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URBAN DEVELOPMENT IN THE UNITED STATES, 1690-1990

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ABSTRACT

The United States transformed itself from a rural to an urban society over the last three centuries. After a century of unremarkable growth, the pace of urbanization was historically unprecedented between the nineteenth and early twentieth centuries. In the twentieth century, the urban population continued to increase but in a much more dispersed manner as the suburban population increased. Throughout these developments, cities also exhibited considerable variation in their population sizes. This paper find that the pace and pattern of U.S. urban development are explained by changes in regional comparative advantage and in economies in transportation and local public goods, which in turn were determined by the changes in the economic structures of cities. This paper also finds that cities varied considerably in size because the larger cities reduced market transaction costs associated with coordinating greater geographic division of labor.

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I. Introduction.

The growing interest in the phenomena of increasing returns in economics has led to a great deal of work on issues concerning the causes of industrial location and city formation. One body of this work has been concerned with establishing the relative importance of natural advantages and increasing returns in determining the location of industries. For scholars like Krugman (1991) and Arthur (1994), the overall patterns of industrial location and city formation are driven by increasing returns. On the other hand, Kim (1995, 1998, 1999) suggests that the long-run trends in U.S. regional specialization are consistent with explanations based on comparative advantage and Ellison and Glaeser (1999) find that natural advantages may explain about half of the geographic concentration of industries. However, for scholars like Henderson (1988), there is no conflict between comparative advantage and increasing returns. Indeed, some types of increasing returns may be nested in comparative advantage. Henderson argues that while comparative advantage may drive the overall proportion of economic activities of regions and cities, increasing returns are likely to play an important role in explaining why cities exist and where they locate.

Another growing body of work in urban and regional economics has attempted to identify the nature of increasing returns. In particular, numerous studies have attempted to measure which of the Marshallian externalities, technological spillovers, labor market pooling, or non-traded industry specific inputs, is empirically most significant. In addition, studies have attempted to identify whether these externalities are ones of localization or urbanization and whether they are dynamic or static.[1] This paper stresses the importance of economies in transportation and in the

[1] For example, see Ellison and Glaeser (1997), Dumais, Ellison and Glaeser (1998), Glaeser et. al (1992), Henderson, Kuncoro, and Turner (1995), Black and Henderson (1997, 1998), Henderson (1998), Dobkins and Ioannides (1998), and Rosenthal and Strange (1998). For a review of the literature, see Fujita

provision of local public goods. Trade involves transactions in information and in physical transfers of goods between buyers and sellers. If there are economies in physical, port and terminal operation in transportation, then the costs of trade are lower in cities. In addition, if there are economies in the provision of local public goods such as water, gas, electricity, and communications, cities may lower the costs of trade between firms and workers and between firms themselves.[2]

Over the years, urban economists have also been interested in explaining why city sizes differ. Despite the apparent historical persistence of this phenomenon, there seems to be little consensus of the exact causes as to why city sizes differ. The standard textbook explanation for the existence of an urban hierarchy is Christaller's (1966) central place theory which explains the size distribution of cities based on economies of scale in retail markets. More recently, Dobkins and Ioannides (1998) propose a central place theory based on mercantile or wholesale trade rather than retail trade. However, there are a number of alternative theories. For example, Henderson (1988) argues that the distribution of city sizes is due to economies of scale in manufacturing while others, such as Krugman (1996) and Gabaix (1997), argue that the size distribution of cities is a statistical artifact generated by a simple growth model.

This paper attempts to shed some light on the causes of industrial location and city formation by documenting and examining the historical patterns of U.S. urban development. This

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and Thisse (1996), Quigley (1998) and Glaeser (1998).

[2] See Berliant and Wang (1993), Berliant and Konishi (1994), and Konishi (1996) for models of city formation using local public goods (or market places) and transportation. Alternatively, the provision of local public goods may lower the cost of matching between workers and firms (see Helsley and Strange (1990)).

paper finds that the pace and pattern of U.S. urban development are explained by changes in regional comparative advantage and in economies in transportation and local public goods. These in turn were affected by changes in the economic structure of the American economy from agriculture to manufacturing and then to services. In addition, the examination of the economic structures of cities by their sizes suggests that cities varied considerably in size over time because the larger cities performed special market-making functions.[3] Regional comparative advantage led to trade, but gains from trade did not come freely. In addition to the physical cost of transporting goods, the geographic division of labor increased market transaction costs. The concentration in large cities of market coordinators, as well as institutions which inspected, certified and enforced contracts, reduced the transaction costs associated with this greater geographic division of labor. In particular, the traders who held diverse private information concerning the supply and demand of goods through the market process revealed their information so that the buyers and sellers needed only to know the price and stochastic factors in the economy.

The paper is organized as follows. Section II documents the historical patterns of U.S. urban development. Section III examines the causes of the long-run trends in U.S. urban development. Section IV studies the relationship between the economic structures of cities and the size distribution of cities. Section V concludes with a summary.

II. U.S. Urban Development, 1690-1990.

The history of cities in the United States has witnessed dramatic developments over the last

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[3] Like Dobkins and Ioannides (1998), this paper suggests that the size distribution of cities can be explained by a mercantile theory of cities. However, whereas Dobkins and Ioannides (1998) motivate their discussion using models from Fujita and Mori (1997), Krugman (1993), and Pred (1972, 1977), this paper's theoretical motivation comes from Grossman (1989).

three centuries. In the late seventeenth and the eighteenth centuries, cities were few in number, concentrated along the eastern seaboard, and their activities were dominated by merchants who facilitated trade with Europe. In the early nineteenth and the early twentieth centuries, the onset of industrialization and the expansion of the domestic market significantly increased the number and size of cities. Moreover, a new type of city emerged in different places; unlike cities of the earlier period, large industrial cities sprang up in the northeastern and mid-western regions. The growing relative importance of services since the mid-twentieth century altered, once again, the overall pattern of urban development. The importance of the urban population continued to rise, but in a much more dispersed manner. The share of population in urban areas increased when measured in terms of metropolitan areas, but in terms of cities defined by political boundaries, it peaked and stabilized. Finally, this period witnessed a geographic shift in the share of large cities toward the southwestern regions of the United States.

Table 1 presents data on the number and size of cities where city is defined as an area having a population of greater than 2,500. Between 1690 and 1790, the number of cities increased moderately from 4 to 24, but the percentage of urban population declined from 8.3% to 5.1%. In the period between 1790 and 1880, the number and size of cities grew at historically unprecedented rates. During this period, the number of cities increased from 24 to 939 and the percentage of urban population increased from 5.1% to 28.2%. The era of industrial cities reached its zenith between 1880 and 1920 when the number of cities increased from 939 to 2722, the number of cities with populations of more than 100,000 increased from 20 to 68, and the percentage of urban population increased from 28.2% to 51.2%. Although the number of cities continued to increase during the second half of the twentieth century, the level of urbanization

peaked at 65% in 1960 and declined between 1960 and 1990 to 62%. Moreover, between 1960 and 1990, the proportion of urban population decreased in the largest cities with populations of more than 500,000.

In the second half of the twentieth century, urban development in the United States was also characterized by a dispersal of the population out of central cities into suburban areas. Table 2 shows the changes in the number and size of metropolitan areas.[4] The information by metropolitan areas provide a strikingly different picture of U.S. urban development than that painted above. The data indicate that there was significant growth in the number of metropolitan areas in most size categories and that the percentage of population in metropolitan areas increased from 51.0% to 77.5% between 1940 and 1990. Moreover, unlike the patterns exhibited in Table 1, the data in Table 2 show a reduction in the metropolitan population in the two smallest-sized categories, a slight increase in the middle-sized category, and a significant increase in the two largest-sized categories. Thus, the urban population not only continued to increase over the second half of the twentieth century as measured by metropolitan areas, but the very largest metropolitan areas continued to thrive during this period.

The data indicate that the historical pace and pattern of U.S. urban development are closely linked to the changes in the economic structures of cities. In the late seventeenth and the

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[4] As the definition of cities using political jurisdictions became unsatisfactory, the census officials developed the metropolitan area concept using counties. For 1940, the data are from the *County Data Book* which defined the metropolitan area as a central city or cities having population of 50,000 or more and its adjacent minor civil divisions which have a population of 150 or more per square mile. While the essential concept of metropolitan areas has not changed, the definition has been refined over the years. For 1990, the data are from the *Census of Population*. The sample of metropolitan areas used in this paper consist of primary metropolitan statistical areas (PMSA's), broken up from consolidated metropolitan areas (CMSA's) and metropolitan statistical areas (MSA's).

eighteenth centuries, the economic structures of cities were dominated by the merchants and the surrounding hinterland activities in agriculture and other extractive industries. In the nineteenth century, the economic activities of the majority of cities were dominated by manufacturing. By 1820, the cities in the United States already had a significant portion of their populations engaged in manufacturing activities.[5] Industrial activities continued to play a significant role in city economies between the late nineteenth and the early twentieth centuries. Table 3 shows that manufacturing employment as a percentage of population for large cities was 14.9%, 17.1% and 18.2% in 1880, 1900, and 1920 respectively.[6] Since the mid-twentieth century, the importance of manufacturing in cities declined significantly. In the two years 1940 and 1990, less than 10% of the population in cities was engaged in manufacturing and by 1990, approximately 34% percent of the population was engaged in services.[7]

The data in Table 4 show that large cities became concentrated in different geographic regions over time.[8] In the period between 1690 and 1820, the majority of cities were located along

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[5] In their study of Northeastern cities, Williamson and Swanson (1966) show that approximately 60% of the labor force was engaged in manufacturing activities between 1820 and 1840. Since 33% of the population was in the labor force during those years, about 20% of the population was engaged in manufacturing. Williamson and Swanson (1966) derive their figures from the labor force data in the censuses of population whereas the figures presented in Table 3 are based on the censuses of manufacturing.

[6] The census bureau provides more detailed information on large cities. However, the size criterion has changed significantly over time. In general, large cities are defined as follows: in 1790, cities with populations of greater than 2,500; in 1820, greater than 5,000; in 1880, greater than 20,000; in 1900, greater than 25,000; in 1920 and 1940, greater than 50,000; and, in 1990, greater than 100,000. In Table 3, large cities for 1940 are defined as cities with populations of greater than 90,000.

[7] Similar results are obtained for metropolitan areas.

[8] Leven (1993) presents data on the geographic distribution of all urban and metropolitan population between 1790 and 1988. In general, the overall historical trends are similar to those found in Table 4.

the eastern seaboard in the New England, Middle Atlantic and South Atlantic regions. In the period between 1820 and 1920, large cities emerged in new areas of the New England and Middle Atlantic regions and in the East North Central region. During this period, 60% of large cities were located in these three regions. The second half of the twentieth century ushered in yet another significant change in the geographic distribution of cities. The share of cities in the northeast decreased dramatically as the share in the southwest increased. The New England and Middle Atlantic regions' shares of large cities fell from an apex of 21% and 25% at the turn of the century to 4.6% and 6.6% respectively, whereas the shares in the West South Central, Mountain and Pacific regions rose from 5%, 2%, and 5% to 14%, 9%, and 26% respectively.

Despite these dramatic historical changes in the number, size, location, and the economic structure of cities, one characteristic of cities has remained remarkably stable. At any given point in time, cities varied enormously in their population sizes. In particular, the size distribution of cities has followed, what urban economists refer to as, the rank-size rule. The rule states that the population of a city is equal to the population of the largest city divided by the rank of the city in question. Surprisingly, the population size distribution of cities has been relatively stable despite significant movements in the ranks of many cities.[9] While some cities such as New York were able to maintain their rankings throughout the last two centuries, the rankings of the majority of cities

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[9] Zipf's (1949) rank-size rule is a special case of the Pareto distribution: $P = c\ R^{-\alpha}$ where P is population, c and α are constants, and R is city rank. Zipf observed that constant α was equal to one and constant c was equal to the population size of the largest city. The rank-size rule can be easily estimated using least squares in the following logarithmic form: $\log (P) = \log (c) - \alpha \log (R)$. The existence of a rank-size rule means that α equals 1. While the hypothesis that α equals 1 can be easily rejected for most time periods, the log-linear specification does quite well. For cities, the estimated coefficient α, which was statistically significant at the one percent level for all years, was -0.98 in 1880, but declined to -0.94, -0.91, and -0.91 in 1900, 1920 and 1940 respectively, and then fell further to -0.76 in 1990. On the other hand, for metropolitan areas, the estimated coefficient rose from -0.98 to -1.09 between 1940 and 1990.

have shifted considerably over time.[10]

Thus far, the information on U.S. urban development has been based on a definition of a city given by census and other government officials at any given point in time. However, defining a city, especially a definition that is meaningful over time, is a non-trivial issue. While the census definition of a city in the eighteenth century as being an area with a population of over 2,500 might be useful, that definition is unlikely to be useful in the late nineteenth and the twentieth centuries. The government officials have recognized this fact and have accordingly raised the threshold population level for what constitutes a "large city" over time. However, the population cutoff values have been based on absolute and arbitrary population levels. While the census and other government officials' definition of a city may still provide valuable information on U.S. urban development, it is important to examine whether an alternative definition of a city, perhaps one that is more consistent over time, provides a different view of U.S. urban development.

Rather than defining a city based on a different absolute population cutoff value for various points in time, it is possible to define a city based on relative cutoff values which are consistently defined over time. In order to define a relative measure, the city population was divided by the mean of the sample for cities in 1880, 1900, 1940 and 1990, and for metropolitan areas in 1940 and 1990.[11] At any given point in time, for a city to be included in the final sample based on relative values, a city's population divided by the mean of the sample needed to above the value of the smallest city in 1990. The smallest city and metropolitan area were Chandler, Arizona and

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[10] For example, Madden (1956) reports that, in his sample of large cities between 1870 and 1950, seventy percent of cities changed ranks by a significant degree.

[11] Black and Henderson (1997, 1998) examine the issue of using absolute and relative definitions of cities for a consistently defined metropolitan area between 1900 and 1990.

Enid, Oklahoma and their populations divided by their sample means were 0.278 and 0.099 respectively. The relative definition eliminated a number of cities from the final sample for some years, but the relative and the absolute cutoff values did not differ much for metropolitan areas.

Figure 1 presents the probability density estimates of the normalized city distribution for large cities and metropolitan areas.[12] In general, these estimates suggest a pattern of U.S. urban development that is consistent with information given using the census definition of cities based on absolute cutoff values. The density estimates for cities show three distinct density distributions for cities. In 1820, when agriculture still dominated U.S. economic activities, the distribution of cities was characterized by many small cities and a few very large cities relative to the mean. In 1880, as manufacturing became more important, the distribution of cities shifted toward larger cities relative to the mean. Since the middle of the twentieth century, however, as services became more dominant, the importance of smaller cities has increased once again. On the other hand, consistent with the information provided above, the trend is reversed for metropolitan areas. For these areas, the density estimates show a greater importance for cities whose sizes are greater than the sample mean.

III. Explaining the Historical Trends in U.S. Urban Development.

The American economy in the late seventeenth and the eighteenth centuries was dominated by agriculture, fishery, and other extractive industries. Each of the regions of colonial British America was endowed with a different climate, soil, and topography and as a result specialized in different industries. The New England colonies specialized in fish, livestock, wood, and whale

[12] The kernel densities were estimated using Stata with a Gaussian kernel and a default bandwidth setting for the log of the population divided by the mean of the sample. Thus, the negative and positive values represent cities whose populations were below or above the mean respectively.

products, the Middle colonies in grain, the Upper South in tobacco, and the Lower South in rice and indigo.[13] These colonial economies were integrated with Europe and the West Indies for political and economic reasons. Since the colonies were subjects of England, trade in some goods such as tobacco was restricted to England. But more importantly, the potential benefits to trade with Europe and the West Indies were far greater than inter-colonial trade due to the patterns of comparative advantage and the transportation and communications technologies.

The cities during this period located near ports and navigable rivers and specialized in providing mercantile services for an economy based on foreign trade. The concentration of merchants in cities facilitated the coordination of the supply and demand over great distances. The regular gathering of merchants in tea houses and merchants' exchanges and the establishment of newspapers and trade papers provided timely information.[14] Cities also provided insurance and banking services which also facilitated trade. However, given the prohibitive costs of transmitting information during this period, the potential benefits of providing these intermediary services were largely limited by the size of a city's hinterland.[15]

Industrialization in the United States first took root between the late eighteenth and the

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[13] See Shepherd and Walton (1972), Bridenbaugh (1938) and McCusker and Menard (1985).

[14] See Albion (1939).

[15] If the geographic distribution of the cities in this period is mainly determined by the size of a city's hinterland economy, then there is a puzzle. From this perspective, the cities were over-represented in New England and under-represented in the Upper South. In 1770, the New England region's population stood at 581,038 and its per capita value of exports was £0.85 whereas the Upper South had 649,615 people with a per capita value of export of £1.80 (see Shepherd and Walton (1972, 101)). However, New England possessed a disproportionate number of cities when compared to the share of cities in the Upper South (see Bridenbaugh (1995, 216-217)).

early nineteenth centuries in the Northeast and then spread to other regions.[16] The growing importance of manufacturing, which coincided with the rise of the national domestic market, increased the level and scope of trade dramatically. The economic integration of the regional economies not only led to growth in regional specialization and trade, it also led to an increase in the pace of urbanization. This section examines which theory of cities is most consistent with the patterns of city formation in the late nineteenth and early twentieth centuries.

The manufacturing data on cities are sparse for the early part of U.S. industrialization but a rich data set exists for large cities in the latter part. The census bureau began collecting industrial data on cities in 1880 and has continued to do so for every census year thereafter. Yet, despite the existence of excellent data on cities since the late nineteenth century, few scholars have examined them in any detail. One major reason for this neglect is that the information on cities during this period is reported by very specific products since standard industrial codes (SIC) were not used until the mid-twentieth century. In this paper, the data on cities for 1880 and 1940 were aggregated to the 2-digit SIC using definitions from Niemi (1974) and the census bureau.[17]

The sample of cities for 1880 and 1940 depended upon the decisions made by census officials. In 1880, the *Census of Manufactures* reported data on the 100 largest cities; in 1940, it reported data on 87 cities with populations of more than 100,000.[18] The data on these large cities

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[16] See Sokoloff (1986) and Goldin and Sokoloff (1984).

[17] The industrial data on cities were constructed for 1940 rather than for 1920 because the data on cities for 1940 are one of the most complete. For the 1940 census, officials devised a means to provide more complete information on cities by reporting the data in a more aggregate industry level comparable to the 2-digit industries and/or by aggregating the city data with county data.

[18] In 1940, there were 92 cities with populations of greater than 100,000. However, information on 87 cities is available. The census officials omitted data on 7 cities for disclosure reasons, but then added two cities, Lynn and Evansville, whose population sizes were slightly fewer than 100,000.

shown in Table 4 indicate that the average and median population in cities increased five-fold between 1880 and 1940 from 91,000 to 424,422 and from 35,092 to 177,662 respectively. In 1880, the 100 largest cities represented about 18.1% of the total U.S. population and about 53.1% of U.S. manufacturing employment whereas in 1940, the 87 largest cities represented about 28% of the total population and 39% of total manufacturing employment.[19]

The data in Table 6 indicate that cities were quite specialized in their manufacturing structures at the 2-digit industries.[20] In 1880, for 22% of the large cities, one industry accounted for at least, and often far more than, half of their manufacturing employment and for another 24% of the cities, two industries accounted for at least half of their manufacturing employment. In 1940, despite a significant increase in their sizes, cities were equally specialized. In that year, 21.8% of the cities had at least half of their manufacturing employment in one industry and another 25.3% in two industries. However, within any given year, the larger cities were likely to be more diversified than smaller cities because industries such as food, apparel, and printing were always well represented in these cities.

In general, a city's manufacturing structure reflected that of the census region in which it resided. The regression estimate of city industrial structures on their regional industrial structures

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[19] The growth rate in city population may be biased upward since the sample for 1940 may over-represent larger cities as a result of the change in the cutoff procedure for reporting. However, similar information from a consistent sample of cities indicates that the potential upward bias is small. From the reported cities in 1880 and 1940 it is possible to construct consistent panel data for 60 cities which appear in both years. This consistent sample eliminates 40 cities from the 1880 sample which were large enough to be considered for reporting in 1880 but fell below the cutoff value in 1940 and 27 cities which were too small to be in the 1880 sample but grew in size to populations of more than 100,000 by 1940. For the consistent sample of 60 cities, the average and median populations increased four-fold from 123,141 to 513,002 and from 50,584 to 238,674 respectively.

[20] Regional specialization and industry localization increased between 1880 and 1940. See Kim (1995) for details.

presented in Table 7 suggests that they are significantly correlated. The data in Table 8 provide more detailed information on the industrial structures of cities and their regions. In 1880, the cities in the New England region were specialized in textiles and leather; cities in the Middle Atlantic region were specialized in textiles and apparel; cities in East North Central were specialized in food, lumber and wood; cities in West North Central were specialized in food, lumber and wood, apparel, and stone, clay and glass; in the Southern and Pacific regions, cities were specialized in food, tobacco, apparel, and lumber and wood. However, there were some important differences between the industrial structures of cities and their regions. Some industries such as the apparel and printing industries were over-represented in cities whereas the lumber and wood industry was severely under-represented.[21] In some regions such as the East South Central, West South Central, and Pacific regions, tobacco manufacturing was over-represented in cities.

As the U.S. regions became more economically integrated between 1880 and 1940, patterns of U.S. regional specialization changed. However, despite the changes in the patterns of U.S. regional specialization, the correspondence between the manufacturing structures of cities and their regions remained stable. In 1940, the large cities in New England maintained their specialization in textiles, but also became more specialized in apparel and machinery; the cities in the Middle Atlantic remained specialized in apparel and textiles but became more specialized in food; the cities in the East North Central regions remained specialized in food but also significantly shifted their specialization to primary metal, machinery, and transportation; the cities in the West North Central region became significantly more specialized in food; South Atlantic cities became specialized in food, tobacco, and apparel; the cities in the East South Central region became

[21] See Alexanderson (1956).

specialized in food, textiles, furniture, and primary metal; in the West South Central region, they became specialized in food, textiles, and apparel; the lone Mountain city became specialized in food, tobacco, apparel, and primary metal; and cities in the Pacific region became specialized in food and apparel (see Table 8).

In 1940, as in 1880, there were some systematic differences between the manufacturing structures of cities and their regions. Once again, the large cities, when compared to their regions, had a greater proportion of their manufacturing employment in apparel and printing whereas the smaller cities had a larger share in lumber and wood. However, some new patterns also emerged. Unlike in 1880, the textile industry became a small city industry in 1940. The South Atlantic and East South Central regions had 41% and 23% of their manufacturing employment in textiles, but only 7.8% and 10.6% respectively for cities in those regions. Petroleum manufacturing was also overly represented in the smaller cities in the West South Central region. Petroleum accounted for more than 10% of employment in that region, but was responsible for less than one percent in its large cities. Tobacco manufacturing was, once again, centered in the large cities in the South Atlantic and East South Central regions, but the pattern reversed in the Pacific region.

The study of the industrial composition of cities may not fully identify the sources of city formation, but it does provide some important clues. The fact that the industrial structures of cities reflect that of the census region in which they resided seems to suggest that city specialization is driven by regional comparative advantage. Thus, increasing returns do not seem to explain the overall proportion of regional and city specialization. However, increasing returns are likely play an important role in explaining why cities form and where they locate within the region. Unfortunately, it is difficult to determine exactly which kinds of increasing returns are at work.

One source is Marshallian externalities but they must be of localization rather than of urbanization type. Other important sources are the economies in local public goods and in transportation of inputs and final goods.

In addition, the fact that the large cities in the New England, Middle Atlantic, and East North Central regions had a significantly higher proportion of the population engaged in manufacturing and the fact that the large cities were concentrated in these three regions both suggest that these regions had an overall regional comparative advantage in manufacturing. The data in Table 3 show that, in 1880, the large cities in the New England, Middle Atlantic, and East North Central regions had, respectively, 24.1%, 16.2%, and 14.0% of their populations in manufacturing whereas the other regions, except for South Atlantic, had less than 10%; in 1920, the three regions in the manufacturing belt had more than 20% of their population in manufacturing whereas other regions had less than 14%. The data in Table 4 show that the three regions, New England, Middle Atlantic, and East North Central, contained more than 60% of large cities between 1880 and 1920.

The second half of the twentieth century has been characterized by a significant shift in economic activities away from manufacturing into services. In the early part of the century, the percentage of the population employed in services and in manufacturing was relatively even in large cities. However, by the late twentieth century, the percentage of employment in services reached almost three times that of manufacturing.[22] The growth in the importance of services led to

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[22] Between 1920 and 1990, the average percentage of the population employed in manufacturing in large cities fell from 18% to 9.5% whereas the percentage in services rose from 20.0% to 27.3%. The data on manufacturing employment are from the *Census of Manufactures*, but the data on services come from two different sources. The 1920 service employment is from the labor force data in the *Census of Population* whereas the 1990 data are from the *Census of Services*. The labor force data from the *Census*

significant changes in the nature and scope of trade. Services, unlike manufacturing, involve little physical trade in final goods and raw materials. While trade in services may benefit from economies in the communication infrastructure, it is unlikely to derive much benefit from physical economies in transportation. In addition, during this period, further developments in manufacturing lowered the physical economies of transportation as electricity replaced coal as the dominant form of final energy, as raw material intensities and plant sizes of manufacturing fell, and as products became significantly lighter. These developments had a significant impact on the pace and pattern of U.S. urban development in the second half of the twentieth century.

The changes in the economic structures of cities and in the economies of inter- and intra-urban transportation modes altered the relative growth rates of cities of different size classes since the mid-twentieth century. In the late nineteenth and the early twentieth centuries, significant economies in both inter- and intra-urban transportation led to the concentration of population in very large cities.[23] The large scale economies and production intensity in relatively immobile resources, in conjunction with existing water and railroad transportation modes, led to significant economies of scale in transportation.[24] Moreover, intra-urban transportation based on trolleys and

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of Population for the entire economy indicate that the percentage of population engaged in services was 13.0% in 1920 and rose to 33.9% in 1990.

[23] Moses and Williamson (1967) argue that the physical form of cities during this period was influenced significantly by the inter- and intra-urban transportation modes.

[24] Although there is little evidence for economies of scale at the firm level, most studies indicate significant increasing returns in traffic density in railroad transportation. Most estimates of returns to density are between 1.76 and 1.92. See Keeler (1983, 57) and Caves, Christensen, Tretheway, and Windle (1985, 112). Studies indicate that there are moderate scale economies in the provision of local public goods. Most studies indicate that scale economies in police protection, fire protection and schools occur up to a population of about 100,000. Scale economies in the provision of water and sewage services are likely to be some what higher. See Hirsch (1959), Hines (1969), and Walzer (1972).

electric rail was also subject to significant economies in commuting. Since the mid-twentieth century, as services became more important, economies in inter-urban transportation fell.[25] Moreover, the increase in consumption of certain types of services such as housing and retail goods and the rise of automobiles as the dominant form of commuting led to a decline in the density of cities.[26] This decline was not only accounted for by a fall in density of older cities as they became more suburban, but also by the addition of new cities which were less dense than the existing ones.

The growing importance of services and other developments in the manufacturing sector greatly altered the geographic location of cities. The concentration of large cities in the second half of the twentieth century shifted away from the New England, Middle Atlantic and East North Central regions to the Southwestern regions of the United States. The geographic redistribution of large cities was caused by the decreased importance of comparative advantage in resources of the manufacturing belt. As services became an increasingly dominant portion of city economies and as factors in manufacturing became more mobile over time, geographic differences in factor endowments diminished across the U.S. regions.[27] Consequently, between 1920 and 1990, the percentage of large cities in the New England, Middle Atlantic, and East North Central regions fell

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[25] The economies in inter-urban transportation also fell as scale economies in manufacturing fell, as manufacturing became less intensive in resources, and as transportation modes shifted to trucks and airplanes.

[26] See Mieszkowski and Mills (1993) and Margo (1992) for explanations concerning the rise of suburbanization.

[27] Kim (1995) documents that regional industrial structures in manufacturing converged over the second half of the twentieth century. Kim (1998) shows that the convergence in industrial structures is even more dramatic when services are included. While, due to disclosure laws, it is difficult to construct accurate industrial structures of many major cities in the second half of the twentieth century, it is highly unlikely that a city's industrial structure strayed significantly from that of its region.

from 60% to 25% whereas the share of large cities in the West South Central, Mountain and Pacific regions rose from 15% to 50%.

IV. Explaining the Size Distribution of U.S. Cities, 1900-1990.

This section explores whether cities of different sizes possess different economic and social structures. The analysis of the economic structures of cities by size distribution is based on samples of large U.S. cities between 1900 and 1990. In 1900, data were available for cities with 25,000 or more inhabitants; in 1920, 1940, and 1990, the threshold levels were 50,000, 100,000 and 100,000 inhabitants, respectively. Data on cities were derived from a variety of sources: the *Census of Population*, 1900-1990; *Census of Manufactures*, 1900-1987; *Census of Business*, 1940-1987; *Census of Services*, 1990, and *County and City Data Book*, 1994.

The dependent variables in each of the cross-sectional regressions are the log of population, population, city rank, and city density. The set of independent variables differ from year to year as the occupational structure has become more refined over time. Although not available for all years, they include the percentage of foreign-born, black, and educated, and the percentage of employment in agriculture, mining, manufacturing, wholesale trade, retail trade, transportation, FIRE, business services, personal services, amusement, professional services and government as a percentage of total population.

Some simple descriptive statistics of these variables are presented in Table 9. The mean population of large cities was 123,000, 228,300, 413,000, and 326,000 in 1900, 1920, 1940, and 1990 respectively. The density of cities in the sample rose slightly from 7,377 to 8461 persons per square mile between 1900 and 1920, but then declined significantly to 4,233 persons per square mile in 1990. The percentage of the foreign born population in large cities was almost 21% in

1900, but declined steadily to about 11% in 1990. On the other hand, the percentage of the black population in large cities was less than 10% before 1940, but then rose to 18.6% in 1990. The average percentage of population engaged in manufacturing in cities fell from 17.1% to 9.3% whereas the percentage in services rose from 20.0% to 27.3% between 1900 and 1990.

The regression results in Table 10 show that large cities differed from smaller cities in many ways. Large cities consistently had a greater proportion of their population in transaction services.[28] In 1900 and 1920, a standard deviation increase in the percentage of the population engaged in trade related activities is associated with a more than 40% increase in city population and an increase in the size ranking of cities by 25 places. In addition, in 1920, a standard deviation increase in clerical workers also led to an increase in population by 35% and a rise in rank of about 20 places. In 1940, standard deviation increases in the percentage of population engaged in wholesale trade and business services increased the population by 34% (10 places in rank) and 54% (16 places in rank) respectively. While still significantly positive, the influence of transaction services declined somewhat in 1990. In that year, business and legal services were significant, but wholesale trade was significant only when these variables, due to problems of multicollinearity, were excluded from the regression.

The size of cities was significantly correlated with demographic variables on immigrants and blacks. While the relationship between the foreign-born and city size has weakened over time, the correlation between city size and the percentage of black population has strengthened. City size was significantly correlated with the foreign born population in 1900, 1920, and 1940, but became insignificant in 1990. Except for 1900, the foreign-born resided in dense cities. City size, except for

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[28] See Wallis and North (1986) for a definition of transaction services.

dense cities in 1920, did not correlate with the proportion of the black population for most years, but became significantly correlated in 1990.

The larger cities also had a greater proportion of their populations in government and amusement activities in 1940 and 1990. However, most other economic variables showed negative or little correlation with city size. Since agricultural activity requires large amounts of land relative to population, it is not surprising that it was negatively correlated with city size and city density for most years for which data exist. The transportation variable was positively correlated with dense cities in 1920, but was negatively correlated with population size in 1940. The level of education, proxied in different years by illiteracy rates, median years of schooling, or graduation rates of high school or greater, tended to correlate negatively with city size but the relationship was rarely significant.

The data appear to support the hypothesis that the size distribution of cities is explained by the concentration of transaction services in the higher-ranked cities. However, the data seem to reject two other popular theories. City sizes were not correlated with retail nor manufacturing activities. Contrary to the predictions of the central place theory based on economies in retail trade, the data indicate that smaller cities had a greater percentage of their population engaged in retail trade. For example, in 1940 and 1990, a standard deviation increase in the percentage of the population engaged in retail trade was associated with a 10% and 23% decline in city population respectively. Data also indicate little correlation between city size and manufacturing activities. For most years, the percentage of the population engaged in manufacturing was unrelated to city sizes and in 1990, the relationship was significantly negative.

V. Conclusion.

This paper has attempted to document the long-run pace and pattern of U.S. urban development and to shed some light on the forces which produced them. The data indicate that there were two significant turning points in the history of U.S. urban development. The first turning point coincided with a shift from an agricultural to a manufacturing economy between the late nineteenth and the turn of the twentieth centuries and the second coincided with a shift toward a service economy in the mid-twentieth century. This paper suggests that the historical pace and pattern of U.S. urban development are adequately explained by changes in regional comparative advantage and economies in transportation and local public goods which in turn were determined by the changes in the structure of the economy.

Throughout the history of U.S. urban development, cities exhibited considerable variation in their sizes because the larger cities lowered the costs of market transactions. When markets were still relatively small, the larger cities lowered the cost of coordinating supply and demand by concentrating in one location merchants, newspapers, trade journals, and insurance firms, and developing auction markets. As the size of markets grew, the development of organized exchanges and the concentration of specialized merchants continued to perform similar functions.[29] However, the geographic area serviced by the very largest cities grew as merchants in these cities coordinated the national and international supply and demand of goods. These very largest cities exhibited considerable persistence in their rankings over time. On the other hand, the fortunes of

[29] For example, in the case of the grain market, the establishment of the Chicago Board of Trade, which had significant powers of inspection, certification and enforcement of contracts, significantly lowered the costs of market transactions. The standardization of grades and amounts in grain, the acceptance of bills of lading and warehouse receipts as negotiable instruments of title, and futures contracts enabled Chicago to transact a significant amount of grain at a very low cost to buyers and sellers (see Cronon (1991, 123)).

medium to large cities, which serviced their regional markets, depended a great deal on the fortunes of their regional economies and exhibited considerable movements in their rankings over time.

In recent years, the most significant trend in economic geography has been the general dispersal of economic activities. Since the middle of the twentieth century, there has been a significant decline in specialization and localization of industries at the regional level. The convergence in regional industrial structures has also been accompanied by convergence in regional income per capita. From an urban standpoint, the trend toward population dispersion began much earlier. The introduction of more efficient intra-city transportation modes such as street railways allowed the population density to fall in the central cities as residences radiated outwards. However, since the middle of the twentieth century, the pace of spatial dispersion in cities increased significantly. The growth of low-density, so-called edge-cities, has significantly changed the American urban landscape and its local political jurisdictions. The study of the long-run trends in U.S. urban development suggests that the persistence of this trend is likely to depend upon future turning points in the structure of the American economy.

Table 1

Number and Population of Cities in the United States, 1690-1990

	Number of Cities									
	1690	1720	1790	1820	1880	1920	1940	1960	1960*	1990*
Size Categories										
2,500-5,000	3	2	12	26	467	1255	1422	1777	-	-
5,000-10,000	1	2	7	22	249	715	965	1320	16434	16929
10,000-25,000		1	3	8	146	465	665	1142	978	1290
25,000-50,000			2	2	42	143	213	424	366	567
50,000-100,000				2	15	76	107	203	180	309
100,000-250,000				1	12	43	55	80	79	131
250,000-500,000					4	13	23	29	30	40
500,000-1,000,000					3	9	9	16	16	15
1,000,000 +					1	3	5	5	5	8
Number	4	5	24	61	939	2722	3464	4996	18088	19289
	Distribution of Population (Percent)									
	1690	1720	1790	1820	1880	1920	1940	1960	1960*	1990*
Size Categories										
2,500-5,000	5.0%	1.6%	1.1%	1.0%	3.2%	4.1%	3.8%	3.5%	-	-
5,000-10,000	3.3	3.7	1.2	1.6	3.4	4.7	5.1	5.2	13.9	11.3
10,000-25,000	0	2.6	1.2	1.3	4.4	6.7	7.6	9.9	8.4	8.2
25,000-50,000	0	0	1.6	0.7	2.9	4.8	5.6	8.2	7.1	8.0
50,000-100,000	0	0	0	1.3	1.9	5.0	5.6	7.8	7.0	8.5
100,000-250,000	0	0	0	1.3	3.6	6.2	5.9	6.5	6.4	7.7
250,000-500,000	0	0	0	0	2.6	4.3	5.9	5.9	6.0	5.7
500,000-1,000,000	0	0	0	0	3.8	5.9	4.9	6.2	6.2	4.1
1,000,000 +	0	0	0	0	2.4	9.6	12.1	9.8	9.8	8.0
Total Urban	8.3%	7.8%	5.1%	7.2%	28.2%	51.2%	56.5%	63.1%	64.7%	61.6%
(millions)										
Urban Population	0.02	0.04	0.2	0.7	14.1	54.2	74.4	112.5	116.0	153.1
U.S. Population	0.21	0.47	3.9	9.6	50.2	105.7	131.7	178.5	178.5	248.7

* Uses the new urban areas defined by the 1960 *Census of Population*.

Sources: Data for 1690 and 1720 are from Bridenbaugh (1938) and the Historical Statistics of the United States. All other data are from the *Census of Population*, 1960, Vol. 1, Characteristics of the Population, U.S. Summary, 1-14-15 and the *Statistical Abstract of the U.S.*, 1992.

Table 2

Number and Population of Metropolitan Areas in the United States, 1940-1990

	Number of Cities		
	1940	1960	1990
Size Categories			
50,000-100,000	15	24	26
100,000-250,000	69	91	143
250,000-500,000	30	52	75
500,000-1,000,000	13	31	45
1,000,000 +	11	24	46
Number	138	222	335
	Distribution of Population (Percent)		
	1940	1960	1990
Size Categories			
50,000-100,000	1.0%	1.1%	0.9%
100,000-250,000	16.9	8.2	9.1
250,000-500,000	8.3	9.7	10.6
500,000-1,000,000	6.9	12.0	13.1
1,000,000 +	26.2	34.3	43.9
Total Metropolitan	51.0%	65.3%	77.5%
(millions)			
Metropolitan Population	67.1	116.6	192.9
U.S. Population	131.7	178.5	248.7

Sources: *County Data Book*, 1947; *Statistical Abstract of the U.S.*, 1965; *Census of Population*, 1990.
Note: In general, the metropolitan area is a county or a group of contiguous counties (except in New England) which contains at least one central city of 50,000 inhabitants or more or "twin cities" with a combined population of at least 50,000. In New England, towns and cities are used in defining metropolitan areas.

Table 3
Manufacturing in Large Cities as a Percentage of Population by Region, 1880-1990

	1880*		1900		1920		1940*		1990	
New England	24.1%	(10.0)	23.2%	(8.7)	27.1%	(9.5)	15.9%	(5.1)	11.0%	(4.7)
Middle Atlantic	16.2	(8.9)	19.5	(5.7)	21.5	(8.1)	12.6	(5.1)	11.1	(7.0)
East North Central	14.0	(3.2)	18.0	(4.1)	21.9	(7.1)	14.6	(4.7)	13.0	(6.2)
West North Central	8.9	(3.2)	11.5	(4.9)	12.4	(5.4)	6.7	(2.5)	11.1	(5.5)
South Atlantic	11.4	(7.3)	14.5	(5.6)	12.2	(6.4)	7.4	(3.6)	8.5	(6.1)
East South Central	8.8	(3.6)	12.0	(4.4)	13.6	(4.1)	6.0	(3.5)	10.1	(4.5)
West South Central	3.1	(1.1)	7.8	(1.9)	6.1	(1.5)	5.2	(3.5)	6.5	(3.3)
Mountain	6.4	(1.9)	11.3	(5.3)	6.8	(-)	3.3	(1.1)	6.4	(4.0)
Pacific	6.8	(3.8)	11.2	(2.8)	10.1	(3.2)	5.4	(1.8)	8.9	(9.2)
United States	14.9	(9.2)	17.1	(7.4)	18.2	(9.5)	9.2	(6.8)	9.5	(7.1)
Total Number of Cities	100		145		143		92		197	

*Manufacturing employment data for 1880 and 1940 are for wage earners only.
Standard deviation is in paranthesis.
Sources: *Census of Population*, *Census of Manufactures*, 1880, 1900, 1940, 1990.

Table 4
Geographic Distribution of Large Cities in the United States, 1690-1990

	1690	1720	1790	1820	1880	1900	1920	1940	1990
					(Percent)				
New England	50.0%	40.0%	58.3%	34.4%	20.0%	20.0%	17.5%	12.7%	4.6%
Middle Atlantic	50.0	40.0	16.7	31.3	28.0	23.5	24.5	20.8	6.6
East North Central	0.0	0.0	0.0	3.1	18.0	20.0	18.2	20.3	13.7
West North Central	0.0	0.0	0.0	0.0	9.0	10.3	9.8	9.1	7.1
South Atlantic	0.0	20.0	25.0	25.0	11.0	6.9	11.9	13.2	14.2
East South Central	0.0	0.0	0.0	3.1	6.0	7.6	5.6	5.1	5.6
West South Central	0.0	0.0	0.0	3.1	3.0	4.8	5.6	8.1	13.7
Mountain	0.0	0.0	0.0	0.0	2.0	2.1	1.0	2.0	8.7
Pacific	0.0	0.0	0.0	0.0	3.0	4.8	7.7	8.6	25.9
United States	100	100	100	100	100	100	100	100	100
Total U.S. (Number)	4	5	24	32	100	145	143	197	197

Sources: Bridenbaugh (1938), *Historical Statistics of the United States*, and the *Census of Population*, 1790, 1820, 1880, 1900, 1940, 1990. Large cities were defined as follows: in 1790, cities with population greater than 2,500; in 1820, cities with population greater than 5,000; in 1880, cities with population greater than 20,000; in 1900, cities with population greater than 25,000; in 1920 and 1940, cities with population greater than 50,000; 1990, cities with population greater than 100,000.

Figure 1

Kernel Density Estimates for Size Distribution of Cities, 1820-1990

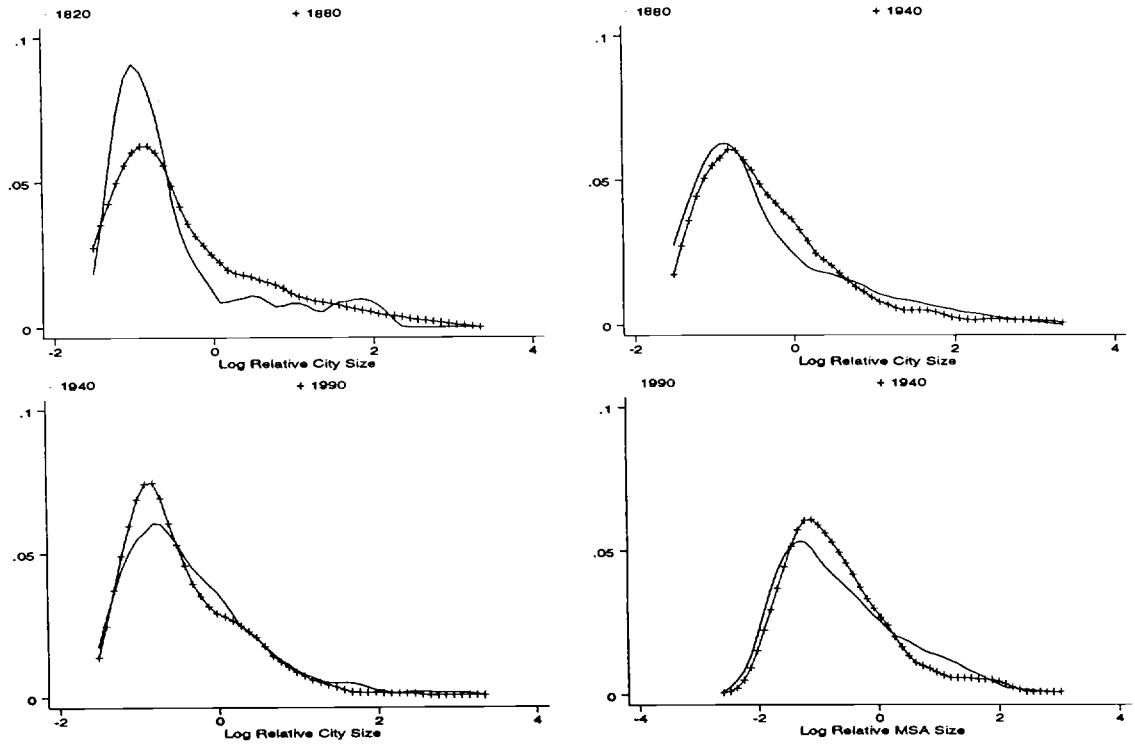

Table 5
Descriptive Statistics of Large Cities in the United States, 1880 and 1940

	1880		1940	
	Population	Mfg.	Population	Mfg.
Mean	91,007	14,508	424,422	40,941
Median	35,092	5,417	177,662	19,021
Std. Dev.	166,061	30,884	887,319	82,853
Minimum	19,743	152	97,062	305
Maximum	1,206,299	227,352	7,454,995	616,749
Number of Obs.	100	100	87	87
	Population (million)	Mfg. (million)	Population (million)	Mfg. (million)
All Large Cities	9.1	1.45	36.9	3.56
Total U.S.	50.2	2.73	131.7	9.06
Large Cities as a Percent of U.S.	18.1%	53.1%	28.0%	39.3%

Note: The manufacturing employment data for 1880 is the number of hands employeed (or wage earners or production workers). The manufacturing employment data for 1940 is for all employees (wage earners, salaried officials, and salaried employees).
Sources: *Census of Population*, 1880, 1940, and *Census of Manufactures*, 1880, 1940.

Table 6
Industrial Concentration in Large Cities, 1880 and 1940

	The Number of Industries that Accounts for 50 Percent or More of Manufacturing Employment in Cities	
	Number of Cities	
Number of 2-digit SIC Industries	1880	1940
One	22 (22%)	19 (22%)
Two	24 (24%)	22 (25%)
Three	33 (33%)	31 (36%)
Four	15 (15%)	13 (15%)
Five	5 (5%)	2 (2%)
Six	1 (1%)	
Number of Observations	100	87

Sources: *Census of Manufactures*, 1880, 1940.

Table 7

Industrial Structures of Regions and Cities, 1880-1940

	Dependent Variable			
	City Industrial Structure			
Independent Variable	(1)	(2)	(3)	(4)
Regional Industrial Structure	0.65 (20.3)	0.65 (20.2)	0.65 (20.0)	0.65 (20.0)
Time Dummies	no	yes	no	yes
Regional Dummies	no	no	yes	yes
Adj-R^2	0.53	0.53	0.52	0.52
Number of Observations	360	360	360	360

Note: t-statistics are in parentheses.
Sources: *Census of Manufactures*, 1880, 1940.

Table 8

Industrial Structure of Large Cities and Regions, 1880-1940

	1880									
Regions	NE Region	NE Cities	MA Region	MA Cities	ENC Region	ENC Cities	WNC Region	WNC Cities	SA Region	SA Cities
# of cities		(20)		(28)		(17)		(9)		(11)
	(Percentage of Industry Employment Divided by Total Manufacturing)									
20 Food	2.9	5.1	6.0	5.8	11.4	13.0	17.7	12.9	14.6	15.6
21 Tobacco	0.4	0.6	3.2	3.6	2.8	4.5	3.1	4.3	11.5	13.6
22 Textiles	36.9	33.3	16.3	15.1	2.5	1.0	2.3	1.7	10.0	3.2
23 Apparel	6.7	9.3	15.8	21.1	8.0	16.3	6.0	10.3	7.8	16.4
24 Lumber	6.0	4.2	7.3	4.7	18.9	9.5	17.5	14.3	13.2	5.9
25 Furniture	1.6	2.4	2.1	2.4	4.8	7.0	3.2	3.7	1.1	1.8
26 Paper	2.5	2.5	1.8	1.7	1.0	0.4	0.4	0.3	0.9	0.8
27 Printing	1.6	4.1	3.3	5.0	3.2	6.2	4.7	7.5	2.7	4.1
28 Chemicals	1.5	1.0	2.9	2.1	2.3	1.3	2.8	2.7	7.9	2.3
29 Petroleum	0.1	0.2	0.2	0.3	0.3	0.4	0.2	0.2	0.3	0.1
30 Rubber	1.1	0.4	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0
31 Leather	14.0	10.4	5.9	5.9	5.2	6.1	6.6	6.5	4.1	5.5
32 Stone	2.6	3.1	5.5	5.2	6.9	5.3	10.0	9.4	6.0	8.0
33 Primary	3.2	2.5	8.4	6.0	7.5	4.9	4.2	4.7	6.0	6.2
34 Fabricated	5.2	4.4	5.6	5.1	9.0	7.1	8.3	5.4	4.6	4.2
35 Machinery	5.5	8.7	7.0	7.8	6.7	9.3	5.5	8.8	3.6	6.0
36 Electrical	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0
37 Trans.	2.0	2.4	3.1	2.3	7.0	5.1	5.5	5.4	4.3	4.6
38 Inst.	1.0	0.5	0.8	0.6	0.6	0.5	0.4	0.5	0.3	0.5
39 Misc.	4.9	4.9	4.2	5.2	1.7	2.0	1.4	1.2	0.8	1.1
Total	100	100	100	100	100	100	100	100	100	100
				(Thousands)						
All Employees	645	207	1045	644	532	218	131	56	212	95
Large City Share		(32%)		(62%)		(41%)		(43%)		(45%)

Sources: *Census of Manufactures*, 1880.

Note: NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, PC - Pacific.

Table 8 - continued

Industrial Structure of Large Cities and Regions, 1880-1940

	1880							
Regions	ESC Region	ESC Cities	WSC Region	WSC Cities	MT Region	MT Cities	PC Region	PC Cities
# of cities		(6)		(3)		(2)		(3)
	(Percentage of Industry Employment Divided by Total Manufacturing)							
20 Food	14.4	10.3	24.1	21.2	13.6	14.6	14.7	11.8
21 Tobacco	4.5	10.6	4.6	12.8	0.4	0.9	7.4	12.8
22 Textiles	8.4	3.0	3.7	6.5	3.1	0.0	4.7	1.7
23 Apparel	3.6	9.6	4.8	12.6	3.1	5.6	8.1	13.4
24 Lumber	18.3	11.0	27.3	10.2	28.2	8.1	18.0	9.6
25 Furniture	2.8	5.2	1.1	1.1	1.9	2.6	3.1	3.4
26 Paper	0.5	0.0	0.4	1.0	0.3	0.0	0.7	0.3
27 Printing	2.4	5.8	3.6	7.9	4.2	11.0	4.3	6.8
28 Chemicals	2.2	0.5	1.7	0.9	4.0	0.0	3.6	2.8
29 Petroleum	0.3	0.1	0.0	0.0	0.0	0.0	0.4	0.6
30 Rubber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31 Leather	5.8	8.6	3.9	5.8	8.8	12.5	10.3	13.3
32 Stone	8.1	5.2	7.9	1.8	12.6	20.3	4.2	2.5
33 Primary	11.9	7.8	0.6	0.0	3.0	0.0	2.2	2.4
34 Fabricated	6.6	6.6	6.8	4.6	7.4	6.4	7.0	4.2
35 Machinery	4.4	9.6	5.0	8.6	5.3	11.2	5.5	7.4
36 Electrical	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
37 Trans.	4.6	5.0	3.3	3.5	2.8	5.1	3.4	3.7
38 Inst.	0.5	0.3	0.4	0.7	0.4	1.1	0.6	0.9
39 Misc.	0.7	0.9	0.7	0.9	0.8	0.6	1.7	2.4
Total	100	100	100	100	100	100	100	100
				(Thousands)				
All Employees	77	25	29	10	10	3	48	27
Large City Share		(33%)		(35%)		(30%)		(56%)

Sources: *Census of Manufactures*, 1880.

Table 8 - continued

Industrial Structure of Large Cities and Regions, 1880-1940

	1940									
Regions	NE Region	NE Cities	MA Region	MA Cities	ENC Region	ENC Cities	WNC Region	WNC Cities	SA Region	SA Cities
# of cities		(13)		(17)		(15)		(9)		(10)
	(Percentage of Industry Employment Divided by Total Manufacturing)									
20 Food	4.7	8.4	7.7	10.8	9.6	13.0	27.6	25.0	7.2	15.8
21 Tobacco	0.1	0.2	1.3	2.3	0.0	0.5	2.4	0.9	2.5	13.8
22 Textiles	27.5	19.4	12.3	9.1	2.1	2.0	1.6	2.5	41.2	7.8
23 Apparel	6.4	12.3	18.3	23.2	4.9	6.7	9.0	10.0	6.8	13.3
24 Lumber	2.2	0.3	1.0	0.5	2.1	0.8	3.7	1.5	9.5	1.2
25 Furniture	1.3	1.7	1.7	1.9	3.1	3.4	1.9	3.6	3.7	4.0
26 Paper	4.9	2.2	3.3	2.5	3.6	1.9	2.9	3.2	2.5	3.1
27 Printing	3.1	6.1	4.7	7.4	4.5	6.5	6.8	9.3	2.2	7.6
28 Chemicals	1.3	2.7	4.0	4.2	2.5	2.8	2.9	4.5	6.1	3.8
29 Petroleum	0.3	0.0	1.3	0.6	1.2	0.4	1.3	0.3	0.4	0.5
30 Rubber	2.8	2.3	1.0	0.7	2.7	2.9	0.5	0.2	0.0	0.3
31 Leather	11.3	5.3	4.1	3.2	3.1	2.3	8.4	6.9	1.7	2.2
32 Stone	1.2	0.9	3.7	1.3	3.8	1.2	4.2	2.5	3.8	2.4
33 Primary	4.0	9.7	10.9	7.0	12.3	13.4	3.1	8.9	4.5	8.0
34 Fabricated	6.1	4.1	5.3	3.3	8.6	6.2	4.9	2.9	2.3	3.7
35 Machinery	8.7	10.1	5.2	4.8	12.4	11.5	6.6	6.5	1.1	2.8
36 Electrical	3.7	6.7	4.2	4.9	4.6	5.6	2.4	3.2	0.3	1.1
37 Trans.	2.3	0.5	4.0	3.9	16.2	15.1	2.9	4.9	3.2	6.2
38 Inst.	2.0	0.2	2.0	1.0	0.0	0.4	4.3	0.1	0.1	0.0
39 Misc.	6.1	7.0	4.2	7.4	2.7	3.3	2.5	3.1	1.0	2.4
Total	100	100	100	100	100	100	100	100	100	100
	(Thousands)									
All Employees	947	341	2234	1250	2158	1091	399	184	959	196
Large City Share		(36%)		(56%)		(51%)		(46%)		(20%)

Sources: *Census of Manufactures*, 1940.

Note: NE - New England, MA - Middle Atlantic, ENC - East North Central, WNC - West North Central, SA - South Atlantic, ESC - East South Central, WSC - West South Central, MT - Mountain, PC - Pacific.

Table 8 - continued

Industrial Structure of Large Cities and Regions, 1880-1940

	1940							
Regions # of cities	ESC Region	ESC Cities (5)	WSC Region	WSC Cities (7)	MT Region	MT Cities (1)	PC Region	PC Cities (10)
	(Percentage of Industry Employment Divided by Total Manufacturing)							
20 Food	8.4	15.2	21.7	25.5	32.9	35.9	20.2	24.1
21 Tobacco	1.0	6.4	0.0	1.3	0.0	0.0	10.2	0.2
22 Textiles	23.4	10.6	4.4	10.3	0.7	0.4	1.5	2.5
23 Apparel	9.0	4.3	6.3	15.8	2.4	11.0	5.5	13.7
24 Lumber	17.2	6.1	24.3	1.9	19.9	1.9	20.1	7.1
25 Furniture	2.6	10.0	2.6	6.6	1.0	2.8	3.0	7.2
26 Paper	2.5	1.7	4.1	1.8	0.3	1.0	3.6	1.8
27 Printing	2.5	5.8	4.4	8.4	7.3	13.6	4.4	8.7
28 Chemicals	6.8	4.9	5.2	2.4	2.4	2.3	2.3	2.5
29 Petroleum	0.8	0.1	10.5	0.3	3.7	0.0	2.1	0.3
30 Rubber	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.4
31 Leather	2.2	4.0	0.3	0.3	0.6	2.5	0.6	0.9
32 Stone	3.4	1.8	4.0	3.2	4.8	4.4	2.8	2.3
33 Primary	10.5	15.2	2.1	5.5	19.1	11.0	3.4	7.1
34 Fabricated	4.9	3.9	2.9	2.8	2.0	2.1	4.8	4.5
35 Machinery	1.6	4.6	4.4	8.8	2.5	6.4	3.4	4.5
36 Electrical	0.7	0.4	0.2	0.2	0.1	0.3	0.9	1.9
37 Trans.	1.4	3.3	1.7	3.6	0.3	0.8	6.9	7.8
38 Inst.	0.3	0.0	0.1	0.0	0.1	0.4	0.3	0.2
39 Misc.	0.9	1.4	0.9	1.4	0.0	3.3	1.4	2.1
Total	100	100	100	100	100	100	100	100
				(Thousands)				
All Employees	349	98	257	96	65	13	466	198
Large City Share		(28%)		(37%)		(20%)		(43%)

Sources: *Census of Manufactures*, 1940.

Table 9

Descriptive Statistics of Large U.S. Cities, 1900-1990

1900	Mean	Std. Dev.	Minimum	Maximum	Number
Population (1,000)	123	323	25	3,437	160
Log of Population	11.05	0.89	10.13	15.05	160
Density (pop. per sq. mile)	7,377	5,769	568	52,768	160
		(Percentage of Population)			
Foreign Born	20.9%	11.3	2.2	47.7	160
Black	7.8%	13.7	0.02	57.1	160
Illiteracy Rate	6.0%	4.7	1.3	26.7	160
Agriculture	0.57%	0.40	0.08	1.86	160
Manufacturing	17.1%	5.6	7.6	34.5	160
Trade and Transportation	11.6%	2.6	6.8	17.4	160
Professional Service	2.29%	0.62	1.11	4.44	160
Personal Service	11.1%	3.9	5.3	24.1	160

Note: The sample represents cities having 25,000 inhabitants or more.
Source: *Census of Population*, 1900: Vol. 2, Part 2.

Table 9 - continued

Descriptive Statistics of Large U.S. Cities, 1900-1990

1920	Mean	Std. Dev.	Minimum	Maximum	Number
Population (1,000)	228.3	546.2	50.0	5,620	143
Log of Population	11.73	0.86	10.82	15.54	143
Density (pop. per sq. mile)	8,461	6,085	948	52,562	143
		(Percentage of Population)			
Foreign Born	17.5%	10.8	1.0	43.0	143
Black	8.1%	11.9	0.08	47.6	143
Illiteracy Rate	4.4%	2.7	0.5	12.1	143
Agriculture	0.46%	0.51	0.04	2.78	143
Mining	0.34%	1.10	0.0	8.29	143
Manufacturing	18.2%	9.5	2.6	43.7	143
Transportation	4.1%	1.6	1.3	9.5	143
Trade	6.2%	1.6	3.1	10.7	143
Public Service	1.0%	1.0	0.3	9.8	143
Professional Service	2.7%	0.8	1.1	7.4	143
Personal Service	4.9%	2.5	1.8	17.1	143
Clerical	5.2%	1.7	2.1	16.7	143

Note: The sample represents cities having 50,000 inhabitants or more.
Sources: *Census of Population*, 1920: Vol. 2; *Census of Manufactures*, 1920.

Table 9 - continued

Descriptive Statistics of Large U.S. Cities, 1900-1990

1940	Mean	Std. Dev.	Minimum	Maximum	Number
Population (1,000)	413	869	101	7,455	92
Log of Population	12.37	0.84	11.52	15.82	92
Density (pop. per sq. mile)	8,425	4,858	1,622	24,933	92
Median School Years Completed	9.0	0.9	7.5	11.4	92
		(Percentage of Population)			
Foreign Born	12.2%	0.8	11.5	15.8	92
Black	9.2%	10.1	0.1	40.8	92
Agriculture	0.20%	0.17	0.03	0.99	92
Mining	0.22%	0.62	0.00	3.71	92
Construction	1.81%	0.53	0.75	4.00	92
Manufacturing	11.1%	4.8	3.1	22.8	92
Transportation	3.4%	1.1	1.4	6.3	92
Wholesale Trade	2.5%	1.1	0.6	5.9	92
Retail Trade	5.8%	1.1	2.9	8.4	92
Finance, Insurance Real Estate	1.8%	0.7	0.6	4.7	92
Business Service	0.82%	0.20	0.39	1.24	92
Personal Service	4.1%	1.7	1.8	10.4	92
Amusement	0.40%	0.22	0.21	2.04	92
Professional Service	3.1%	0.6	1.9	5.4	92
Government	2.0%	1.9	0.8	13.5	92

Note: The sample represents cities having 100,000 inhabitants or more.
Sources: *Census of Population*, 1940: Vol. 2; *Census of Manufactures*, 1940; *Census of Business*, 1940.

Table 9 - continued

Descriptive Statistics of Large U.S. Cities, 1900-1990

1990	Mean	Std. Dev.	Minimum	Maximum	Number
Population (1,000)	326	630	91	7,323	194
Log of Population	12.26	0.74	11.4	15.81	194
Density (pop. per sq. mile)	4,233	3,294	446	23,701	194
		(Percentage of Population)			
Foreign Born	11.0%	11.2	0.8	70.4	194
Black	18.6%	17.1	0.1	75.7	194
High School Graduate or Higher	75.5%	9.6	44.3	95.1	194
Manufacturing	9.3%	7.0	0.6	61.1	194
Wholesale Trade	3.2%	1.7	0.5	10.5	194
Retail Trade	9.1%	2.7	2.7	17.2	194
Finance, Insurance Real Estate	3.6%	1.3	1.3	7.4	194
Business Service	3.7%	2.2	0.6	11.8	194
Personal Service	2.8%	2.8	0.6	27.7	194
Amusement	0.6%	0.5	0.05	4.6	194
Legal Service	0.70%	0.63	0.04	4.78	194
Health Service	2.5%	0.9	0.5	5.3	194
Government	1.5%	1.1	0.0	7.7	194

Note: The sample represents cities having 100,000 inhabitants or more.
Sources: *Census of Manufactures*, 1987; *Census of Business*, 1987; *Census of Services*, 1987; County and City Data Book, 1994.

Table 10
Economic Structures of Cities, 1900

Variable	(1) Log(Pop)	(2) Population	(3) Rank	(4) Density
Constant	8.51***	-417	235.6***	9113
	(7.41)	(0.92)	(3.93)	(1.30)
Foreign Born	0.038***	10.25***	-1.61***	60.75
	(3.89)	(2.68)	(3.20)	(1.03)
Black	0.022	3.60	-1.25	58.10
	(1.28)	(0.53)	(1.40)	(0.56)
Illiteracy Rate	-0.02	-0.93	0.76	-263.5
	(0.58)	(-0.07)	(0.42)	(1.25)
Agriculture	-0.69***	-141.2*	35.3***	-6562***
	(3.61)	(1.88)	(3.57)	(5.65)
Manufacturing	0.0076	-4.67	-1.44	36.22
	(0.33)	(0.51)	(1.19)	(0.25)
Trade and Trans.	0.16***	31.9**	-9.10***	722.2***
	(4.23)	(2.15)	(4.66)	(3.15)
Professional Serv.	0.049	15.13	-5.21	-2807**
	(0.26)	(0.21)	(0.54)	(2.50)
Personal Serv.	-0.013	-3.34	0.95	41.52
	(0.41)	(0.26)	(0.57)	(0.21)
Regional Dummies				
Northeast	0.19	118.9	-7.90	-1214
	(0.54)	(0.88)	(0.44)	(0.58)
Midwest	0.20	98.9	-4.08	-2860
	(0.60)	(0.75)	(0.24)	(1.41)
South	0.17	82.0	-3.48	1650
	(0.38)	(0.46)	(0.15)	(0.60)
R^2	0.264	0.122	0.262	0.344
N	160	160	160	160

*Significant at the 10 percent level.
**Significant at the 5 percent level.
*** Significant at the 1 percent level.
Sources: See Table 9.

Table 10 - continued
Economic Structures of Cities, 1920

Variable	(1) Log(Pop)	(2) Population	(3) Rank	(4) Density
Constant	10.63***	221.9	183.6***	15132**
	(9.45)	(0.27)	(3.39)	(1.99)
Foreign Born	0.034***	20.85**	-1.09*	243.4***
	(2.83)	(2.40)	(1.90)	(3.03)
Black	0.020	10.10	-0.75	222.4**
	(1.39)	(0.94)	(1.05)	(2.23)
Illiteracy Rate	0.010	-4.09	-2.60	-310.8
	(0.23)	(0.13)	(1.21)	(1.03)
Agriculture	-0.643***	-301.4**	23.74***	-5428***
	(3.45)	(2.21)	(2.64)	(4.29)
Manufacturing	0.0027	-19.31	-1.26	-250.3*
	(0.12)	(1.18)	(1.17)	(1.66)
Transportation	-0.033	-33.15	-0.755	924.5**
	(0.55)	(0.75)	(0.26)	(2.26)
Trade	0.287***	114.3**	-15.57***	415.5
	(3.89)	(2.13)	(4.39)	(0.83)
Public Service	0.067	12.16	-4.00	373.5
	(1.01)	(0.25)	(1.25)	(0.83)
Professional Serv.	-0.343**	-152.6	15.32**	-2244**
	(2.35)	(1.43)	(2.18)	(2.27)
Personal Serv.	-0.025	-9.98	1.97	-843.7**
	(0.49)	(0.27)	(0.82)	(2.50)
Clerical	0.207***	56.47	-11.68***	614.6*
	(3.91)	(1.46)	(4.56)	(1.71)
Regional Dummies				
Northeast	-1.178***	-313.0	56.0***	-2194
	(3.32)	(1.21)	(3.27)	(0.91)
Midwest	-0.990***	-267.9	50.99***	-5010**
	(2.87)	(1.06)	(3.07)	(2.14)
South	-1.474***	-466.0	73.11***	-5894**
	(3.52)	(1.53)	(3.62)	(2.08)
R^2	0.393	0.189	0.386	0.438
N	143	143	143	143

*Significant at the 10 percent level.
**Significant at the 5 percent level.
*** Significant at the 1 percent level.
Sources: See Table 9.

Table 10 - continued
Economic Structures of Cities, 1940

Variable	(1) Log(Pop)	(2) Population	(3) Rank	(4) Density
Constant	12.99***	1114	19.88	9540
	(7.08)	(0.49)	(0.31)	(0.91)
Foreign Born	0.041**	49.30**	-0.63	178.7*
	(2.51)	(2.46)	(1.11)	(1.94)
Black	0.059***	26.76	-2.048***	75.76
	(3.36)	(1.24)	(3.31)	(0.76)
Median School	-0.22	-174.2	5.983	-1296
Years Completed	(1.51)	(0.96)	(1.15)	(1.55)
Agriculture	-1.82***	-1699**	49.59**	-12326***
	(2.73)	(2.05)	(2.10)	(3.23)
Mining	-0.068	6.677	4.709	-74.23
	(0.48)	(0.04)	(0.94)	(0.09)
Construction	0.0045	-136.4	-1.366	2376
	(0.01)	(0.36)	(0.13)	(1.38)
Manufacturing	-0.024	-7.474	1.481	58.44
	(0.75)	(0.19)	(1.30)	(0.32)
Transportation	-0.16*	-82.35	6.352**	-66.58
	(1.75)	(0.75)	(2.02)	(0.13)
Wholesale Trade	0.32**	200.6	-8.693**	1166
	(2.55)	(1.30)	(1.97)	(1.64)
Retail Trade	-0.095	-211.2	-0.321	-890.5
	(0.92)	(1.66)	(0.09)	(1.52)
FIRE	-0.028	95.41	0.111	-69.63
	(0.19)	(0.51)	(0.02)	(0.08)
Business Services	2.75***	2125**	-80.15***	12204**
	(3.20)	(2.00)	(2.64)	(2.50)
Personal Service	-0.41***	-98.18	15.28***	-587.3
	(2.78)	(0.54)	(2.93)	(0.70)
Amusement	1.473***	1154**	-31.65**	-204.6
	(3.55)	(2.25)	(2.16)	(0.09)
Professional Service	-0.036	-157.7	-1.017	-877.7
	(0.22)	(0.77)	(0.17)	(0.94)
Government	0.116**	109.5*	-2.442	741.1***
	(2.52)	(1.91)	(1.50)	(2.82)

Table 10 - continued below

Table 10 - continued
Economic Structures of Cities, 1940

Variable	(1) Log(Pop)	(2) Population	(3) Rank	(4) Density
Regional Dummies				
Northeast	-0.071	-44.34	2.373	4552**
	(0.18)	(0.09)	(0.17)	(2.01)
Midwest	0.022	18.15	2.606	634.2
	(0.06)	(0.04)	(0.21)	(0.32)
South	0.218	40.00	-6.399	-276.2
	(0.44)	(0.07)	(0.36)	(0.10)
R^2	0.595	0.416	0.496	0.605
N	92	92	92	92

*Significant at the 10 percent level.
**Significant at the 5 percent level.
*** Significant at the 1 percent level.
Sources: See Table 9.

Table 10 - continued
Economic Structures of Cities, 1990

Variable	(1) Log(Pop)	(2) Log(Pop)	(3) Log(Pop)	(4) Population	(5) Density
Constant	12.32***	13.05***	13.34***	289.5	103.7
	(16.9)	(16.5)	(16.9)	(0.40)	(0.05)
Foreign Born	0.0058	0.0011	-0.0030	8.202	181.0***
	(0.85)	(0.16)	(0.43)	(1.29)	(9.00)
Black	0.0089**	0.0076*	0.0044	2.995	52.18***
	(2.17)	(1.85)	(1.07)	(0.80)	(4.39)
High School	0.0029	-0.0099	-0.010	-3.321	7.637
Grad. Rate	(0.31)	(1.02)	(1.06)	(0.38)	(0.28)
Manufacturing	-0.017**	-0.022**	-0.018**	-10.82	-10.67
	(2.04)	(2.48)	(2.01)	(1.36)	(0.42)
Wholesale Trade	0.094**	0.043	0.027	18.24	-2.707
	(2.51)	(0.96)	(0.61)	(0.45)	(0.02)
Retail Trade	-0.085***	-0.098***	-0.086***	-44.49	8.890
	(3.40)	(3.83)	(2.83)	(1.61)	(0.10)
FIRE	0.081	0.056	0.048	62.84	131.2
	(1.53)	(1.05)	(0.92)	(1.32)	(0.87)
Business Service	-	0.072*	0.052	11.48	-122.0
		(1.82)	(1.30)	(0.32)	(1.07)
Personal Service	0.021	-0.001	-0.013	-22.53	-56.19
	(1.10)	(0.04)	(0.63)	(1.17)	(0.92)
Amusement	-	0.207*	0.194	300.9***	259.8
		(1.65)	(1.58)	(2.71)	(0.74)
Legal Service	-	-	0.324***	1.676	417.6
			(3.00)	(0.02)	(1.35)
Health Service	-	-	-0.095	-18.70	-272.4
			(1.30)	(0.28)	(1.29)
Government	-	-	0.059	142.2***	554.6***
			(0.99)	(2.65)	(3.27)
Regional Dummies					
Northeast	-0.288	-0.316	-0.322	26.79	3146***
	(1.33)	(1.47)	(1.52)	(0.14)	(5.20)
Midwest	0.237	0.188	0.165	197.4	1063**
	(1.41)	(1.12)	(0.99)	(1.31)	(2.24)
South	-0.011	-0.068	0.001	-22.65	-1285***
	(0.073)	(0.44)	(0.004)	(0.16)	(2.91)
R^2	0.233	0.257	0.297	0.204	0.71
N	194	194	194	194	194

*Significant at the 10 percent level; **Significant at the 5 percent level; *** Significant at the 1 percent level.
Sources: See Table 9.

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