Inside Indiana's Counties: Township Population Changes, 1990 to 2000

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What does the Census of 2000 tell us about land use within our counties? Are we sprawling out? Is our population growing evenly or unevenly? Here are some answers. They will not satisfy our every concern, but they may provide some indication of what is happening in Indiana's 92 counties.

Figure 2
Distribution of Townships by Growth Rate, 1990-2000

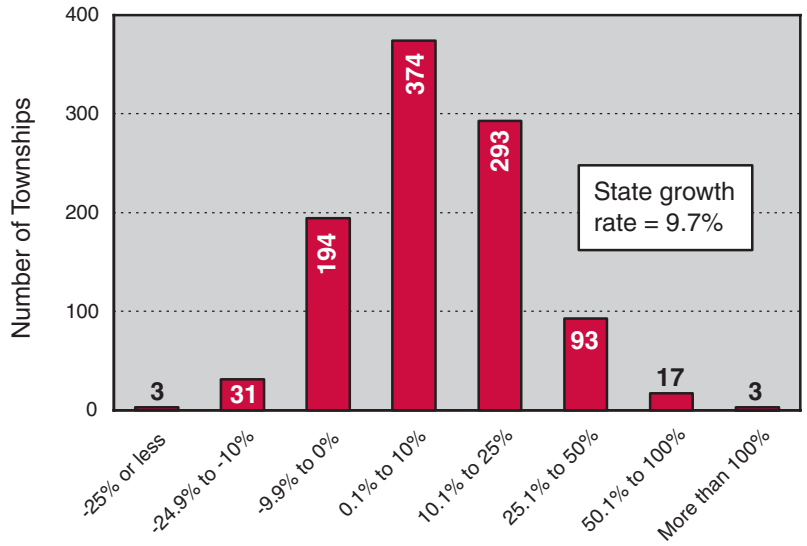
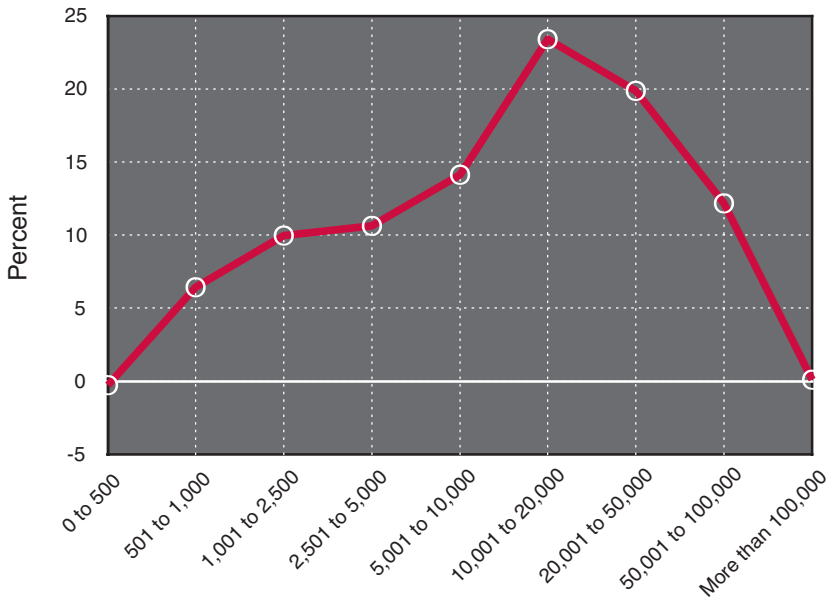


Figure 3
Average Growth Rate by Township Size



Here is an overview of what we will be investigating:

• Population growth in Indiana townships between 1990 and 2000.

• Uniformity of growth. A county may grow by 10 percent in population, that growth may be very unevenly distributed around the county. In one extreme case, all the growth is in one township with no change in any of the other townships. Another extreme would have all townships growing at exactly the same rate of increase.

We will use two measures—the range of growth rates and the coefficient of variation to describe how different growth rates were within each county.

• Internal shifts. A county may show no change in population, but there may be considerable shifts of population within the county as some townships grow and others decline.

We will measure those shifts and relate them to the county's population and its change in the 1990s.

• Concentration of population. Despite the different rates of growth, at any one time the population of a county may be concentrated in one or a few townships. This is the typical pattern of our counties, with population concentrated in the county seat and sparse settlements elsewhere in outlying townships.

We will use a concentration index and its changes to see if our county populations are becoming more or less concentrated.

In each of these four sections, we will provide data for each county through visuals and point out which counties show the most or the least growth, uniformity, internal shifts, and concentration of population. (For specific data on these factors for each county, visit www.ibrc.indiana.edu).

Population Growth

Indiana has 1,008 townships. La Porte County has 21 and Allen, 20. Blackford, Brown, and Ohio counties have just four townships each. Seven townships have populations over 100,000, lead by Center Township in Marion County and North Township in Lake County, which each exceeds 165,000. Six of these seven townships are located in Marion and Lake counties. The seventh is Wayne Township in Allen County.

Figure 1 (on the inside back cover) shows the distribution of townships by size in 2000. There were 802 townships with 5,000 or fewer persons. This amounts to 80 percent of all Indiana townships. The

Figure 4
Blackford County Township Growth Rates

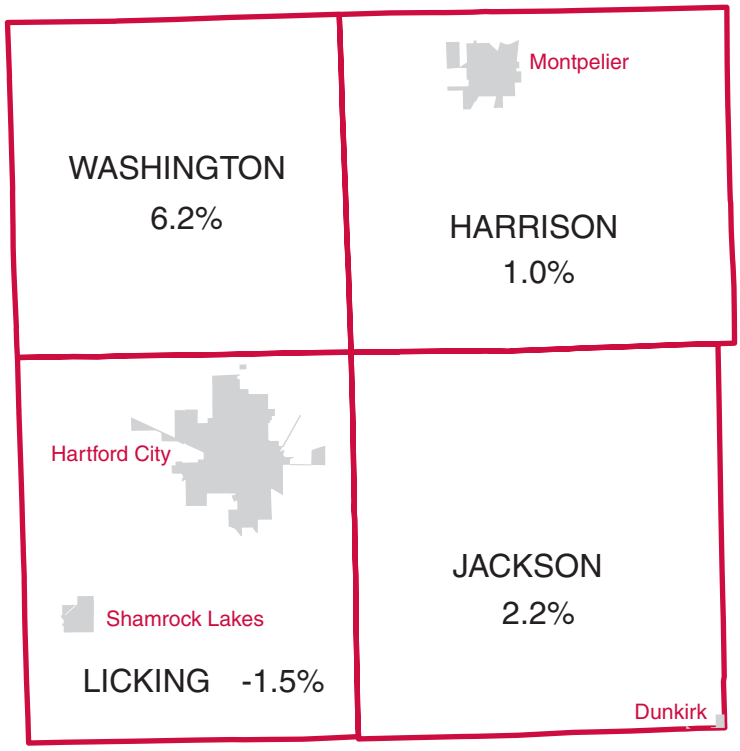
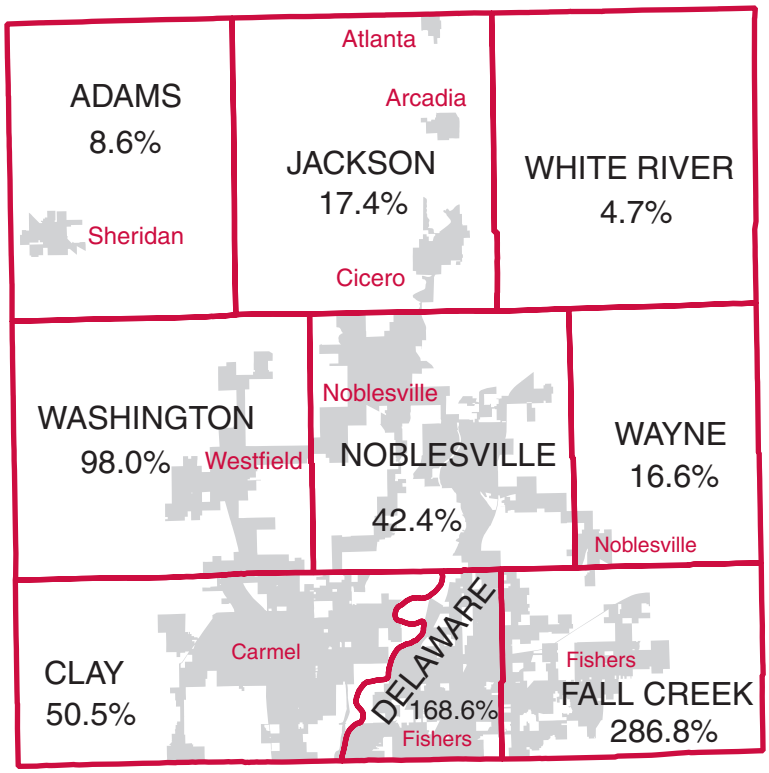


Figure 5
Hamilton County Township Growth Rates



smallest township in Indiana is Wabash in Gibson County with 44 persons. Townships with 1,000 or fewer persons decreased in number from 280 in 1990 to 239 in 2000, while all other size townships grew or remained the same.

Four townships showed no change in population between 1990 and 2000. Declining townships totaled 224, of which three (Clinton Township in Cass County, -50 percent, Washington in Harrison County, -35 percent, and Center in Rush County, -25 percent) lost one-quarter or more of their population. Three of the four fastest growing townships were in Hamilton County, led by Fall Creek Township (287 percent), with Haddon Township in Sullivan County also growing rapidly due to a new prison. **Figure 2** shows the distribution of townships by growth rates.

Townships between 10,000 and 20,000 had the best average population growth rate between 1990 and 2000 (see **Figure 3**). Very small townships and the largest townships showed virtually no growth.

Uniformity of Growth

If all townships grew at the same rate, then the difference between the highest and the lowest growth rates is zero. A broad range of growth rates suggests very different experiences in different parts of the county. A narrow range, by contrast, is likely to mean that the townships were subject to similar forces and factors.

Specifically, how does this matter? Narrowly contained growth at a high rate probably puts more stress on water, sewer, and road systems. It focuses new enrollments in fewer schools. It concentrates the demand for commercial, health care, and public safety services. Broadly dispersed growth may be easier on existing systems, spreading the burden more evenly through the county. It is unclear, without much more information, whether dispersed or concentrated growth is less costly or more advantageous.

No county approached a zero range of population growth rates in 2000. The smallest difference in township growth rates within a county was 7.7 percent in Blackford County, where the highest rate of growth was 6.2 percent in Washington Township and the lowest was –1.5 percent in Licking Township (see **Figure 4**). The greatest difference, by contrast, was in Hamilton County where Fall Creek Township gained 287 percent and White River Township advanced by only 5 percent, for a range of 282 percent (see **Figure 5**). We will refer to these maps again later to illustrate our methods.

The map in **Figure 6** shows the range in growth rates for the population of Indiana's 92 counties. While all 92 counties had at least one township in the county that grew, there were 20 counties in which every township grew in population between 1990 and 2000. However, this means that in 72 Indiana counties, at least one township declined in population. There was a significant positive relationship between the rate of growth in the county and the size of the range differential, as might be expected.

In Blackford County (as seen in **Figure 4**) three of the four townships grew in population, but the county lost population because its dominant township, Licking, declined. While the county's growth rate was close to zero (-0.1 percent), the average of the township growth rates was 2.0 percent. The variability around this mean gave the county a coefficient of variation of 1.6.

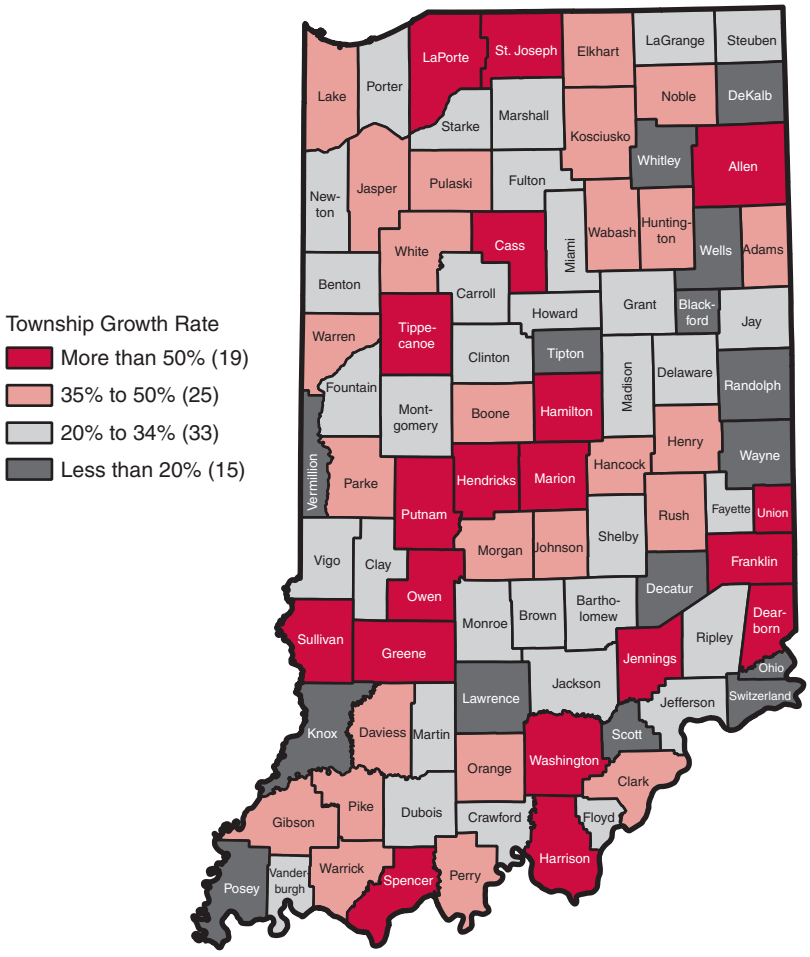
In Hamilton County (**Figure 5**) the county's rate of growth was 68 percent, but the average growth rate of the townships was 77 percent, as the greatest growth did not take place in the most populous townships. Here the coefficient of variation was 1.2.

Now we have Blackford County with a range of 7.7 percent and a coefficient of variation of 1.6 in contrast to Hamilton County with a wider range of 282 percent but a smaller coefficient of variation of 1.2. Which had more uniformity of growth? To answer this question, we standardized both the range and the coefficient of variation for each county and produced a uniformity index.[1]

Figure 7 presents the uniformity index for each county. Blackford County, with an index score of -1.18 had the most uniformity of township growth in the state, followed by Switzerland, Tipton, and Scott counties. Hamilton County (7.04) ranked next to last in uniformity behind Gibson County (9.04). Other counties with little uniformity of growth were Sullivan, Henry, Cass, and Dearborn. Grant and Lake counties had the lowest index values (-0.01), which means they were most typical although they ranked 66th and 67th respectively.

Uniformity, or its converse highly differentiated growth, may be sought by planners while market forces may encourage developers in the opposite direction. It is doubtful that any consensus exists about this subject.

Figure 6
Range of Difference in Township Growth Rates

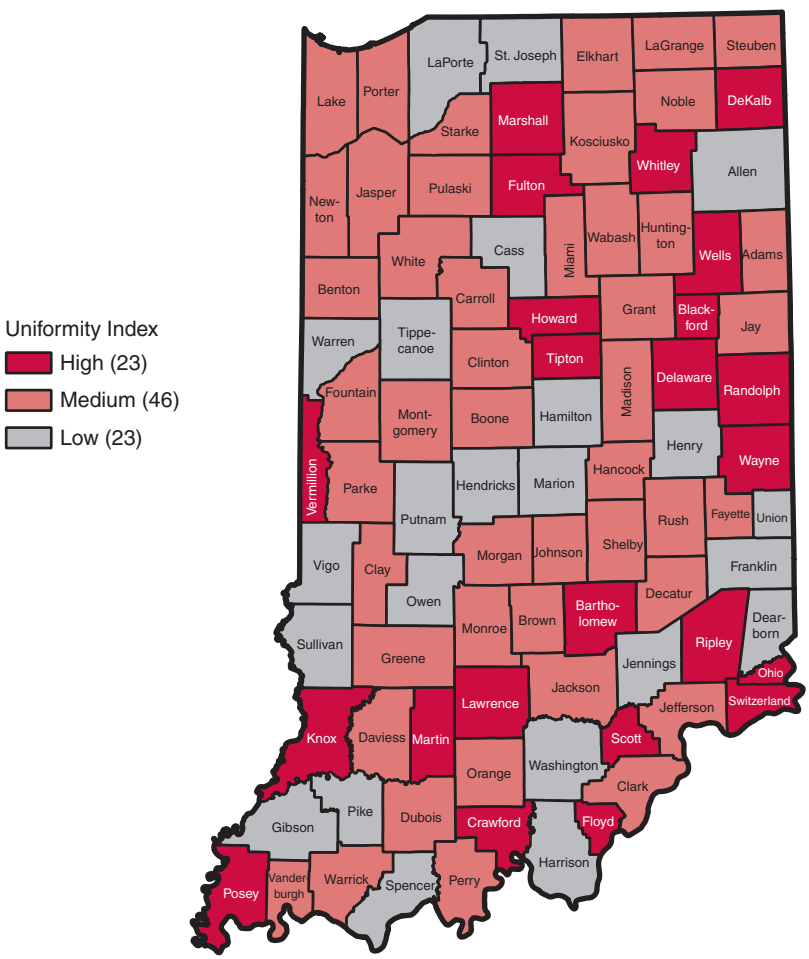


Internal Shifts

If growth is uniform, all townships grow at the same rate and there is no shift of population from one township to another. This does not mean that people do not move from one township to another, nor does it exclude people moving in from or out to other counties. When we say "no shift," we mean no net change in population different from that which would be expected if the township had grown at the county's rate of growth.

For example, consider Blackford County again. The county had 19 fewer persons in 2000 than in 1990. This was a negative 0.1 percent growth rate. **Table 1** shows the uniform or expected change versus the actual change in population for each township. The difference between the uniform change (that is, the change that would occur if the township had grown at the county's rate of change) and the actual change we call the shift in population.

Figure 7
Uniformity Index of Townships by County



How much of a shift in population occurred in Blackford County? The total number of persons was 124. They may be imagined as moving from Licking Township into the other three townships. These 124 persons represent 0.9 percent of the 2000 population in Blackford County. The average county in the state had 3 a percent difference in the distribution of its population in 2000 from its 1990 pattern of settlement. Blackford was second lowest in the state in this measure of internal change. Marion County had the greatest internal shift of 44,479, equaling 5.2 percent of its 2000 population, 14th in the state.

However, this shift in population can be assessed differently. Instead of comparing the shift to the 2000 population, it may be compared to the change in population between 1990 and 2000. This is a comparison of change within the context of change and we refer to this as churn.

In Blackford County, with a shift of 124 persons but a total change of only minus 19 persons, the churn ratio was 653 percent, fifth highest in the state. The highest churn ratio was in Martin County at infinity (266 shift over a zero change in population). Vermillion County was second and Vigo third. The lowest churn ratio was 6 percent in Switzerland County, followed by Steuben, Hancock, and Johnson counties (see **Figure 8**).

Table 1
Township—Uniform or Expected Change Versus Actual Change in Population

				Cumulative count			*Cumulative percent*		Mean growth rate
Population	1990	2000	Change	1990	2000	Change	1990	2000	
0 to 500	81	76	-5	81	76	-5	8%	8%	-0.3%
501 to 1,000	199	163	-36	280	239	-41	28%	24%	6.4%
1,001 to 2,500	362	371	9	642	610	-32	64%	61%	10.0%
2,501 to 5,000	179	192	13	821	802	-19	81%	80%	10.6%
5,001 to 10,000	87	94	7	908	896	-12	90%	89%	14.1%
10,001 to 20,000	43	48	5	951	944	-7	94%	94%	23.4%
20,001 to 50,000	40	42	2	991	986	-5	98%	98%	19.9%
50,001 to 100,000	10	15	5	1001	1001	0	99%	99%	12.2%
More than 100,000	7	7	0	1008	1008	0	100%	100%	0.1%

Statewide, this intra-county township shift equaled nearly 252,700 persons, about 3 percent of Indiana's population in 2000, and gave us a churn ratio of 47 percent. There seems to be little relationship between the rate of growth in a county and its churn ratio.

Concentration of Population

Lack of uniformity (disparities in growth rates) shifts the balance of population within a county. Which brings us to the issue of sprawl. What is sprawl? We may presume that it is a decrease in the concentration of population. Thus, with a shift of population from Licking Township to the other townships, Blackford County experienced sprawl in the 1990s.

In 1990, Blackford County had a concentration index[2] of 26.8. If the value had been 100, it would have meant that all the people of the county lived in one township. A value of zero would have meant that the population was perfectly distributed among the townships. In 2000, the concentration index for Blackford County was 25.6; hence, there was a decrease in concentration of 1.2 units. In 1990, Blackford had the 14th most concentrated population among the state's 92 counties. In 2000, it had slipped to 15th most concentrated.

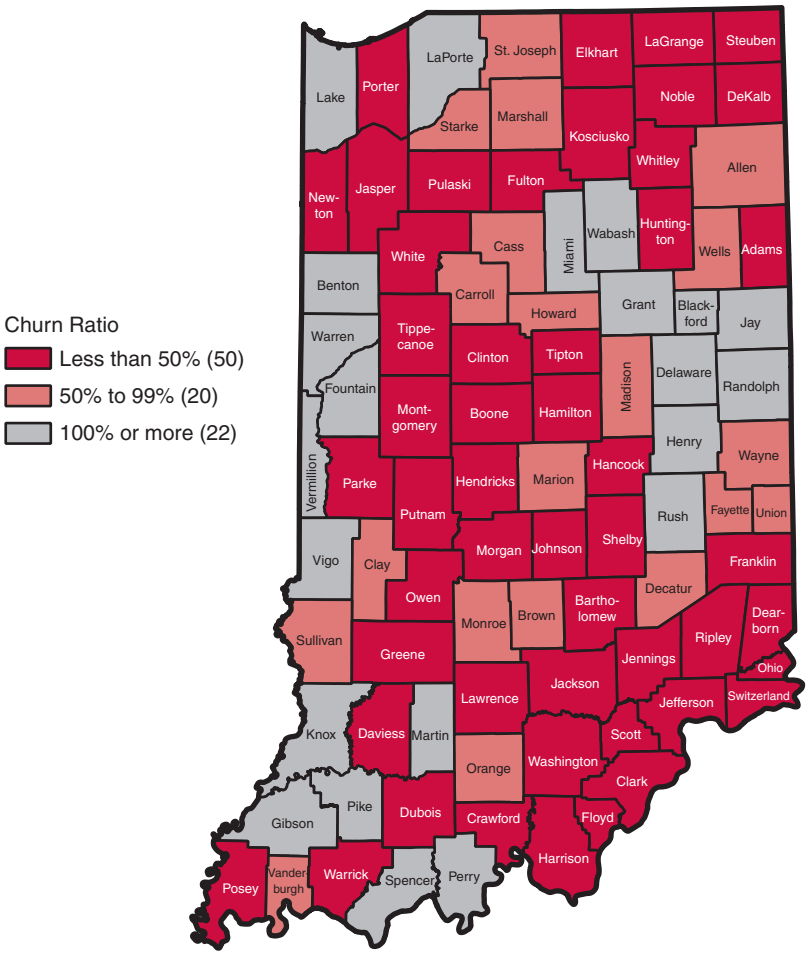
For perspective, the most and least concentrated Indiana counties in 2000 are shown in **Figure 9**. The 15 counties that had become more concentrated are shown with an up arrow (↑) and the 37 counties that became less concentrated are shown with a down arrow (↓). Forty counties in which the change in concentration was less than plus or minus 1.0 are shown without any sign.

Sprawl, as measured by decline in concentration was greatest in Perry and Ohio counties, followed by St. Joseph, Allen, Delaware, Tippecanoe, and Howard. By contrast, suburban counties (Johnson, Boone, and Shelby) in the Indianapolis metro area became more concentrated. The greatest degree of increased concentration could be found in Warrick, Jackson, and Cass counties.

Deconcentration of population continued in Marion County, which was already the 87th least concentrated county in 1990. By 2000, Marion was exceeded in "sprawl" only by Lagrange County. Would anyone consider Lagrange County afflicted with sprawl? Of course not! The pattern of residential settlement in Lagrange County is the prototypical rural area with a few small towns to serve a self-sufficient farm population. Marion County, however, has the same widespread residential settlement pattern. The difference is that the population density in Marion County is 2,011 persons per square mile while it is only 78 in Lagrange County.

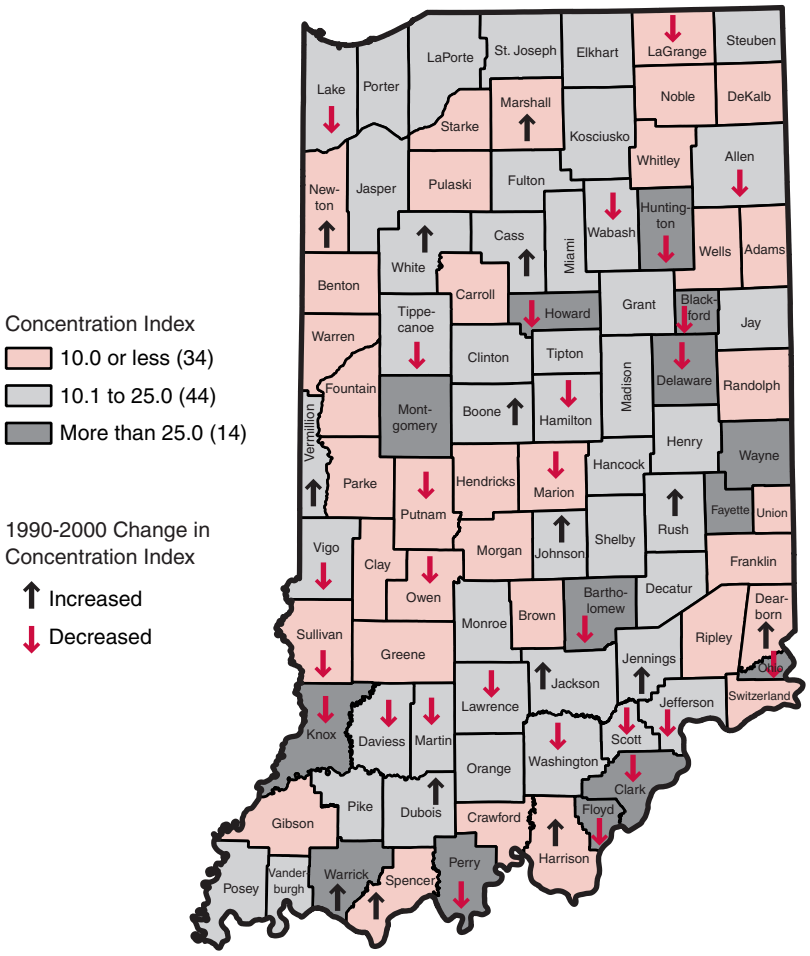
Are greater or lesser degrees of concentration and population density to be desired? That may be a function of preferences more than costs. But we know little of either preferences or costs. Life-long national subsidies for owner-occupied single-family dwellings encourage people toward more deconcentrated (lower density) developments. Ignorance of the cost differential between high and low density residential

Figure 8
Churn Ratio for Townships, by County



patterns leads the anti-sprawl crowd to bemoan continuing deconcentrated settlements. That same ignorance, a few generations back, lead the anti-urban, fresh air folks to decry city life and support the suburban pattern we see today.

Figure 9
Concentration of Population in 2000—Most and Least



Summary

- In 2000, 80 percent of all Indiana townships (802 or 1008) had 5,000 or fewer persons.
- 224 townships declined in population from 1990 to 2000, four showed no change, while the remaining 908 gained in population.
- Very small townships and the largest townships showed virtually no growth.
- No Indiana county had a uniform rate of population growth. Hamilton County had the greatest difference between its fastest and slowest growing townships. Blackford County had the least such difference.
- Marion County had the greatest internal shift of population (44,479) equaling 5.2 percent of its 2000 population, 14th in the state.
- The highest churn ratio (shift divided by change) was in Martin County at infinity (266 shift over a zero change in population). Vermillion County was second and Vigo third. The lowest churn ratio was 6 percent in Switzerland County, followed by Steuben, Hancock, and Johnson counties.
- 15 counties became more concentrated in their populations while 37 had less concentration. The remaining 40 counties showed little change in concentration.
- Sprawl remains an ambiguous concept and no measures seem to reflect whether concentrated or deconcentrated settlement patterns are to be sought by policy makers.

Notes

1. Z-values were constructed for each variable using the mean and standard deviation values of each county. These were then summed to provide an index of uniformity. The lower the values of the range and the coefficient of variation in population growth rates, the lower the resulting z-values. Hence, a negative summed z-value indicates a county with more uniformity than a county with a positive z-value. A uniformity index value of zero would indicate a county that is average in both its range and coefficient of variation in growth rates.
2. The concentration index is the sum of the squared percentages of population in each township. It is reported here adjusted for the number of townships in each county.

Excel worksheets with all of the data used for this article can be found on the Indiana Business Research Center's website at www.ibrc.indiana.edu—go to the *Indiana Business Review* section.

Census 2000 in Indiana

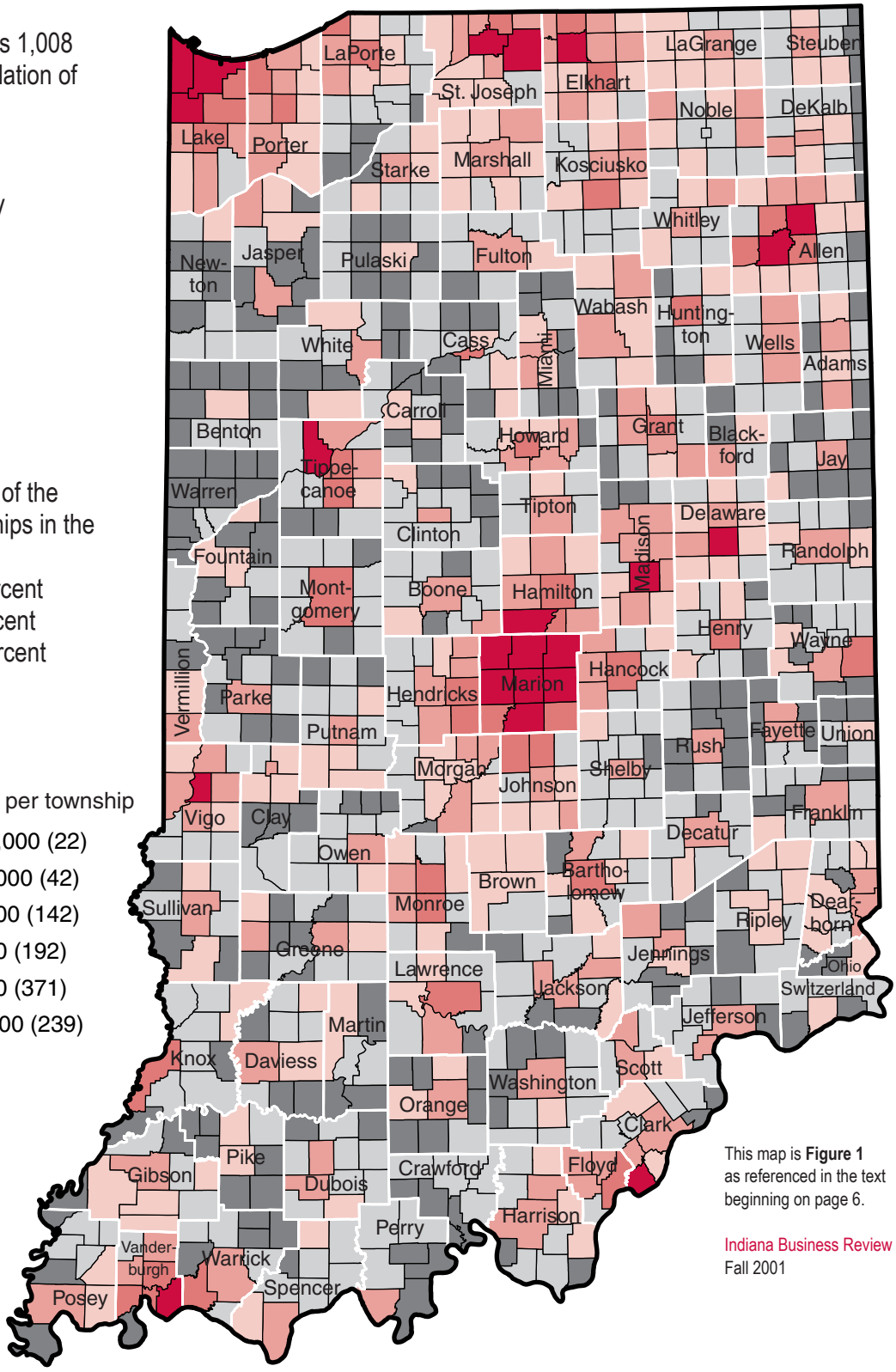
Distribution of Population by Township

Three-fourths of Indiana's 1,008 townships have a population of 5,000 or less.

The smallest township:
- Wabash in Gibson County (population 44)

The largest townships:
- Center in Lake County (population 167,055)
- North in Lake County (population 165,656)

Hamilton County has three of the four fastest-growing townships in the state:
- Fall Creek: 287 percent
- Delaware: 169 percent
- Washington: 98 percent



Range of population per township
- More than 50,000 (22)
- 20,001 to 50,000 (42)
- 5,001 to 20,000 (142)
- 2,501 to 5,000 (192)
- 1,001 to 2,500 (371)
- Less than 1,000 (239)

This map is **Figure 1** as referenced in the text beginning on page 6.