

Linda M. Ghelfi and Timothy S. Parker

A County-Level Measure of Urban Influence

An area's geographic context has a significant effect on its development. Broad sets of economic opportunities accrue to a place by virtue of both its size and its access to larger economies. And, access to larger economies—centers of information, communication, trade, and finance—provides the conduit through which the smaller economy connects to national and international marketplaces. These relationships among economies are basic concepts of central place theory commonly studied in regional economics (Lösch, Nourse). Population size, urbanization, or access to larger communities are often central in much research that is dependent upon county-level data sets. For purposes of enhancing research on the geographic differences in economic opportunities, we developed a set of county-level urban influence categories.

The Urban Influence Codes

The urban influence codes divide counties, county equivalents, and independent cities in the United States into nine groups. For simplicity, the term “county” is used to refer to all 3,141 counties, parishes, boroughs, census-defined areas, independent cities, and Yellowstone National Park reported in the 1990 Census of Population and Housing data files. Metro counties are divided into two groups by the size of the metro area—those in “large” areas with at least 1 million residents and those in “small” areas with fewer than 1 million residents. Nonmetro counties are divided into groups by their adjacency to metro areas—adjacent to a large metro area, adjacent to a small metro area, and not adjacent to any metro area. Nonmetro counties adjacent to either size metro area are further classified by the size of their “city”—those containing all or part of a city of 10,000 or more residents and those containing

no part of a city that large. Nonmetro counties not adjacent to a metro area are further divided by the size of the largest place they contain—all or part of a “city” of 10,000 or more residents, all or part of a “town” of 2,500 to 9,999 residents, and “totally rural,” containing no part of a town with at least 2,500 residents. The widely used ERS rural-urban continuum codes group counties by an aggregate measure of urban population, not largest city size, and do not identify which size of metro area adjacent counties abut (see “How Our Codes Compare with the Rural-Urban Continuum Codes,” p. 40, for more details).

There are 836 metro counties; 311 are part of large metro areas, and 525 are part of small metro areas. There are 2,305 nonmetro counties. Of the 183 nonmetro counties that are adjacent to large metro areas, 63 have their own city. Another 815 nonmetro counties are adjacent to small metro areas, 188 of which have their own city. Among the 1,304 nonmetro counties that are not adjacent to a metro area, 234 have their own city, 555 have a town, and 515 are totally rural. The maps show that not all the metro areas are completely surrounded by adjacent counties (figs. 1 and 2). Some of the counties abutting metro areas do not meet the 2-percent commuting requirement to be considered “adjacent.” Other nonmetro counties have more commuting to a nearby metro area of the other size, so they are classified as adjacent to that other area. (For more details, see “Classification Methods,” p. 34.)

Some of the urban influence groups are concentrated in particular Census Divisions. Most concentrated are the totally rural nonadjacent counties—41 percent of them are in the West North Central division (fig. 3 and table 1). Researchers using the urban influence codes should be conscious of this concentration and the lower, but still significant, concentrations of other urban influence categories in several of the Census Divisions.

Linda Ghelfi is a senior economist in the Rural Business & Development Policy Branch and Timothy Parker is a sociologist in the Food Assistance, Poverty & Well Being Branch of the Food & Rural Economics Division, ERS.

Figure 1

Large metro areas and their adjacent nonmetro counties

Large metro areas influence many nonmetro counties

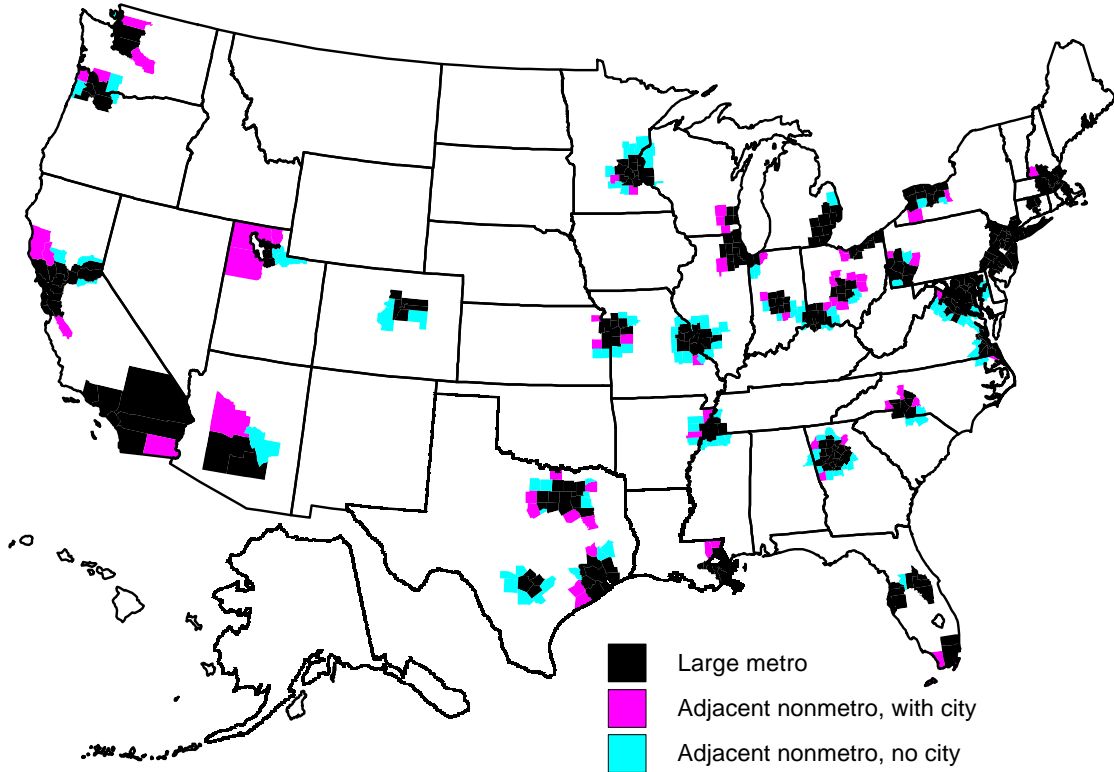
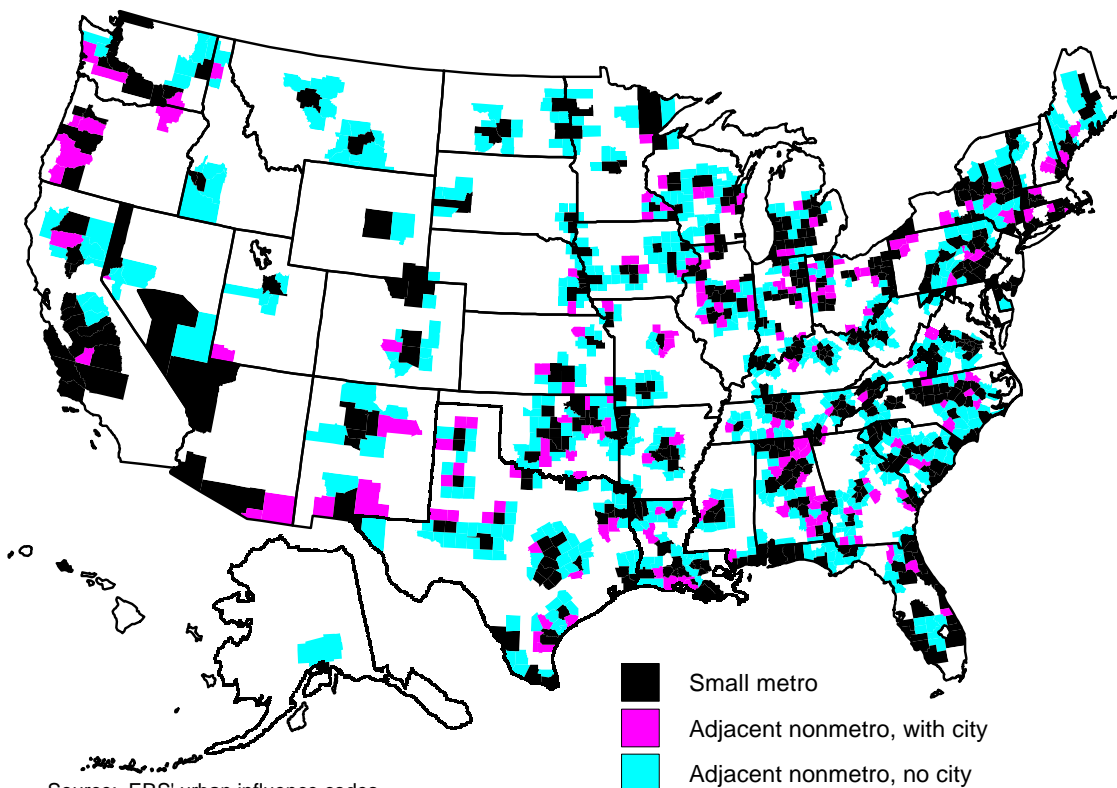


Figure 2

Small metro areas and their adjacent nonmetro counties

The more numerous small metro areas influence a much larger group of nonmetro counties



Source: ERS' urban influence codes.

Classification Methods

These codes group metro and nonmetro counties according to the official metro status announced by the Office of Management and Budget in June 1993, based on population and commuting data from the 1990 Census of Population.

A Metropolitan Statistical Area (MSA) is a county or group of counties containing at least one city of 50,000 or more residents or containing a Census Bureau-defined urbanized area of at least 50,000 residents with a total metro area population of at least 100,000. In addition to the county or counties containing the main city or urbanized area, an MSA may include other counties having strong ties to the central city. For a more thorough definition of metropolitan, see U.S. Department of Commerce, Bureau of the Census, *State and Metropolitan Area Data Book, 1991*.

Nonmetro counties lie outside metro areas. They are defined as adjacent if they physically abut a metro area and have at least 2 percent of employed persons commuting to work in core county(ies) of the metro area. When a nonmetro county met the criterion of adjacency to more than one metro area, it was designated as adjacent to the metro area to which the largest percentage of its workers commuted.

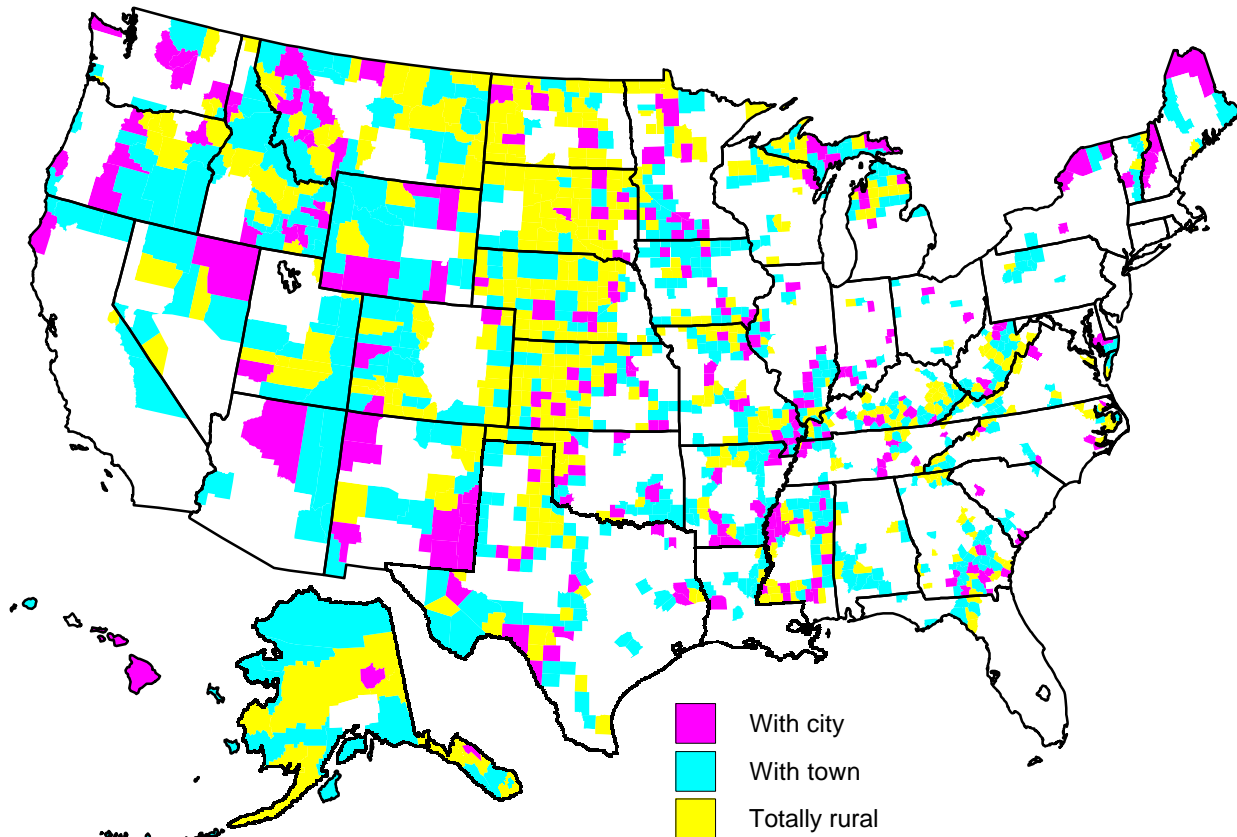
The cut point for nonmetro city size is set at 10,000 residents. In creating an earlier, 1980, version of the urban influence codes, we tested higher cut points of 15,000 or more and of 20,000 or more residents, but too few nonmetro cities were that large. In a special Census issue of *Rural Conditions and Trends* (Ghelfi, ed.), a wide set of social and economic characteristics were analyzed using the older codes.

Census Defined Places are considered to be cities or towns in this classification. Virginia's independent cities are considered in determining the largest city or town in the counties which the independent cities border, Hawaii's Kalawao County is considered to have the size of place that island-sharing Maui County, HI, has, and Montana's Yellowstone National Park is considered to have the size of place that adjoining Park County has.

Figure 3

Nonadjacent nonmetro counties by city size

Totally rural nonadjacent counties are concentrated in the West North Central States



Source: ERS' urban influence codes.

Table 1

Counties by Urban Influence and Census Division*Nonadjacent rural counties are concentrated in the West North Central division*

	Census Division ¹									U.S. total
	NE	MA	ENC	WNC	SA	ESC	WSC	M	P	
	Number									
All counties	67	150	437	618	591	364	470	281	163	3,141
Metro:										
Large	10	47	59	29	83	10	33	11	29	311
Small	20	45	90	43	136	66	74	23	28	525
Nonmetro:										
Adjacent to large metro—										
With city	1	4	17	6	10	0	13	4	8	63
No city	0	4	25	18	35	9	18	7	7	123
Adjacent to small metro—										
With city	8	11	39	20	28	26	37	9	10	188
No city	11	25	84	100	144	91	121	36	15	627
Nonadjacent—										
With city	5	4	27	62	24	33	30	33	16	234
With town	8	9	60	131	70	68	94	86	29	555
Totally rural	4	1	36	209	61	61	50	72	21	515
	Percentage of counties in Census Division ²									
All counties	2.1	4.8	13.9	19.7	18.8	11.6	15.0	8.9	5.2	100.0
Metro:										
Large	3.2	15.1	19.0	9.3	26.7	3.2	10.6	3.5	9.3	100.0
Small	3.8	8.6	17.1	8.2	25.9	12.6	14.1	4.4	5.3	100.0
Nonmetro:										
Adjacent to large metro—										
With city	1.6	6.3	27.0	9.5	15.9	0	20.6	6.3	12.7	100.0
No city	0	3.3	20.3	14.6	28.5	7.3	14.6	5.7	5.7	100.0
Adjacent to small metro—										
With city	4.3	5.9	20.7	10.6	14.9	13.8	19.7	4.8	5.3	100.0
No city	1.8	4.0	13.4	15.9	23.0	14.5	19.3	5.7	2.4	100.0
Nonadjacent—										
With city	2.1	1.7	11.5	26.5	10.3	14.1	12.8	14.1	6.8	100.0
With town	1.4	1.6	10.8	23.6	12.6	12.3	16.9	15.5	5.2	100.0
Totally rural	.8	.2	7.0	40.6	11.8	11.8	9.7	14.0	4.1	100.0

¹NE=New England, including Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

MA=Middle Atlantic, including New Jersey, New York, and Pennsylvania.

ENC=East North Central, including Illinois, Indiana, Michigan, Ohio, and Wisconsin.

WNC=West North Central, including Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

SA=South Atlantic, including Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia.

ESC=East South Central, including Alabama, Kentucky, Mississippi, and Tennessee.

WSC=West South Central, including Arkansas, Louisiana, Oklahoma, and Texas.

M=Mountain, including Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming.

P=Pacific, including Alaska, California, Hawaii, Oregon, and Washington.

²Bold numbers in this panel denote that the share of counties in the urban influence group is as high or higher than the share of all counties in the Census Division.

Source: ERS' urban influence codes.

Urban Influence Groups Differ Along Many Social and Economic Dimensions

Several social and economic characteristics of counties show interesting differences among the urban influence groups and changes in their growth patterns between the 1980's and the early 1990's. In general, urbanization and

adjacency are positively related to growth and access to opportunities.

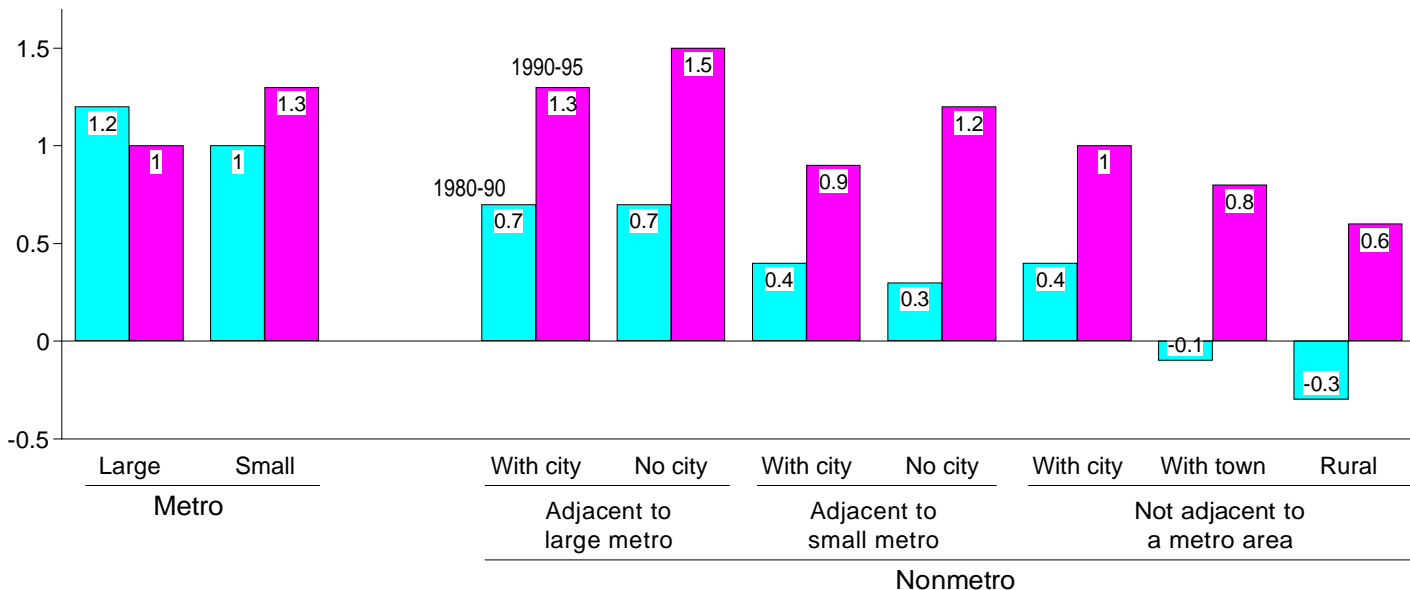
Population growth favored metro areas during the 1980's (fig. 4). Nonmetro counties adjacent to the large metro areas were the fastest growing nonmetro groups, whether

Figure 4

Population change, 1980-95

Urbanization and adjacency meant faster population growth during the 1980's; less urban counties have fared much better so far in the 1990's

Average annual percent change



Source: Calculated by ERS using data from the Bureau of the Census.

or not they had their own cities. Those nonmetro counties adjacent to the smaller metro areas did not receive the same kind of boost from their location. While the small metro areas grew almost as fast as the large metro areas, the nonmetro counties adjacent to the small metro areas grew less than half as fast as the small metro areas did.

At the nonadjacent end of the nonmetro spectrum, counties with their own cities experienced moderate population growth during the 1980's, as fast as that experienced by the counties with cities that are adjacent to small metro areas. Those counties with towns averaged slight annual losses of population, and the totally rural counties averaged 0.3 percent annual population loss.

Federal-State estimates of county population since the 1990 census show that population growth has favored nonmetro areas in the early 1990's. Nonmetro counties adjacent to large metro areas had faster population growth during 1990-95 than the large metro areas themselves had. Small metro areas are now growing faster than the large metro areas and are still growing faster than their adjacent nonmetro counties, but by only a slim margin. And, countering their decline during the 1980's, the population of nonadjacent counties with towns grew by 0.8 percent annually and the totally rural counties grew by 0.6 percent annually during 1990-95.

In the 1980-90 period, the population of adjacent nonmetro counties with cities grew at about the same rate as

those without cities within both the large and small metro adjacency groups. It was in the nonadjacent group that having a city appeared to boost population growth. During 1990-95, the population of adjacent counties without cities grew somewhat faster than that of the adjacent counties with cities. These nonmetro areas appear to be benefiting more now from their location next to the metro areas than they did during the 1980's. However, the adjacent counties without cities may also be facing the pressures of balancing the development they are experiencing from metro migrants seeking less dense, less expensive housing with the desires of longer term residents to maintain the "rural" quality of life.

The nonadjacent counties with cities experienced faster population growth than the other nonadjacent counties in both the 1980's and the early 1990's. Many of the cities in nonadjacent counties undoubtedly perform trade center functions that the adjacent nonmetro counties may obtain through the metro areas they have access to.

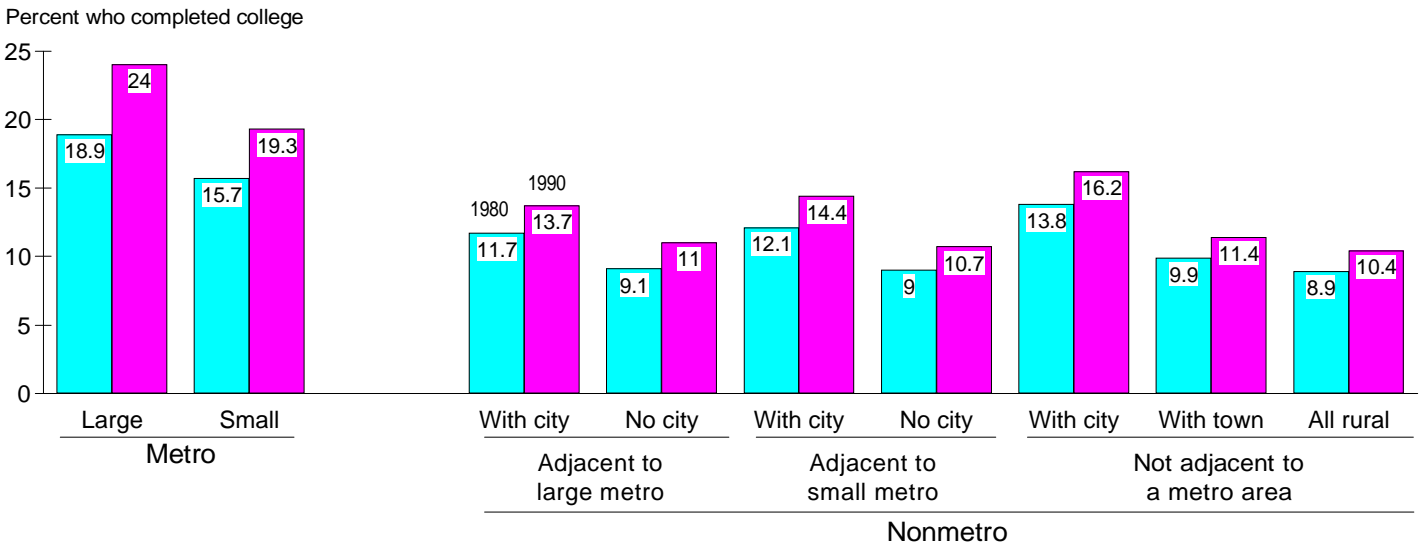
Educational attainment, measured here by the proportion of adults 25 and older who have completed a 4-year college education, also suggests that the nonadjacent counties with cities perform trade center functions. Among all nonmetro groups, the nonadjacent counties with cities have the highest proportion of college-educated residents (fig. 5).

Employment growth, like population growth, has favored the nonmetro counties that are adjacent to large metro

Figure 5

Population 25 and older having completed a college education, 1980-90

More urban counties attract highly educated residents; the nonadjacent counties with cities have the highest proportion of college-educated residents of all the nonmetro groups

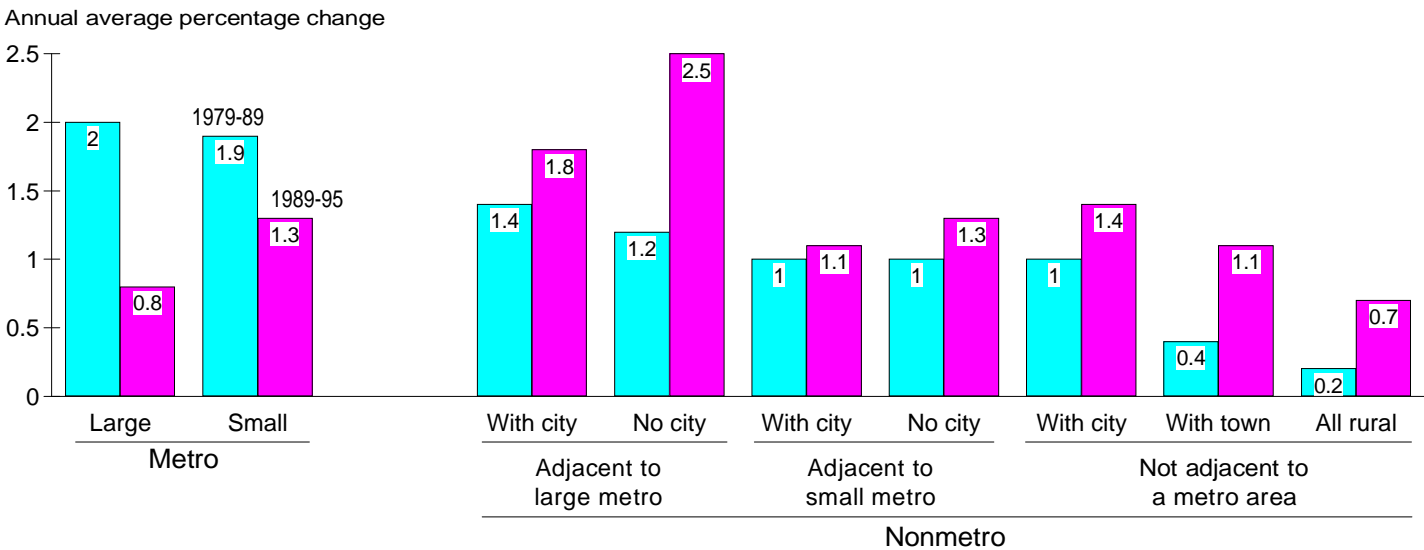


Source: Calculated by ERS using data from the Bureau of the Census.

Figure 6

Employment change, 1979-95

While employment growth favored metro areas during the 1980's, residents of nonmetro areas adjacent to large metro areas have benefited from faster employment growth during the early 1990's



Source: Calculated by ERS using data from the Bureau of Labor Statistics.

areas, especially those without cities (fig. 6). Among nonadjacent counties, those with cities continue to have faster employment growth than the counties with towns and the totally rural counties, but the advantage is not as great in the early 1990's as it was during the 1980's. Commuting data from the 1990 census, although based on an earlier metro-nonmetro designation, suggests that many of the jobs adjacent county residents obtain are actually in the

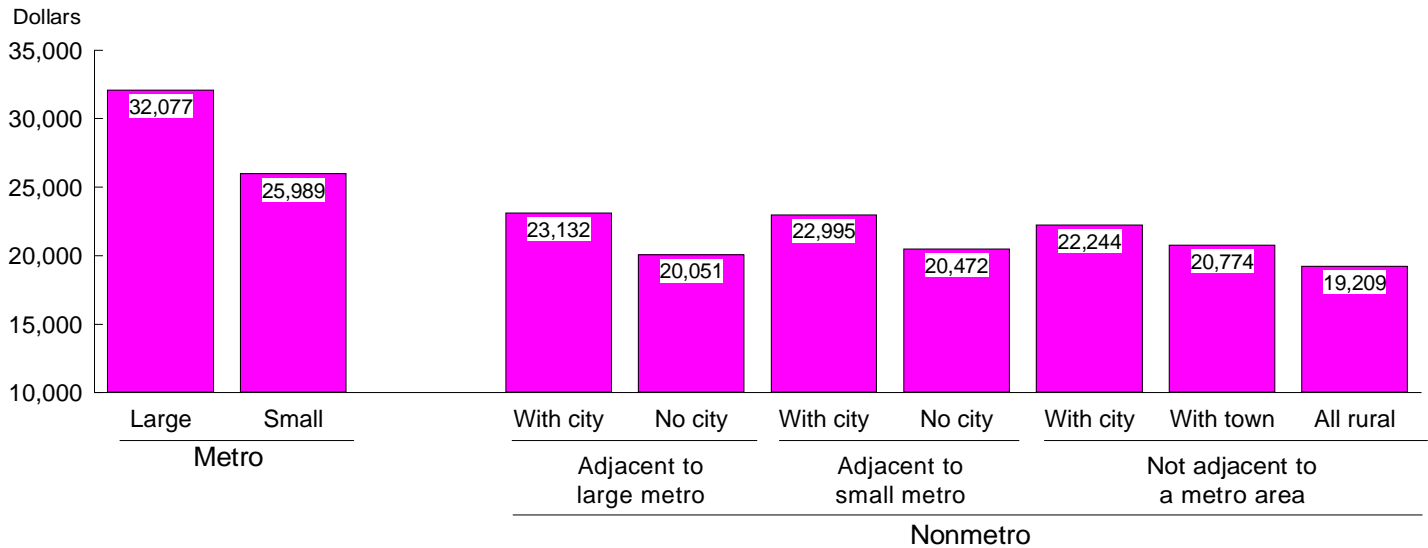
metro areas. Faster population and employment growth in the adjacent nonmetro counties during the 1990's may be a function of the increasing availability of jobs in the outer fringe of metro areas.

Earnings per job are measured at the place of work. In 1994, the jobs in large metro areas averaged about \$9,000 more in earnings than jobs in their adjacent nonmetro

Figure 7

Earnings per job, 1994

Large metro areas have the highest earnings per job, followed by smaller metro areas and the nonmetro counties with cities

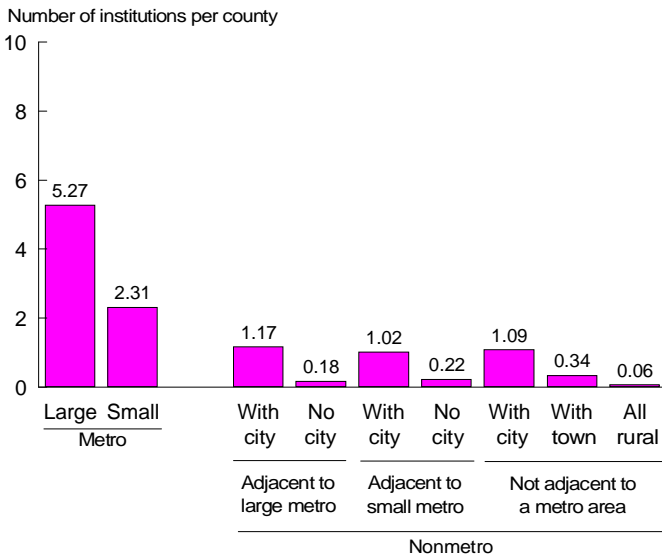


Source: Calculated by ERS using data from the Bureau of Economic Analysis.

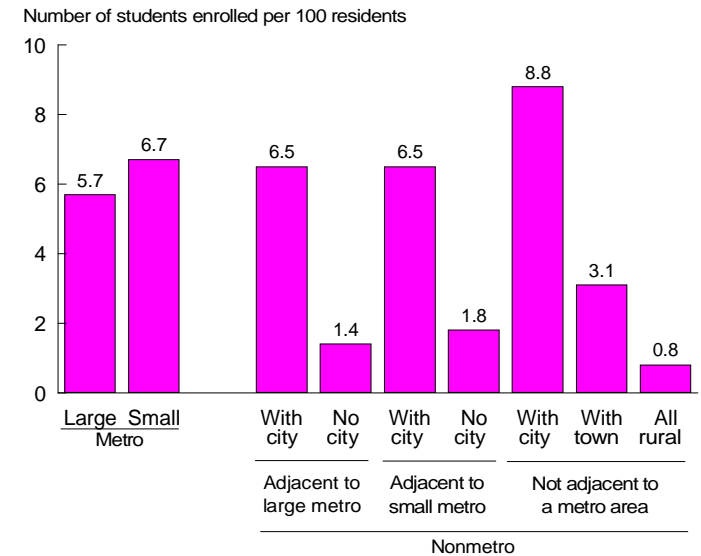
Figure 8

Higher education access measures, school year 1994-95

The groups of nonmetro counties without cities average less than one institution of higher learning per county...



...the number of students enrolled per 100 residents also shows that the counties without cities provide scarce opportunities for higher learning; the nonmetro counties with cities compare much more favorably with metro areas on this measure of access



Source: Calculated by ERS using data from the U.S. Department of Education.

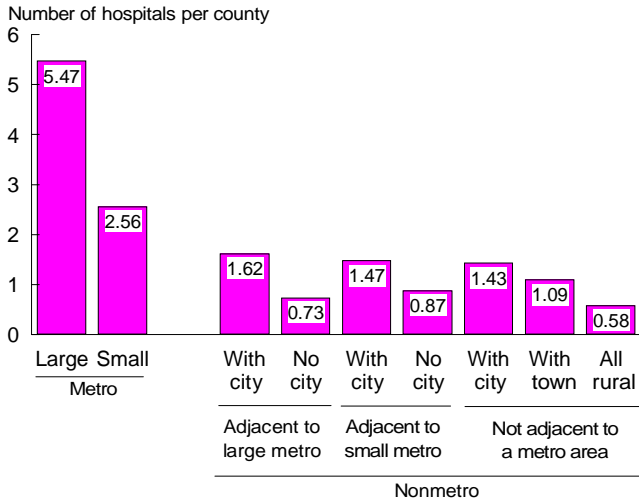
counties with cities and about \$12,000 more in earnings than jobs in their adjacent counties without cities (fig. 7). The jobs in small metro areas also averaged higher earnings than jobs in their adjacent counties, but the advantage was in the \$3,000 to \$5,000 range. Higher earnings

are undoubtedly part of the reason for adjacent nonmetro residents' interest in commuting to metro jobs. Earnings in the nonadjacent counties are highest in counties with cities. Few workers in nonadjacent counties have the

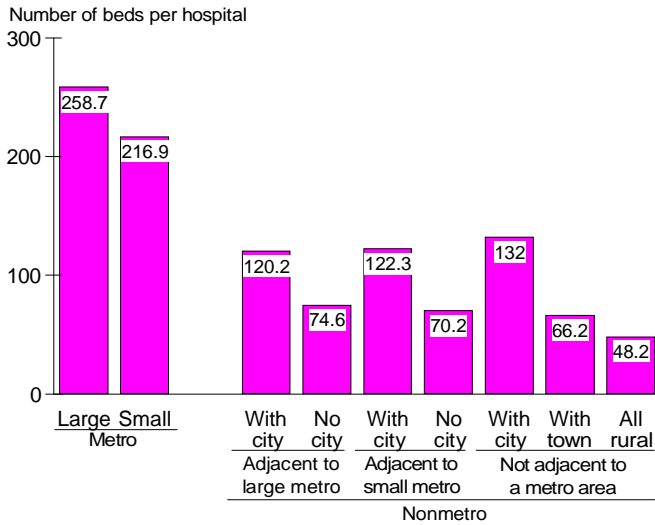
Figure 9

Hospital and physician supply measures, 1993-94

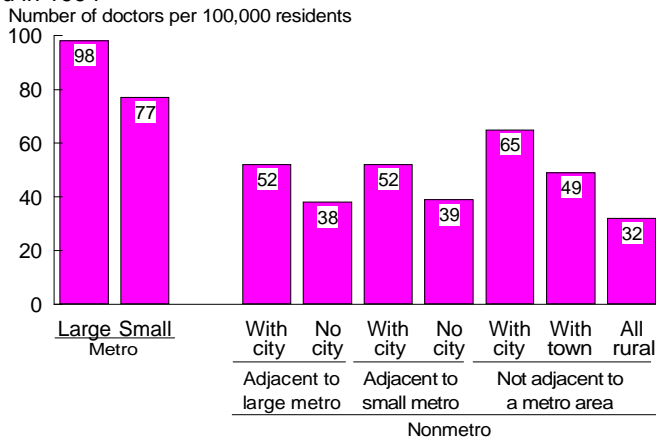
Nonmetro counties without cities averaged less than one short-term community hospital per county in 1993....



...the hospitals in nonmetro counties without cities averaged fewer beds than other nonmetro hospitals...



...and counties without cities also averaged fewer primary care doctors per 100,000 residents than counties with cities did in 1994



Note: Alaska counties are not included in these data.

Source: Calculated by ERS using data from the American Hospital Association, Annual Survey of Hospitals, 1993, and the American Medical Association, Physicians Masterfile, 1994.

option of working in metro areas, so local earnings are more indicative of their opportunities.

Institutions of higher learning, here defined as 2- or 4-year degree-granting colleges, illustrate the access residents have to local educational opportunities. The average number of institutions per county shows that large metro areas have the highest density of colleges (fig. 8). Having a city greatly increases the chances of a nonmetro county having a college. When access is measured by the number of students enrolled per 100 residents, the advantage nonmetro counties with cities have over those without cities is just as striking, but the metro advantage disappears. All the groups of nonmetro counties with cities have higher ratios of students to residents than the metro areas do. Residents of adjacent counties may also commute to metro colleges, giving them more access than their local options suggest.

Hospital and physician supply favor metro areas in all three ways we measured. The number of short-term community hospitals per county is largest in large metro areas (fig. 9). As in access to colleges, having a city greatly increases the chances of a nonmetro county having a hospital. In addition, nonmetro hospitals average fewer beds than metro hospitals. Among nonmetro county groups, the counties without cities have the smallest hospitals. Furthermore, large metro areas had the highest ratio of primary care physicians to residents. Among the nonmetro groups, the nonadjacent counties with cities have the highest physicians/population ratio. Hospitals and physicians in metro areas may provide care to residents of adjacent nonmetro counties. The hospitals and physicians in nonadjacent counties with cities may provide care to residents of surrounding counties with sparser populations and fewer medical resources.

Conclusions

The urban influence codes measure the importance of adjacency to the large and small metro areas and the importance of the size of the largest city within a nonmetro county, concepts that are not directly measured in other widely used typologies. We caution researchers, however, that the coding structure of the variable from 1 to 9 should not be viewed as reflecting a continuous decline in urban influence.

As with the rural-urban continuum codes (Butler and Beale) and the ERS typology codes (Cook and Mizer), we developed the urban influence codes for our own and others' use. The codes are available through the ERS homepage on the Internet. (See "Access to the Urban Influence Codes," p. 40.) If other researchers use them in investigating some of the myriad facets of life in rural America, we would appreciate receiving copies of the analyses and comments on the classification.

For Further Reading . . .

M. A. Butler and C. L. Beale, *Rural-Urban Continuum Codes for Metro and Nonmetro Counties, 1993*, USDA-ERS, AGES 9425, Sept, 1994.

P. J. Cook and K. L. Mizer, *The Revised ERS County Typology*, USDA-ERS, RDRR-89, Dec. 1994.

L. M. Ghelfi, ed., *Rural Conditions and Trends*, Special Census Issue, Vol. 4, No. 3, Fall 1993.

A. Lösch, *The Economics of Location*, Yale University Press, New Haven, CT, 1954.

H. O. Nourse, "Systems of Cities," chapter 3 in *Regional Economics: A Study in the Structure, Stability, and Growth of Regions*, McGraw-Hill, New York, 1968.

Access to the Urban Influence Codes

The urban influence codes are available on the ERS homepage on the INTERNET. To read the file and download it, if you want to, go to

<http://www.econ.ag.gov/briefing/rural/data/urbinfl.txt>

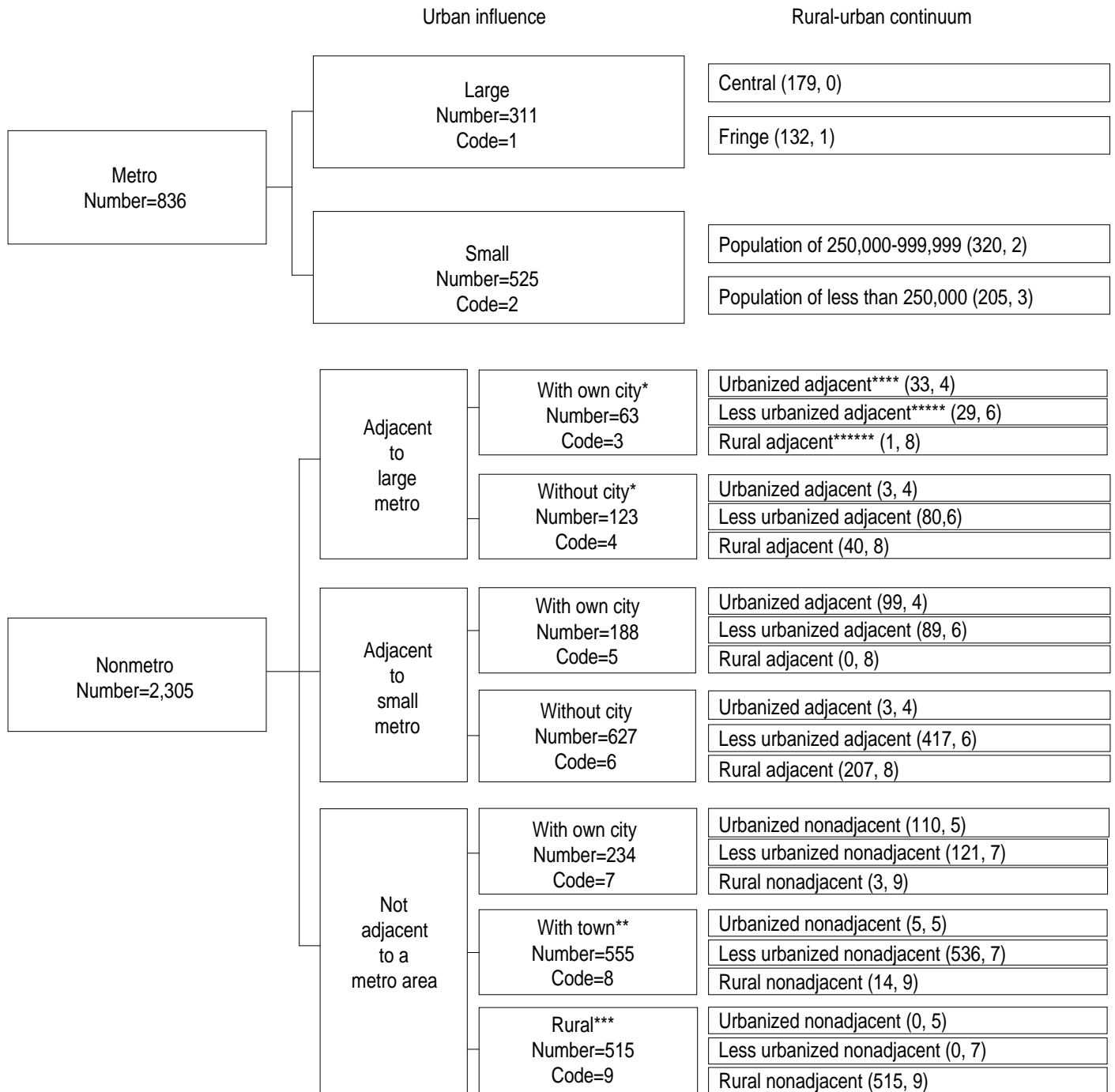
How Our Codes Compare with the Rural-Urban Continuum Codes

Because many researchers are very familiar with the ERS rural-urban continuum codes ("Beale" codes), we show here how our codes relate to the continuum codes. While we break metro areas only into large and small, the continuum codes differentiate central and fringe counties within the large category and two sizes of metro areas within the small category. The definition of a core county of a large metro area is no longer restricted to counties containing all or part of the central city, so we decided not to differentiate between the two types of large metro counties. We had planned to break our small metro category into the two size classes used in the continuum codes, but in analyzing population and employment growth in nonmetro counties adjacent to the two sizes of smaller metro areas, we found little difference between the effects the two smaller sizes of metro areas had on surrounding counties. Therefore, we chose not to differentiate between them.

It is in the groupings of nonmetro counties where the two classifications differ substantially. The continuum codes identify nonmetro counties that are adjacent to any metro area while our codes distinguish nonmetro counties that are adjacent to large metro areas from those adjacent to small metro areas. In the continuum codes, nonmetro urbanization is measured on the basis of the total number of urban residents in the county. In our codes, urban influence is based on the size of the largest city that is at least partly in the county.

As one would expect, the "urbanized" continuum counties mostly fall into our "own city" categories, only 12 of them do not contain any part of a city of 10,000 or more residents. However, many of the "less urbanized" continuum counties have their "own city." And, four of the "rural" continuum counties contain part of a city of 10,000 or more residents. The one of those four counties that is classified as adjacent to a large metro area is Camden County, NC. It is adjacent to the large metro area of Norfolk-Virginia Beach-Newport News, VA, and contains 29 residents of Elizabeth City, a nonmetro city of over 14,000 population located predominantly in Pasquotank County, NC. The other three rural continuum counties that we classify as nonadjacent with city are Montgomery County, GA (contains 111 residents of Vidalia, a city of 11,000 mostly in Toombs County, GA), Leelanau County, MI (contains 29 residents of Traverse City, a city of 15,000 mostly in Grand Traverse County, MI), and Ralls County, MO (contains 269 residents of Hannibal, a city of nearly 18,000 mostly in Marion County, MO).

Counties by Urban Influence and Rural-Urban Continuum Codes



Note: Numbers in parentheses after the rural-urban continuum names are the number of counties and the rural-urban continuum code.

*Own city means the county contains all or part of a city containing at least 10,000 residents and without city means the county contains no part of a city that large.

**Town means the county contains all or part of a city containing 2,500-9,999 residents.

***Rural means the county contains no part of a city containing at least 2,500 residents.

****Urbanized means the county contains at least 20,000 urban residents.

*****Less urbanized means the county contains 2,500-19,999 urban residents.

*****Rural in this classification means the county contains 0-2,499 urban residents.