one county to another, the population of workers in each county, and the distance between the two counties.[a]

In this model, we show that C, the number of commuters from one county i to another j, is positively related to P_i, the population of workers residing in county i, and E_j, the number of employees in county j, but negatively related to D_{ij}, the distance between the two counties. By using a simple log-linear regression of these variables, we can quantify the relationship among the variables. In addition, by pooling data from the 1980, 1990, and 2000 censuses, we establish a framework for quantifying changes in the effect (elasticity) of distance on commuting.

The following equations show the estimated coefficients for population, employment, and distance for 1980 and 2000. Year dummy variables are interacted with distance only, to estimate changes in the dampening effect of distance on commuting between 1980 and 2000:

$$1980: C_{ij}=0.1611\frac{P_i^{0.4699}E_j^{1.0897}}{D_{ij}^{3.2511}} \quad 2000: C_{ij}= 0.1611\frac{P_i^{0.4699}E_j^{1.0897}}{D_{ij}^{3.093}},$$

where C_{ij} is the number of people commuting from county i to county j, P_i is the total number of working residents in county i, E_j is the total number of people working in county j, and D_{ij} is the distance between the two counties. Only the coefficient (power) on distance is allowed to vary across years—the lower the coefficient, the less of a dampening effect distance has on commuting.

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[a]Because of the difficulty of estimating the distance covered in same-county commutes, we exclude them from our gravity model. As a very rough measure of the distance between two counties i and j, we use the distance between the geographic center of county i and the geographic center of county j from the ArcView mapping software produced by ESRI (the Environmental Systems Research Institute). Note that the distance measure is "as the crow flies" and does not take into account natural obstacles such as bodies of water. This problem is most pronounced in the case of Nassau and Suffolk counties, the two counties on Long Island. To improve the distance measure for the Long Island counties, we recalculated the distances between Suffolk and Nassau counties, on the one hand, and all other counties, on the other, by assuming that the commuter would have to travel through Queens to reach his or her destination.

To isolate the effect of commuter behavior on the length of commutes, we can use the model to predict how commuting patterns would have changed from 1980 to 2000 if population and employment in all twenty-seven counties of the metro area had remained unchanged. Holding these two factors constant, the model estimates that the number of 10-mile commutes would have increased by 44 percent, the number of 50-mile commutes by 87 percent, and the number of 100-mile commutes by 109 percent.

Alternatively, we can hold sensitivity to distance constant and estimate how much of the change in commuting patterns was driven by shifts in the geographic distribution of people and jobs. Using this approach, we can compare the number of workers predicted to commute from one county to another in 2000 with the actual number and repeat this exercise for every pair of counties in the region. The overall increase in commuting distance can be summarized by observing the change in the proportion of (1) *all* workers commuting to a different county, and (2) a subset of this group consisting of workers who commute beyond adjacent counties—that is, commuters who cover particularly long distances. By tallying up and then comparing the actual and predicted commuting counts across the whole metro area, we can attribute the overall increase in these respective proportions to shifts in people and jobs and/or a diminished sensitivity to distance.

We find that the increase in the proportion of all metro area workers commuting to a different county—from 38 percent in 1980 to 41 percent in 2000—stems almost entirely from shifts in people and jobs. However, most of the rise in the proportion of commuters traveling beyond adjacent counties—from 10 percent in 1980 to more than 12 percent in 2000—can be attributed to reduced sensitivity to distance. Thus, both the dispersion of workers and jobs and a greater tolerance for distance appear to have contributed to the trend toward longer commutes.

To understand how the model works in a particular instance, consider the increase in the number of workers making the roughly 50-mile commute from Westchester County, New York, to Morris County, New Jersey. Between 1980 and 2000, this number grew from 170 to 362, an increase of 113 percent. Our model indicated that the diminishing sensitivity of commuting to long distances would be expected to raise the number of 50-mile commutes by 87 percent. Accordingly, in this case, the change in commuter behavior would explain about three-quarters of the overall increase in the number of commuters. The rest of the increase can be attributed to overall growth in population and employment in the respective counties.

Why Distance May Now Matter Less

While our econometric analysis suggests that a change in behavior has contributed significantly to the metro area's longer commutes, it does not explain *why* commuters' behavior has changed—that is, why distance has had less of a dampening effect on commuting over time. There are a number of potential explanations for this reduced sensitivity to long commuting distances. First, the growing specialization in jobs may make it increasingly difficult to match workers with these jobs. Thus, employers may now need to look further afield geographically to find the right person for a particular job and, conversely, workers may need to look further afield to find a good job fit for their skills and interests. This effect would be compounded in a dual-earner household where the workers may have to take jobs far from one another.

Second, increased specialization in residential amenities may prompt someone working in a given location to look for a home in a more distant area. For example, a family seeking bucolic surroundings or a top-rated school may choose a very different community than a family looking for brisk nightlife or low property taxes.

Third, declining transportation costs (relative to earnings) would clearly tend to reduce the constraining effect of distance on commuting.[6] From 1980 to 2000, nominal per capita personal income more than tripled, while the transportation component of the metropolitan area consumer price index increased 94 percent. Relatively lower commuting costs would have the greatest impact on commuters with more modest incomes because, for this group, transportation can claim a larger share of the household budget.

Finally, although rising income clearly increases the cost of long commutes, the rise of flexible work schedules, as well as advances in telecommunications and information technology, may enable workers to put in fewer days at the office. A 20 percent increase in the average commuting time may be more palatable if one typically commutes only three or four days a week. Moreover, technological advances have enabled at least some commuters—particularly those in the information industries—to work more productively in transit, making the commute less of a time burden.

Other often cited explanations for the change in commuter behavior seem less plausible. Some observers have suggested that improvements in transportation links have made possible faster commutes over a given distance; however, as noted earlier, average commute times have increased across the board to roughly the same extent that distances have increased. Other analysts have argued that rising housing costs have forced people to commute longer distances. While this may

well be the case for certain types of workers in some areas, the argument does not appear to apply broadly to workers in the New York metro area, since census data show that, of people working in a given county in this area, the *higher* wage earners tend to have longer commutes.[7]

Regional Interdependence

Regardless of its causes, the fact that workers are commuting farther from their primary residence implies strengthening economic linkages across counties, communities, and even states in the metropolitan region.[8] More specifically, the increased worker flows, both in and out of New York City (particularly Manhattan), are a sign that the suburbs and inner city have grown increasingly interdependent in recent decades.[9]

Recent research suggests that a metropolitan area's economic performance is significantly affected by the performance and functionality of its central city. This theory is based on the finding that the primary economic linkage between central business districts and their suburbs is in the form of trade—city firms providing services to suburban residents and businesses and vice versa (see Haughwout and Inman [2002]). Like Voith (1993), we find a different channel—the commuting linkages between the central city and its outlying areas—and, on the strength of the evidence from the census data, argue that this channel is growing in importance.

Conclusion

The Census Bureau's rich worker flow data set offers tremendous potential for comprehensive research on changes in commuting patterns.[10] Drawing on county-to-county commutation data, we have been able to sketch a rough picture of recent trends in the New York metro area. We find that although the outlying counties are attracting growing numbers of commuters, Manhattan remains the region's unambiguous employment center. Moreover, despite the migration of jobs to the suburbs, both the time and the distance of the average commute have lengthened noticeably since 1980. Using a gravity model to investigate the relationship between worker flows and distance, we determine that the dispersion of both people and jobs has played a role in the metro area's longer commutes. Also important, however, has been a change in the behavior of employers and employees: Distance now appears to be less of a deterrent in the matching of people and jobs.

Notes

1. In this article, we use the term "suburbs" to encompass the entire metropolitan area outside the *primary* central city (New York City); this term includes a number of secondary (and fairly large) urban centers, such as Newark, New Jersey; Morristown, New Jersey; Stamford, Connecticut; Yonkers, New York; and Poughkeepsie, New York.

2. For some states, such as Connecticut, the worker flow data are provided at the level of the town or village. We aggregated the Connecticut numbers into county-level aggregates for the sake of consistency with the New York and New Jersey data.

3. Data from the 1970 census presented comparability problems and were not used.

4. The number of people commuting into New York City is smaller than the number commuting into Manhattan because many of the commuters into Manhattan reside in the outer boroughs.

5. The authors acknowledge that commutes "seem to be slowly lengthening" but argue that "the average commute would be longer still if jobs were not suburbanizing." Their analysis is not based on the decennial census but rather on panel data from the American Housing Survey that cover selected years from 1985 to 1997.

6. This effect is, of course, separate from the marginal cost of commuting *time*, which would tend to rise with earnings.

7. Detailed information on wage earnings (by major industry) for commuters between specified counties can be found at <http://www.bea.doc.gov/bea/regional/reis/jtw/default.cfm>.

8. The same trend appears to be taking place nationally, although we have focused our analysis on the New York City metro region exclusively.

9. In line with these trends, the Census Bureau has recently redefined the New York metropolitan area such that the broader consolidated metropolitan region now reaches farther into Connecticut and the lower Hudson Valley.

10. The 2000 census includes more detailed commuting data by community, which would be particularly useful in identifying worker travel patterns in smaller metropolitan areas where both the central city and many of the suburbs are in the same county. Unfortunately, the lack of detailed community-level data for earlier census years would make an examination of changes in commuting patterns difficult.

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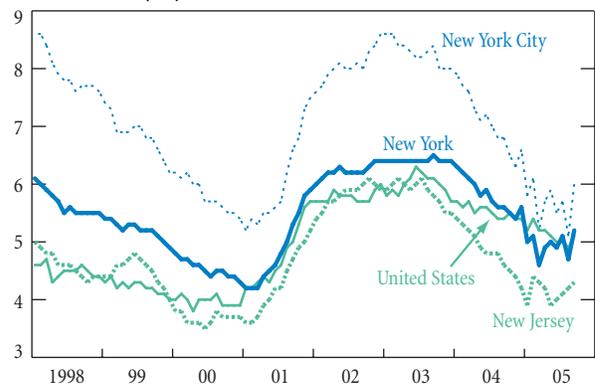
Economic Trends in the Second District

Payroll Employment

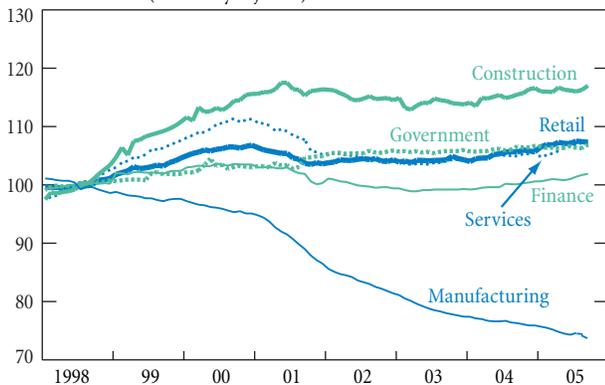Index: 1998 = 100 (seasonally adjusted)
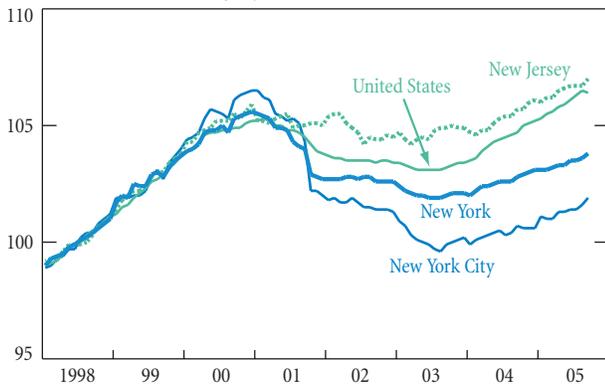
Unemployment Rates

Percent (seasonally adjusted)

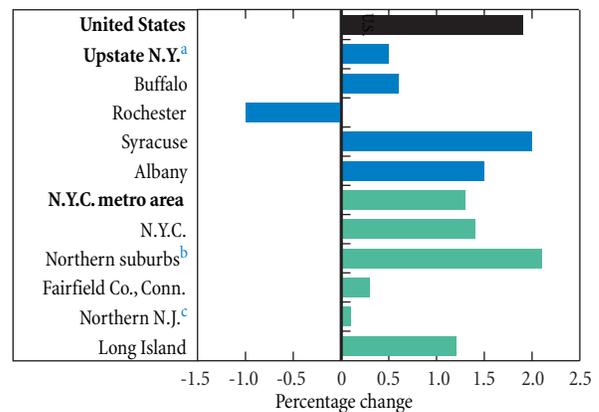## Payroll Employment in Selected Sectors
New York and New Jersey Combined

Index: 1990 = 100 (seasonally adjusted)

Job Growth in the Nation and Selected Metropolitan Areas
Third-Quarter 2004 to Third-Quarter 2005

Sources: New York, New Jersey, and Connecticut Departments of Labor; U.S. Department of Labor, Bureau of Labor Statistics; U.S. Bureau of the Census; Federal Reserve Bank of New York.

[a] Upstate New York comprises the four metropolitan areas listed as well as Binghamton, Elmira, Glens Falls, Ithaca, and Utica-Rome.

[b] The northern suburbs of New York City comprise Dutchess, Orange, Putnam, Rockland, and Westchester counties, New York.

[c] Northern New Jersey comprises Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, and Union counties, as well as Pike County, Pennsylvania.

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