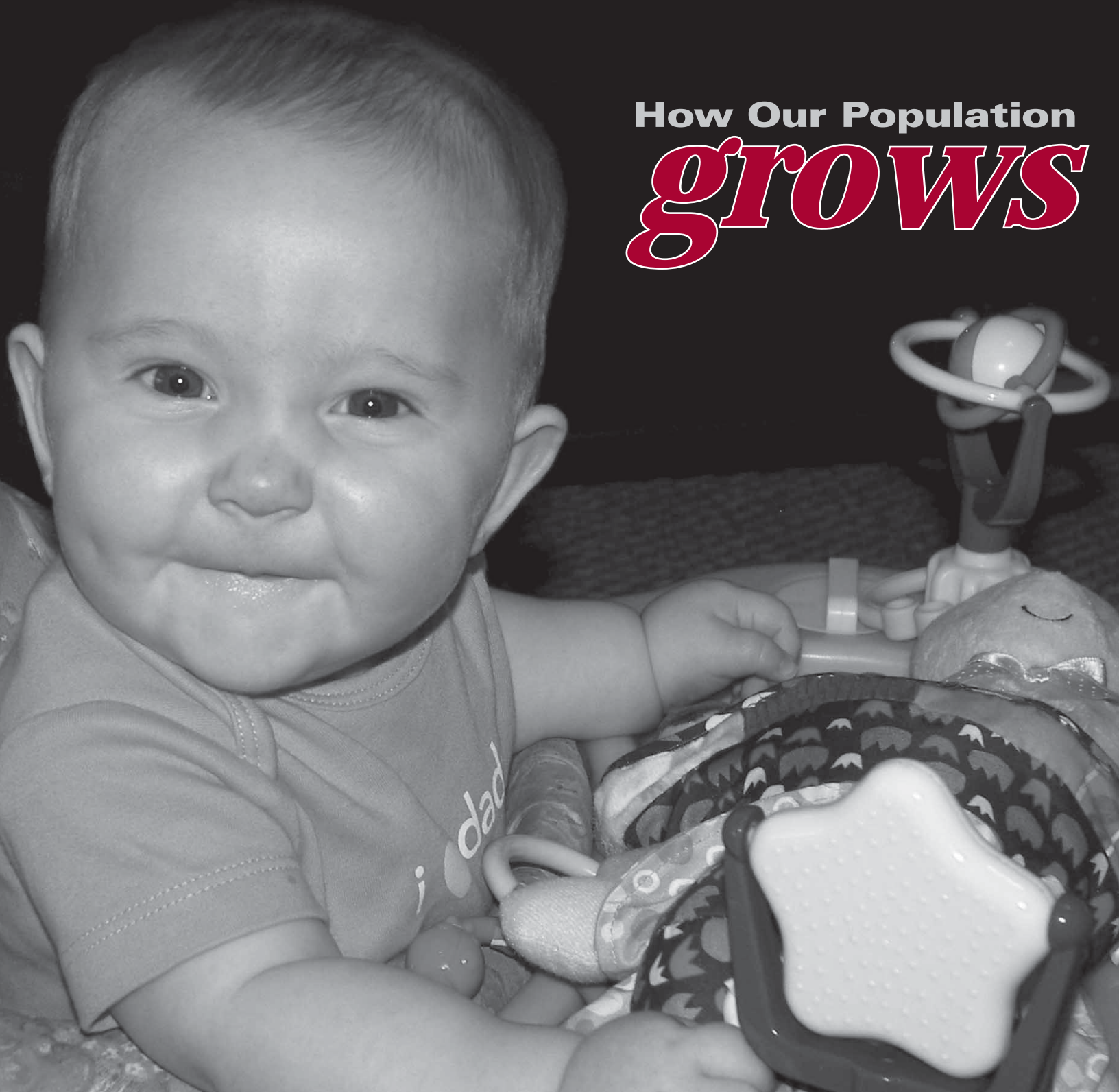


Indiana Business Review

How Our Population
grows



KELLEY SCHOOL OF BUSINESS

INDIANA UNIVERSITY
Indiana Business Research Center

Summer 2008

Providing insight and analysis on Indiana's
economic and demographic issues since 1926

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From the Editor

It is so fundamental to everything we do that we often ignore it—our population. Few know how many people actually reside in their state, county, or town, but the mere fact of “how many” people live in a community or area is critical to everything that makes a community tick—water, sewerage, roads, health care, public safety, and the consumable goods and services we all rely upon. Even fewer ponder how population actually grows or declines. A recent *NY Times* article was both sad and heartening when discussing that very issue (of course, it focused on the fact that Pittsburgh now has more people dying within its boundaries than being born—a demographic fact called natural decrease). Indiana is not even close to natural decrease—we have approximately double the births than deaths, but that doesn't mean communities within our state are immune to that sad effect, as you will learn in this issue.

—Carol O. Rogers, Executive Editor

How Our Population Grows

Matt Kinghorn: Demographer, Indiana Business Research Center, Kelley School of Business, Indiana University

Rachel Justis: Geodemographic Analyst, Indiana Business Research Center, Kelley School of Business, Indiana University

Indiana will add roughly 940,000 residents by 2040—a 15 percent increase from 2005, according to the state’s official population projections produced by the Indiana Business Research Center.¹ Indiana’s population will surpass 7 million by 2030 and should reach 7.2 million in 2040.

Sixty-five of Indiana’s ninety-two counties will increase in population, but the ten-county Indianapolis metro area will account for 54 percent of Indiana’s growth between 2005 and 2040 (see **Figure 1**). In fact, five Indianapolis suburban counties can expect to grow by more than 30 percent, led by Hamilton County with an astounding projected increase of 85 percent. Northeast Indiana is another region which can expect to see significant growth. LaGrange, Elkhart, Adams, and Allen counties are each projected to increase by more than 20 percent. Meanwhile, twenty-seven counties are likely to have fewer residents by 2040.

By 2040, one in five Hoosiers will be of traditional retirement age, an increase of 90 percent. Meanwhile, the number of people in the 25-to-54 age group—an important labor force demographic—will decline. The following sections will look closer at how key age groups are changing.

At this juncture, it is important to keep in mind that these projections rely exclusively on recent birth, death, and migration trends. Therefore, they reflect what Indiana and its communities will look like if past conditions persist, and no assumptions have been made about future economic or environmental conditions. In addition, since population dynamics (particularly migration) can be difficult to predict, long-range projections can be subject to significant error; therefore, it is often useful to pay greater attention

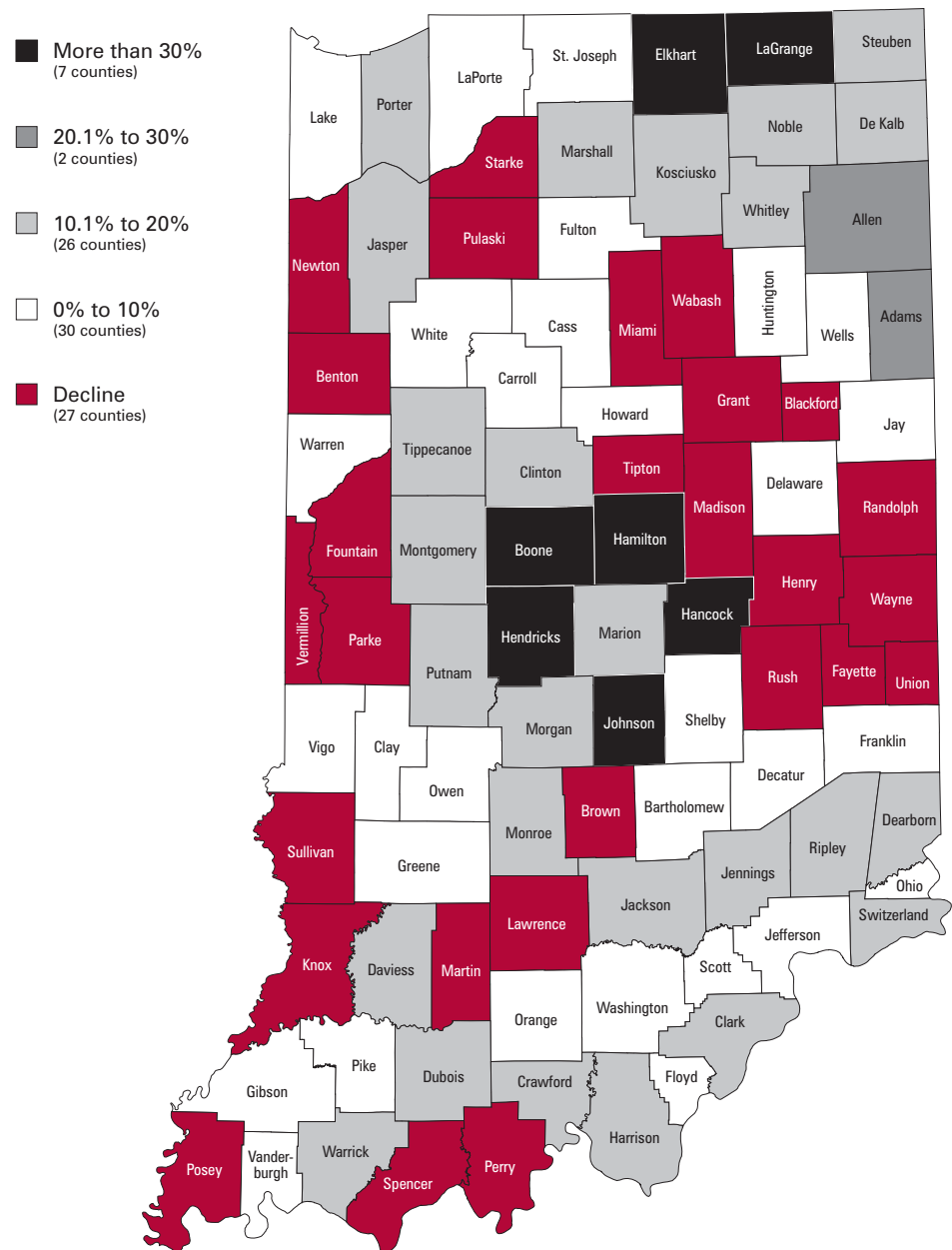
to trends during the next fifteen to twenty years.

Indiana’s Aging Population

The primary force behind Indiana’s changing population dynamics is the inevitable aging of the baby

boom generation. At present, this group is between the ages of forty-four and sixty-one and, by 2030, this entire cohort will be of traditional retirement age. This fact promises to transform the state.

FIGURE 1: Projected Percent Change in Population, 2005 to 2040



Source: Indiana Business Research Center

Figure 2 illustrates the share of total population by age group over the next thirty-five years. The share of population age 65 and older will increase from roughly 12 percent of the total to nearly 21 percent. During this period, the sixty-five and older population will surpass the 0–14 and 15–24 age groups on its way from the smallest to the third largest of these segments. Each of the other age groups will see its share of total population decline by 2040.

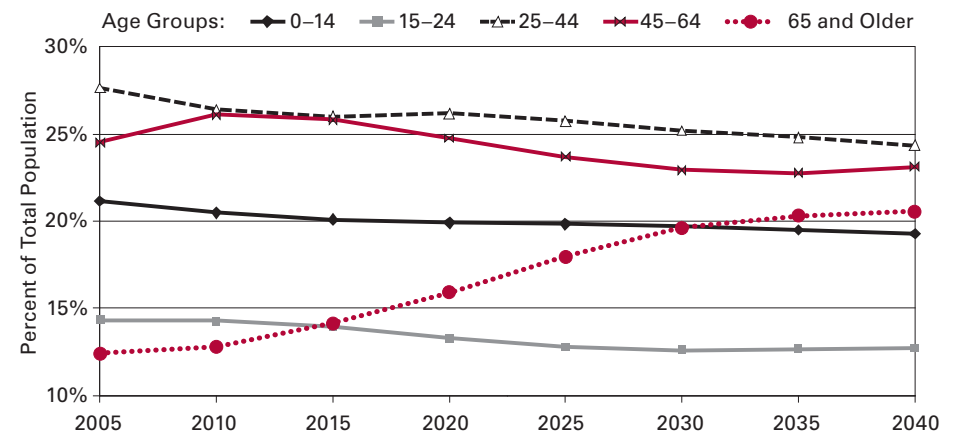
An aging population is not unique to Indiana, of course, but is a national trend. In fact, when compared to the rest of the nation, Indiana is relatively young with a 2006 median age of 36.3, which ranks in the youngest third of all states according to the U.S. Census Bureau. The state’s median age is expected to increase to 39.8 years by 2040.

There is a wide disparity in aging patterns among Indiana counties. In 2005, the youngest counties exhibit one of two primary characteristics. There are major college student populations in Delaware (33.5 percent), Monroe (27.9 percent), and Tippecanoe (27.7 percent) counties. Meanwhile, there are sizable Amish and Mennonite populations that tend to have higher fertility rates in Adams (33.4 percent), Elkhart (33.4 percent), and LaGrange (29.8 percent) counties. Each of these counties will age modestly over the next thirty-five years, with the exception of Adams County, which will be one of six counties to actually get younger over the next three decades.

At the other end of the spectrum, ten counties had a median age of 40 or older in 2005. These counties are largely rural. As **Figure 3** shows, many Hoosier counties will age significantly. The number of counties with a median age of forty or above will increase from ten in 2005 to sixty-nine in 2040.

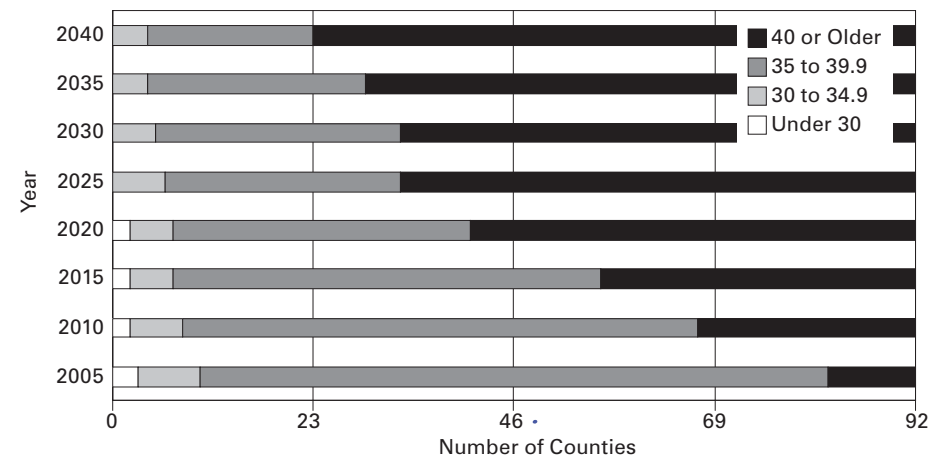
With 75 percent of Indiana’s counties exhibiting a median age of 40 or above in 2040, how is it that

FIGURE 2: Projected Share of Total Population by Age Group, 2005 to 2040



Source: Indiana Business Research Center

FIGURE 3: Projected Distribution of Counties by Median Age, 2005 to 2040



Source: Indiana Business Research Center

the state’s median age will remain below 40? Aging in Indiana over the next three decades will be more pronounced in rural areas of the state. Marion County, which is home to one of every seven Hoosiers, however, will have a median age of 37 in 2040. Other urban counties such as Allen, St. Joseph, Vigo, and Hamilton will also be below 40.

The Changing 25-to-54 Age Group

This boomer-driven aging could have some serious impacts on Indiana and its economy. Namely, will Indiana have the labor force to grow, or even maintain, its current level of economic activity?

Indiana is projected to have 2.6 million people age 25 to 54 by the year 2025—a 1.7 percent decline from 2005 levels. This is actually a rather modest decline compared to what is projected for other states.² But this change varies dramatically depending where in Indiana one looks.

Figure 4 illustrates county-level change between 2005 and 2025 in the number of 25- to 54-year-olds. Seven counties will see this age group increase 10 percent or more. Hamilton and Hendricks counties will experience the largest rate of change, with increases of 49 percent and 37 percent, respectively.

Most of the state, however, will not be as fortunate. Thirty-two counties (predominately rural in nature) will see their population between 25 and 54 years old decline more than 10 percent between 2005 and 2025. Rush, Martin, and Benton counties fare the worst on this measure, with projected declines exceeding 20 percent.

One should point out, however, that although fifteen counties will see an increase in the number of people in the 25-to-54 age group, virtually all counties will have a lower percentage of their population in the 25-to-54 demographic by 2025 compared to 2005. This will occur because other age groups will grow at an even faster rate. The exceptions are Monroe and Tippecanoe counties, whose 25-to-54 age group will remain stable because of the influences of Indiana University and Purdue University, respectively.

Figure 5 highlights the percent change from 2005 to 2040 in the 25–54 age group for Indiana, its metro areas and its nonmetro areas. Indiana will see a steady decline in this important labor force demographic over the next 15 years before it rebounds from 2020 to 2040. Urban areas will see the 25-to-54 age group decline slightly between 2010 and 2020 before it begins to exceed current levels in 2025 and beyond. The most alarming development is the likelihood of a 9 percent decline in this age group in rural Indiana by 2020. These labor force realities could hinder prospects for Indiana’s economic growth over the next 20 years, particularly in rural areas of the state.

However, decreased economic activity as a result of a shrinking labor force is by no means a certainty for our state. This decline could be offset by increased migration (both domestic and international), reduced out-migration (brain drain) or increased productivity. Additionally, there is a growing belief that many baby boomers will continue

FIGURE 4: Change in Population Age 25 to 54, 2005 to 2025

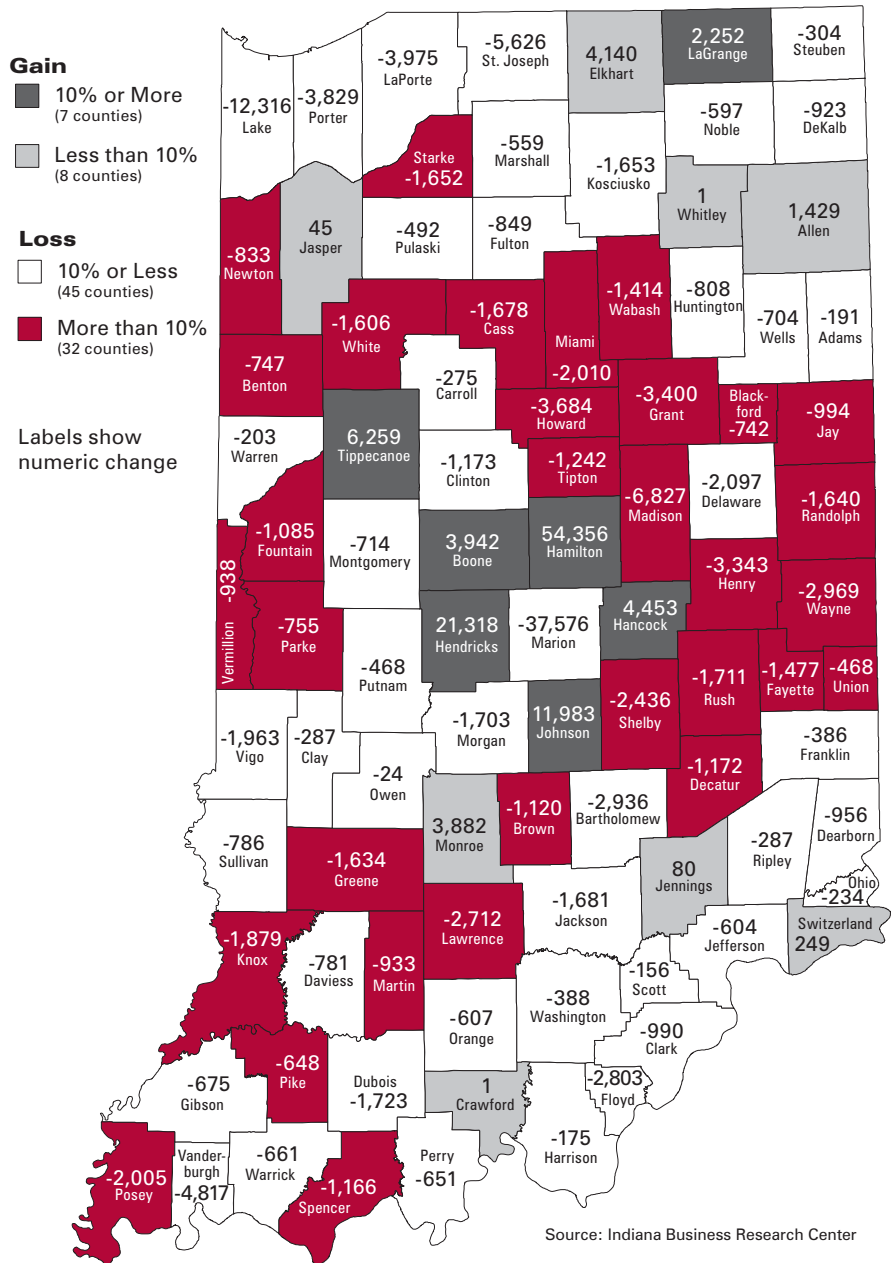
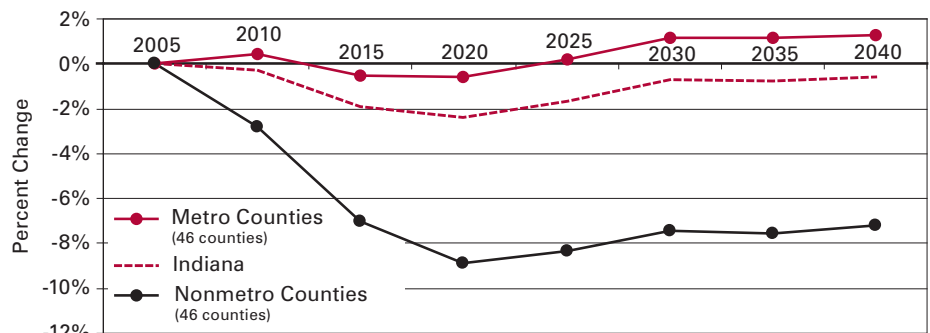


FIGURE 5: Projected Change in the 25-to-54 Age Group, 2005 to 2040



to work—whether by choice or necessity—into their retirement years.

Indiana’s School-Age Population

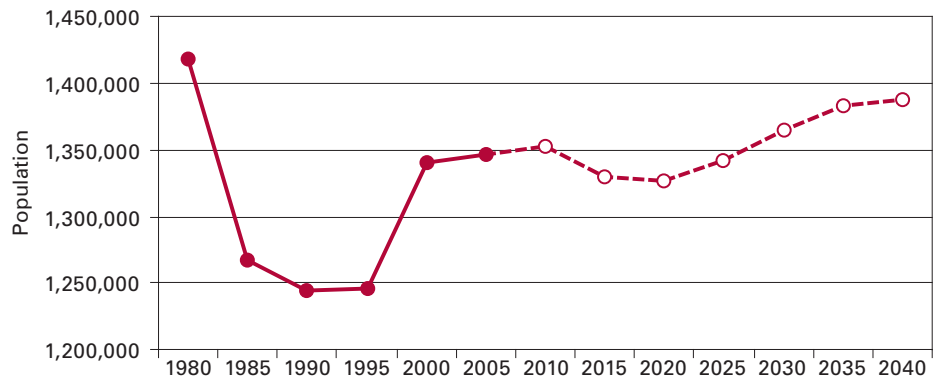
As **Figure 6** illustrates, Indiana will see its school-age population (defined here as age 5 to 19) decline by nearly 25,000 (2 percent) between 2010 and 2020. Beyond 2020, this age group will likely grow steadily over the next 20 years when it reaches a total of just under 1.4 million residents in 2040—a 3 percent increase over the current size.

There are two primary forces behind this pattern. The first is simply the typical ebb-and-flow of demographic dynamics. For instance, a look at **Figure 7** shows that in 2005 the 10-to-14 and 15-to-19 age groups are much larger than the age groups under 10. As these older cohorts age and are replaced by the younger cohorts, Indiana will see a temporary dip in school-age children. By 2020, however, we see that the 0-to-4 and 5-to-9 age groups are considerably larger than the older cohorts and will lead the rebound in school-age population.

Of course, the number of children in our state is directly related to the number of adults in the prime child-bearing age groups. Therefore, the decline in the school-age population between 2010 and 2020 can be attributed to the temporary decline currently seen in the number of females between the ages of 20 and 40 (see **Figure 8**). As the size of this population rebounds after 2005, so does the expected school-age population 10 to 15 years later.

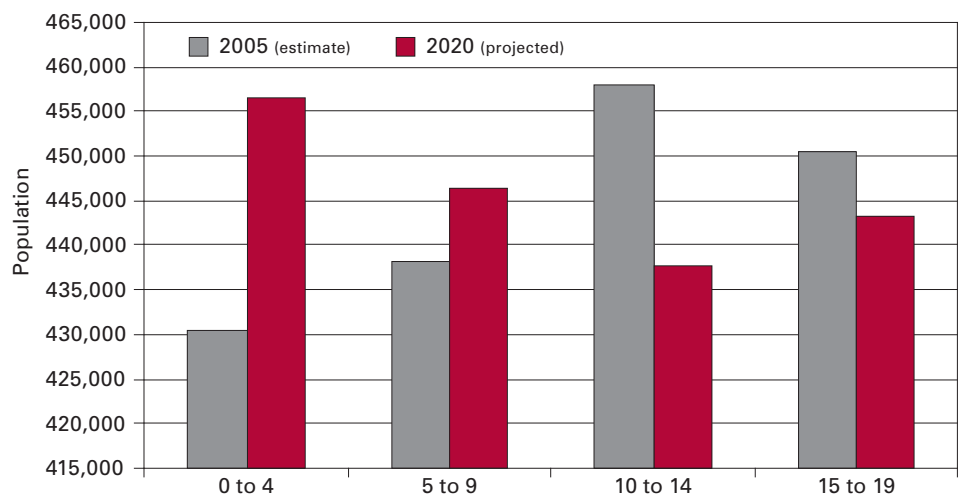
The second factor is the key assumption underlying these population projections: that the net in-migration that Indiana has experienced since the early 1990s will continue into the foreseeable future, although at a progressively lesser rate. Therefore, since migration is generally a function of economic opportunity, the realized patterns in future school-age populations will

FIGURE 6: Indiana Population Age 5 to 19, 1980 to 2040



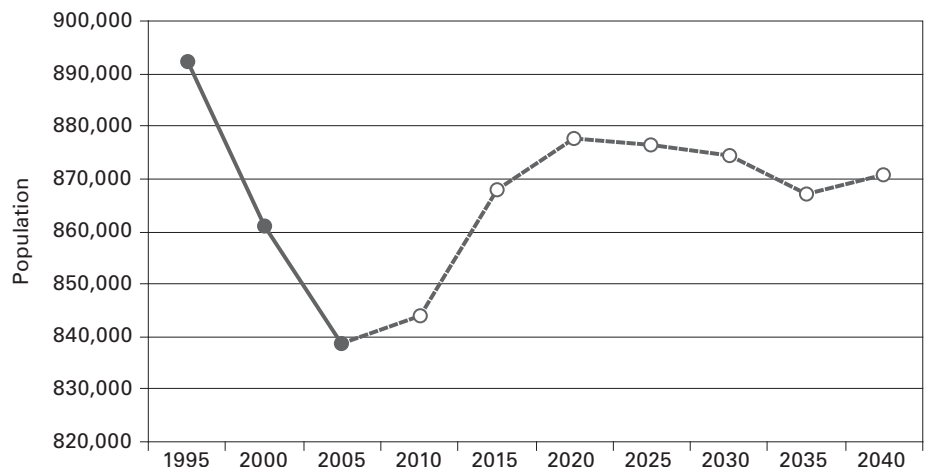
Source: Indiana Business Research Center

FIGURE 7: Indiana Population by Selected Age Groups, 2005 and 2020



Source: Indiana Business Research Center

FIGURE 8: Indiana Female Population Age 20 to 40, 1995 to 2040



Source: Indiana Business Research Center

hinge on Indiana's ability to grow and evolve economically.

Returning to **Figure 6**, we see how the combination of demographic and migration/economic forces have produced dramatic shifts in the size of this age group in the past. The school-age population, for instance, declined by 12 percent between 1980 and 1990 as the last of the baby boom generation progressed beyond this age group in the early 1980s and the state experienced significant net out-migration throughout the decade. The school-age population rebounded in the 1990s, with a growth of nearly 8 percent as the state once again experienced net in-migration and

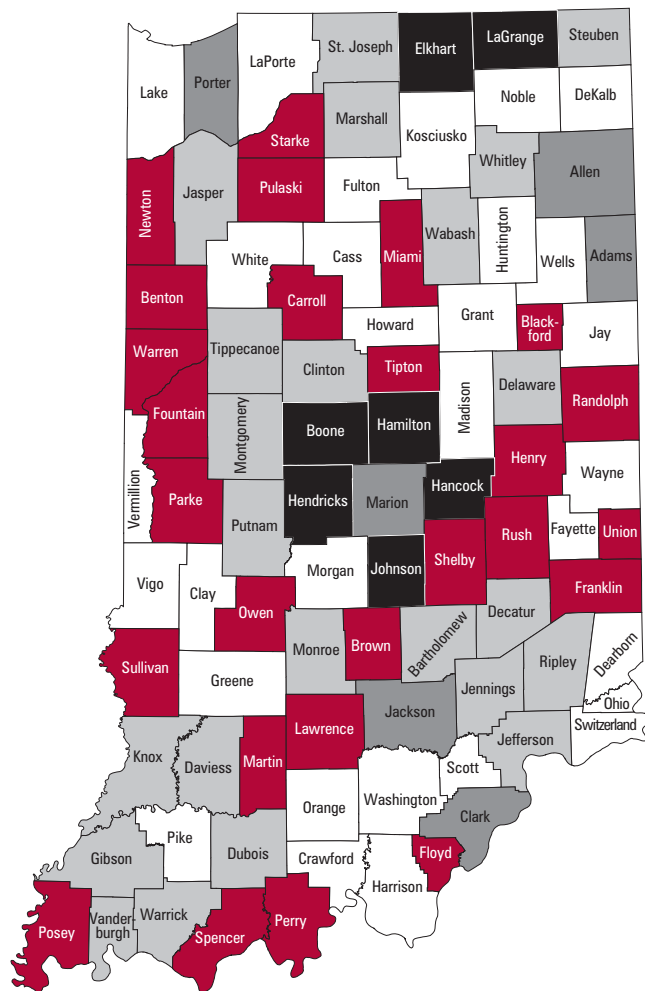
births increased slightly with baby boomers occupying the prime child-bearing years. In-migration, while still occurring, has cooled somewhat since 2000 but births have steadily risen since the late 1990s resulting in a slight increase (0.5 percent) in the size of the school-age population between 2000 and 2005.

The impact of migration patterns on the school-age population becomes even more evident when we analyze trends at the county level. The areas of Indiana that can expect a growing school-age population are those areas that will attract college graduates and young families. In Indiana, those communities figure to

increasingly be in our metropolitan areas.

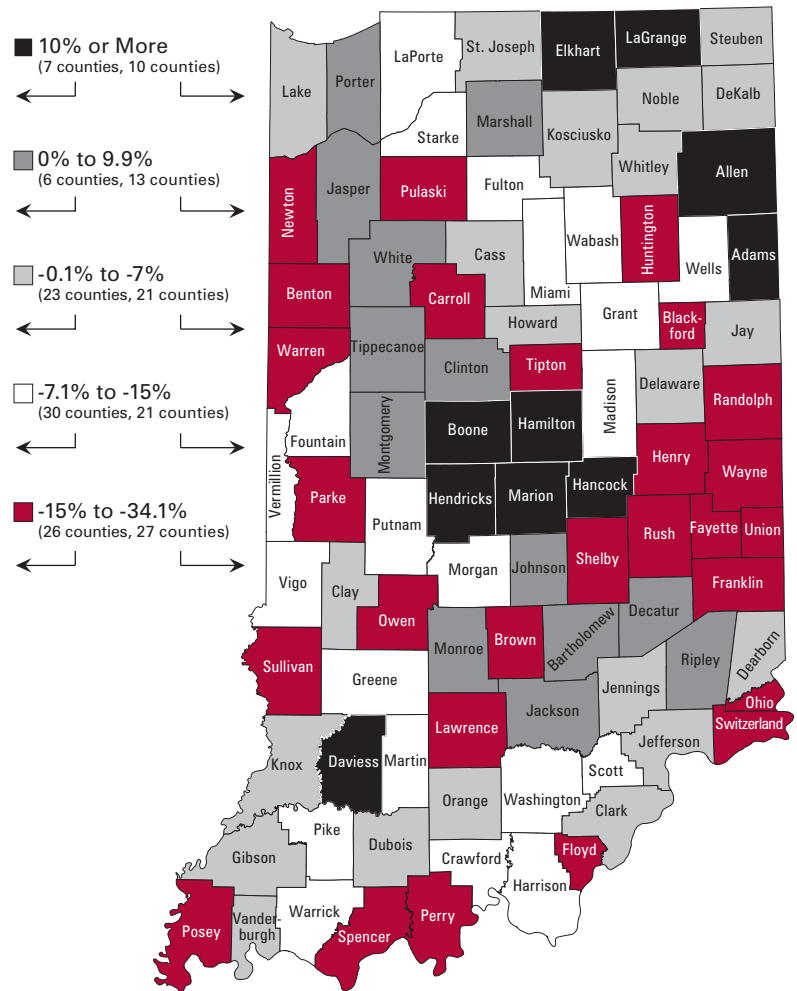
By 2025, when Indiana's school-age population as a whole will have returned to the approximate size it held in 2005, only thirteen of our state's ninety-two counties will have shown an increase in the population age 5 to 19 (see **Figure 9**). Not surprisingly, six of these thirteen counties are in the Indianapolis metro area (MSA) led by Hamilton County (52 percent increase), Hendricks County (22 percent), Hancock County (20 percent), and Boone County (15 percent). Other urban or suburban counties that will show increases are Allen, Clark, Elkhart, and Porter

FIGURE 9: Percent Change in Population Age 5 to 19, 2005 to 2025



Source: Indiana Business Research Center

FIGURE 10: Percent Change in Population Age 5 to 19, 2005 to 2040



Source: Indiana Business Research Center

counties. The two rural exceptions, Adams and LaGrange counties, are characterized by large Amish and Mennonite populations which tend to have higher fertility rates than the general population.

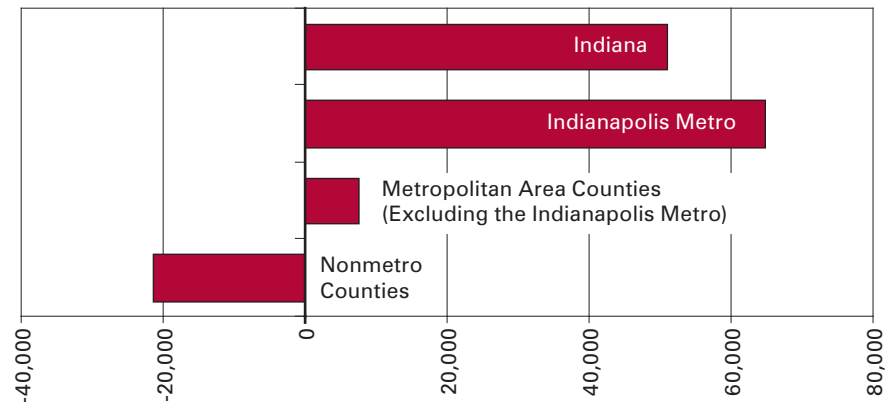
Figure 10 illustrates that by 2040, an additional ten counties will likely exhibit a growth in its school-age population bringing the state to a total of twenty-three counties which will have a larger 5-to-19 population than they had in 2005. That means that over the next thirty years, three out of four Indiana counties will see a decline in this age group.

The areas to see the greatest relative losses will be predominately nonmetro counties. However, several of Indiana’s metropolitan areas will see a significant decline in these age groups as well.

A look at recent migration movements indicates why these discrepancies are likely. **Figure 11** examines the net migration totals from 2000 to 2006 for Indiana and three broad subsets of the state: the Indianapolis MSA, other Indiana MSAs and nonmetro counties. In-migration to the ten-county Indianapolis metro exceeded the state total over this period by nearly 14,000 residents. Taken together, other Indiana metro areas showed very modest in-migration while nonmetro counties experienced significant out-migration.³ The effect of migration on future school-age populations in rural areas is compounded by the tendency for young adults to migrate from these areas at a greater rate than other age groups.

In many communities, these various local trends will have serious impacts on school enrollments and,

■ **FIGURE 11: Net Migration, 2000 to 2006**



Source: Indiana Business Research Center, using U.S. Census Bureau data

by extension, school facility and human resource planning.⁴ Many suburban school districts can expect continued enrollment growth while some rural districts are likely to experience sharp declines. Beyond school enrollments, communities with shifting school-age populations will also have to plan for changes in social service delivery, health care availability, and recreation opportunities among other issues.

Conclusion

Indiana as a whole will continue to grow, but that population growth will not happen evenly throughout our state. Some urban and suburban communities should plan for sustained growth while other urban areas and many rural counties will have to cope with continued losses. Similarly, growth will not occur proportionally among age groups as the senior population will nearly double. As we’ve seen, two primary forces will shape these changes in the coming decades: the aging of the baby boom generation and migration.

The aging population is a certainty in Indiana, as it is nationally, and its impacts on various social programs, the tax base, health care, and housing are predictable to a degree. Migration, on the other hand, is a volatile process that is closely linked to economic opportunity. These population projections will be accurate only to the extent that recent migration trends hold into the future. It is migration, then, that offers communities the greatest opportunity to influence their population change. Future economic prospects and quality of life developments will be key determinants in any community’s ability to maintain its current population or to attract residents. ■

Notes

1. To access the entire population projection dataset, please visit www.stats.indiana.edu/topic/projections.asp.
2. Rachel Justis, “Workers Needed: Please Apply by 2025—The Changing 25-to-54 Age Group,” *InContext*, February 2008.
3. For a more detailed analysis of migration trends over this period, see Rachel Justis, “What’s Driving Population Growth in Indiana Counties and Regions?” *InContext*, July 2007.
4. Since most counties have multiple school districts, it is not appropriate in many cases to use these county-level projections for school district analysis. Population change can vary widely within counties, particularly in fast-growing communities.

“Indiana as a whole will continue to grow, but that population growth will not happen evenly throughout our state.”

Projection Implications on the Economy

Transportation Planning

Stephen C. Smith, AICP: Manager, Long-Range Transportation Planning Section, Indiana Department of Transportation

The demand for transportation services is based upon the relationship between land use and trip making. A large portion of travel is generated by interactions between population concentrations (as measured by households) which tend to produce trips and employment centers which tend to attract trips. A basic measure of travel demand is vehicle miles of travel (number of vehicles times distance traveled) or VMT. Based on the Indiana Department of Transportation's current population and employment forecasts (2000 to 2030) applied through the statewide travel demand simulation model, we see the total growth in VMT increasing 38 percent over that thirty-year period and truck-related VMT increasing by 85 percent. Freight-related traffic is expected to increase more rapidly than passenger traffic due to the increased dispersion of population and employment, increases in income driving demand for consumer goods, and the longer trip lengths associated with the global economy.

The future population projections outline a continuation of recent trends in increased suburbanization and growth of the major metropolitan areas. This is

resulting in a shift of travel patterns from the more traditional radial suburban-to-downtown business district patterns to suburban-to-suburban circumferential travel. Increased congestion levels in these outlying areas will place additional demands on making roadway improvements in these lower density areas experiencing suburbanization.

The aging of the population will also affect travel demand. Personal travel is closely related to the lifestyle of the individual. Persons exhibit peak travel activity at 35 to 50 years of age. As the population ages, the rate of trip making declines, providing a moderating impact on future travel demand growth. This moderating impact will be most pronounced in the rural areas of the state where the median age of the population tends to be higher.

INDOT will use the new 2005 to 2040 population projections as a key input into the update of the statewide travel demand simulation model as we advance our horizon planning year from 2030 to 2035.

Land Use

John R. Ottensmann: Director, Urban Policy and Planning, Center for Urban Policy and the Environment, School of Public and Environmental Affairs, Indiana University

Many Hoosiers have become increasingly concerned about the rapid pace of urban development in Indiana. We are seeing the loss of agricultural land, forests, environmentally-sensitive areas, and other open space to new subdivisions and commercial and industrial development. Some have characterized current patterns of development as "urban sprawl." While the population of Indiana is projected to increase by 15 percent from 2005 to 2040, the amount of land in Indiana in urban use could increase by a third or more, resulting in the loss of over 60,000 acres of rural land to urban development, according to the Indiana Department of Transportation.

Urban development is associated with population growth as new residences and businesses are developed to accommodate increasing population. The population projections developed by the Indiana Business Research Center show where these changes will be the greatest and provide the basis for planning to deal with them.

The distribution of projected population growth across Indiana's counties is very uneven. Just sixteen counties have projected population increases from 2005 to 2040 of 10,000 or more (see accompanying metro map).

These sixteen counties account for 86 percent of the net population growth projected for Indiana to 2040. The counties are located within or adjacent to the largest metropolitan areas in the state or are the homes of Indiana's two largest public universities. These are the counties that will see the largest amounts of urban development and the highest levels of conversion of rural land to urban uses.

An additional 12 counties are projected to have population growth in excess of 5,000 persons by 2040, accounting for an additional 9 percent of the state's projected population growth. These counties will also be facing significant urban development.

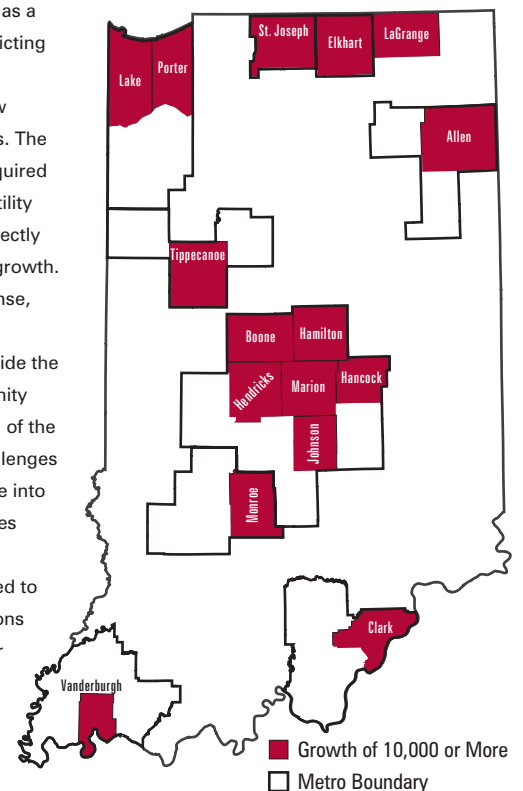
Population projections are literally the starting point for planning for new urban development. Comprehensive plans and zoning ordinances set guidelines for development. The development of these tools requires careful consideration

of the population to be accommodated and the residential, commercial, and industrial development needed for that population.

For the public infrastructure required to support new growth, population projections likewise provide the point of departure for the planning. Everyone understands the importance of population projections for the planning for new schools in growing areas. Transportation planners use

projected populations as a major element in predicting future travel demand when planning for new transportation facilities. The additional capacity required for water and sewer utility systems is likewise directly related to population growth.

In the broadest sense, projections of future population levels provide the residents of a community with an understanding of the opportunities and challenges they face as they move into the future. Communities faced with significant population growth need to consider the implications of that growth for their communities and how they will manage that growth.



Education Enrollment Numbers Are a Significant Matter

Terry Spradlin, MPA: Associate Director for Education Policy, Center for Evaluation and Education Policy, Indiana University

During the thirteen years of my professional career spent at the State House, very few policy matters intrigued me more than the development of the state budget, and the school funding formula in particular. Before voting on each version of the state budget bill, legislators were certain to review the school funding formula printouts to determine whether the school corporations in their legislative districts were to receive increased or decreased funding. Generally speaking, and to over-simplify the school funding formula, increased or decreased funding was predicated on the enrollment trends of each school corporation. Thus, enrollment projections are a matter of serious concern for schools.

When looking at state population trends through 2040, it is projected that the total population of school-aged children (defined as age 5 to 19) will remain relatively constant, with only a slight increase of approximately 40,000 students. This projection in and of itself will not alter public school funding in Indiana in any significant manner. Over time, school corporations that lose or gain students will certainly lose or gain funding through the formula—a matter of great significance locally. However, at the state level, population trends that reflect the growing diversity of the student population in terms of family income, students with disabilities, and limited-English proficiency (LEP), to

name a few, are just as important to consider. For example, the school funding formula includes a complexity index that generates additional funds to school corporations that have higher percentages of students from low-income families (as measured by the percent of the student population that qualifies for free and reduced-price meals). Additionally, school corporations that have increasing populations of special needs or LEP students (a population that grew statewide 408 percent from 1994–95 to 2004–05) are likely to receive additional categorical funding under present-day state funding priorities.

Yes, student enrollment trends are matters of high significance in K–12 education in Indiana. However, a singular focus on enrollment trends would understate the importance of this age cohort on the economic vitality of the state. To ensure long-term economic development and job growth in the Hoosier state, we must also pay careful attention to increasing the high school graduation rates, sustaining improvements in college attendance rates, and elevating college graduation rates. If the state can succeed in improving these achievement outcomes, we should find substantial growth in the overall literacy and educational attainment levels of our adult population. Ultimately, this will lead to a lower reliance on public assistance programs, a larger tax base, and a skilled workforce to grow jobs—a winning proposition for Indiana!

Job Training and Areas of Labor Shortages

Carol O. Rogers: Executive Editor, Indiana Business Research Center

Population projections are a key component used to calculate labor force projections. These labor force projections are then used by state and local government officials to identify industries and occupations that are facing an aging and/or shrinking labor pool. By identifying those areas with potential future labor shortages, policy makers can target job training programs to meet future needs.

An aging labor force is not unique to Indiana, and we know that once individuals reach 55, labor force participation declines dramatically. As the nation's 45-to-54 age group continues to migrate into the 55-to-64 age group, there are growing concerns over a shortage of skilled workers to fill jobs in industries such as construction, manufacturing and health care nationwide.

Skilled occupations within these industries can be targeted for job training. Occupations that would most likely be affected by the generation shifts due to their prominence in the “aging workforce industries” are a variety of engineers and engineering technicians, electrical occupations, health care occupations, sales occupations, maintenance and repair occupations, production and transportation, and material moving occupations.

Identifying industries and occupations that will be most impacted by an aging population shows where to direct job training resources. This information is used to focus on specific skills needed for job training and change educational curriculum to address projected shortages before they become problematic.

Public Health

Mary McKee: Director, Public Health Practice, Marion County Health Department

Public health is all about people and monitoring the health status of the community, diagnosing and investigating health problems, educating and empowering people about health issues, assuring the provision of health care when it is otherwise unavailable, and evaluating outcomes. These are all reliant on accurate and timely data, particularly population data. Even more useful can be projections of population with characteristics such as gender and age and race or ethnicity. The following lists a selection of examples where population projections provide critical inputs:

- Healthy People 2020 and setting the framework for national health objectives.
- Resource planning purposes around the core functions of public health—assessment, policy development, and assurance.
- State and county projections for calculating the gaps in care.
- Accurate data that describe the local community, rather than the national average—can be used to compare communities and tease out issues of health disparities among communities or between demographic groups.
- Accurate population projections for public health emergency preparedness planning.
- The importance of data for developing attractive and persuasive funding requests.

County Population Estimates for 2007: Interpreting the Components of Change

Vincent Thompson: President, Thompson Analytics, LLC

The Census Bureau's latest county population estimates paint an informative picture of population growth since Census 2000. As always, some counties gained population, some lost, and some didn't change much. It is important for us to look at changes in total county population, but some of the more interesting results won't be revealed until we dig a little deeper and examine the components of change.

The Tall and Short of It

Table 1 lists the twenty most and twenty least populated counties in Indiana, according to the Census Bureau's estimates for July 1, 2007. The top twenty counties account for 4.14 million people, or 65.3 percent of the state's estimated 6.35 million residents. Those same twenty counties only accounted for 64.3 percent of the state population as of Census 2000. That's an increase of one full percentage point for the seven-and-one-quarter year period. In contrast, the bottom twenty dipped slightly from 276,342 to 271,489 people; that is, from 4.5 percent to a 4.3 percent share of the state's population.

Looking at the changes in rank, we can see that the bottom twenty have remained relatively stable, while the top twenty have seen a good deal of movement. Notably, Hamilton County has overtaken Elkhart County at fifth place, and is on pace to overtake St. Joseph County at fourth place before Census 2010. Also, Johnson and Hendricks counties have both surpassed several other counties to fill the tenth and eleventh spots, respectively. It seems likely that Hendricks County will join the top ten soon.

Marion County, Indiana's largest county and home to Indianapolis,

■ TABLE 1: Twenty Largest and Smallest Counties, 2007

Rank, 2007 Population Estimate	Change in Rank Since 2000*	County	2007 Population Estimate	Numeric Change Since 2000	Percent Change Since 2000
1	0	Marion	876,804	16,350	1.9
2	0	Lake	492,104	7,540	1.6
3	0	Allen	349,488	17,639	5.3
4	0	St. Joseph	266,088	529	0.2
5	+1	Hamilton	261,661	78,921	43.2
6	-1	Elkhart	197,942	15,151	8.3
7	0	Vanderburgh	174,425	2,499	1.5
8	0	Tippecanoe	163,364	14,409	9.7
9	0	Porter	160,578	13,780	9.4
10	+3	Johnson	135,951	20,742	18.0
11	+5	Hendricks	134,558	30,465	29.3
12	-2	Madison	131,312	-2,046	-1.5
13	-2	Monroe	128,643	8,080	6.7
14	-2	Delaware	115,419	-3,350	-2.8
15	-1	LaPorte	109,787	-319	-0.3
16	+1	Clark	105,035	8,569	8.9
17	-2	Vigo	104,915	-933	-0.9
18	0	Howard	83,776	-1,188	-1.4
19	0	Kosciusko	76,115	2,058	2.8
20	+1	Bartholomew	74,750	3,315	4.6
73	0	Carroll	19,987	-178	-0.9
74	0	Orange	19,607	301	1.6
75	0	Perry	18,916	17	0.1
76	0	Rush	17,494	-767	-4.2
77	+1	Parke	17,169	-71	-0.4
78	-1	Fountain	17,143	-812	-4.5
79	0	Vermillion	16,417	-371	-2.2
80	0	Tipton	16,069	-508	-3.1
81	0	Brown	14,670	-287	-1.9
82	0	Newton	14,014	-552	-3.8
83	+1	Pulaski	13,778	23	0.2
84	-1	Blackford	13,189	-859	-6.1
85	0	Pike	12,605	-231	-1.8
86	0	Crawford	10,782	39	0.4
87	0	Martin	10,058	-311	-3.0
88	+1	Switzerland	9,684	619	6.8
89	-1	Benton	8,810	-611	-6.5
90	0	Warren	8,482	63	0.7
91	0	Union	7,203	-146	-2.0
92	0	Ohio	5,772	149	2.6

Source: U.S. Census Bureau

also makes a showing in the Census Bureau's list of 100 largest U.S. counties, placing fifty-fifth. That is a decline of five places since Census 2000, when Marion County ranked fiftieth.

To Gain or Not to Gain

Table 2 ranks the top and bottom five counties by numeric change. Hamilton County heads this list with a gain of almost 79,000 residents from April 2000 to July 2007. Although Marion County made fifth place, its growth in percentage terms ranked only thirty-seventh in the state.

Grant County sustained the greatest numeric loss of population. All of the bottom five counties have struggled with manufacturing employment losses over the period, especially Madison, Delaware, and Grant counties.

Of the top five numeric gainers, Hamilton, Hendricks, and Johnson counties also made the top five list for percent change, as shown in **Table 3**. All of the top five percentage gainers are "donut" counties surrounding Marion County. Two of these counties

TABLE 2: Top and Bottom Five Counties Ranked by Numeric Change, 2000 to 2007

Rank, Numeric Change	County	Numeric Change
1	Hamilton	78,921
2	Hendricks	30,465
3	Johnson	20,742
4	Allen	17,639
5	Marion	16,350
88	Wabash	-2,042
89	Madison	-2,046
90	Wayne	-2,837
91	Delaware	-3,350
92	Grant	-4,556

Source: U.S. Census Bureau

also made the Census Bureau's list of the 100 fastest growing counties across the nation: Hamilton (twenty-third) and Hendricks (eighty-fifth).

Two of the counties among the five having the greatest percentage loss, Grant and Wabash, were also among the five with the greatest numeric loss. Although Benton County takes last place here, that county is very

TABLE 3: Top and Bottom Five Counties Ranked by Percent Change, 2000 to 2007

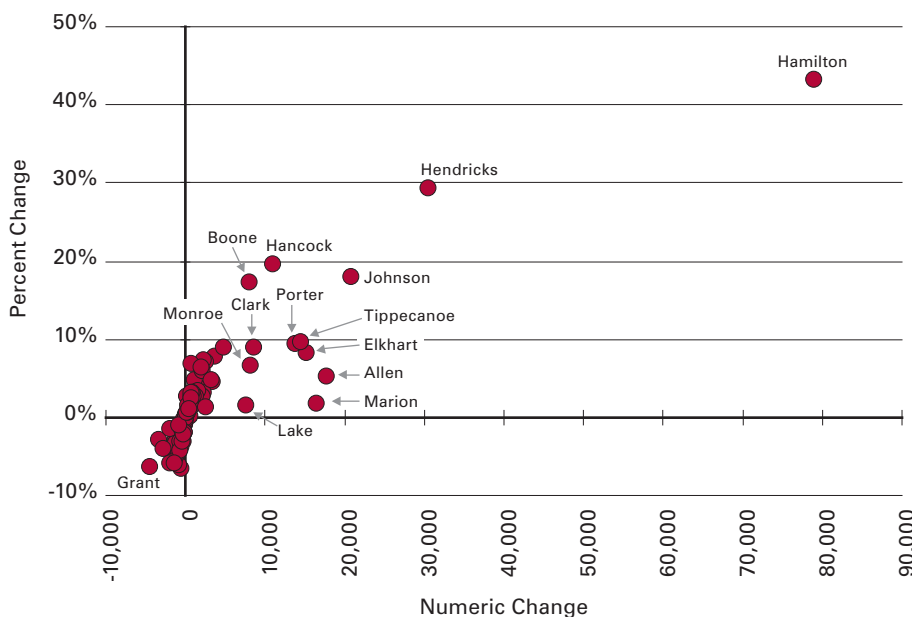
Rank, Percent Change	County	Percent Change
1	Hamilton	43.2
2	Hendricks	29.3
3	Hancock	19.7
4	Johnson	18.0
5	Boone	17.4
88	White	-5.7
89	Wabash	-5.8
90	Blackford	-6.1
91	Grant	-6.2
92	Benton	-6.5

Source: U.S. Census Bureau

small, so the magnitude of change was not very great; Benton County's 6.5 percent decrease corresponds to a loss of 611 residents, while Grant County's 6.2 percent decrease came with a loss of 4,556 residents.

To assess the magnitude of population growth, **Figure 1** provides a scatterplot of percent change versus numeric change. Each of Indiana's ninety-two counties is represented by its own data point. Points that are well away from the scatterplot's "center of mass" are labeled individually. This allows us to quickly identify the counties that had the most momentum over the period. Immediately we see Hamilton and Hendricks counties have the most growth momentum, far exceeding other counties in terms of both percent and numeric change. We can also quickly determine that Grant County has the most negative momentum. Furthermore, this approach helps distinguish from the rest of the pack a few of the counties that didn't make the top or bottom five lists.

FIGURE 1: Percent Change vs. Numeric Change, 2000 to 2007



Sources: Thompson Analytics LLC, using data from the U.S. Census Bureau

The Inevitable: Births and Deaths

Obviously, the number of births and deaths in a county is heavily influenced by the county's number

■ **TABLE 4: Top and Bottom Five Counties Ranked by Natural Increase, 2000 to 2007**

Rank, Natural Increase	County	Natural Increase	Births	Deaths
1	Marion	51,025	105,567	54,542
2	Allen	19,288	38,350	19,062
3	Hamilton	19,069	26,381	7,312
4	Lake	15,852	50,492	34,640
5	Elkhart	13,573	23,826	10,253
88	Brown	-12	937	949
89	Knox	-23	3,277	3,300
90	Henry	-35	4,056	4,091
91	Sullivan	-85	1,753	1,838
92	Vermillion	-179	1,454	1,633

Source: U.S. Census Bureau

of residents. So, when we look at **Table 4** and discover the top five counties ranked by natural increase are also among the top six ranked by population (shown in **Table 1**), we are not surprised. What, however, explains why the rankings in the two tables aren't the same? Primarily, it's because each county has a different age distribution. All else held constant, counties that have a higher proportion of older residents will have a smaller natural increase, because there will be more deaths and fewer births compared to those of a county of the same population but younger age distribution. This partially explains why, for example, Lake County is ranked second by population but only fourth by natural increase. Lake County's estimated median age in 2006 (the most recent estimate available) was 37.0, whereas it was only 35.4 for Allen County and 33.9 for Hamilton County. Similarly, Elkhart County edged out St. Joseph County to make the top five in part because its median age in 2006 was only 33.9, whereas St. Joseph's was 35.7. Of course, differing fertility and mortality rates play a role as well.

As for the bottom five counties in **Table 4**, which are the only Hoosier counties having more deaths than

births during the period, three are among Indiana's counties having a very high estimated median age in 2006. Brown County has the oldest age distribution with a median age of 42.8, and Henry County ranks second at 41.0. Vermillion County, which has the greatest natural decrease, ranks ninth in median age at 40.2. Knox County's median age is pulled down to 38.1 by the college-aged population attending Vincennes University. Sullivan County's median age isn't far off at 37.7.

Knox and Sullivan counties, however, both have relatively low fertility rates, ranking sixtieth and seventy-first, respectively, according to Indiana State Department of Health data for 2005 (the most recent data available at the time of this writing).¹ Also notable is that Brown County had the lowest fertility of all Indiana counties in 2005, at a rate nearly half that of the state's. Brown County also has a low mortality rate, ranking seventy-seventh in 2005. In contrast, the other four counties in the bottom five of **Table 4** have some of the highest mortality rates. For 2005, Vermillion County had the third highest mortality rate, Henry County ranked fifth, Knox County twelfth, and Sullivan County eighteenth.

■ **TABLE 5: Top and Bottom Five Counties Ranked by Total Net Migration, 2000 to 2007**

Rank, Total Net Migration	County	Total Net Migration	Net International Migration	Net Domestic Migration
1	Hamilton	55,047	2,080	52,967
2	Hendricks	24,818	491	24,327
3	Johnson	14,647	621	14,026
4	Porter	9,356	1,004	8,352
5	Hancock	8,431	37	8,394
88	Delaware	-4,087	887	-4,974
89	Grant	-4,455	118	-4,573
90	Lake	-6,236	4,303	-10,539
91	St. Joseph	-8,666	4,371	-13,037
92	Marion	-31,235	17,222	-48,457

Source: U.S. Census Bureau

Influx and Outflux

The remaining components of population change involve migration, or people moving into or out of a county. Domestic migration happens when a migrant's origin and destination are both within the United States, whereas for international migration, either the origin or destination is outside the nation. Net migration is merely equal to the "ins" minus the "outs" for a given geography. Total net migration is the sum of net domestic migration and net international migration.

Table 5 ranks the top and bottom five counties by total net migration from April 2000 to July 2007. For the third time in this article, Hamilton and Hendricks counties are ranked first and second, respectively (see also **Tables 2** and **3**). Marion County sits at the bottom of the list with a net outflow of over 31,000, more than three times that of ninety-first-ranked St. Joseph County. Also note that Marion County's net domestic migration is more than 48,000—a key factor in the large inflows experienced by the surrounding "donut" counties, of which four are in the top five. Porter County, ranked fourth, picks up large gains from

neighboring Lake County, ranked ninetyeth.

Delaware and Grant counties, ranked eighty-eighth and eighty-ninth in **Table 5**, have struggled with declining manufacturing employment as previously mentioned. St. Joseph County also has lost some manufacturing jobs, and neighboring Elkhart County has been the destination for a large share of its domestic out-migrants. This makes some sense when you consider that St. Joseph County lost over 1,400 manufacturing jobs from 2001 to 2006, whereas Elkhart County gained about 8,700 manufacturing jobs over the same period.

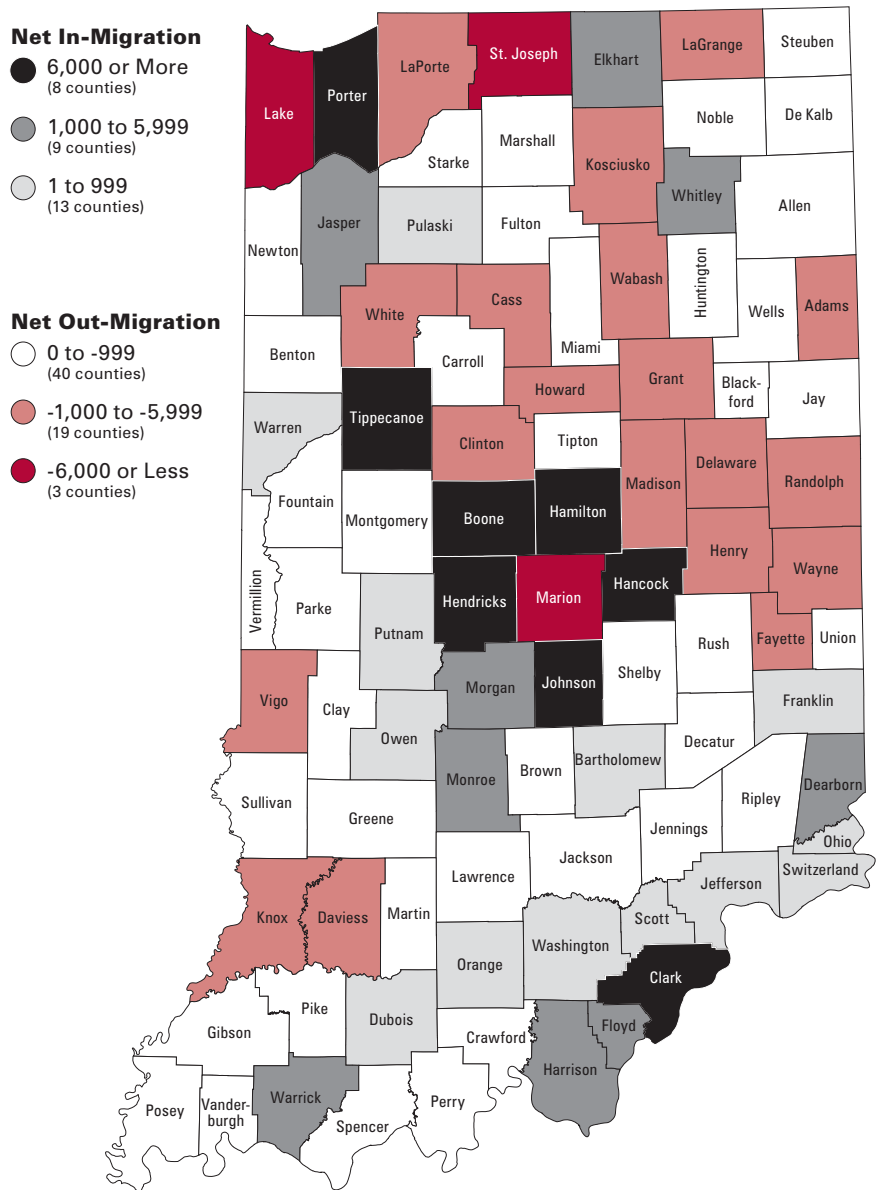
Figure 2 illustrates county migration levels across the state. Notice the “donut” counties are true to their name here, as five of the counties that border Marion County have a net in-migration of at least 6,000, and another exceeds 1,000. The map also gives us an idea of which counties are likely supplying migrants to adjacent counties.

Reasons People Move

Why, indeed, do people move? The U.S. Census Bureau splits the reasons into four broad categories for the purposes of the Current Population Survey: family-related, employment-related, housing-related, and other. Each of these has more detailed subcategories. For example, employment-related reasons for moving are further broken down as follows: new job or job transfer, to look for work or lost job, to be closer to work/easier commute, retired, other job-related reason.

One of the results from the 2006 Annual Social and Economic Supplement to the Current Population Survey is those who moved within the same county are estimated to have moved for employment-related reasons only about 9 percent of the time, whereas the figure for intercounty movers is

FIGURE 2: Total Net Migration, 2000 to 2007



Source: IBRC, using U.S. Census Bureau data

about 33 percent.² These results have remained fairly stable over time.

Employment’s Influence on Migration

Given the fact that employment-related reasons often serve as the antecedent to a move, we have undertaken the task of measuring the relationship between employment and migration for Indiana’s ninety-two counties. First, we calculated

over-the-year changes in employment for each county from 1999 to 2006 using Quarterly Census of Employment and Wages (QCEW) data from the Bureau of Labor Statistics. Since it often takes time for people to decide whether to move, and then even more time to make the move once decided, we relate each one-year change in county employment to the following year’s county net migration. To quantify

this relationship, we calculated the simple correlation between them across all ninety-two counties. For each of the seven years examined, we calculated two separate correlations: one between change in employment and total net migration and another between change in employment and net domestic migration.

For those who aren't statistically inclined, note that a correlation coefficient is a number between -1.00 and +1.00, where +1.00 indicates a perfect positive linear relationship (i.e., a straight line with positive slope intersecting all data points), and -1.00 indicates a perfect inverse linear relationship (i.e., a straight line with negative slope intersecting all data points). One nice thing about the correlation coefficient is if you square it, you get what we call R-square, which tells us the percentage of variation in the predicted variable (in our case, net migration) that is explained by variation in the predictor (for us, change in employment).

Table 6 provides a summary of the correlations. The table also provides over-the-year changes in employment for the whole state as a reference. With only two exceptions, the correlation between county-level change in employment and county-level total net migration is at least 0.65. For the most recent year, the correlation reached 0.74, the highest value over the period. This means that 55 percent of the variation in total net migration for 2006–07 was explained by the variation in change in employment for 2005–06. For 2005–06 total net migration the correlation is 0.67 and the R-square value is 0.44, or 44 percent. That value loosely compares to the 33 percent figure from the Current Population Survey mentioned above (a nationwide result).

An interesting finding is the difference in correlations for total net migration versus net domestic migration. Note that the correlation

TABLE 6: Correlation Between Over-the-Year County Employment Change and County Net Migration One Year Later

Employment Change Period	Indiana Over-the-Year Change in Employment*	Migration Period	Correlation with	
			Total Net Migration	Net Domestic Migration
2005–2006	+18,624	2006–2007	0.74	0.63
2004–2005	+24,922	2005–2006	0.67	0.49
2003–2004	+26,994	2004–2005	0.31	0.14
2002–2003	-10,674	2003–2004	0.73	0.76
2001–2002	-38,683	2002–2003	0.65	0.77
2000–2001	-63,268	2001–2002	0.65	0.77
1999–2000	+28,687	2000–2001	0.25	0.03

*Census of Employment and Wages

Sources: Bureau of Labor Statistics and the U.S. Census Bureau; Calculations by Thompson Analytics LLC

for net domestic migration is higher than that for total net migration in 2001–02, 2002–03 and 2003–04, whereas it was higher for total net migration in the other years. This seems to be a result of post-9/11 tightening of immigration policy, which served to increase the strength of the relationship between employment change and net domestic migration for three years. The highest correlation with net domestic migration, 0.77, came immediately following the terrorist attacks. The corresponding R-square value is about 60 percent.

What happened in the two years where the correlations are low? Note that those two periods are adjacent to the three consecutive years Indiana sustained over-the-year employment losses. In other words, the relationship did not hold for those two years due to the effects of a nearby peak or trough in employment. Specifically, the change in county employment over the 1999–2000 period didn't produce as much migration as we might've expected in 2000–01 because the economy started to "head south" during that time (a recent peak). The relationship between 2003–04 changes in employment and 2004–05 net migration also failed to hold, probably because the citizenry were still "trying to get back on their feet" after struggling through three years

of over-the-year employment losses (a recent trough). In other words, it seems likely that some who were willing to move for employment reasons during the 2004–05 period were financially unable to do so.

More Than Meets the Eye

The goal of this article was as much to stimulate thought and discussion about Indiana's latest county population estimates as it was to call attention to compelling facts and figures. Hopefully the content will be of practical use to those who must take such things in consideration in their personal or professional decision making. Ultimately, however, the hope is that readers will come away with a heightened awareness that there is much more than meets the eye regarding the basic population estimates data. ■

Notes

1. By the time this article is published, the Indiana State Department of Health will have released the 2006 births and deaths data. For total fertility rates go to www.in.gov/isdh/19095.htm, select a year and look for Table 31. For mortality rates go to www.in.gov/isdh/19096.htm and look for Table 5a for the selected year.
2. Source: U.S. Census Bureau, Current Population Survey, 2006 Annual Social and Economic Supplement, tables 34-1 and 34-2. Available online at <http://www.census.gov/population/www/socdemo/migrate/cps2006.html>.

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