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Nineteenth-Century Urbanization Patterns in the United States

ROGER F. RIEFLER

By viewing urban areas in the northeast quadrant of the United States as a system of cities, this paper attempts to isolate the common factors precipitating the overall pattern of urbanization in the nineteenth century. For the antebellum period commercial activity, both interregional and especially intraregional trade, appears to be the driving force generating urbanization. During the post-bellum period manufacturing comes to the fore as the prime factor allowing cities to grow at a rate exceeding that of their hinterland.

I

URBANIZATION of the United States in the nineteenth century has been described in numerous scholarly texts. As Eric Lampard, writing in 1961, pointed out, "... the urban-industrial transformation [has] now become part of the furniture displayed in every up-to-date textbook of U.S. history. . . ."¹ Yet, as the same author had pointed out six years earlier, at that time "no systematic study has ever been made of the role of cities in recent [as opposed to medieval] economic development. We are still unable to counter the charge that cities are 'abnormal' and 'costly' with any account of the ways in which they have actually facilitated, let alone fostered, progressive economic change."² Obviously, since 1955 significant progress has been made towards filling this lacuna.³

Scholars have responded to Lampard's challenge by emphasizing two relatively distinct vantage points. The first, exemplified in the work of Douglass North, Julius Rubin, and George Rogers Taylor, tends to view cities as being contained in or comprising relatively homogeneous regions and, as a corollary, emphasizes the role of external relationships (for ex-

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¹ Eric E. Lampard, "American Historians and the Study of Urbanization," *American Historical Review*, 67 (Oct. 1961), 52.

² Eric E. Lampard, "The History of Cities in the Economically Advanced Areas," *Economic Development and Cultural Change*, 3 (Jan. 1955), 83-84.

³ For a more comprehensive review of this literature see Diane Lindstrom and John Sharpless, "Urban Growth and Economic Structure in Antebellum America," in Paul Uselding, ed., *Research in Economic History*, vol. 3 (Greenwich, Conn., 1978), 161-216.

ample, interregional trade, intercity communication) as the mechanism of economic change.⁴

Although interregional exchange may generate national growth by the familiar mechanism of specialization, to a significant extent the growth of a particular urban area may be viewed as "growth competitive": cities are seen as competing for a share of the observed national growth.

The second approach to urban development, illustrated in recent work by Jeffrey Williamson, Simeon Crowther, Diane Lindstrom, and John Sharpless, adopts a more nodal view of an urban area.⁵ Emphasis is placed on intraregional as opposed to interregional exchange. The city-hinterland relationship is a major focus of attention. Often implicitly underlying this approach is the view that urban growth, rather than being competitive, is generative; that is, the observed growth of the totality is merely the sum of the growth of its parts.

The focus of this paper is the urbanization process. In the nineteenth-century United States two processes coincided: cities grew and the proportion of the population living in urban areas increased. The important thing to realize is that although the two processes are interconnected, they are different. It is entirely possible, for instance, to have city growth without an increase in the urbanization ratio. Although we can expect that many of the explanations advanced in the literature for city growth (in particular cases or in general) may aid in explaining urbanization and vice versa, care must be taken to avoid making such transformations too quickly.

In contrast to much of the previous nineteenth-century urbanization literature, the primary objective of this paper is not to explain the growth of a specific urban area or to explain variations in city growth rates, but rather to hypothesize that there was a common factor or set of factors precipitating the overall pattern of urbanization. It is our objective to isolate those factors operating in the nineteenth century.⁶

II

This paper utilizes two models common to the literature on city growth to gain insights into the nineteenth-century pattern of urbanization in the

⁴ Douglass C. North, *The Economic Growth of the United States, 1790 to 1860* (Englewood Cliffs, N. J., 1961); Julius Rubin, *Imitation by Canal or Innovation by Railroad: A Comparative Study of the Response to the Erie Canal in Boston, Philadelphia and Baltimore*, unpublished Ph.D. dissertation, Columbia Univ., 1959; George Rogers Taylor, *The Transportation Revolution, 1815-1860* (New York, 1951).

⁵ Jeffrey G. Williamson, "Antebellum Urbanization in the American Northeast," this JOURNAL, 25 (Dec. 1965), 592-608; Simeon J. Crowther, "Urban Growth in the Mid-Atlantic States, 1785-1850," this JOURNAL, 36 (Sept. 1976), 624-43; Diane L. Lindstrom, "Demand, Markets and Eastern Economic Development: Philadelphia, 1815-1840," this JOURNAL, 35 (Mar. 1975), 271-73; Lindstrom and Sharpless, "Urban Growth and Economic Structure."

⁶ In this sense our paper is more in the tradition of Allan R. Pred, *The Spatial Dynamics of Urban-Industrial Growth, 1800-1914* (Cambridge, Mass., 1966) than that of Jeffrey G. Williamson and Joseph A. Swanson, "The Growth of Cities in the American Northeast, 1820-1870," *Explorations in Economic History*, 2nd series, 4 (Supp. 1966), 3-101.

United States. The first is the export-base model.⁷ As applied to nineteenth-century city growth this model usually takes one of two forms: an entrepôt version emphasizing interregional trade and the commercial export base, and a manufacturing version focusing upon the industrial export base.⁸

The second model utilized is based on central place theory.⁹ Crucial to this theory is the symbiotic relationship that exists between a city and its hinterland and the existence of economies of scale in the provision of urban goods and especially urban services. Here emphasis is on center-periphery or intraregional rather than interregional trade.

The urban areas included in our analysis are all located in what may be called the northeastern quadrant of the United States. Our sample extends from those cities in New England in the northeast to St. Louis, Peoria, and Rockford, Illinois in the west. Our southeastern-most city is Washington, D.C. The only cities included in our analysis that are both west of the Alleghenies and south of the Ohio River are those in West Virginia and Louisville in Kentucky. The spatial delineation of our sample was motivated by George Rogers Taylor's assessment of the concentration of antebellum manufacturing in the northeast as well as consideration of temporal development patterns during the nineteenth century and what might be termed the modern industrial belt of the United States.¹⁰ Only cities currently identified as being parts of Standard Metropolitan Statistical Areas (SMSAs) were included in the sample.¹¹ Statistics were gathered for a total of 103 areas, but data constraints usually restricted the sample size utilized in specific tests.¹²

Use of the SMSA concept is crucial for our analysis. Although we utilize published decennial census data on population to measure city growth, a consistent definition of "hinterland" is needed. Given the paucity of intraregional trade statistics and the slightly over one hundred cities in our sample, some *a priori* delineation of a city's hinterland was necessary. SMSAs were designed to meet the modern concept of a metropolitan area as "an integrated economic and social unit with a recognized urban population nucleus of substantial size."¹³ The spatial extent of an SMSA is determined largely by contemporary commuting patterns.¹⁴ They represent fairly homogeneous labor markets. How well, though,

⁷ James Heilbrun, *Urban Economics and Public Policy* (New York, 1974), Ch. 7.

⁸ See Allan R. Pred, *Urban Growth and the Circulation of Information: The United States System of Cities 1790-1840* (Cambridge, Mass., 1973) for a complementary approach emphasizing information flows.

⁹ Hugh O. Nourse, *Regional Economics* (New York, 1968), Ch. 3.

¹⁰ Taylor, *Transportation Revolution*, p. 246. See also Pred, *Urban Growth*, p. 4, and John Sharpless, *City Growth in the United States, England and Wales, 1820-1861* (Ann Arbor, 1975), p. 130.

¹¹ Executive Office of the President, Office of Management and Budget, *Standard Metropolitan Statistical Areas*, Revised (Washington, 1975).

¹² A listing of the 103 SMSAs is available on request.

¹³ Executive Office of the President, *Standard Areas*, p. iii.

¹⁴ *Ibid.*, p. 1-4.

does a contemporary SMSA match the historical counterpart of a nineteenth-century city and hinterland?¹⁵

Several factors dictated our choice of the SMSA, as defined in 1975, to delineate nineteenth-century urban economic areas. First, although they may overestimate the hinterland of a city, especially in the early antebellum period, they do provide a consistent upper bound to a city's "zone of interest." They provide a spatial zone of interest that is mutually exclusive in the sense that, for instance, a part of the Philadelphia SMSA is unlikely to have been "serviced" by Lancaster in the antebellum period, Allentown in the post-bellum period, and Philadelphia in the twentieth century. Economic relations beyond the SMSA boundary undoubtedly were more subject to the vagaries of interregional competition. We can be fairly certain that those areas contained in the SMSA, *to the extent* that they were integrated into the country's urban system, were under the zone of interest of the central city or cities of the area.¹⁶

Second, since we will be concerned with comparative growth in the hinterlands versus that in the cities, the SMSA concept provides us with a unit that approximates a homogeneous labor market. Thus, when analyzing the spatial distribution of manufacturing, we can assume labor is a fairly ubiquitous resource within the boundaries of the SMSA and focus on other local inputs (for example, raw materials, transportation, services, and so forth) as dictating the locational choice between city and hinterland.

Finally, use of the SMSA with its emphasis on labor market homogeneity is preferred to the alternative of using Bureau of Economic Analysis Areas (BEAs) for the nineteenth century.¹⁷ Current BEAs are based upon modern trading patterns (especially for the service and trade sectors) rather than labor market homogeneity. If, however, we accept the Moses-Williamson thesis that "in the nineteenth century [as opposed to the twentieth century] the cost of moving goods within the city was: (1) high relative to the costs of moving people within cities; and (2) high relative to the cost of moving goods between cities," then it follows that the SMSA definition with its emphasis on the movement of people would be more appropriate for the nineteenth century than the available alternative of the BEA.¹⁸

¹⁵ Note that Williamson and Swanson, "Growth of Cities," Crowther, "Urban Growth" and Lindstrom and Sharpless, "Urban Growth and Economic Structure" use differing definitions of a city's hinterland. All these authors, however, use a broader geographical definition of hinterland than that applied in this paper.

¹⁶ In those cases where the SMSA contains more than one central city (for example, the Allentown-Bethlehem-Easton SMSA) the population and manufacturing employment reported for all components was added to derive the city (versus hinterland) statistic used below.

¹⁷ Bureau of Economic Analysis, U. S. Dept. of Commerce and Economic Research Service, U. S. Department of Agriculture, *1972 OBERS Projections of Regional Activity in the United States*, vol. 2 (Washington D. C., 1974).

¹⁸ Leon Moses and Harold F. Williamson, Jr., "The Location of Economic Activity in Cities," *The American Economic Review*, 57 (May, 1967), 212. A final justification for adopting the SMSA concept rests on the rather robust results, reported below, examining the relationship between 1860 and 1900 city and hinterland populations.

Given the use of the SMSA concept, the applicability of central place theory is tested by correlating central place (city or cities) population with hinterland (non-city SMSA) population. Since we wish to test whether central place theory plays a significant role in explaining urbanization rather than the precise size of that impact, and since no account is taken of other factors such as differential income levels, topography, industry mix, and so forth affecting development patterns, a nonparametric test rather than a (multiple) regression technique is applied. Specifically we hypothesize that during the antebellum period central place theory plays a significant role in explaining urban growth patterns in the northeast quadrant of the United States. In the later nineteenth century, 1870–1900, we expect a much weaker association due to the growth of secondary activity (for example, a manufacturing export base) in major cities.

The influence of manufacturing on urban development patterns is investigated through the use of location quotients. The location quotient, which is designed to measure the relative importance of manufacturing in an SMSA, is defined in equation 1.

$${}_tLQ_i = \frac{{}_tNmfg._i / {}_tPop_i}{{}_tNmfg._{u.s.} / {}_tPop_{u.s.}}, \quad (1)$$

where:

$Nmfg._i(Nmfg._{u.s.})$ = the manufacturing labor force in SMSA i (U.S.),

$Pop_i(Pop_{u.s.})$ = the population of SMSA i (U.S.), and

t = the year (1860 or 1900).

The larger the coefficient, the more important manufacturing is in the SMSA's economic base.¹⁹ The location quotient is correlated with relative population growth, city center versus total SMSA, in order to isolate the impact, if any, of manufacturing on the process and pattern of urbanization. Again nonparametric techniques are used.

For the post-Civil War period it is our hypothesis that the more important manufacturing in an SMSA, the faster the growth of the city versus the rest of the SMSA. This would reflect the urban orientation of manufacturing during this period and the growth of industrial cities. For the antebellum period, however, an *a priori* hypothesis on the role of manufacturing is much more difficult to formulate. If manufacturing during this period were largely raw material oriented or an activity adjunct to agriculture we would expect manufacturing to be closely associated with rapid hinterland (*vis à vis* city) development. On the other hand, if manufacturing were the handmaiden to trade, especially interregional or entrepôt trade, quite the opposite thesis could be advanced. Although recognizing that either of these two effects may be found dominant, our *a priori*

¹⁹ Heilbrun, *Urban Economics*, pp. 142–44. Also see Sharpless, *City Growth*, Ch. 8, and Lindstrom and Sharpless, "Urban Growth and Economic Structure," pp. 165–68, on the use of location quotients.

expectation is that the relationship between manufacturing and urban development patterns will be weaker in the antebellum period.

SMSAs were defined as delineated in the 1975 revised edition of *Standard Metropolitan Statistical Areas*.²⁰ Population data for cities and counties were derived from the various issues of the decennial census. Manufacturing employment data, with an exception noted below, were also extracted from the 1860 and 1900 decennial census volumes. To facilitate the presentation of our results, the period will be divided, as is customary, at the Civil War. Section III presents our results for the antebellum period and Section IV pertains to the 1870–1900 period. The 1860–1870 decade is excluded to minimize war-induced aberrations in the pattern of urbanization. The final section summarizes our results and further discusses their implications.

III

For the 1800–1860 period data deficiencies as well as the relatively undeveloped nature of the American urban structure preclude the use of a consistent sample of cities or SMSAs for all our calculations. In all cases reported below, however, a geographically representative sample of northeastern urban areas was achieved. In all tests the number of observations actually used will be indicated.

In 1860 our sample of 90 SMSAs contained 10,254,798 people or about one third of the total U.S. population. Together these SMSAs accounted for slightly less than half the population of their respective states. The central city or cities of these SMSAs contained 3,752,658 inhabitants or 37 percent of the sample's total population. This was 60 percent of the total urban population in 1860.²¹ Non-city SMSA population, which will be identified as hinterland population, exceeded city population by almost 75 percent. In 76 of the 90 SMSAs hinterland population exceeded urban population. As might be anticipated, the exceptions include the major ports of New York, Philadelphia, and Baltimore as well as most, but not all, New England SMSAs. It is interesting to note that in 1970, after the suburbanization of the twentieth century, hinterland population for a slightly larger sample of one hundred SMSAs in the northeast quadrant accounted for 57 percent of SMSA population.

We expect, as proposed in Section II, that the utilization of the SMSA concept in the nineteenth century adequately captures a central city's hinterland or intraregional trade area, so the question of the efficacy of the SMSA now can be empirically tested. A Spearman rank correlation test was applied to an ordering of city (or cities) population and hinterland

²⁰ Executive Office of the President, *Standard Areas*.

²¹ U. S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1970* (Washington, 1975), Series A57-72, pp. 11–12.

TABLE 1
CITY VERSUS HINTERLAND POPULATION
GROWTH: ANTEBELLUM PERIOD

<i>Period</i>	<i>Sample Size</i>	<i>Spearman Rank Correlation</i>
1. 1800–1860	33	+0.584 ^a
2. 1850–1860	51	+0.487 ^a
3. 1830–1860	51	+0.167

^a Significantly different from zero at the 99 percent confidence interval.

Source: See text.

population in 1860. If a central place urban hierarchy exists and if the SMSA concept adequately captures this hierarchy we should expect a positive, significant relationship. This was found. The Spearman rank correlation coefficient was +0.610 ($n = 90$), which is significantly different from zero at the 99 percent confidence interval.²² For comparison, a similar test applied to 1970 data yielded a slightly higher coefficient of +0.722 ($n = 100$).

These results suggest that in 1860 the northeast quadrant of the United States fulfills the central place-serving-hinterland formulation of central place theory but the question of the role of hinterland development on city growth remains. Following central place theory we would expect that as a city's hinterland grows, the city will expand and this expansion will exceed that found in the periphery as the urban area provides more specialized services as well as a larger variety of services. For the full 1800–1860 period we have consistent city and hinterland population growth statistics for 33 SMSAs. In thirty of these, city growth exceeded hinterland increase. Table 1 reports the results of Spearman rank correlation tests of city growth versus hinterland growth for the antebellum period. For both the 1800–1860 and 1850–1860 periods, as indicated by lines 1 and 2, a significant positive correlation between city and hinterland population expansion was found. It appears hinterland growth and intraregional exchange were important in explaining the urbanization process in the United States during the antebellum period.²³

A third test, reported on line 3 of Table 1, of the central place growth hypothesis was conducted; this one for the 1830–1860 period. City growth exceeded hinterland development in all 51 cases over this thirty-year period. A Spearman test applied to these data, however, resulted in a rank correlation that, although positive, was insignificantly different from zero,

²² The residuals, or more precisely the differences in city versus hinterland ranking, are interesting. Several New England cities (for example, Lowell, Fall River) rank much higher than their respective hinterlands. On the other hand smaller (newer) cities in the midwest exhibit the opposite tendency.

²³ This conclusion, although based on a more restrictive geographical definition of an urban hinterland, is consistent with that advanced by Crowther, "Urban Growth," Lindstrom, "Eastern Economic Development," Lindstrom and Sharpless, "Urban Growth and Economic Structure," and Williamson and Swanson, "Growth of Cities."

even at the 90 percent confidence interval. Given our previously reported results, this suggests that although hinterland growth and intraregional trade was a significant determinant of the urbanization process in the antebellum period, that influence was overshadowed by other factors in the 1830–1850 time span.²⁴ On the basis of the literature, one might hypothesize that either interregional (or *entrepôt*) trade or even manufacturing development might underlie urbanization patterns during this period, but at this point we can indicate only the inadequacy of the intraregional trade thesis.

The Eighth Census of the United States reported 1,311,246 persons employed in manufacturing in 1860. Total manufacturing employment in 102 SMSAs in the northeastern portion of the United States was 818,561 or 62 percent of that total. Twenty five New England SMSAs alone accounted for 250,028 workers, or 30 percent of the northeastern total.²⁵ Although it is impossible to derive a city-hinterland division of manufacturing employment from published census tabulations, for a sample of 50 non-New England SMSAs 74 percent of all reported manufacturing employment was attributed to the county containing the central city or cities of the SMSA. This may be taken as an upper bound measure of the cities' dominance in this activity.

An 1860 location quotient was calculated for 96 SMSAs. These location quotients [see equation (1)] measure the degree to which an SMSA specializes in manufacturing; a coefficient greater than one indicates the SMSA is more specialized in manufacturing than is the United States as a whole. The location quotients ranged from 6.40 for the New Bedford SMSA to 0.09 for Champaign-Urbana. Forty-nine SMSAs, or slightly more than half of the entire sample, recorded quotients greater than one. Of these 49, 24 were located in New England, and New England SMSAs accounted for nine of the largest ten quotients.

An indirect measure of the city orientation of manufacturing was accomplished by correlating the 1860 location quotient rank with the (rank of the) percent of an SMSA's population living in the city. If manufacturing were largely city oriented, the more important manufacturing was for an SMSA, the higher the percent of the SMSA population we would expect to find residing in the city. The Spearman rank correlation coefficient

²⁴ A Spearman rank correlation of city and hinterland population growth from 1800 to 1830 ($n=30$) yields a coefficient of +0.329. This is significant at the 90 percent confidence interval indicating the importance of intra-area trade to urbanization patterns during this earlier period.

²⁵ Since New England manufacturing employment with one exception was reported on a county basis whereas SMSAs are composed of townships (or parts of counties), it was necessary to estimate the SMSAs' manufacturing components. This was accomplished by allocating county manufacturing employment to or between SMSAs on the basis of population data reported at the township level. Given the labor market homogeneity of the SMSA definition, this technique should adequately approximate true SMSA manufacturing employment. For the Boston SMSA, where a crosscheck was possible, this method resulted in an estimate of 80,507 versus the census reported 80,614.

TABLE 2
MANUFACTURING AND URBANIZATION
PATTERNS: ANTEBELLUM PERIOD

<i>Period</i>	<i>Sample Size</i>	<i>Spearman Rank Correlation</i>
1. 1800–1860	90	–0.013
2. 1800–1860	49	+0.115
3. 1800–1860	29	+0.276
4. 1850–1860	80	+0.248 ^a
5. 1830–1860	51	+0.356 ^a

^a Significantly different from zero at the 95 percent confidence interval.

Source: See text.

($n = 96$) was +0.749, which is significantly different from zero at the 99 percent confidence interval.²⁶

The above calculation supports the presumption that manufacturing was significantly city oriented; the crucial question for our analysis, however, is the role played by manufacturing in the antebellum urbanization pattern. To analyze this question, ranked 1860 location quotients were correlated with ranked population growth rates in the SMSA relative to those in the city or cities comprising the urban core. The results of such tests are reported in Table 2.

The first such test, reported on line 1, utilized average annual population growth in the SMSA divided by average annual population growth in the city. Since average annual growth rates were used, SMSAs could be included regardless of when they first appeared in the census.²⁷ The resulting Spearman rank correlation coefficient was not significantly different from zero. It appears that manufacturing had no impact on urbanization patterns in the northeastern portion of the United States during the antebellum period of the nineteenth century. This conclusion is further supported if we narrow our analysis to those 49 cities having a location quotient greater than one. The resulting Spearman rank correlation coefficient, contained on line 2 of Table 2, is not significantly different from zero. Further restricting our analysis to those 29 SMSAs specializing in manufacturing, having at least 2,500 urban inhabitants in 1860, and for which 1800–1860 census tabulations are available, does not change the results, as illustrated by line 3.

It is informative to look into the effect of manufacturing on urbanization patterns during the 1850–1860 decade, during what may be called,

²⁶ If we restrict the analysis to the 29 SMSAs for which 1800–60 population statistics are available (thus eliminating “new” cities), and those that are specialized in manufacturing, measured by a location quotient greater than one, the rank correlation coefficient is +0.410. This is significant at the 95 percent confidence interval. These results further support the analysis advanced by Lindstrom and Sharpless, “Urban Growth and Economic Structure,” 165–69.

²⁷ Eighty-six of the ninety SMSAs contained central cities with a population of at least 2,500, the usual urban criteria, by 1860.

using Taylor's terminology, the pre-dawn period before "the great era of the industrial city."²⁸ A rank correlation test juxtapositioning 1860 SMSA location quotient with 1850–1860 SMSA population growth divided by city growth, results in a correlation (see line 4 of Table 2) that is positive and significantly different from zero at the 95 percent confidence interval. This positive coefficient indicates that the more important manufacturing is to the SMSA, the faster the hinterland grows as compared to the city during the decade. This contradicts the urbanizing influence of manufacturing. Similar results are obtained ($R_r = +0.332$) if we exclude New England SMSAs ($n = 57$). If we restrict the analysis to those SMSAs having a location quotient greater than one and a central city or cities of at least 2,500 in 1850, however, the rank correlation coefficient of -0.183 ($n = 46$) is not significantly different from zero. Thus, in those SMSAs offering superior access to interregional markets and/or local inputs (for example, skilled labor), therefore having a location quotient greater than one, manufacturing had little if any impact on urbanization. In the remaining SMSAs manufacturing tended to stimulate hinterland growth relative to city growth during the 1850–1860 decade. In either case no evidence exists that manufacturing contributed to the urbanization process during this decade.²⁹

In light of our central place-intraregional exchange results reported above, it is useful to consider the impact of manufacturing on urbanization patterns during the 1830–1860 period. To what extent can manufacturing fill the vacuum created by the inability of the central place formulation to explain urbanization patterns between 1830 and 1860 or, more precisely, between 1830 and 1850? Focusing on those 51 SMSAs for which 1830–1860 population statistics are available, the Spearman rank correlation coefficient between the 1860 manufacturing location quotient and the population growth variable (SMSA divided by city population growth), reported on line 5 of Table 2, is significantly different from zero at the 95 percent confidence interval.³⁰ As in the previous 1850–1860 analysis, it appears that manufacturing importance, as measured by the location quotient, is correlated with non-city population growth within the SMSA. Thus, although a central place/intraregional trade model emphasizing city-hinterland exchange shows promise in explaining antebellum urbanization patterns, manufacturing does not appear to have had a positive impact on this process.

²⁸ Taylor, *Transportation Revolution*, p. 389.

²⁹ The similarity of this result to that obtained by Deane and Cole is intriguing. See Deane and Cole, *British Economic Growth, 1688–1959* (Cambridge, 1964), pp. 106–22. Also see Williamson and Swanson, "Growth of Cities," 44–58, and Lindstrom and Sharpless, "Urban Growth and Economic Structure," 184–85.

³⁰ Neither restricting our analysis to those SMSAs containing cities of at least 2,500 inhabitants in 1830 ($n = 36$, $R_r = +0.174$) nor examining those SMSAs with an 1860 location quotient greater than one and city population of at least 2,500 ($n = 34$, $R_r = -0.099$) changes our conclusion for the 1830–60 period. In these two tests the correlation coefficients are insignificantly different from zero.

IV

By 1900 the SMSAs in our sample more than doubled in population from just over 10 million to more than 26 million. Although these SMSAs still accounted for approximately one third of the total population of the United States, their share of the population of the appropriate states had increased from 49 to 59 percent between 1860 and 1900. City population more than tripled during this period to 15,222,291, and these urban areas accounted for 58 percent of SMSA population in 1900, versus 37 percent in 1860. This 58-42 percent city-hinterland split is almost exactly opposite the division exhibited by the same SMSAs in 1970. The percent of total United States urban population residing in the central city or cities of our sample SMSAs had declined from 60 percent in 1860 to 50 percent in 1900, reflecting urban development outside of the northeastern quadrant.³¹ Although total city population in 1900 exceeded SMSA hinterland population, in 59 of the 100 SMSAs included non-city population exceeded city population. This 59 percent figure is dramatically lower than the 84 percent (76 of 90 SMSAs) reported in 1860, reflecting the significant urbanization occurring during the 1860-1900 period.

A Spearman rank correlation test between city population and hinterland population in 1900 to verify the existence of a central place hierarchy results in a coefficient of +0.603 ($n = 100$), which is significantly different from zero at the 99 percent confidence interval. Although this result suggests that our use of SMSA statistics for 1900 adequately captures the flavor of an existing central place hierarchy, note that the coefficient is slightly lower than that reported for 1860 ($R_r = +0.610$), and that calculated for the same one hundred SMSAs in 1970 ($R_r = +0.722$). Although the latter differential is statistically significant, the former is not.

The reason for this diminution of the rank correlation coefficient becomes readily apparent when we investigate the dynamic role played by central place theory/intraregional exchange in explaining the pattern of urbanization between 1870 and 1900. As in the antebellum period, we expect a positive relation between hinterland growth and city growth. A Spearman rank correlation test was run between 1870-1900 city population growth and non-city SMSA or hinterland population growth in one hundred SMSAs. The resulting coefficient of +0.145 exhibited the expected positive sign, but was not significantly different from zero at the 90 percent confidence interval. Intraregional exchange appears to have had no significant impact on the pattern of urbanization in the latter part of the nineteenth century. At this point it seems reasonable to hypothesize that the age of the industrial city had arrived during this period and that commerce, both intraregional and possibly interregional, had been replaced by manufacturing as the primary engine of urbanization.

³¹ U. S. Bureau of the Census, *Historical Statistics*, pp. 11-12.

The Twelfth Census reported total manufacturing employment in the counties and townships comprising 97 northeastern SMSAs as 3,329,362. This represents over a three-fold increase in manufacturing employment since 1860. Expressed as a percent of total U. S. employment in manufacturing, however, our SMSA sample retained its roughly 62 percent share, increasing slightly from 62.4 to 62.6 percent. Of this 1900 total manufacturing employment in our sample of SMSAs, central city or cities accounted for 74.4 percent. Location quotients for 98 SMSAs in 1900 range from 4.90 for the Waterbury SMSA to 0.37 for the Champaign-Urbana SMSA. This range is smaller than in 1860. Seventy-eight of the SMSAs, about 80 percent, recorded a location quotient greater than one in 1900, as opposed to slightly more than 50 percent for a similar sample in 1860. Although manufacturing employment in SMSAs increased significantly and more areas became relatively specialized in manufacturing, the high degree of specialization, exhibited especially by several New England SMSAs in 1860, had moderated.

Although no direct comparison of the urban nature of manufacturing in 1900 as opposed to 1860 is possible given the lack of comparable published census tabulations, it is possible to investigate the relationship between the importance of manufacturing, measured by the 1900 location coefficient, and the proportion of SMSA population residing in the central city or cities in that year. Such a rank correlation test ($n = 98$) results in a coefficient of $+ 0.648$, which is significantly positive at the 99 percent confidence interval. This is a slightly lower coefficient than that previously reported for 1860.

If we correlate the 1900 SMSA location quotient for manufacturing with SMSA divided by city 1870–1900 population growth the resulting coefficient is $+ 0.361$ ($n = 98$), which is significantly different from zero at the 99 percent confidence interval. This result, consistent with those reported for the antebellum period, indicates that relative specialization in manufacturing was more consistent with hinterland or periphery growth than with city growth and urbanization. Such a result is surprising for a period usually identified with the advent of the industrial city.

The difficulty arises from our use of the 1900 location quotient for manufacturing. In analyzing the antebellum period using the 1860 manufacturing location coefficient we were implicitly assuming that the manufacturing activity being measured developed over the 1800–1860 period. Such a *tabula rasa* assumption may be adequate for this period but such is not the case for the 1870–1900 period. We can measure manufacturing development in the latter part of the nineteenth century by looking at the change in location quotient between 1860 and 1900. If we correlate the absolute change in the size of this quotient with SMSA versus city growth patterns, the Spearman rank coefficient is -0.519 ($n = 92$). If relative location quotient change is substituted for absolute change, the rank correlation coefficient is -0.571 ($n = 92$). Both coefficients are significant at the

99 percent confidence interval. The negative sign indicates that the greater the growth of manufacturing specialization, the greater the growth of the city or cities of the SMSA relative to the hinterland. This directly contradicts our previously reported finding for the 1850–1860 decade. Clearly, in the latter part of the nineteenth century, not only did the industrial city come of age, but industrialization played a significant role in the urbanization process or pattern of that era.³²

V

The urbanization of the United States is illustrated in Census Bureau data extending from the earliest enumerations through to the latest 1970 tabulation. It is not surprising that such a lengthy process is attributable to many different causes necessitating a rather eclectic approach to its study. The purpose of this paper has been to identify the dominant cause or causes of urbanization patterns in the nineteenth century. Rather than addressing the issue of city growth from the perspective of a single city or group of cities, we have attempted to view the urbanization process from the vantage of a system of cities. We have not attempted to capture the singular agents influencing regional vagaries in urbanization patterns. We have tried to isolate the common factors contributing to the urbanization of the entire system of cities in the northeastern quadrant of the United States.

Our results indicate that in the antebellum period intraregional exchange was an important determinant of the urbanization process. As city hinterlands grew in population, cities grew to provide goods and services to that intraregional market. As predicted by central place theory, such expansion undoubtedly involved not only replication in kind, but expansion into new and more specialized activities. The result of such expansion, caused by a symbiotic city-hinterland relationship, was the urbanization process captured by our data. During this period the growth of manufacturing did not exert a significant force on the urbanization process of the system of cities; its influence on specific cities such as Lowell and New Bedford can't be denied, however.

Although our antebellum analysis did not directly take into account the influence of interregional or entrepôt trade, our inability to explain urbanization patterns in the 1830–1850 period (using either central place or manufacturing formulations of our tests) suggests that it was such trade that directed urban development patterns during this span of years. Our

³² Although our methods do not allow for identification of the differential factors at work in the post- versus antebellum milieu, it appears reasonable to hypothesize that a combination of (1) integration of an SMSA-oriented national rail system, (2) increased agglomeration economies, and (3) rapid growth in intermediate and final (as opposed to resource-oriented initial) stages in the manufacturing sequence explain this discontinuity with the past.

results indicate the antebellum period as a whole could be called the age of commercial urbanization.

During the last thirty years of the nineteenth century, manufacturing growth comes to the fore as a prime determinant of urbanization patterns.³³ In those areas where increases in manufacturing specialization were most significant, city growth exceeded hinterland development by the widest margin resulting in rapid urbanization. Conversely, intra-regional trade, fostered by the mutual growth of both cities and hinterland, appears to provide very little in explanatory power vis-à-vis the observed urbanization pattern between 1870 and 1900.

³³ Our statistical findings on the urbanization forces at work in the United States system of cities during the nineteenth century thus are broadly congruent to the conceptual framework and empirical evidence advanced in Pred, *Spatial Dynamics*.