



Capacity-Cost Indexes for Indiana Local Governments 2002 and 2018

Larry DeBoer
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About the Author:

Larry DeBoer is a professor and extension specialist in Agricultural Economics at Purdue University, where he has earned a reputation as one of the state's foremost experts on Indiana tax and budget issues since joining the faculty in 1984. He studies state and local government public policy, including such topics as government budget and taxing options, issues of property tax assessment, local government revenue options, and the fiscal impact of economic development.

Professor DeBoer worked with the Indiana Legislative Services Agency on tax and finance issues from 1988 to 2014, and continues to contribute to LSA's annual property tax analysis. DeBoer directed a study on market value property tax assessment for the Indiana State Board of Tax Commissioners during 1995-97, and oversaw the staff work for Governor O'Bannon's Citizen's Commission on Taxation, 1997-98.

A decade later, he contributed research to Governor Daniels' Commission on Local Government Reform (2007) and has studied the effects of the constitutional property tax caps enacted in 2008-2009, including a 2015 report – 'What Do We Know About Indiana's Property Tax Caps?' – for the Indiana Fiscal Policy Institute. DeBoer was the 2009 recipient of Purdue's Hovde Award for service to the rural people of Indiana.

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Publishing Note from the Indiana Fiscal Policy Institute:

Even before COVID-19 reached Indiana to create widespread economic disruption and decline, local governments in the places where most Hoosiers live and work had been grappling with growing budgetary pressure even during the decade of recovery from the Great Recession of 2008-2009.

*In 2019, the Indiana Fiscal Policy Institute (IFPI) asked Dr. Larry DeBoer of Purdue University to revisit and expand an earlier analysis of local government fiscal climate. This resulting study, “**Capacity-Cost Indexes for Indiana Local Governments – 2002 & 2018**,” analyzes the economic, demographic and policy changes contributing to a divergent pattern of revenue capacity and service costs across urban, rural and mixed (suburban and industrial) communities.*

Professor DeBoer details how fiscal stress has increased in urban counties, as revenue potential also fails to keep pace with costs in many of the state’s fastest-growing areas. He explores the negative effects of manufacturing losses on industrial counties that have failed to diversify, and the revenue stability that agricultural assessment and tax policies have brought to rural counties since 2002.

As the COVID recession reduces revenue capacity statewide, we believe the report also acts as a roadmap to areas likely to be hardest-hit by a sharp downturn, accelerating the longer-term challenges of a tax base limited by a combination of policy choices and economic trends. IFPI is pleased to partner again with Larry DeBoer, sharing vital insights from one of Indiana’s foremost experts on state and local tax policy.

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Summary of Findings

Capacity-Cost Indexes. This paper reports calculations of a **capacity-cost index**, which compares each county's revenue capacity to its service costs. Revenue capacity includes the assessed value of property, taxable income, state school aid and state road aid. Service costs are influenced by population, population in cities and towns, school enrollment and road miles. A positive capacity-cost index implies that the local governments in a county can provide an average level of services at lower than average tax rates, or more services at average tax rates. A negative capacity-cost index means that governments must charge higher tax rates to provide average services, or make due with fewer services at average tax rates. Capacity-cost indexes are calculated for all 92 counties, using data for 2018 and 2002.

Property Tax Rates. Capacity-cost indexes help explain property tax rates. In 2018, counties with positive capacity-cost indexes tended to charge lower property tax rates. Counties with smaller capacities relative to costs charged higher tax rates. This was true to a lesser extent in 2002 as well. There is a much weaker association between the capacity-cost index and spending in 2018, and the association was not present in 2002. Generally, Indiana local governments do not use increases in capacity to increase spending on services.

Importance of the Maximum Levy. One reason must be the maximum property tax levy. The maximum levy increases with the maximum levy growth quotient, which is based on growth of Indiana income statewide. Maximum levy growth is unrelated to local assessed value changes. If local assessed value grows more rapidly than the MLGQ, tax rates will fall. Higher capacity leads to lower tax rates. If the MLGQ rises more than local assessments, tax rates will rise. Lower capacity leads to higher tax rates.

Tax Cap Credits. Counties with low revenue capacity relative to service costs generally have higher property tax rates. This results in higher tax cap credit property tax losses as a percentage of the property tax levy. The tax cap credits worsen the budget stress faced by local governments with low revenue capacity compared to costs.

Statewide Policy Changes Affect Capacity. Indiana saw significant changes in local government budget policy over the 2002-2018 period. On the capacity side, the move to market-value-in-use assessment increased assessed value, but state policy changes reduced the use of property taxes, in favor of local income taxes and state schools aid. The state provided counties with more options for replacing property taxes with local income taxes, and increased the flexibility in setting LIT rates. The state replaced school general fund property taxes with added state school aid. A boost in state aid for roads came late in this period as well.

Competing Trends in Service Costs. Indiana local governments faced two competing trends in service costs from 2002 to 2018. Service costs grew faster because population moved towards cities and towns, and from rural to urban counties. But service costs grew more slowly because the share of school enrollment in total population decreased.

Urban, Rural and Mixed Counties. The average urban county had a negative capacity-cost index in 2018. Revenues at average tax rates would not cover average service costs. The average rural county had a positive index. A group of “mixed” urban/rural counties had smaller positive indexes. Capacity-cost indexes diverged between 2002 and 2018. Urban county indexes were negative in 2002, and became more negative by 2018. Rural and mixed counties became more positive.

Explanations for the capacity-cost indexes in 2018, and the divergence since 2002, are found in three factors: population growth and decline, rising assessed values of farmland, and declines in manufacturing employment.

Population Shifts from Rural to Urban. Most urban counties saw population growth. Most rural counties saw population decreases. Unexpectedly, both caused service costs per person to rise. The most rapidly growing counties—all urban or mixed—saw large increases in city/town population, school enrollment and road miles. These are all factors that accelerate service costs.

Declining population counties were mostly rural. Total costs did not decline proportionately with population. In particular, road mileage was nearly unchanged, which meant that spending on roads per person increased.

Costs grew least in counties with stable or modestly growing populations. Existing infrastructure and staffing was sufficient to cover added services, and declining school enrollment helped hold down costs.

The Standard Homestead Deduction and Capacity. Rapid population growth requires new housing construction, which adds to assessed value. But new homes have new \$45,000 standard deductions subtracted, so the increase in taxable assessed value is less. In counties with slower population growth, most of the increase in homestead assessed value is in upward trending of existing homes. There are no new standard deductions to subtract. Places with faster growing populations experienced a drag on capacity growth from increasing standard deductions. Places with slower growing populations saw greater growth in taxable assessed value.

Farmland Assessment and Capacity. Farmland was assessed upward with the 2003 reassessment, and increased further with rising commodity prices and lower interest rates after 2007. The rise in the base rate of farmland added to capacity of rural and mixed counties. In addition, the base rate is a statewide figure determined by the Department of Local Government Finance. It does not vary with local economic conditions. When population falls, the farmland remains, and this tends to increase capacity per person.

Lost Manufacturing Employment. Capacity grew slowly in counties that lost manufacturing jobs without rapid growth in other employment. Most of these counties are located in the east-north-central corridor from Howard and Cass to Fayette and Wayne Counties. They include urban, mixed and rural counties. Population declined in these counties, but costs did not fall proportionately.

Urban County Capacities and Costs. Population grew in urban counties, and this increased costs more than capacity. The drag from the standard deduction, the small share of farmland and the loss of manufacturing jobs are reasons. Rising income taxes and added state school aid were not enough to compensate. Property tax rates rose as a result, which increased tax cap credit losses, further eroding revenues.

Rural County Capacities and Costs. Population fell in rural counties, but costs did not fall proportionately. Costs per person increased, road costs in particular. The rising base rate of farmland increased capacity more than costs, increasing the positive capacity-cost index. The maximum levy limits required rural counties to use this added capacity to reduce property tax rates. Rates were low enough that they experience little loss from tax cap credits.

Capacities and Costs Where Manufacturing Was Not Replaced. The capacity-cost index became more negative in counties that lost manufacturing jobs without replacing them with other employment. Capacity grew slowly, and costs were spread over declining populations. As in counties with rapid population growth, this resulted in higher tax rates and more tax cap credit losses.

A Note on the COVID-19 Recession

The capacity-cost analysis is based on budgets and revenues for 2018, which look very different from conditions that local governments are experiencing in 2020. The COVID-19 recession will have significant effects on local government budgets.

The recession will reduce capacity. The main effects on property and income taxes will occur for tax collections in 2022. Property values will fall or grow slowly in 2020. There will be less construction, fewer equipment purchases, and property prices may fall. Assessments in 2021 will record these changes, and taxes in 2022 will be based on assessments in 2021. Likewise, incomes will fall in 2020, which will affect local income tax collections in 2021 (that is, W-2 forms for 2021 taxes will reflect earnings in 2020). The state will use collections through the end of June in 2021 to set LIT distributions in 2022.

State aid to schools may be limited by reversions in 2020 and 2021. The state may cut spending below appropriations as revenues fall below what is needed to fund the current biennial budget. The 2022-23 biennial budget will be based on revenue forecasts in December 2020 and April 2021, which are likely to be pessimistic. State aid to schools will grow slowly if at all. State aid for road maintenance to counties, cities and towns has already dropped, with the drop in motor fuel purchases.

These conditions will affect every county, but those with negative capacity-cost indexes will be hit hardest. If assessed value grows slowly or falls in 2021, tax rates in 2022 will rise more than usual. The capacity-cost analysis shows that counties with capacities below costs tend to have higher property tax rates, and so have higher circuit breaker tax cap credit losses. Increases in tax rates will increase tax cap credit losses. Counties with negative capacity-cost indexes will collect a smaller share of their property tax levies as a result of the recession.

Counties with positive capacity-cost indexes tend to have lower property tax rates and lower tax cap credit losses. Most taxpayers will still have tax bills below their caps even with a rise in property tax rates. Counties with capacities above costs will lose less property tax revenue to the recession.

The COVID-19 recession will reduce the capacity of local governments in every Indiana county. Those that are already struggling to deliver services with limited tax bases will be affected most harshly.

Capacity-Cost Indexes for Indiana Local Governments: 2002 and 2018

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Calculation of Capacity-Cost Indexes

Local governments have the capacity to raise revenue. They tax the assessed value of property within their borders. They tax the incomes of their residents. They receive state school support based on the number and characteristics of their pupil population in the school funding formula. They receive state road aid based on road miles and vehicle registrations in the road funding formula. And they raise revenue from dozens of smaller sources. A local government's capacity to raise revenue varies with their property and income tax bases, and with their characteristics in the state funding formulas.

Local governments use this revenue to pay the costs of providing services. Costs vary with the characteristics of their populations. Providing services in cities and towns is costlier than in rural areas. Cities and towns require more expensive police and fire protection, for example. K-12 education is the most expensive service that governments provide. Places with more school children will face higher costs. Other functions of local governments depend on the number of people to be served.

Some services depend on land area as well as population. Roads must reach all places in a county no matter how many people are served. Roads in cities and towns are more expensive than rural roads. Added traffic requires added lanes, more traffic control and more maintenance.

Four indicators give a rough measure of the capacity of local governments to raise revenue: taxable assessed value, taxable income, state school support and state road aid. Four indicators give a rough measure of the costs of service provision by local governments: city and town population, school enrollment, miles of roads in the county and miles of roads in cities and towns.

The capacity-cost index is a way to combine these eight measures into a single measure that compares revenue capacity to service costs. This is done by measuring the capacity and costs at statewide average tax rates and appropriations.

Table 1 provides an example of the calculation of the capacity-cost index for Floyd County, and for the average Indiana county, using data from 2018. Floyd has a population of 77,781, near the average of Indiana counties (Note that the average population of an Indiana county is quite large, because of the few very large population counties—Marion, Lake, Allen, Hamilton and so forth. The median or middle population of Indiana counties is 34,330.)

Revenue capacity is shown in the top half of Table 1. The state average property tax rate, after local income tax credits and tax cap credits are subtracted, is \$2.0946 per \$100 assessed value. Floyd County's net assessed value (after deductions and exemptions) is \$41,079 per person. This is about 10% less than the assessed value in the average county. If Floyd local governments taxed their assessed value at the statewide average tax rate, the resulting revenue would be \$860 per person.

Likewise, the average local income tax rate, including spending and property tax relief rates, is 1.527%. Floyd County's taxable income is \$30,641 per person, which is about one-third higher than the average

county's income. At the statewide average rate, Floyd would raise \$468 per person from this income tax base.

Table 1. Calculation of Capacity-Cost Indexes for 2018.

County	Floyd County		Average County		
Population	77,781		72,738		
CAPACITY					
Capacity Category	Tax Rate or Factor	Tax Base	Revenue Capacity	Tax Base	Revenue Capacity
Net Assessed Value	2.0946	41,079	860	45,304	949
Taxable Income	1.527%	30,641	468	23,923	365
State School Aid	Actual		984		990
State Road Aid	Actual		83		103
Other Revenue	482		482		482
Revenue Capacity	2,877			2,890	
COST					
Cost Category	Cost Factor	Cost Basis per Person	Service Cost	Cost Basis per Person	Service Cost
City/Town Population	1,045	52.5%	549	66.7%	697
School Enrollment	10,683	14.7%	1,574	15.0%	1,601
County Road Miles/1000	8,129	4.5	36	9.8	79
City Road Miles/1000	18,319	2.4	44	3.0	54
Total Population	458		458		458
Service Cost	2,661			2,890	
CAPACITY-COST INDEX			216	-	
PERCENT OF STATE AVERAGE			7.5%	0.0%	

Note that the revenue capacity of property and income taxes does not depend on the taxing decisions made by Floyd local governments. Actual Floyd tax rates do not enter the calculation. Thus, the revenue capacity depends only on the economic characteristics of the county—property values and incomes. (Over longer periods of time tax and spending decisions by local governments may influence economic development.) This is the idea behind revenue capacity: what are the resources available to support local government services, regardless of the policies adopted by the local governments.

In a sense, the state school aid and state road aid formulas are themselves index calculations. The school formula applies per-pupil dollar amounts to the demographic characteristics of the school-age population. The number of pupils, number of lower-income pupils, special education pupils, gifted and talented pupils and so forth are multiplied by formula dollar-per-pupil amounts to determine how much state school aid the districts in the county receive. The state-determined dollar-per-pupil amounts serve the same purpose as state average tax rates for property and income taxes. Likewise, state road aid is based on

formulas that include road miles, vehicle counts and population. Floyd County's school districts receive state aid very near the average county. Floyd's state road aid is less than average.

The index assumes that other revenue sources, such as motor vehicle excise taxes, charges, fines and fees, or interest earnings, depend on the population of the county. These revenue sources average \$482 per person statewide, which is only 17% of the average county's revenue capacity. Property taxes, income taxes, school aid and road aid dominate local revenues.

Floyd County's total revenue capacity is \$2,877 per person, almost identical to the average county's capacity. Floyd's higher taxable income makes up for the lower assessed value and road formula revenues.

Service costs are shown in the lower half of Table 1. Service costs are based on average appropriations by particular unit types, or for particular purposes. The average appropriation of cities and towns, and of the special districts that are associated with cities and towns, is \$1,045 per person. City and town appropriations exclude funds for road and bridge construction and maintenance (like the local road and street fund). In Floyd County, the per-person appropriation is multiplied by the 2018 Census estimate of population in incorporated cities and towns, then divided by county population. This is equivalent to multiplying state average city and town appropriation per person by the percentage of Floyd's population in cities and towns, 52.5%. Since this is less than the average county's percentage of 66.7%, Floyd's city and town service costs are lower than average.

Likewise, the state average appropriation by school corporations is \$10,683 per pupil. In Floyd County, school enrollment is 14.7% of the county population, slightly less than the average county percentage of 15.0%. Floyd's school enrollment service costs are slightly less than average.

Road costs depend more on the miles of road to be maintained than on population. City and town roads are costlier to maintain. The appropriations for county and city/town road funds average \$8,129 per mile and \$18,319 per mile, respectively. These figures are multiplied by road miles per person. In Table 1 these figures are shown as road miles per 1,000 people, so they are easier to read. Floyd County has 4.5 county road miles per 1,000 people, and 2.4 city road miles per 1,000 people. Both are less than average road miles, which makes Floyd's road service costs lower than average.

County non-road fund appropriations, township appropriations and library appropriations are delivered to the whole population of the county, at \$458 per person. This is only 16% of total costs, so costs of cities and towns, school children and roads dominate local costs.

For Floyd County, total service costs are \$2,661 per person, \$229 less than the average county's costs. This is mainly because Floyd has fewer people in cities and towns, but also because the county has fewer road miles, perhaps because of its small land area.

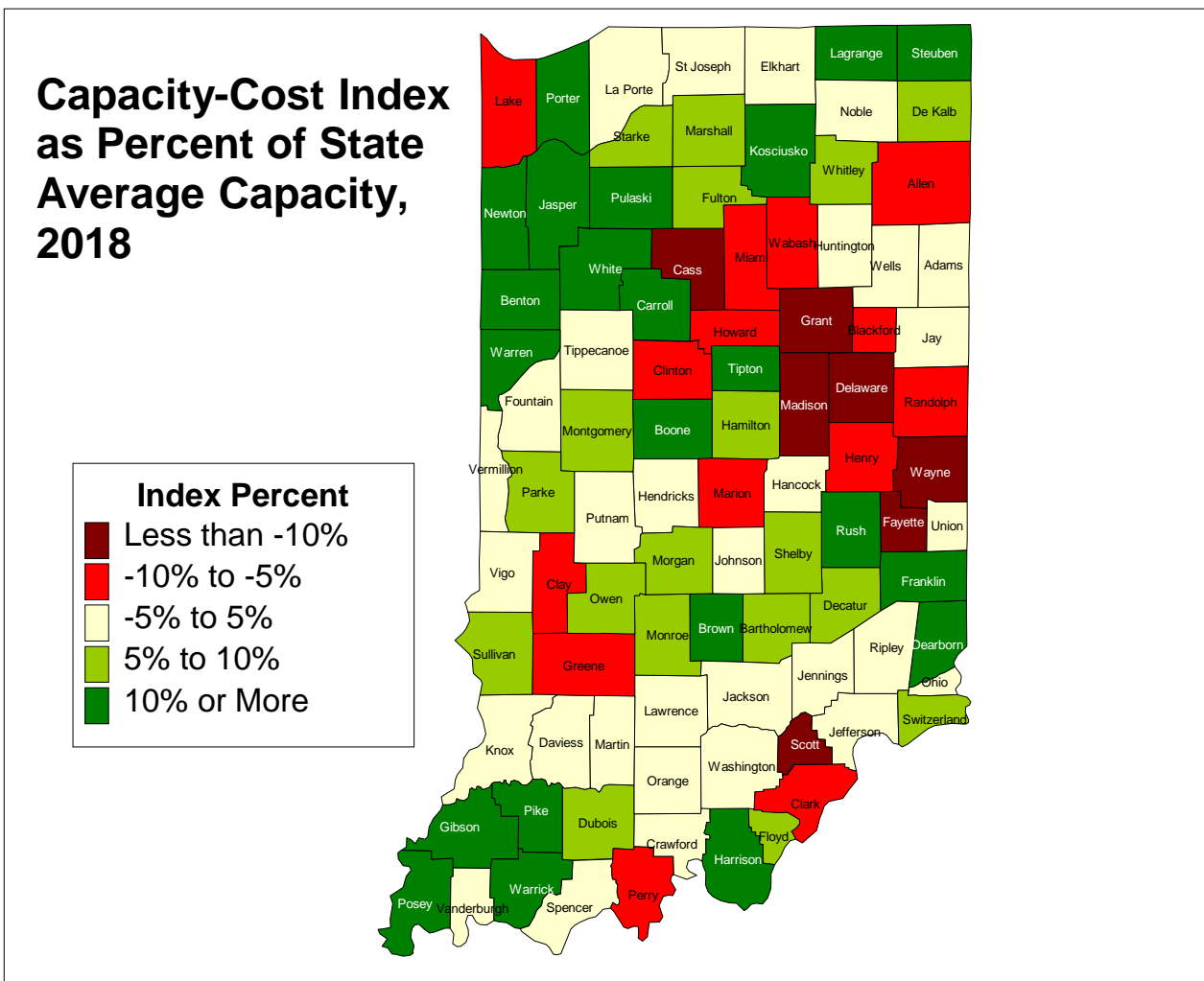
The difference between revenue capacity and service costs is the capacity-cost index. Floyd has a positive number, \$216 per person, which is 7.5% of the \$2,890 revenue capacity and service costs of the average county. This means that, at statewide average tax rates, with current funding formulas, the local governments in Floyd County could more than meet the costs of delivering the average level of services to their populations. Floyd local governments can either provide the average level of services at lower tax rates, or provide a greater-than-average level of services at average tax rates.

Detailed methods are reported in the appendix.

Capacity-Cost Indexes in 2018

The map in Figure 1, and the tables in the appendix, show the results of the capacity-cost calculations for Indiana counties in 2018. Capacity-cost indexes are shown as a percent of the county average cost and capacity per person (\$2,890), which will be useful for comparisons to 2002 below. The map reveals some regional patterns.

Figure 1.



Rural Counties. Many rural counties have positive indexes of 5% or more of average capacity and cost. Table 2 compares the eight characteristics of two of these counties, Rush on the east side of the state, and Warren on the west side, as well as the average county.

Each has revenue capacities well above the state average, mostly because of large net assessed values per person. A large part of the taxable property in these counties is farmland. Farmland is valued based on a statewide base rate per acre, which is the same whether a county's population is large or small. Both

Rush and Warren have small populations, so the value of this farmland per person is high. Both counties have large state road aid per person. In a sense, road aid per person is the inverse of traffic volume: roads are supported by the state formula based partly on mileage, even if few drivers use the roads. In addition, Warren County is treated well by the school funding formula. Both counties' taxable incomes are below average, which is a characteristic of many rural counties.

Table 2. Calculation of Capacity-Cost Indexes in Selected Rural Counties.

County	Rush County		Warren County		Average County				
Population	16,663		8,263		72,738				
CAPACITY									
Capacity Category	Tax Rate or Factor	Tax Base	Revenue Capacity	Tax Base	Revenue Capacity	Tax Base	Revenue Capacity		
Net Assessed Value	2.0946	61,097	1,280	81,328	1,703	45,304	949		
Taxable Income	1.527%	19,629	300	21,581	330	23,923	365		
State School Aid	Actual		952		1,309		990		
State Road Aid	Actual		243		337		103		
Other Revenue	482		482		482		482		
Revenue Capacity			3,256		4,161		2,890		
COST									
Cost Category	Cost Factor	Cost Basis per Person	Service Cost	Cost Basis per Person	Service Cost	Cost Basis per Person	Service Cost		
City/Town Population	1,045	42.6%	445	34.9%	364	66.7%	697		
School Enrollment	10,683	14.7%	1,569	19.9%	2,122	15.0%	1,601		
County Road Miles/1000	8,129	44.9	365	66.2	538	9.8	79		
City Road Miles/1000	18,319	2.3	42	2.9	53	3.0	54		
Total Population	458		458		458		458		
Service Cost			2,879		3,535		2,890		
CAPACITY-COST INDEX							376	626	-
PERCENT OF STATE AVERAGE							13.0%	21.7%	0.0%

These rural county service costs are not particularly low, on a per person basis. Rush has costs similar to the state average. Warren has higher costs, mainly due to the large number of school children as a share of the population (which explains the large amount of revenue from the school funding formula). Both have relatively small city/town populations, which holds down service costs. County road miles per person are particularly high, again an inverse of traffic volume.

It may be surprising that rural counties do not have lower than average costs, with so few people in cities and towns. But counties with small populations could face diseconomies of scale, meaning costs per person are higher in very small counties. There is a floor on the provision of some services. Some level must be provided in every county, no matter the population. Roads must make the land area of the whole county accessible, so in counties with small populations road costs per person are particularly high.

East-North-Central Corridor. All of the counties in the east-north-central corridor have negative capacity-cost indexes, from north-central Cass and Miami Counties to east-central Fayette and Wayne Counties. Six of the seven counties with indexes less than -10% of average cost and capacity are in this corridor. (Only Scott County is not in this corridor.)

Table 3. Calculation of Capacity-Cost Indexes in Selected East-North-Central Counties.

County	Fayette County			Grant County		Average County	
Population	23,047			65,936		72,738	
CAPACITY							
Capacity Category	Tax Rate or Factor	Tax Base	Revenue Capacity	Tax Base	Revenue Capacity	Tax Base	Revenue Capacity
Net Assessed Value	2.0946	30,127	631	31,915	668	45,304	949
Taxable Income	1.527%	15,658	239	16,767	256	23,923	365
State School Aid	Actual		1,008		1,027		990
State Road Aid	Actual		136		121		103
Other Revenue	482		482		482		482
Revenue Capacity			2,496		2,554		2,890
COST							
Cost Category	Cost Factor	Cost Basis per Person	Service Cost	Cost Basis per Person	Service Cost	Cost Basis per Person	Service Cost
City/Town Population	1,045	55.7%	582	69.6%	727	66.7%	697
School Enrollment	10,683	15.2%	1,622	15.2%	1,628	15.0%	1,601
County Road Miles/1000	8,129	16.3	133	12.1	98	9.8	79
City Road Miles/1000	18,319	3.0	54	4.3	79	3.0	54
Total Population	458		458		458		458
Service Cost			2,849		2,991		2,890
CAPACITY-COST INDEX			(353)	(437)		-	
PERCENT OF STATE AVERAGE			-12.2%	-15.1%		0.0%	

Two of these counties are shown in Table 3, Fayette and Grant. Both have costs not much different from the state average. It is the low revenue capacity that creates the negative indexes. Each has net assessed value per person about one-third smaller than the average county. Each has taxable income at least 30% lower than average. Each does slightly better than average in the state aid formulas, but not nearly enough to compensate for the smaller tax bases.

A hypothesis about the counties in this corridor is that they used to be centers of automobile manufacturing. Starting in the late 1970's, manufacturing jobs and businesses began to disappear, due to changes in technology and relocation of manufacturing activity nationally and world-wide. Incomes and property values grew slowly or declined. Population dropped too, but not as much. As a result service costs rose faster than capacity, so that by 2018 the balance was negative. The counties in the corridor cannot support average service costs with average tax rates. Tax rates must be higher, or service provision lower.

Suburban and Urban Counties. In several cases shown on the map, suburban counties have positive capacity-cost indexes, while neighboring urban counties have negative indexes. Compare Lake to Porter, Allen to DeKalb or Whitley, and Marion to Boone, Hamilton, Morgan or Shelby. Vanderburg has a near-zero index, but all of its surrounding counties are positive. Marion and Boone are shown in Table 4. Boone has a large positive capacity-cost index. Marion's index is negative.

Table 4. Calculation of Capacity-Cost Indexes in Selected Suburban and Urban Counties.

County	Boone County		Marion County		Average County		
Population	66,999		954,670		72,738		
CAPACITY							
Capacity Category	Tax Rate or Factor	Tax Base	Revenue Capacity	Tax Base	Revenue Capacity	Tax Base	Revenue Capacity
Net Assessed Value	2.0946	73,657	1,543	42,672	894	45,304	949
Taxable Income	1.527%	44,991	687	22,631	346	23,923	365
State School Aid	Actual		1,145		1,004		990
State Road Aid	Actual		118		63		103
Other Revenue	482		482		482		482
Revenue Capacity			3,974		2,789		2,890
COST							
Cost Category	Cost Factor	Cost Basis per Person	Service Cost	Cost Basis per Person	Service Cost	Cost Basis per Person	Service Cost
City/Town Population	1,045	82.1%	857	100.0%	1,045	66.7%	697
School Enrollment	10,683	19.0%	2,028	13.9%	1,486	15.0%	1,601
County Road Miles/1000	8,129	11.2	91	2.0	16	9.8	79
City Road Miles/1000	18,319	4.1	75	1.7	31	3.0	54
Total Population	458		458		458		458
Service Cost			3,509		3,036		2,890
CAPACITY-COST INDEX			465	(248)		-	
PERCENT OF STATE AVERAGE			16.1%	-8.6%		0.0%	

Boone County has both capacity and costs much higher than the state average county. Both net assessed value and taxable income are high in Boone, and state school aid responds to the large population of school children. Boone's costs are high because of a large share of city/town population, and that large share of school children.

No county in Indiana really is comparable to Marion, with a population almost double the next largest county, and its unique UniGov local government structure. This is not apparent on a per person basis, though. Marion's revenue capacity is a little lower than average, and the county's costs are a little higher. Both net assessed value and taxable income are lower than average, by less than 10% in each case. School aid is near average, and road aid is low (again, the inverse of traffic volume). In total capacity is \$101 per person lower than average.

Marion's costs are higher than average, mainly because all of its population is in cities or towns. This is compensated to some degree by the small proportion of school children in the population, and the relatively low "inverse-of-traffic" road costs. UniGov makes the division of road costs between county and city problematic, but in total road costs per person are lower than average. Total service costs are \$146 per person above average.

Compared to the average county, Marion's negative capacity-cost index are nearly equal parts lower capacity and higher costs.

Consequences in 2018

A positive capacity-cost index implies that the local governments in a county can provide the average cost services at lower-than-average tax rates. Or, they can provide greater than average cost services at average tax rates.

Figure 2.

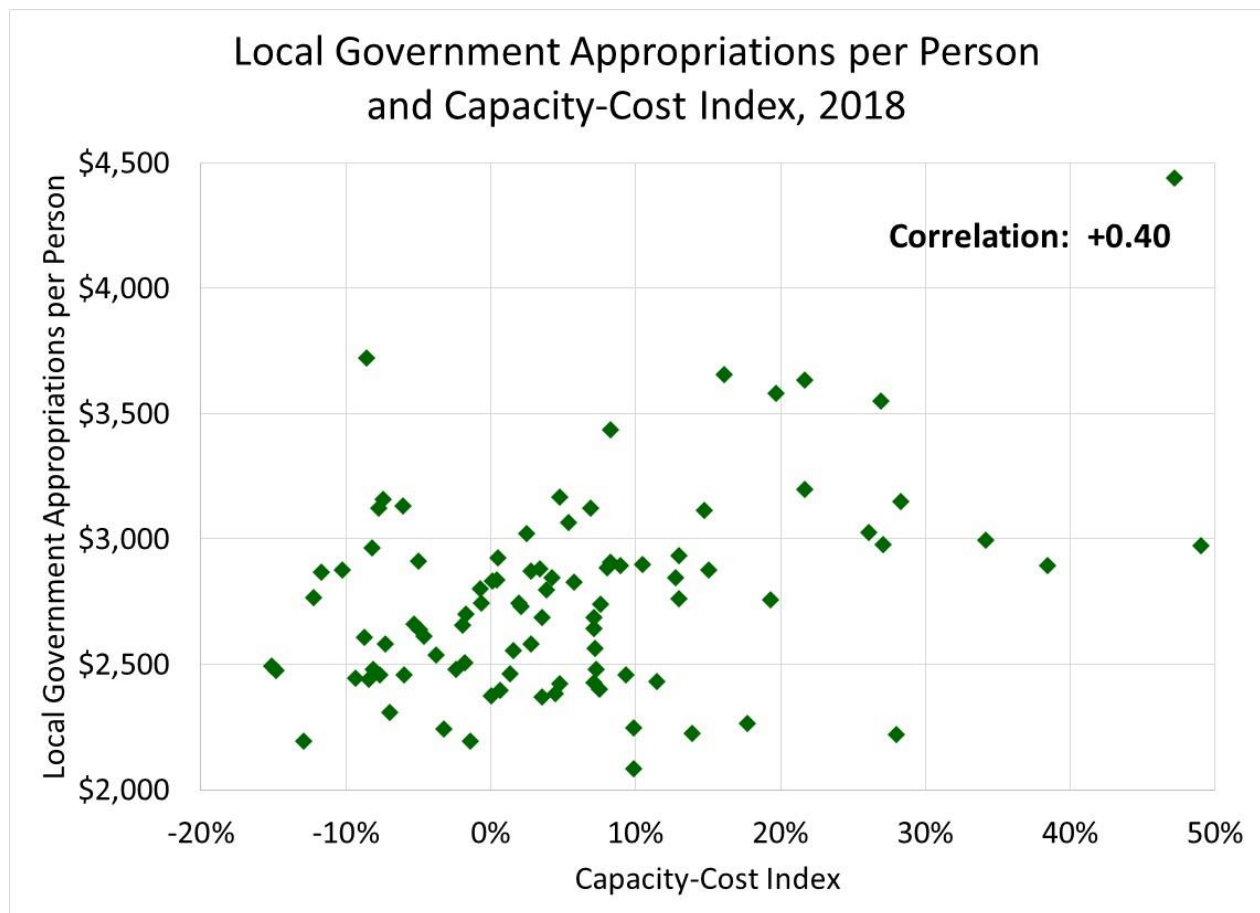
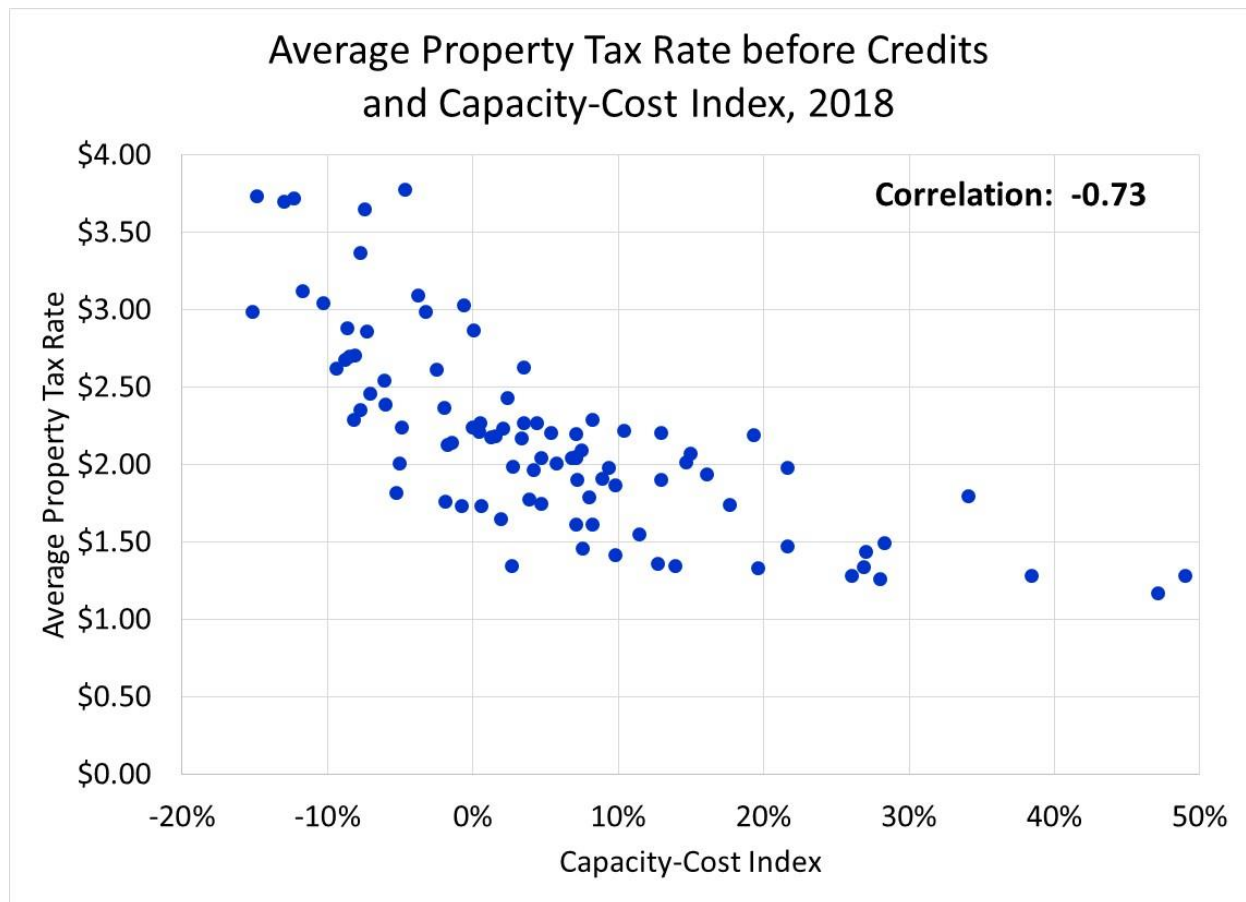


Figure 2 shows the actual appropriations per person for all the local governments in each of the 92 counties, against the capacity-cost indexes. There is a positive correlation, and a modest upward slope to the observations. To some degree, counties with greater capacity relative to costs appear to take advantage by providing more services, or at least spending more on services. As seen below, much of this

correlation is due to rural counties, which had high assessed values per person and high costs per person in 2018.

Figure 3 shows a stronger correlation between the capacity-cost indexes and the county average property tax rates. These are the certified rates, unadjusted for local income tax or tax cap credits. Counties with higher capacities relative to costs tend to levy lower property tax rates. Those with high costs relative to capacity have higher property tax rates.

Figure 3.



There is evidence for both relationships, though the correlation with tax rates is stronger. Where counties have larger capacities relative to their costs, they can provide services at lower tax rates. Where counties have smaller capacities relative to costs, they must charge higher tax rates.

The relationship between the capacity-cost index and property tax rates may be the result of the state-imposed maximum levy limits. The maximum levy was established long ago, during the Bowen administration in the mid-1970s. Since 2002 the “maximum levy growth quotient” has allowed the maximum levy to increase by the six-year average in Indiana non-farm income growth. Most local governments set their levies at or near the maximum. Tax rates are recalculated each year by dividing the levy by assessed value.

The maximum levy largely prevents local governments from using more rapid growth in assessed value to add appropriations for additional services, when local governments are at their maximum levies.

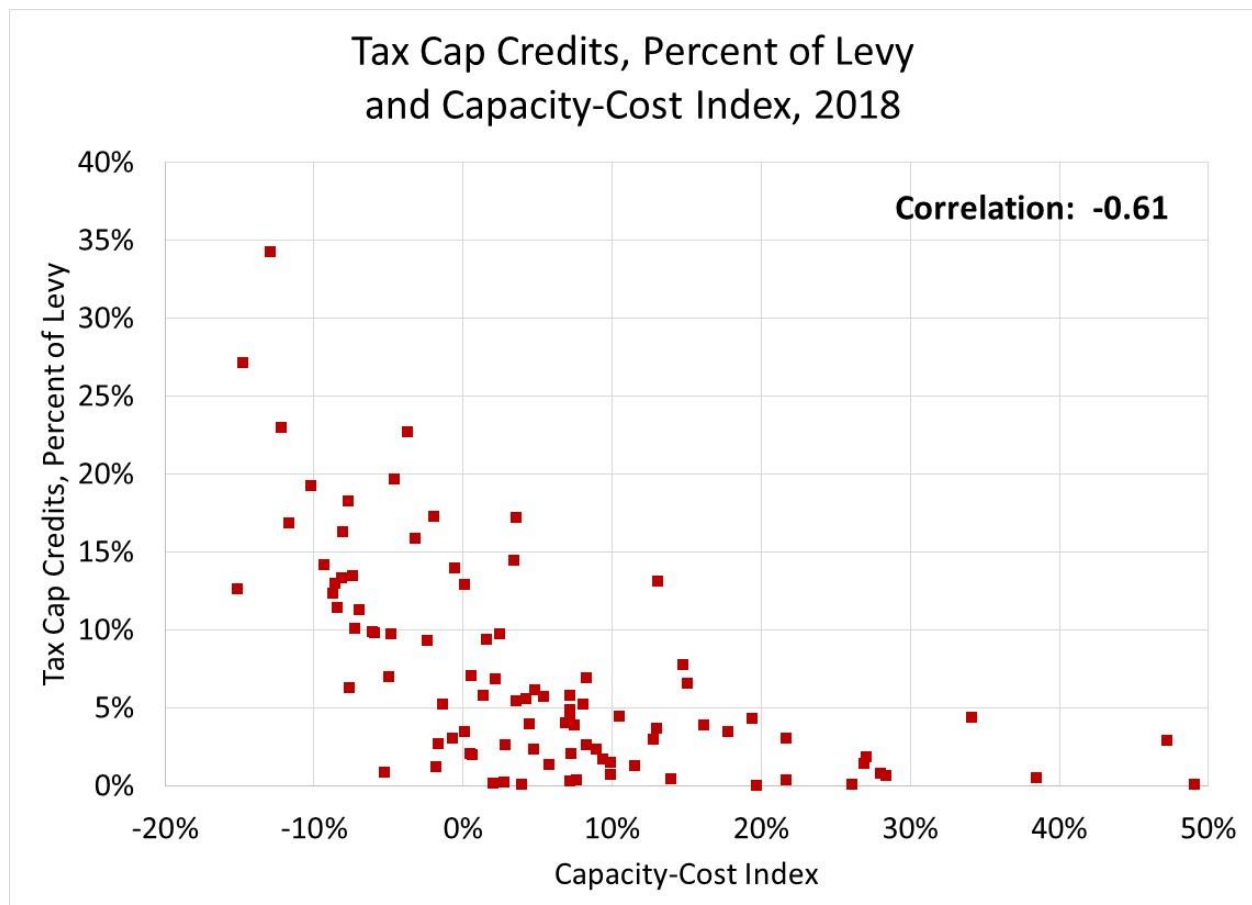
Assessed value may grow rapidly, but the maximum levy grows only as fast as state income. Instead, growth in assessed value tends to reduce tax rates. When assessed value grows slowly, local governments may still increase their levies at the growth quotient rate. Tax rates increase.

The primary determinant of the Constitutional tax cap credits, known as circuit breaker credits, is the tax rate that applies to the taxpayer's property. Higher tax rates are more likely to result in tax bills above a property's cap. This generates a tax cap credit, which is a part of the tax bill that the taxpayer does not pay, and a part of the tax levy that the local governments do not receive. Statewide, tax cap credits reduce tax bills and property tax revenues by about 11%.

Counties with low revenue capacity relative to service costs generally have higher property tax rates. Figure 4 shows that this results in higher tax cap credit revenue losses as a percentage of the property tax levy. All but one of the counties with capacity-cost index percentages less than -10% have tax cap credit losses of 10% or more. All but three of the counties with capacity-cost indexes greater than 10% have tax cap credit losses of less than 5%.

The tax cap credits worsen the budget stress faced by local governments with relatively low revenue capacity. (Note that the correlation coefficient of -0.61 is not stronger partly because the property tax cap credit percent cannot be less than zero. If the correlation is limited to the 69 counties with capacity-cost indexes less than 10%, the correlation is -0.71.)

Figure 4.



Capacity-Cost Indexes in 2002

Why do some counties have positive capacity-cost indexes, and others negative indexes? Comparisons across counties in a single year give part of the answer. Comparisons across years can add to the explanations.

Capacity-cost indexes are calculated for Indiana county governments for 2002. The big policy changes resulting from the Town of St. John Supreme Court decision, which forced changes in the property tax assessment system, began in 2003. The year 2002 was the last under the old system, so the year 2002 is appropriate for comparison.

Table 4. Calculation of Capacity-Cost Indexes for 2002.

County	Floyd County		Average County		
Population	71,407		66,913		
CAPACITY					
	Tax Rate	Revenue		Revenue	
Revenue Category	or Factor	Tax Base	Capacity	Tax Base	Capacity
Net Assessed Value	3.5697	26,534	947	29,054	1,037
Taxable Income	0.825%	20,131	166	16,637	137
State School Aid	Actual		551		557
State Road Aid	Actual		45		56
Other Revenue	470		470		470
Revenue Capacity	2,180			2,258	
COST					
	Cost	Cost Basis	Service	Cost Basis	Service
Cost Category	Factor	per Person	Cost	per Person	Cost
City/Town Population	725	56.2%	408	65.8%	477
School Enrollment	7,962	15.5%	1,237	16.1%	1,285
County Road Miles/1000	5,133	4.31	22	10.83	56
City Road Miles/1000	13,085	2.33	30	2.59	34
Total Population	406		406		406
Service Cost	2,103			2,258	
CAPACITY-COST INDEX			76	(0)	
PERCENT OF STATE AVERAGE			3.4%	0.0%	

Table 4 shows the 2002 capacity and cost calculations for Floyd County and the average county, for comparison to the 2018 figures in Table 1. The capacity calculation is in the top half of Table 4. The average property tax rate after state property tax replacement and homestead credits was \$3.57 per \$100 assessed value. The average local income tax rate was 0.825%. In 2002, as in 2018, Floyd County had somewhat lower than average net assessed value per person, but higher than average taxable income.

And, in general, there was less “color” on the 2002 map. In 2002, 45 counties had indexes close to zero, between -5% and 5%. In 2018, the number is 31.

Policy, Economic and Demographic Changes, 2002 to 2018

Change in capacities and costs between 2002 and 2018 resulted from a combination of changes in Indiana local government tax and budget policy, and economic and demographic changes. Table 5 shows the calculations for the average county for 2002 and 2018, and the percentage changes between these years.

Table 5. Comparison of Capacities and Costs for the Average County in 2002 and 2018.

County	Average County								
Population	66,913			72,738			8.7%		
CAPACITY	2002			2018			Percent Change		
Capacity Category	Tax Rate or Factor	Tax Base	Revenue Capacity	Tax Rate or Factor	Tax Base	Revenue Capacity	Tax Rate or Factor	Tax Base	Revenue Capacity
Net Assessed Value	3.5697	29,054	1,037	2.0946	45,304	949	-41.3%	55.9%	-8.5%
Taxable Income	0.825%	16,637	137	1.527%	23,923	365	85.0%	43.8%	166.1%
State School Aid	Actual		557	Actual		990			77.6%
State Road Aid	Actual		56	Actual		103			84.2%
Other Revenue	470		470	482		482	2.5%		2.5%
Revenue Capacity			2,258			2,890			28.0%
COST									
Cost Category	Cost Factor	Cost per Person	Service Cost	Cost Factor	Cost per Person	Service Cost	Cost Factor	Cost per Person	Service Cost
City/Town Population	725	65.8%	477	1,045	66.7%	697	44.0%	1.3%	45.9%
School Enrollment	7,962	16.1%	1,285	10,683	15.0%	1,601	34.2%	-7.2%	24.5%
County Road Miles/1000	5,133	10.8	56	8,129	9.8	79	58.4%	-9.9%	42.7%
City Road Miles/1000	13,085	2.6	34	18,319	3.0	54	40.0%	14.8%	60.7%
Total Population	406		406	458		458	458		13.0%
Service Cost			2,258			2,890			28.0%

Revenue Capacity. The top half of Table 5 shows changes in revenue capacity. The revenue capacity of the property tax decreased by 8.5% on average between 2002 and 2018. This was a combination of a large increase in the tax base, net assessed value, and an even larger decrease in the average tax rate after credits. The tax base changes were most influenced by the Indiana Supreme Court’s Town of St. John decision in December 1998, which required assessments for property taxes to be based on “objective measures of property wealth.” Indiana moved from “true tax value” to “market-value-in-use” in the reassessment of 2002-pay-2003. Assessments increased for older homes, rental housing and farmland particularly. For the next decade property tax reforms were many and major.

Some changes affected assessments beyond market-value-in-use assessment. Indiana introduced annual adjustments in assessed values for real property in 2008 (2007 for farmland). Annual changes in property selling prices were incorporated into assessed values. Trending effectively replaces the old reassessment cycle, adjusting values annually rather than at six to ten year intervals. Over long periods (such as the 16 years from 2002 to 2018), trending may not cause big differences in assessments.

However, changes in the assessment of farmland, and its trending, caused important changes in the revenue capacity of rural counties. Farmland is assessed at a statewide base rate per acre with adjustments for soil productivity and other features. Until pay-2003 the base rate had been negotiated between agricultural interests and the old State Tax Board, and had changed very little in the prior 22 years, despite big swings in actual farmland values.

Starting for taxes in 2003 the farmland base rate was set using a capitalization formula, based on rents, crop yields, commodity prices, costs and interest rates. The formula was changed several times between 2003 and 2018. Trending began for the base rate in 2007, just as commodity prices and rents began to rise and interest rates began to fall. Actual farmland values increased, and so did assessed values. Actual values peaked in 2014, and after 2015 falling commodity prices and rents reduced farmland assessed values. Still, in 2018 farmland assessments are still considerably higher than they were in 2007. The gross assessed value of agricultural property (including buildings) grew 71% from 2007 to 2018, compared to total gross assessed value growth of 18%.

Assessment and taxation of business inventories were phased out between 2003 and 2007. This required a Constitutional amendment, passed in 2004. The amendment also approved the large standard deduction for homesteads, set at \$35,000 with the 2003 reassessment, and raised to \$45,000 with the 2008 reforms. Those reforms introduced the 35% supplemental homestead deduction as well. These changes reduced taxable assessed value, but not enough to reverse the overall upward trend.

Some changes affected levies and rates. The state established a new formula for calculating maximum levy growth in pay-2003. The old assessed value growth quotient (AVGQ) was based on local assessed value growth, with upper and lower limits. The new quotient was based on the six-year average of statewide non-farm income growth. The new formula resulted in lower growth limits.

The property tax levy for the school general fund was eliminated, and the revenue was (mostly) replaced with added state aid for 2009 budgets. A 2010 Constitutional amendment established the circuit breaker tax caps. Limits were imposed on tax bills, based on percentages of gross assessed value (before deductions). Some limits had been introduced earlier in statute. Taxes were limited to 1% of homestead assessed value, 2% of other residential and farmland assessed value, and 3% for business real and personal property assessed value.

Referenda were required for larger capital projects that would be financed with debt service property tax rates, beginning in 2008. This replaced the old petition-remonstrance system. In addition, beginning in 2009 many more school corporations began asking voters for additional property tax levies for operating costs. This was the only major change that worked to increase property tax levies rates.

These enormous property tax changes are summarized by two numbers in the capacity-cost calculations shown in Table 5. The average tax base, net assessed value, increased 55.9% from 2002 to 2018. Market value in use assessment, trending and the farmland capitalization formula made assessments more responsive to changes in property prices. Prices generally rose, apart from the Great Recession and recent decreases in farm land values. Higher homestead deductions meant less of the total value of

property would be subject to taxation, which kept tax base growth lower. The elimination of inventory assessments also reduced tax base growth.

The tax rate net of credits fell 41.3%. The tighter maximum levy limits, elimination of school general fund taxes, circuit breaker caps and capital projects referenda worked to reduce levies and tax rates. More frequent operating referenda pushed in the opposite direction.

Local governments are less reliant on property taxes in 2018 than they were in 2002. Property taxes accounted for 46% of revenue capacity in 2002, but only 33% in 2018.

The revenue capacity of local income taxes increased 166.1% between 2002 and 2018. This was a combination of an 85% increase in the tax rate, applied to modest growth in taxable income of 43.8% (which is 2.3% per year, on average). Again, policy changes played a role. New local option income taxes (LOITs) were introduced between 2003 and 2007, which allowed counties to raise income tax rates and use the revenue to reduce property taxes. A new local income tax option was introduced to fund public safety expenditures.

In 2018 the various local income taxes were combined into one rate, with categories of revenues to be used for different purposes. The next year an additional category was introduced, to fund county correctional facilities. The reform eliminated some rate limits on individual revenue categories, increasing the flexibility of the local income tax system.

And, throughout this period, many counties adopted new local income taxes and increased existing rates. In 2002 85 counties had local income taxes at an average rate of 0.825%. As of 2018 all 92 counties had the taxes, at an average rate of 1.527%.

The revenue capacity of state school aid rose 77.6% from 2002 to 2018. This was almost entirely due to state policy—total enrollment rose by only one percent. The biggest increase in state aid came in 2009 when the school general fund property tax levy was replaced with state support. Increases in other years depended on availability of revenue from the state budget, and were generally in line with inflation.

Changes in the funding formula were made with each new budget. The funding formula was “de-ghosted,” so that aid per pupil was based on current enrollment rather than averages of enrollment from several past years. This shifted aid towards school districts with more rapidly growing enrollment. The “complexity” aid based on the count of lower income or disadvantaged pupils increased more slowly, becoming a smaller share of the total. This shifted aid towards higher income school districts.

The revenue capacity from state road aid increased 84.2%. Motor fuel sales grew very little during this period, as high fuel prices discouraged purchases. The gasoline tax rate rose from 15 cents per gallon in 2002 to 18 cents in 2003, and remained at 18 cents through mid-2017. Special fuel tax rates were unchanged.

Most of the road aid revenue capacity increase came at the very end of this period, in 2017. Gasoline taxes rose to 28 cents per gallon, special fuel taxes rose to 48 cents per gallon, and state aid to counties, cities and towns increased substantially.

Over the 2002-2018 period, the trend for local government revenue policy was to restrict the use of property taxes, in favor of local income taxes and state schools aid. The state provided counties with more options for replacing property taxes with local income taxes, and increased the flexibility in setting LIT rates. The state replaced school general fund property taxes with added state school aid. A boost in state aid for roads came late in this period as well.

Service Costs. Local government service costs are influenced by the availability of revenue. But important changes in Indiana demographics exerted an independent influence on costs.

Service costs for the city/town population rose 45.9% from 2002 to 2018. Most of this was a 44% increase in average city/town service costs per person. This was a modest increase, 2.3% per year on average, close to the rate of inflation.

The percentage of Indiana's population in cities and towns also increased during 2002 to 2018, from 65.8% to 66.7%. Total Indiana population grew 8.7% from 2002 to 2018, while the population in cities and towns grew 10.2%. Within each county this could be the result of annexation instead of migration. City and town boundaries expand to cover more people. But population rose in 14 of 17 counties classified as urban, and population fell in 28 of 42 counties classified as rural. People did migrate from rural to urban counties. (See below for the rural-urban classifications.)

School service costs grew 24.5%. The average cost per pupil rose 34.2%, again a modest 1.9% annual increase over 16 years. School enrollment remained nearly constant at about one million pupils, while population rose by more than half-a-million. Enrollment as a percentage of the population fell from 16.1% to 15.0%. Enrollment fell in 71 counties and grew in 21. Decline or slow growth of enrollment—the most expensive cost category—helped hold down service cost increases.

Road costs also reflected the shift of population to cities and towns. Road costs rose in line with inflation. But mileage in counties fell, while mileage in cities and towns rose. Annexation may play a role, but growth in cities and towns shifted the composition of road mileage to more expensive urban roads.

Indiana local governments faced two competing trends in service costs from 2002 to 2018. Service costs grew faster because population moved towards cities and towns, and from rural to urban counties. But service costs grew more slowly because the share of school enrollment in total population decreased.

Rates and Appropriations

Unlike 2018, in 2002 there was no relationship between the capacity-cost index and local government appropriations per person. The scatter diagram in Figure 6 shows no upward pattern, and the correlation is near zero at 0.08. The positive correlation evident in 2018 (Figure 3) must have emerged after 2002.

The negative relationship between the capacity-cost index and county average property tax rates was present in 2002, as shown in Figure 7. The correlation was -0.48, less negative than the -0.73 correlation in 2018. (Note that the negative correlation is not dependent on the two outliers, which are Lake County with an \$8 tax rate, and Posey county with a 34% capacity-cost index. The correlation not including these two counties is -0.50.)

Why did the tax rate correlation grow stronger after 2002, and why did the positive correlation with appropriations appear? Here is an explanation.

Figure 6.

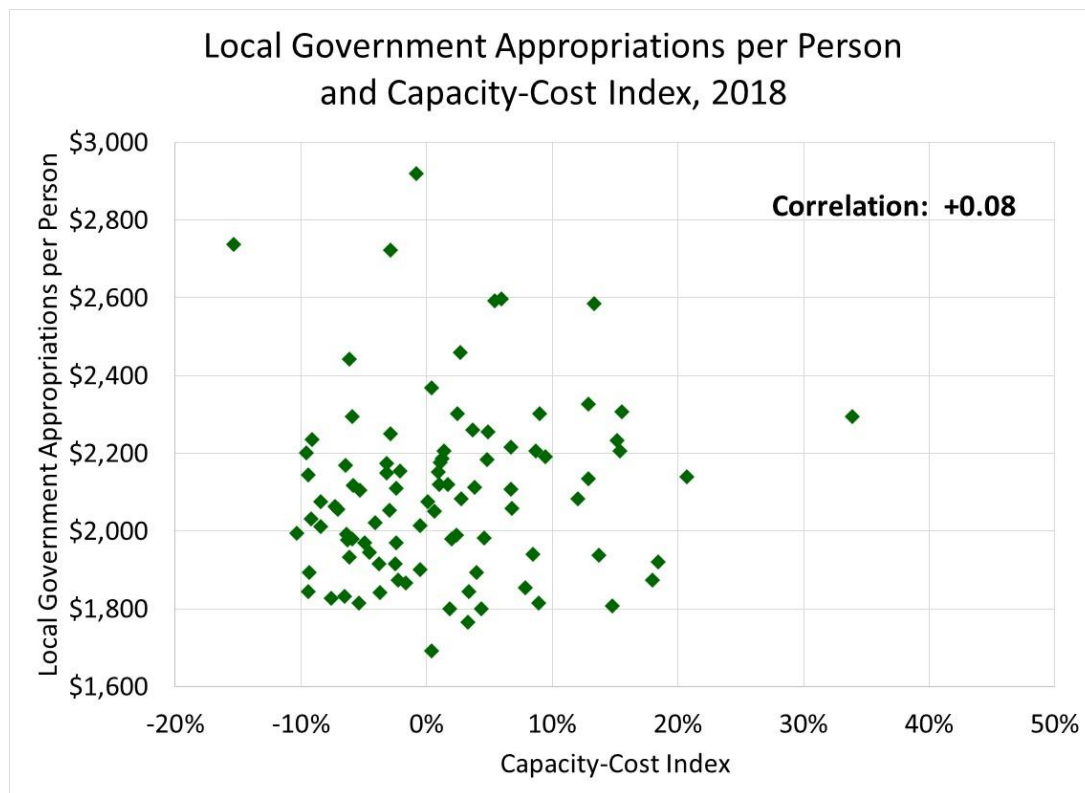
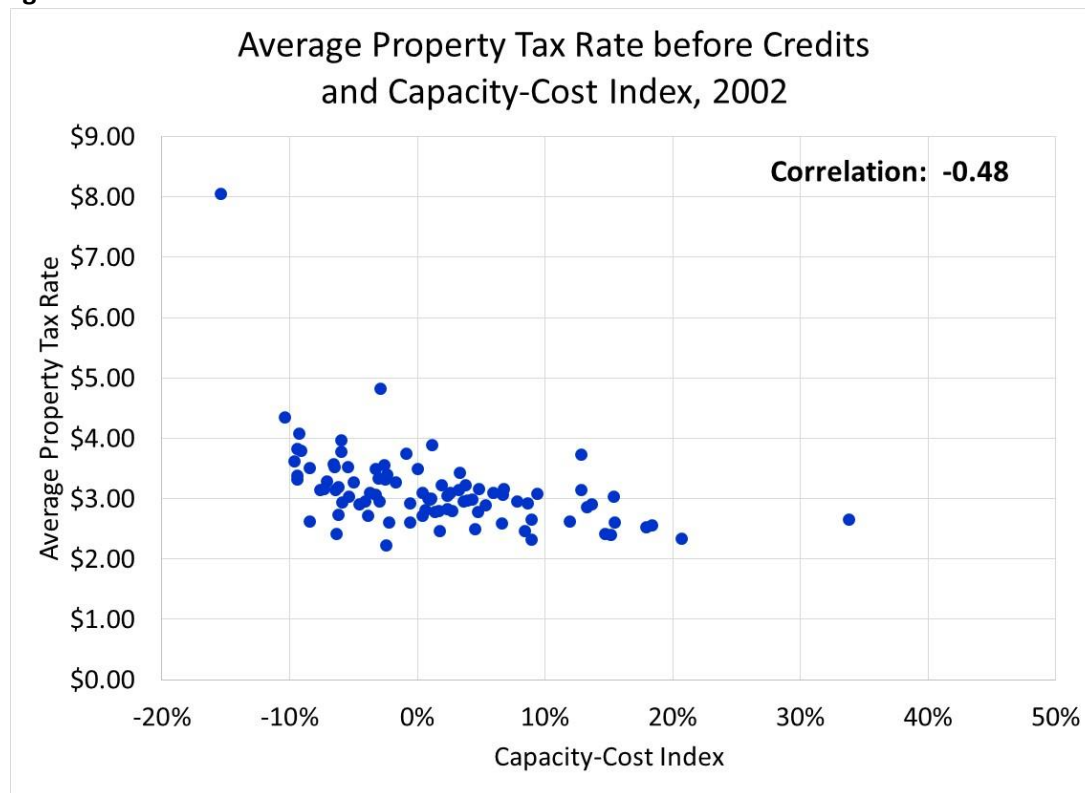


Figure 7.



Local governments might set their appropriations based on capacity, or based on costs, or a combination of the two. If appropriations rise with capacity, there would be a positive correlation between the capacity-cost index and appropriations. If appropriations rise with costs, there would be a negative relationship between the index and appropriations. This could result in a near-zero correlation, if these possibilities offset one another. We see a near-zero correlation in 2002.

Most of the positive correlation between the capacity-cost index and appropriations in 2018 comes from rural counties. The correlation for rural counties in 2018 is +0.56; the correlation for urban counties is +0.09.

Rural county population fell between 2002 and 2018. Appropriations per person tend to rise when population falls, because there are appropriations (like road maintenance) that do not fall proportionately with population. Appropriations per person rose more in rural counties than in urban counties as a result.

Meanwhile, farmland values were rising, and the new capitalization formula with trending captured that rise for assessments. The capacity-cost indexes in rural counties rose more than in urban counties. The combination of rising appropriations per person, due to falling population, and rising capacity-cost indexes, due to rising farmland assessments, created the positive correlation between capacity-cost indexes and appropriations per person in 2018.

These two factors were not present prior to 2002. Rural county population rose slightly *faster* than urban county population between 1970 and 2000. The old negotiated base rate for farmland did not rise or fall

with farmland values. There was no correlation between appropriations and the capacity-cost index in 2002.

The correlation of the index with tax rates became more negative between 2002 and 2018. In 2002 the maximum levy growth limits were tightened. Under the old AVGQ growth limit, rates could be held constant when assessed value grew. Assessed value growth up to 10% could add to levies at constant rates. Local governments had the choice to respond to assessed value growth with increased levies, or decreased rates. To some extent they chose to raise levies, so rates had a weak negative correlation with the index. With the tighter levy limits after 2002, assessed value growth above income growth—usually 4% or less—would almost always force tax rate declines. That would result in a more negative correlation with capacity.

Falling rural population and rising farmland values explain the emergence of a positive correlation between the index and appropriations between 2002 and 2018. The tightening of maximum levy growth limits explains the increasingly negative correlation between the capacity-cost index and property tax rates.

Urban, Rural and Mixed Counties

The capacity-cost maps in Figure 1 for 2018 and Figure 5 for 2002 appear to show differences among urban and rural counties. We need a way to classify counties as urban or rural to examine these differences and to compare them in 2002 and 2018. A classification developed by Ayres, Waldorf, McKendree and Holscher (2013) divides Indiana counties into three classifications, rural, rural/mixed and urban, based on total population, population per square mile, and the population of the largest city in the county. The index also includes a subjective measure, “county identity,” based on how people in each county view themselves.

The map in Figure 8 shows the county classifications. (Rural-mixed is labeled “Mixed” on the map.) There are 17 counties classified as urban, 33 counties classified as mixed and 42 counties classified as rural.

Table 6 shows the average values for the 2002 and 2018 capacity-cost indexes, and the values for three indicators which help explain the indexes and how they have changed. These are weighted averages, meaning they are the sums of the indicators for each county classification, divided by the total populations of the counties in the classifications.

Figure 8.

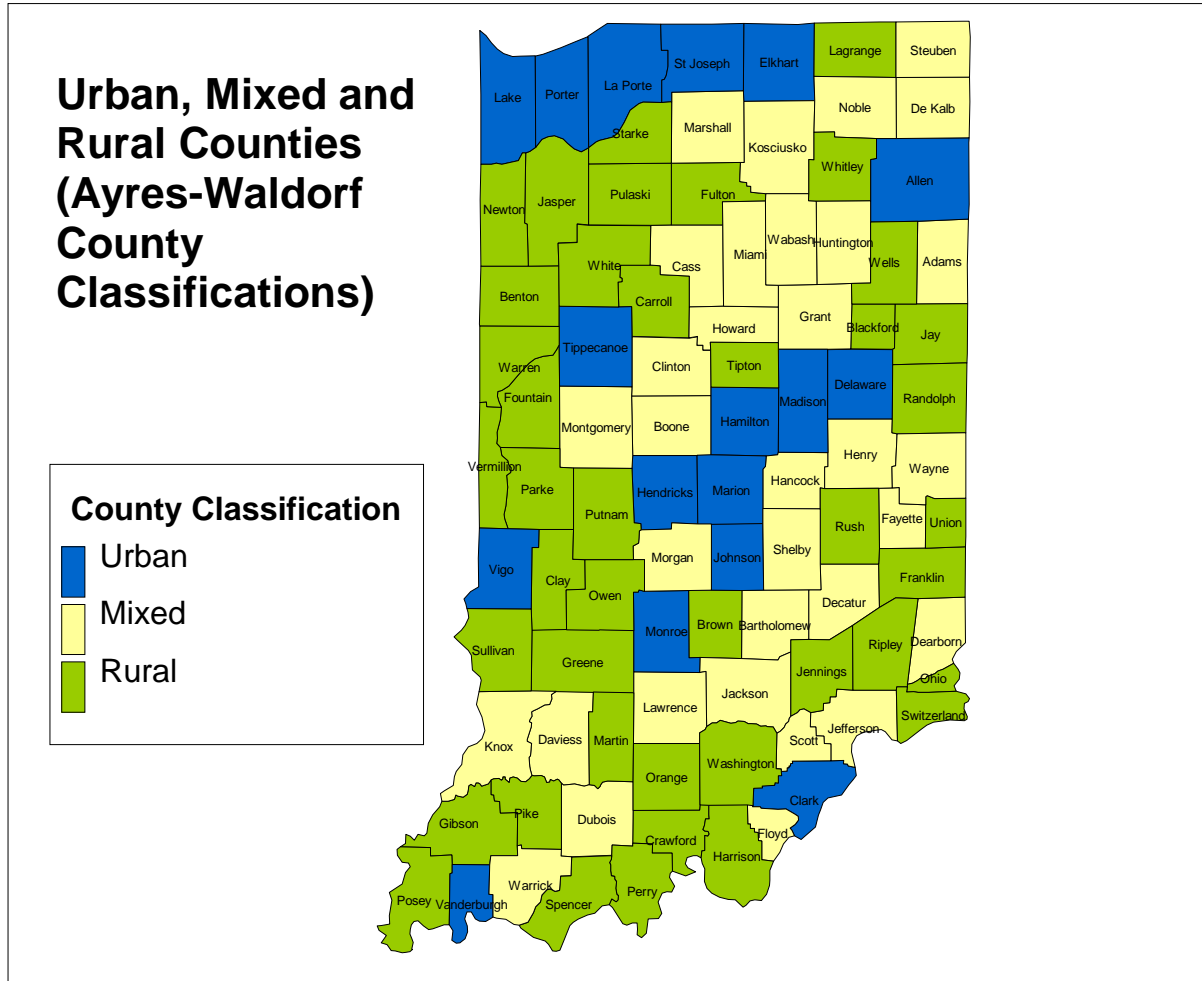


Table 6. Indicators for Urban, Mixed and Rural Counties

County Classification	No. of Counties	Capacity-Cost Index Percents		Population Growth 02-18	Pct. of Gross AV in Agriculture, 2007	Change in Man- ufacturing Emp. Pct., 1972-2017
		2002	2018			
Urban	17	-1.3%	-3.4%	12.6%	1.4%	-19.1%
Mixed	33	1.9%	3.5%	4.3%	6.9%	-12.4%
Rural	42	2.3%	10.2%	-0.3%	14.6%	-4.3%
Total	92	0.0%	0.0%	8.7%	4.4%	-16.1%

The indexes and all of the indicators show substantial differences between urban, mixed and rural counties. The average urban county had a negative capacity-cost index in 2002, and the average became more negative in 2018. Mixed and rural counties had positive average indexes in 2002, which become more positive in 2018. This was especially true for rural counties. Capacity-cost indexes diverged between 2002 and 2018, with urban counties becoming more negative and rural counties more positive.

The indicators give some reasons for the divergence. Urban counties saw population growth, which raised costs. Rural counties have a large percentage of their property tax bases in agriculture. Farmland assessments increased, raising capacity. Urban counties had a large share of the manufacturing job losses over 45 years, slowing growth of income and property values, which slowed capacity growth. In each case, mixed counties were in between.

These three indicators appear to matter for capacity-cost indexes. Here is an analysis of each.

Population Growth

Most urban counties saw population growth. Among the 17 counties classified as urban, 14 grew and 3 declined (Delaware, Madison and Lake). The opposite held true for rural counties. Of 42 rural counties, 14 saw population growth and 28 saw decline. Mixed counties were in between, with 22 growing and 11 declining in population.

In total, urban county populations grew 12.6%, mixed county populations grew 4.3%, and rural county populations fell 0.3%. By county classification, Indiana population was 61% urban and 14% rural in 2002; 63% urban and 13% rural in 2018.

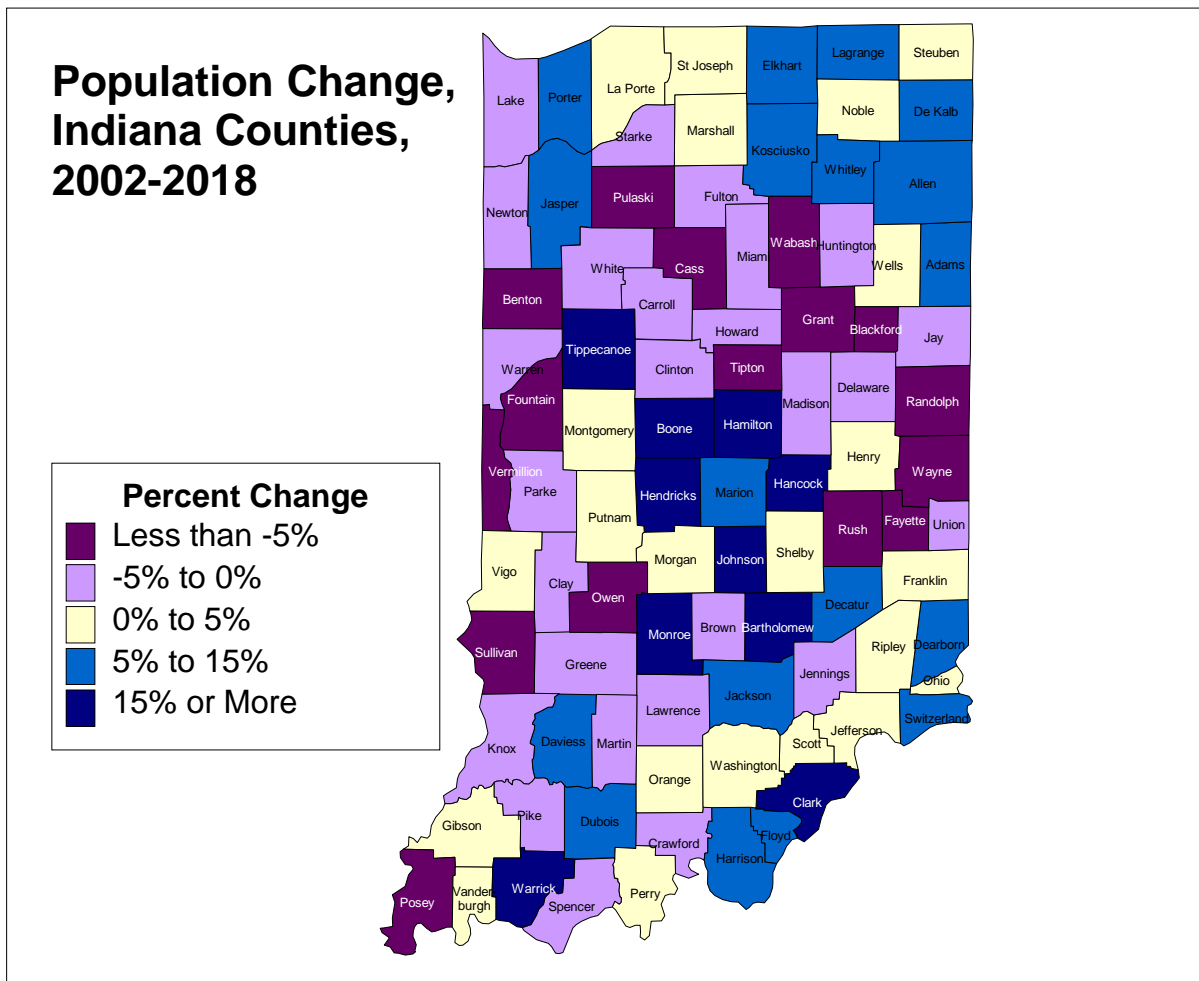
Table 7 divides the counties into five population growth groups, which are mapped in Figure 9. Sixteen counties lost more than 5% of their population from 2002 to 2018. Ten counties gained more than 15%. Table 7 shows the capacities, costs and indexes for 2002 and 2018, and the changes between the two, by population growth category.

Capacity and cost changes from 2002 to 2018 form a U-shaped pattern relative to population. The biggest gains in both costs and capacities were in the counties with the biggest population declines, and in counties with the biggest population gains. The counties in the middle had the smaller increases in capacities and costs.

Table 7. Change in Capacity and Cost by Population Change, 2002-2018 (dollars per person)

Population Change	No. of Counties	2002			2018			Change		
		Capacity	Cost	Index	Capacity	Cost	Index	Capacity	Cost	Index
Less than -5%	16	2,277	2,321	(44)	2,948	2,985	(37)	671	665	6
-5% to 0%	26	2,160	2,327	(167)	2,823	2,934	(111)	662	607	56
0% to 5%	22	2,155	2,173	(19)	2,760	2,719	41	605	545	60
5% to 15%	18	2,346	2,284	62	2,882	2,903	(21)	536	619	(83)
15% or More	10	2,322	2,193	129	3,065	2,954	111	744	761	(18)
Average		2,258	2,258		2,890	2,890		632	632	

Figure 9.



The largest capacity increase was in the fastest growing counties. The second largest increase was in the counties with the biggest declines. The smallest increase was in the counties with moderate growth.

The 16 rapidly declining counties were rural or rural-mixed (Table 8a). Agricultural land and buildings made up 13.7% of their gross assessed value in 2007. Between 2007 and 2018 trending and the rapid rise in the base rate per acre increased agricultural assessments. The combination of higher valued farmland and smaller population increased capacity per person.

Table 8a. Indicators of Capacity and Cost by Population Change, 2002-2018

Population Change	No. of Counties	Avg. Pop. Growth	No. of Counties			Gross AV per person Growth	Net AV per person Growth	NAV/GAV per person Growth Ratio	Ag Share of Gross AV, 07	Man Share of Emp, 01
			Urban	Mixed	Rural					
Less than -5%	16	-7.5%	0	5	11	113.9%	73.7%	0.647	13.7%	23.1%
-5% to 0%	26	-1.9%	3	6	17	135.3%	93.4%	0.690	5.9%	17.0%
0% to 5%	22	2.3%	4	9	9	107.2%	75.1%	0.700	5.4%	18.1%
5% to 15%	18	10.1%	4	9	5	93.4%	49.7%	0.532	2.8%	18.3%
15% or More	10	33.9%	6	4	0	127.1%	74.4%	0.586	2.4%	12.9%
Average	92	8.7%	17	33	42	113.4%	70.0%	0.617	4.4%	17.5%

Table 8b. Indicators of Capacity and Cost by Population Change, 2002-2018

Population Change	No. of Counties	Avg. Pop. Growth	Tax. Income per person 02	Growth per Person			City/Town Pop Growth	Enrollment Growth	Road Miles Growth
				Tax. Income	School Aid	Road Aid			
Less than -5%	16	-7.5%	13,599	41.1%	67.2%	107.2%	-8.7%	-14.0%	-0.9%
-5% to 0%	26	-1.9%	14,372	40.9%	52.4%	94.9%	-1.1%	-12.0%	0.9%
0% to 5%	22	2.3%	15,491	38.5%	69.1%	87.9%	-0.2%	-7.0%	0.6%
5% to 15%	18	10.1%	17,449	37.8%	92.6%	80.1%	9.0%	1.8%	3.9%
15% or More	10	33.9%	20,571	49.7%	109.6%	76.9%	45.1%	32.8%	16.5%
Average	92	8.7%	16,637	43.8%	77.6%	84.2%	10.2%	0.9%	3.1%

Six of the 10 counties with rapid population growth were urban. None were rural. As shown in Table 8a, these counties had more rapid than average increases in gross assessed value. In Table 8b, these counties show higher taxable income per person, higher growth in income per person, and more rapid increases in school aid.

Changes in the state school aid formula benefitted these rapidly growing counties. The enrollment count moved towards current enrollment, rather than averages of past enrollment. This shifted funds to school districts in more rapidly growing counties. The complexity funding became a smaller share of total aid. Rapidly growing counties had higher average incomes, so this change was also to the benefit of their schools.

Rapidly growing counties also had a smaller share of manufacturing employment, which meant manufacturing employment decline did not inhibit assessed value growth. For all these reasons, capacity per person grew even as population increased.

The largest service cost increase also was in the counties with the most population growth, and the second largest increase was in the counties with the biggest declines. The smallest increase was in the counties with slow growth. The underlying reason is the a-symmetry of costs. There is a lower limit to the public services that must be provided. Apart from the limits of capacity, there is no upper limit to the services that can be provided.

Costs do not fall proportionally when population falls. Some service costs do not depend primarily on population. Roads are an example. Table 8b shows that the falling population counties did not see a proportional drop in road mileage. Population fell by 7.5%, but road mileage fell only 0.9%. When population declines, people leave from many communities in a county. People remaining in these communities still must be served by roads.

This applies to other services as well. School buildings would have to be closed to reduce school costs in proportion to declining population. School closings are often resisted by parents, voters and school boards. Closings are sometimes impractical, if they lengthen travel distances so that children must ride buses for hours.

County governments also have a minimum service level. Each county must have a full complement of county government offices: auditor, assessor, treasurer, sheriff and so forth, no matter how population changes.

If costs do not fall proportionally with fewer people, costs per person will rise. That's what happened between 2002 and 2018 for counties with declining populations.

Rapidly growing counties also saw increases in costs per person. Table 8b shows that city/town population grew faster than total population in the most rapidly growing counties. Enrollment also grew in proportion to population, unlike the state as a whole, which saw near-stable enrollment. Road miles increased in rapidly growing counties too. These are the costliest factors in the capacity-cost index, and they grew rapidly in the fast-growing counties. Costs per person increased.

Counties with near-stable populations, or more modest growth, saw smaller increases in costs per person. City/town populations and enrollments fell or grew less than population. Road miles grew by small percentages. The existing road network could handle small population increases. With no declines in population, and declines or modest increases in the factors that most affect costs, costs per person rose by smaller amounts.

And yet, the *change* in the capacity-cost index displays an *inverted-U* pattern (Table 7). Counties with modest declines or modest growth in population saw capacity grow faster than costs. Counties with rapid population declines saw a small increase in the average index. Counties with more rapidly growing population saw their capacity-cost indexes deteriorate. Counties with relatively stable populations fared best.

It's revealing to compare the 22 counties that grew between 0% and 5%, and the 18 counties that grew between 5% and 15%. Population in the former group grew 2.3% on average. The latter group grew 10.1% (Table 8a). Each group had about 8% of its gross assessed value in agriculture, and 18% of its employment in manufacturing. Yet the slower growing group had an average capacity-cost index increase of \$60 per person, while the more rapidly growing group had a decline of \$83 per person.

A major difference between these county groups is indicated by the comparison of *net* assessed value growth to *gross* assessed value growth (Table 8a). Slower growing counties saw a ratio of net AV to gross AV growth of 0.700. More rapidly growing counties saw a ratio of 0.532. In other words, for each \$100 increase in gross assessed value, the slower growing counties could tax an extra \$70 of assessed value, while the more rapidly growing counties added only \$53 to their property tax base.

One reason must be the standard homestead deduction. This deduction was created for taxes in 2003, at \$35,000 per homestead, and increased to \$45,000 for taxes in 2009. Homestead assessed value growth in slowly growing counties must be due more to rising assessed values of existing homes, and due less to new construction. There would be fewer new homestead deductions subtracted from taxable assessed value. In more rapidly growing counties more of the new homestead assessed value would be newly built homes, each with a new standard deduction subtracted.

Can the standard deduction really be that important? In 2018 the standard deduction subtracted \$73 billion from assessed value. It reduced gross assessed value by 14%. Net assessed value would have been 22% higher without the standard deduction subtracted. It's the biggest deduction in the Indiana property tax system.

Costs grow more where population grows more rapidly. But capacity growth led by rising population increases probably generates less added assessed value than growth led by other factors. As a result,

between 2002 and 2018, counties with stable population saw their capacity-cost indexes improve, while those with more rapid population growth saw their indexes deteriorate.

Farmland

One important factor separating rural from urban counties, of course, is the importance of farmland in the property tax base. Table 6 shows that the average rural county had 14.6% of its gross assessed value in agriculture in 2007, while urban counties had only 1.4%. Mixed counties were in between, at 6.9%. Pay-2007 is the earliest year for which we have a breakout of assessed value for agriculture. This is fortunate, because 2007 was the start of trending of the farmland base rate, the beginning of the increase in commodity prices, and just before the Great Recession, which saw reductions in interest rates. The base rate of farmland began rising rapidly only after 2007. Figure 10 maps the shares of agricultural property in gross assessed value for 2007.

Table 9 breaks down the counties by agricultural assessed value shares. In 2002 there was little difference in capacities based on agricultural shares. The lowest average capacity was \$2,247, for counties with a 3% to 6% share. The highest was \$2,284, for counties with a 6% to 10% share. The difference was only \$37 per person.

Table 9. Change in Capacity and Cost by Share of Gross Assessed Value in Agriculture, 2007.

Ag GAV Share 2007	No. of Counties	2002			2018			Change		
		Capacity	Cost	Index	Capacity	Cost	Index	Capacity	Cost	Index
Less than 3%	16	2,252	2,265	(13)	2,849	2,927	(78)	597	661	(65)
3% to 6%	14	2,247	2,207	40	2,929	2,842	86	682	635	46
6% to 10%	18	2,284	2,262	21	2,887	2,816	70	603	554	49
10% to 15%	22	2,277	2,268	9	2,946	2,831	115	669	563	106
15% or More	22	2,263	2,304	(41)	3,094	2,877	217	831	573	258
Average		2,258	2,258		2,890	2,890		632	632	

By 2018, however, the range in capacities was \$245 per person. Counties with the most agricultural property had the highest capacity. Counties with the least agricultural capacity had the lowest capacity. The reason was the rise in the farmland base rate. The capitalization base rate formula, the rise in commodity prices and fall in interest rates, and trending, increased the base rate from \$495 in 2002 and \$880 in 2007, to \$2,050 in 2015, and \$1,850 in 2018. As of pay 2021 the base rate will be \$1,280. That's still 159% higher than the base rate in 2002.

Figure 10.

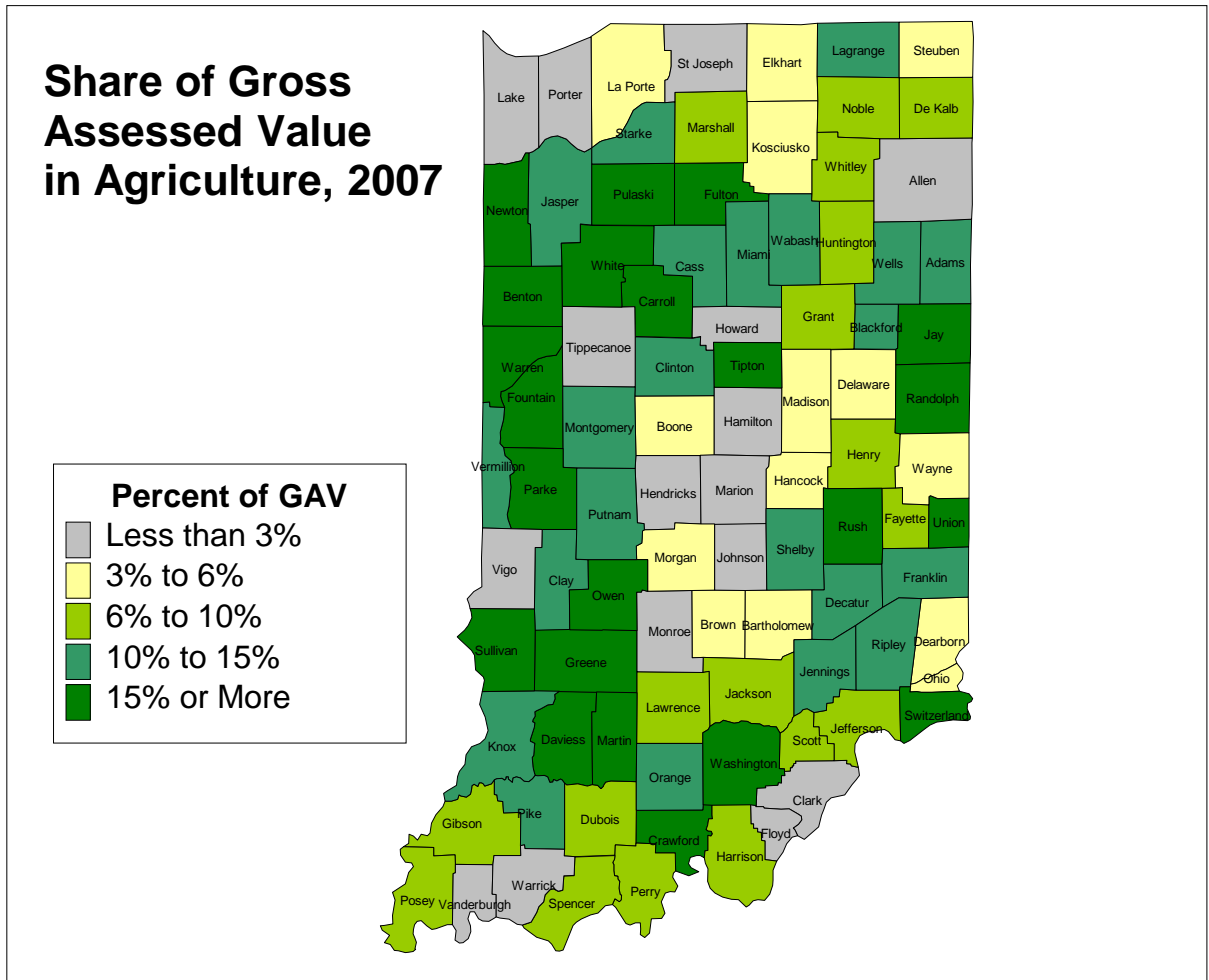


Table 10. Indicators of Capacity and Cost by Agricultural Gross Assessed Value Share, 2002-2018

Ag GAV Share 2007	No. of Counties	Avg. GAV Share 2007	No. of Counties			Total	City/Town	Enrollment	Road Miles
			Urban	Mixed	Rural	Pop Growth	Pop Growth	Growth	Growth
Less than 3%	16	1.8%	13	3	0	13.9%	14.5%	7.3%	10.9%
3% to 6%	14	4.6%	4	8	2	6.5%	7.8%	0.8%	2.4%
6% to 10%	18	8.2%	0	12	6	1.0%	-1.5%	-9.2%	0.4%
10% to 15%	22	12.6%	0	9	13	0.1%	-2.5%	-9.8%	0.0%
15% or More	22	21.7%	0	1	21	-2.8%	-5.2%	-13.4%	-1.1%
Average	92	10.8%	17	33	42	8.7%	10.2%	0.9%	3.1%

In 2002 service costs were modestly higher in counties with the most agricultural property (Table 9). By 2018 service costs were higher in counties with the least agricultural property. During this period costs rose most in counties where agriculture was less than 6% of the tax base, and less in counties with more agriculture.

A comparison of the two extremes in Table 10 shows why. Counties with less than 3% agricultural property were entirely urban and mixed, while 21 of the 22 counties with 15% or more agricultural property were rural. Population increased in the former, declined in the latter. So did enrollment and road miles.

Most importantly, though, in the least agricultural counties population in cities and towns increased by more than total population. The counties became more urban. Service costs are greater in cities and towns than they are elsewhere, so this put upward pressure on costs. The opposite was true in the most agricultural counties. City and town population fell by more than total population, so these counties became more rural. This put downward pressure on the costs.

The rise in the base rate of farmland added to capacity of rural and mixed counties. Growth of population in cities and towns in urban and mixed counties added to service costs. As a result, rural and mixed counties with a large share of assessed value in agriculture saw increases in the capacity-cost index between 2002 and 2018. Urban and mixed counties with a small share of assessed value in agriculture saw decreases in the capacity-cost index.

Manufacturing Job Loss

One more economic trend affected both capacity and costs between 2002 and 2018: the further erosion of manufacturing employment. This trend began in the latter half of the 1970s, but continued through 2018. From 1972 to 2017 (the most recent data available), the number of manufacturing jobs statewide fell 23%, and fell in 45 of the 88 counties for which complete data is available. The share of manufacturing jobs in total employment fell from 30% to 14% statewide, and dropped in 74 of the 88 counties.

Measuring the effect of manufacturing decline is not as simple as looking at percentage changes in manufacturing jobs. Manufacturing employment in Howard County fell 48% from 1972 to 2017, representing a loss of more than 11,000 jobs, out of a total employment of 47,000 in 1972. This had a major effect on Howard's economy. But manufacturing employment also fell 45% in Martin County, representing 350 jobs out of 9,000. Manufacturing was not an important employment sector in Martin County in 1972. Similar percentage changes represent very different effects on local economies.

As a solution, two indicators were used to classify employment change from 1972 to 2017. The first is the change in manufacturing employment share. Howard's manufacturing employment share fell from 51% to 25% of total employment. In Martin, the decrease was from 8% to 5%. Howard's drop of 26 percentage points was much greater than Martin's drop of 3 percentage points. Howard had more manufacturing jobs to lose, and the loss of manufacturing share shows that.

Manufacturing employment share can mislead it a different way, however. Porter County's manufacturing employment share decreased by 22 percentage points, similar to Howard County, but the total number of manufacturing jobs fell only 11 percent. The share declined as much as it did because total employment more than doubled, rising 146%. Porter lost manufacturing jobs, but gained many more jobs in other industries. Howard lost manufacturing jobs, but the county's total employment rose only 7%.

The classification used here answers two questions, did the county lose significant manufacturing employment, and was this employment replaced by jobs in other industries?

The map in Figure 11 and the tables 11a and 11b show the five manufacturing and employment classifications, labeled 1 through 5 in the tables. Classification 1 include counties that saw shares of manufacturing employment drop by 7.5 percentage points or more, with total employment rising by less than 15%. Manufacturing jobs were lost, with fewer gains in other industries to replace them. The East-north-central corridor from Wabash and Howard to Wayne and Fayette all show this pattern, as do Lake, Perry and Vermillion.

Classification 2 includes counties such as Allen, St. Joseph, Vanderburgh and Vigo with large manufacturing share decreases, but employment gains up to 65%. Classification 3 includes counties with large manufacturing job share losses, but much higher total employment gains. This classification includes many counties in the Indianapolis donut (including Marion), as well as counties near Louisville and Cincinnati. These counties lost significant manufacturing share, but had rapid growth in other employment.

Classifications 4 and 5 are counties that had less manufacturing employment share loss, either because they maintained or grew their manufacturing jobs, or because they did not have much manufacturing employment in 1972. Counties in classification 4 saw less total employment growth. These are entirely mixed and rural counties, with a large share of assessed value in agriculture (Table 11b). Classification 5 includes rural counties with little manufacturing, but more total employment growth. Classification 5 also includes counties such as Elkhart, Gibson and Owen, which saw large *increases* in manufacturing employment, helping to drive substantial total employment increases.

Four counties are not included in these tables. The U.S. Department of Commerce concealed the 2017 manufacturing employment data for Carroll, Crawford, Pike and Switzerland, so as not to reveal information about individual employers.

Table 12 shows the capacity-cost indexes based on the manufacturing employment classifications. Counties in classification 1 have large negative capacity-cost indexes, which became more negative between 2002 and 2018. Average capacity grew more slowly than average, while costs grew slightly faster than average.

These are counties that lost manufacturing employment share, but did not gain other employment to compensate. Table 11a shows an average manufacturing share loss of 22.7 percentage points, and an average loss in total employment of 4.9%. The loss of their major employers depressed income growth, though net assessed value saw above average growth. It may be that much of the manufacturing loss occurred between 1972 and 2002, and that net AV per person increased in part due to population decline after that.

All but two of these counties saw their populations decrease between 2002 and 2018. Total population declined more than city/town population, which accounts for the somewhat higher than average cost increase. Costs increased more than average in counties with falling populations, as shown above in Tables 7 and 8b.

Figure 11.

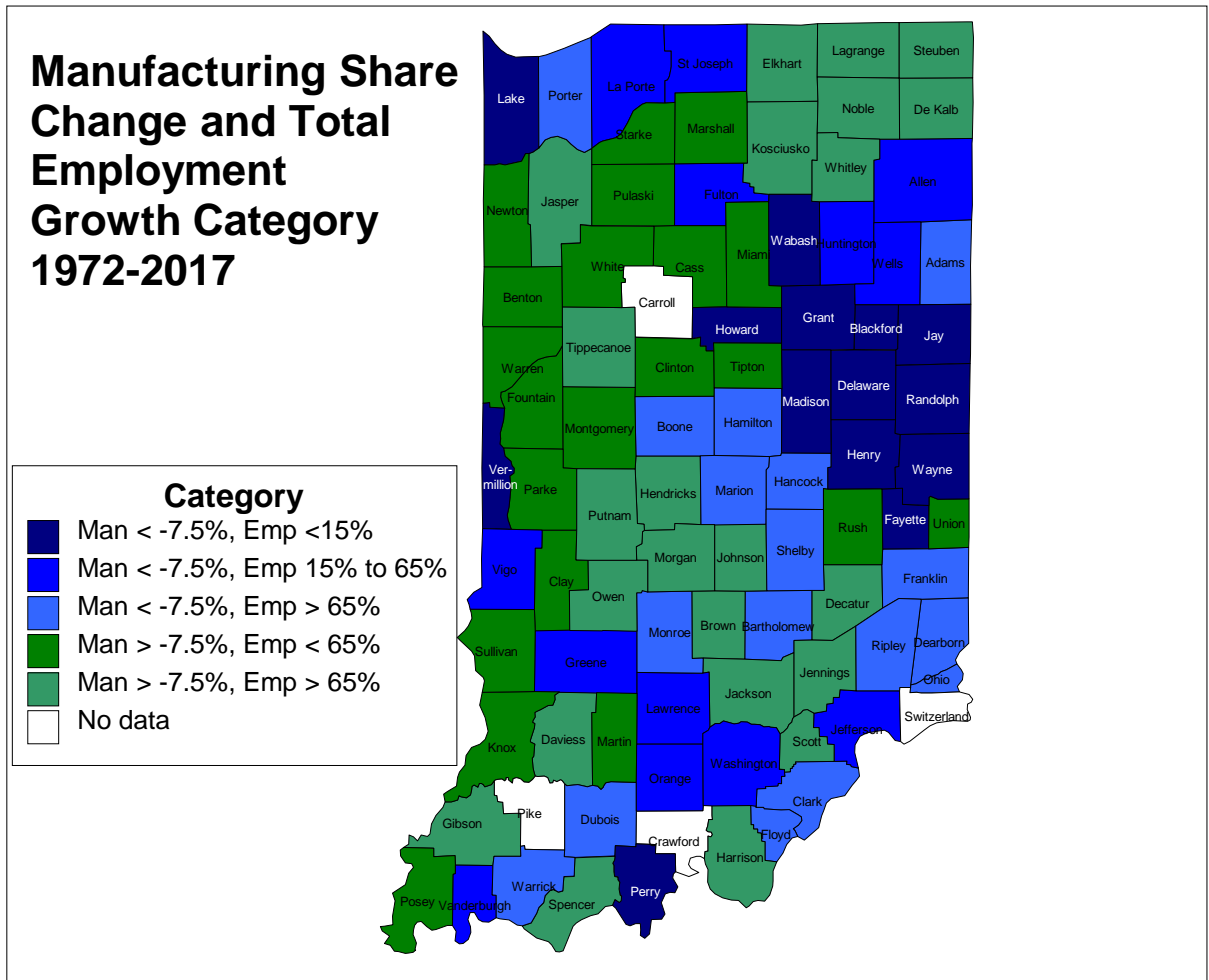


Table 11a. Indicators of Capacity and Cost by Manufacturing and Total Employment Change

Change in Manufacturing Share & Total Employment	No. of Counties	Avg. Change Man. Emp. Share 72-17	Avg. Emp. Growth, 1972-2017	No. of Counties			Total Pop. Growth	City/Town Pop. Growth	Enroll- ment Growth	Road Miles Growth
				Urban	Mixed	Rural				
1 Man < -7.5%, Emp < 15%	14	-22.7%	-4.9%	3	6	5	-2.8%	-1.7%	-11.3%	1.8%
2 Man < -7.5%, Emp 15% - 65%	13	-14.3%	35.4%	5	3	5	4.2%	1.9%	-4.4%	1.5%
3 Man < -7.5%, Emp > 65%	17	-14.6%	171.1%	5	9	3	17.8%	20.2%	11.4%	9.1%
4 Man > -7.5%, Emp < 65%	21	-0.5%	14.8%	0	6	15	-3.6%	-6.2%	-12.1%	-0.9%
5 Man > -7.5%, Emp > 65%	23	-0.3%	133.7%	4	9	10	14.8%	20.0%	7.3%	4.0%
Average	88	-8.8%	76.0%	17	33	38	8.8%	10.2%	1.0%	3.2%

Table 11b. Indicators of Capacity and Cost by Manufacturing and Total Employment Change

Change in Manufacturing Share & Total Employment	No. of Counties	Net AV per person 2002	Tax. Income per person 2002	Growth per Person				Ag Share of Gross AV 2007
				Net AV	Tax. Inc.	School Aid	Road Aid	
1 Man < -7.5%, Emp < 15%	14	23,254	14,648	83.9%	37.5%	52.2%	90.6%	3.8%
2 Man < -7.5%, Emp 15% - 65%	13	25,907	16,243	57.9%	38.3%	75.7%	84.4%	3.4%
3 Man < -7.5%, Emp > 65%	17	33,229	19,288	61.5%	45.6%	96.5%	80.3%	1.9%
4 Man > -7.5%, Emp < 65%	21	29,242	13,564	93.2%	44.6%	67.6%	104.5%	16.0%
5 Man > -7.5%, Emp > 65%	23	30,990	16,082	70.7%	43.9%	86.6%	80.5%	5.8%
Average	88	29,059	16,669	69.9%	43.8%	77.8%	90.3%	4.3%

Table 12. Change in Capacity and Cost by Manufacturing and Total Employment Change

Change in Manufacturing Share & Total Employment	No. of Counties	2002			2018			Change		
		Capacity	Cost	Index	Capacity	Cost	Index	Capacity	Cost	Index
1 Man < -7.5%, Emp < 15%	14	2,138	2,349	(210)	2,730	2,998	(269)	591	650	(58)
2 Man < -7.5%, Emp 15% - 65%	13	2,115	2,175	(61)	2,650	2,742	(92)	535	567	(31)
3 Man < -7.5%, Emp > 65%	17	2,365	2,287	78	2,997	2,971	26	632	684	(52)
4 Man > -7.5%, Emp < 65%	21	2,344	2,342	2	3,160	2,962	199	816	620	197
5 Man > -7.5%, Emp > 65%	23	2,307	2,177	130	2,964	2,787	177	657	609	47
Average	88	2,278	2,278		2,913	2,913		635	635	

Classifications 2 and 3 show counties with similar average losses in manufacturing share. Average total employment growth was five-times as high in classification 3, however. Classification 2 has negative average capacity-cost indexes in 2002 and 2018, while classification 3 shows positive indexes. But both saw decreases their capacity-cost indexes from 2002 to 2018. The reason for classification 2 was slow growth in capacity. The reason for classification 3 was rapid growth in costs.

Loss of manufacturing share resulted in slower net assessed value and taxable income growth per person in classification 2 counties. Capacity grew slowly. All the cost measures in classification 3 counties grew rapidly, especially population in cities and towns (Table 11a). Rapid population growth tends to raise costs more than capacity, as shown in Table 7 above.

The large capacity increase in classification 4 counties results from the large share of agriculture in assessed value. The rise in the base rate and the fall in population increased assessed value per person in these counties, as shown in Table 11b and Table 9 above.

Classification 5 compares to classification 3 in total employment and population growth, but classification 5 had almost no average manufacturing share loss. Net assessed value growth was higher for classification 5 counties. This helps explain the more rapid capacity increase in classification 5. The bigger increase in road miles appears to be the difference making classification 3 county's costs rise more rapidly.

The loss of manufacturing jobs, when not replaced with other employment growth, is associated with negative capacity-cost indexes. Capacity is low. Capacity-cost indexes became more negative between

2002 and 2018 in these counties as well. Counties that lost manufacturing share, but saw rapid growth in other employment, had positive capacity-cost indexes. But these became less positive between 2002 and 2018. The drag of manufacturing job loss, even in these counties, held capacity growth below rapidly rising costs. Counties that had rapid employment growth without manufacturing job loss had positive indexes that improved between 2002 and 2018.

Conclusion

Population growth and decline, rising assessed values of farmland, and declines in manufacturing employment help explain the pattern of capacity-cost indexes among Indiana local governments, both geographically and by urban-mixed-rural classification. Statewide, between 2002 and 2018 Indiana population shifted from rural to urban counties, and from unincorporated areas to cities and towns. Agricultural commodity prices rose, and interest rates fell, which increased farmland assessments under Indiana's market-value-in-use with trending assessment system. Manufacturing employment continued to decline absolutely and as a share of total employment. Some counties saw other employment grow to replace manufacturing jobs, and others did not.

Population grew in most urban counties and fell in most rural counties. Both caused service costs per person to rise. Counties with rapid population growth saw large increases in city/town population, school enrollment and road miles, which increased service costs.

Total costs did not decline proportionately in counties with falling populations. Some service costs have lower limits, no matter how few people a county has. Road mileage in particular was nearly unchanged in declining counties. Falling population tends to increase costs per person.

Counties with stable or modestly growing populations saw the smallest service cost increases. Existing infrastructure and staffing was sufficient to cover added services, and declining school enrollment helped hold down costs.

Rising population is associated with increasing assessed value, rising taxable incomes and higher state aid for schools and roads. However, rapid population growth requires new housing construction, and new homes have new \$45,000 homestead standard deductions subtracted. The increase in taxable assessed value is less than the increase in gross assessed value. In counties with slower population growth, most of the increase in homestead assessed value is in upward trending of existing home assessments. There are no new standard deductions to subtract. Places with faster growing populations experienced a drag on capacity growth from increasing standard deductions. Places with slower growing populations saw greater growth in taxable assessed value.

The assessed value of farmland varies with the base rate per acre, which is a statewide figure determined by the Department of Local Government Finance. It does not vary with local economic conditions. When population falls, the farmland remains, and this tends to increase capacity per person where farmland is a large share of the property tax base.

Farmland was assessed upward with the 2003 reassessment, and the base rate increased further with rising commodity prices and lower interest rates after 2007. The rise in the base rate of farmland added significantly to the capacity of rural and mixed counties.

Capacity grew slowly in counties that lost manufacturing jobs without rapid growth in other employment. This loss of manufacturing began at the end of the 1970's, and had slowed the growth of capacity in manufacturing-dependent counties by 2002. This trend continued through 2018. Capacity grew slowly in counties where manufacturing was a large share of employment, and overall employment grew slowly. In some counties employment in other industries grew enough to replace or more-than-replace lost manufacturing employment. In a few counties manufacturing employment itself grew. Such counties saw more rapid growth of capacity.

These factors combine to explain the trends in revenue capacities and service costs in Indiana from 2002 to 2018. The shift in population from rural counties to cities and towns in urban counties increased service costs generally. Urban county costs rose with the added expense of city/town services, with growing school enrollment and with added city/town road miles. Incomes, school aid and road aid increased, but the added standard deductions for newly built homesteads created a drag on assessed value growth.

Capacity-cost indexes in the average urban county were negative in 2002, and became more negative by 2018. Capacity growth lagged behind cost increases. Negative capacity-cost indexes resulted in higher property tax rates, which increased circuit breaker tax cap losses after the Constitutional change in 2010.

Rural counties also saw service cost increases per person. Some service costs have lower limits, so they do not fall proportionately with population. But the reassessment in 2003 and economic changes after 2007 increased the assessed value of farmland, which provided a significant increase in capacity for rural counties.

Capacity-cost indexes in the average rural county were positive in 2002, and became much more positive by 2018. Tighter maximum levy growth limits meant that most of this added capacity went to property tax rate reductions, not added service provision.

Manufacturing job loss occurred in most of Indiana, but the east-north-central corridor saw the biggest losses without offsetting growth in other employment. Some of these counties are classified as urban, some are mixed and some are rural. They have lower than average assessed values and incomes per person, and saw slower income growth and population declines between 2002 and 2018.

These counties had the most negative capacity-cost indexes in 2002, which became more negative by 2018. They had some of the highest property tax rates in the state as a result, and when the circuit breaker tax cap credits were enacted, saw the largest revenue losses to tax cap credits.

Appendix 1. Regional Development Authorities

Indiana has established at least eight Regional Development Authorities (RDAs) to address quality of life and economic development issues on a multi-county basis. In a sense, the counties in an RDA are combining their revenue capacity to address their joint service costs. Of course, this is by no means a consolidation of local government revenues or responsibilities in any broad sense. Still, capacity-cost indexes might be a useful measure of the relative resources and responsibilities of the local governments in a region.

Table A1 shows the components of the capacity-cost indexes for eight RDAs for 2018. Six of the eight have capacity-cost indexes within \$100 per person of balance. Combined, these RDAs nearly match capacity with costs, whatever the conditions in their component counties.

The Southwest RDA has a positive capacity-cost index of \$227 per person. This RDA includes Gibson, Posey, Vanderburgh and Warrick Counties. Vanderburgh County has a slightly negative index, at -\$18, while the three surrounding counties have positive indexes between \$150 and \$300. The combination makes for a region that can more than meet average service costs at average tax rates.

The East Central RDA has a negative capacity-cost index of \$285 per person. This is no surprise, in that the RDA includes only one county with a slightly positive index (Jay, at \$13), and four counties with indexes that are quite negative. This regional combination could not provide an average service level at average tax rates.

Table A1. Components of Capacities and Costs for RDAs, 2018.

Components of Revenue Capacity

Regional Development Auth.		Average Rate Property Taxes	Average Rate LIT Taxes	Actual School Aid	Actual Road Aid	All Other	Total Revenue Capacity
C	Central	986	426	1,037	78	482	3,008
EC	East Central	721	271	962	131	482	2,567
NC	North Central	784	367	1,018	85	482	2,736
NE	Northeast	998	356	963	110	482	2,909
NW	Northwest	1,012	366	1,012	86	482	2,958
OSI	Our Southern Indiana	799	357	950	101	482	2,689
SW	Southwest	966	387	906	102	482	2,842
WC	West Central	856	289	941	124	482	2,691

Components of Service Cost

Regional Development Auth.		City/Town Pop 2018	School Enrollment 2018	County Road Miles '18	City/Town Road Miles '18	County Pop 2018	Total Service Costs	Capacity- Cost Index
C	Central	885	1,671	31	49	458	3,094	(86)
EC	East Central	682	1,513	128	70	458	2,851	(285)
NC	North Central	564	1,666	50	46	458	2,784	(47)
NE	Northeast	638	1,574	91	56	458	2,817	92
NW	Northwest	830	1,612	25	70	458	2,996	(38)
OSI	Our Southern Indiana	615	1,536	70	55	458	2,734	(46)
SW	Southwest	558	1,467	80	52	458	2,616	227
WC	West Central	609	1,450	126	70	458	2,714	(23)

Table A2. Counties in Indiana Regional Development Authorities

C	Central: Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Morgan, Shelby
EC	East Central: Blackford, Delaware, Henry, Jay, Randolph
NC	North Central: Elkhart, Marshall, St. Joseph
NE	Northeast: Adams, Allen, DeKalb, Huntington, Kosciusko, LaGrange, Noble, Steuben, Wabash, Wells, Whitley
NW	Northwest: Lake, LaPorte, Porter
SW	Southwest: Gibson, Posey, Vanderburgh, Warrick
WC	West Central: Knox, Sullivan, Vigo
OSI	Our Southern Indiana: Clark, Floyd, Jefferson, Scott and Washington

**Appendix 2.
Components of
capacity-cost
indexes by
county, 2018.**

Components of Revenue Capacity										Components of Service Cost										Capacity- Cost Index						
Average					Actual					Total					School						County Pop					Total Service Costs
Property Taxes		Rate		Taxes	LIT		School		Aid Road		Actual		All		Revenue Capacity		City/Town Pop 2018		Enrollment 2018		County Road Miles '18		City/Town Road Miles '18			
949	365	990	103		482	2,890	482	Other	Capacity	Pop 2018	2018	Miles '18	'18	2018	2018	2018	2018	2018	2018		2018	2018	2018	2018	2018	
Indiana Average																										
01	Adams	886	301	764	132	482	2,565	476	1,297	155	458	2,436	129													
02	Allen	816	375	954	85	482	2,712	830	1,543	29	458	2,922	(209)													
03	Bartholomew	1,093	418	956	100	482	3,049	650	1,603	67	458	2,842	207													
04	Benton	2,844	288	1,347	382	482	5,344	676	2,112	621	458	3,980	1,364													
05	Blackford	785	267	967	194	482	2,695	683	1,493	219	458	2,948	(253)													
06	Boone	1,543	687	1,145	118	482	3,974	857	2,028	91	458	3,509	465													
07	Brown	1,751	320	858	156	482	3,566	76	1,398	204	458	2,150	1,416													
08	Carroll	1,250	313	1,066	208	482	3,319	323	1,824	305	458	2,950	369													
09	Cass	756	277	1,147	155	482	2,818	576	1,874	186	458	3,154	(337)													
10	Clark	783	336	911	87	482	2,599	783	1,501	32	458	2,843	(244)													
11	Clay	759	280	1,106	163	482	2,790	455	1,759	207	458	2,941	(152)													
12	Clinton	1,031	287	1,219	167	482	3,185	666	1,991	196	458	3,380	(175)													
13	Crawford	595	237	956	232	482	2,501	213	1,514	355	458	2,594	(93)													
14	Daviess	886	290	939	150	482	2,748	483	1,504	193	458	2,702	45													
15	Dearborn	901	390	1,014	100	482	2,887	338	1,675	83	458	2,584	303													
16	Decatur	1,167	323	1,037	161	482	3,170	564	1,655	193	458	2,932	238													
17	DeKalb	1,157	340	1,016	136	482	3,131	642	1,667	134	458	2,963	167													
18	Delaware	629	273	859	96	482	2,339	789	1,336	56	458	2,713	(374)													
19	Dubois	1,125	499	1,026	132	482	3,265	613	1,791	125	458	3,065	199													
20	Elkhart	863	379	1,123	80	482	2,928	510	1,869	45	458	2,925	3													
21	Fayette	631	239	1,008	136	482	2,496	582	1,622	133	458	2,849	(353)													
22	Floyd	860	468	984	83	482	2,877	549	1,574	36	458	2,651	216													
23	Fountain	1,110	287	961	232	482	3,073	589	1,637	325	458	3,093	(20)													
24	Franklin	950	356	952	167	482	2,908	257	1,607	223	458	2,876	332													
25	Fulton	1,096	298	950	218	482	3,045	417	1,547	315	458	2,787	258													
26	Gibson	1,349	364	983	180	482	3,359	584	1,576	231	458	2,925	434													
27	Grant	668	256	1,027	121	482	2,554	727	1,628	98	458	2,991	(437)													
28	Greene	650	276	942	167	482	2,516	399	1,550	221	458	2,688	(172)													
29	Hamilton	1,316	710	1,075	86	482	3,669	955	1,921	14	458	3,430	239													
30	Hancock	948	414	1,107	98	482	3,048	556	1,899	69	458	3,034	15													

Components of Revenue Capacity										Components of Service Cost										Capacity- Cost Index														
Average					Total					School					City/Town						County Pop					Total								
Rate					Revenue					Enrollment					Road Miles						Service Costs													
Property Taxes					Capacity					Pop 2018					'18						2018					2018								
Taxes					All Other					City/Town					County Road						County Pop					Total								
Taxes					Other					Pop 2018					Miles '18						2018					2018								
Indiana Average																				949	365	990	103	482	2,890	147	1,632	166	458	2,423	19	458	2,423	403
31	Harrison	909	327	977	131	482	2,825	147	1,632	166	458	2,423	19	458	2,423	403																		
32	Hendricks	1,074	417	1,095	77	482	3,145	600	1,922	37	458	3,074	57	458	3,074	71																		
33	Henry	684	268	987	129	482	2,550	551	1,586	131	458	2,783	57	458	2,783	(233)																		
34	Howard	916	325	1,070	103	482	2,897	778	1,750	58	458	3,120	76	458	3,120	(223)																		
35	Huntington	883	324	933	144	482	2,766	628	1,524	151	458	2,832	61	458	2,832	(56)																		
36	Jackson	900	321	1,035	131	482	2,869	589	1,680	135	458	2,918	56	458	2,918	(49)																		
37	Jasper	1,545	327	1,054	171	482	3,579	373	1,719	228	458	2,823	46	458	2,823	754																		
38	Jay	992	244	1,111	206	482	3,035	535	1,669	287	458	3,022	72	458	3,022	13																		
39	Jefferson	860	326	842	129	482	2,640	512	1,388	134	458	2,538	46	458	2,538	102																		
40	Jennings	646	262	1,044	151	482	2,585	265	1,632	197	458	2,583	31	458	2,583	2																		
41	Johnson	894	410	1,065	79	482	2,929	729	1,801	30	458	3,070	52	458	3,070	(141)																		
42	Knox	1,096	314	964	163	482	3,018	653	1,532	192	458	2,920	86	458	2,920	98																		
43	Kosciusko	1,477	399	1,059	115	482	3,533	405	1,720	119	458	2,751	49	458	2,751	782																		
44	LaGrange	1,182	312	755	115	482	2,846	137	1,261	162	458	2,037	19	458	2,037	809																		
45	Lake	964	345	1,018	82	482	2,891	954	1,607	9	458	3,106	78	458	3,106	(215)																		
46	LaPorte	968	325	961	105	482	2,842	619	1,526	76	458	2,739	59	458	2,739	103																		
47	Lawrence	668	284	958	117	482	2,509	428	1,523	117	458	2,579	53	458	2,579	(70)																		
48	Madison	570	274	959	94	482	3,380	691	1,524	55	458	2,807	79	458	2,807	(427)																		
49	Marion	894	346	1,004	63	482	2,789	1,045	1,486	16	458	3,036	31	458	3,036	(248)																		
50	Marshall	1,162	329	1,114	139	482	3,226	446	1,876	160	458	2,993	52	458	2,993	233																		
51	Martin	776	296	912	215	482	2,580	376	1,476	295	458	2,662	56	458	2,662	18																		
52	Miami	662	245	1,043	145	482	2,577	404	1,693	179	458	2,779	44	458	2,779	(202)																		
53	Monroe	993	326	602	75	482	2,478	653	1,009	40	458	2,194	34	458	2,194	285																		
54	Montgomery	1,178	296	1,038	151	482	3,145	592	1,711	176	458	2,989	52	458	2,989	156																		
55	Morgan	919	342	1,065	98	482	2,905	389	1,735	78	458	2,699	38	458	2,699	206																		
56	Newton	1,405	324	994	253	482	3,459	361	1,576	383	458	2,833	55	458	2,833	626																		
57	Noble	958	295	1,053	128	482	2,917	472	1,723	139	458	2,637	45	458	2,637	81																		
58	Ohio	797	315	872	184	482	2,650	383	1,466	194	458	2,337	36	458	2,337	112																		
59	Orange	850	251	1,082	185	482	2,950	432	1,699	249	458	2,912	64	458	2,912	(52)																		
60	Owen	742	333	988	170	482	2,714	152	1,568	243	458	2,143	21	458	2,143	271																		

Components of Revenue Capacity Average										Components of Service Cost										Capacity- Cost Index
Property Taxes	Rate	Average	Actual	Actual	All	Total	City/Town Pop 2018	School Enrollment	County Road Miles '18	City/Town Road Miles '18	County Pop 2018	Total Service Costs								
Aid	LIT	Taxes	School	Road Aid	Other	Revenue Capacity	Pop 2018	2018	2018	'18	'18									
Indiana Average													2,890							
61	1,024	240	1,019	225	482	2,990	319	1,592	352	49	458	2,771	219							
62	644	281	1,021	167	482	2,595	489	1,640	207	61	458	2,885	(270)							
63	1,247	309	953	236	482	3,228	281	1,529	356	45	458	2,639	559							
64	Porter	452	1,028	82	482	3,224	611	1,684	38	57	458	2,849	375							
65	Posey	410	914	170	482	3,561	366	1,477	224	48	458	2,374	986							
66	Pulaski	291	1,144	340	482	3,809	326	1,838	572	47	458	3,241	568							
67	Putnam	885	890	135	482	2,671	419	1,451	162	43	458	2,333	138							
68	Randolph	962	289	1,261	203	3,198	563	2,069	280	63	458	3,434	(236)							
69	Ripley	971	337	1,147	164	3,101	450	1,883	201	50	458	3,043	57							
70	Rush	1,280	300	952	243	3,236	445	1,569	365	42	458	2,819	376							
71	St. Joseph	659	364	922	79	2,507	625	1,475	34	48	458	2,641	(134)							
72	Scott	635	257	1,109	118	2,601	475	1,736	105	48	458	2,823	(221)							
73	Shelby	1,051	332	1,041	137	3,042	510	1,754	151	48	458	2,921	121							
74	Spencer	1,707	356	1,000	209	4,783	406	1,712	298	61	458	2,335	819							
75	Starke	887	254	984	176	2,783	274	1,559	239	46	458	2,376	207							
76	Steuben	1,814	336	892	134	3,659	418	1,472	145	54	458	2,147	1,111							
77	Sullivan	1,054	279	835	223	2,873	450	1,344	337	79	458	2,367	206							
78	Switzerland	883	222	940	186	2,713	181	1,503	266	20	458	2,428	285							
79	Tippecanoe	818	314	808	74	2,496	688	1,312	36	43	458	2,336	(40)							
80	Tipton	1,306	361	989	216	3,394	461	1,635	299	55	458	2,918	426							
81	Union	1,076	279	1,138	231	3,205	389	1,876	306	38	458	3,068	138							
82	Vanderburgh	797	355	846	79	2,560	689	1,348	26	56	458	2,377	(18)							
83	Vermillion	1,104	302	1,085	178	3,351	606	1,722	207	96	458	3,090	62							
84	Vigo	735	282	953	91	2,544	624	1,443	63	63	458	2,852	(108)							
85	Wabash	889	333	1,110	163	2,977	586	1,819	189	69	458	3,122	(145)							
86	Warren	1,703	330	1,309	337	4,161	364	2,122	538	53	458	3,535	626							
87	Warrick	996	481	1,032	99	3,091	245	1,749	97	29	458	2,378	512							
88	Washington	766	257	1,001	165	2,671	329	1,579	223	43	458	2,333	38							
89	Wayne	764	273	1,020	112	2,652	710	1,624	85	71	458	2,948	(296)							
90	Wells	1,154	329	1,103	167	3,235	556	1,875	204	63	458	3,155	79							
91	White	1,742	326	1,019	215	3,784	470	1,714	306	59	458	3,007	777							
92	Whitley	920	357	935	134	2,829	400	1,574	150	36	458	2,619	210							

Appendix 3. Data and Methods.

Appropriation, levies and tax rate data were acquired from a Department of Local Government Finance (DLGF) spreadsheet from their website, which shows data derived from budget form 4-B. Data on tax district property tax assessments, levies, rates and credits were from county abstracts, in spreadsheets provided by the DLGF by request. (These data are now available on Indiana's Gateway system.) Data on the components of gross and net assessed value were acquired from the Legislative Services Agency's county property tax reports. The earliest of these reports are for 2007, which is why the agricultural assessment results are based in that year.

Local income tax data are available from the Indiana State Budget Agency's website. School aid and enrollment data are available from the Indiana Department of Education's website. State road aid data are available on the Indiana State Auditor's website. All these sources are for data in 2018.

Population data are from the U.S. Census population estimates for counties, cities and towns. Road miles are available from the Indiana Department of Transportation Roadway Assets website.

Data for 2002 were from earlier versions of these websites, and from the author's contacts with various state government agencies.

Revenue capacity

Property Tax Capacity. Property tax revenue is calculated as the tax rate times the net assessed value, less credits. The tax rate is measured in dollars per \$100 of assessed value. Net assessed value is the gross assessed value set by the county or township assessor, less deductions.

Credits are subtracted from tax bills after the rate times assessment calculation. Local credits are percentage reductions in tax bills, funded by local income tax revenue. Tax cap or circuit breaker credits are subtracted to bring a tax bill under its constitutional tax cap, if necessary.

An average property tax rate is calculated by summing the property tax levies for all units in all counties, then subtracting the local income tax and tax cap credits. This figure is divided by county net assessed value, to yield an average post-credit tax rate. This rate is multiplied by each county's net assessed value to yield property tax capacity, the amount that the local government units in each county could raise by taxing their net assessed value at the statewide post-credit property tax rate.

Local Income Tax Capacity. Local income tax revenue is calculated as the local income tax rate times taxable income. County taxable income is calculated by dividing total local income tax revenue by the total tax rate. In 2002 there were 7 counties that did not have local income taxes. Taxable income was estimated based on the first year that the county had an income tax, scaled back to 2002 in proportion to the growth in total personal income, as measured by the U.S. Bureau of Economic Analysis county income data.

Local income tax distributions in 2002 were above collections in many cases. Distributions lagged the drop in collections as a result of the 2001 recession. Income tax collections for 2002 were used instead of distributions, to avoid large overestimates of taxable income. This was not necessary in 2018, because it was the ninth year of an expansion. Distributions more closely matched collections.

Statewide local income tax revenue is divided by statewide taxable income, to derive an average local income tax rate. This rate is multiplied by each county's taxable income to yield local income tax capacity, the amount that the local government units in each county could raise by taxing their local taxable income at the statewide local income tax rate.

Note that county income tax capacity includes income tax revenue for property tax relief. The local income tax credits are subtracted from property tax capacity when the net property tax rate is calculated, so that this revenue is not double-counted.

State School Aid. State aid to public school corporations is calculated by formula. The school aid formula is usually revised every two years as part of the state budget. School aid is distributed to school corporations based on the number of pupils in the corporation.

A significant problem with summing school aid by county are the cross-county school corporations. State aid and enrollment are available only by school corporation. For this study, aid and enrollment are divided among counties based on shares of school corporation gross assessed value.

State school aid capacity uses actual state school aid. The school aid formula is fixed by the General Assembly based on total enrollment and the number of pupils in each program category. These are the county characteristics that produce the school aid amount, so actual school aid is an index of those characteristics.

State Highway, Road and Street Aid. State revenue for road construction and maintenance is collected from motor fuel taxes and some vehicle registration fees, and distributed by formula to the Indiana Department of Transportation and to counties, cities and towns. There are two main formulas for distributing state aid for roads, called the Motor Vehicle Highway (MVH) and the Local Road and Street (LRS) formulas.

As with schools, cross-county cities and towns present a problem. There are more than a dozen cities or towns in more than one county. Again, road aid to cross-county cities or towns is divided among the counties based on shares in gross assessed value.

Again as with schools, state road aid capacity uses actual state road aid. The road aid formulas are fixed based on local unit characteristics. Actual road aid is an index of these characteristics.

All Other Revenue. Property taxes, local income taxes, state school aid and state road aid fund 83% of local appropriations. The remaining 17% come from a variety of sources, including motor vehicle excise taxes, several small local option taxes, charges and fees, federal and state aid, sale of property, interest earnings, and many more. All other revenue capacity is calculated on a per person basis, multiplying county population by the state average other revenue.

Service Costs

Counties, Townships and Library Districts. County, Township and Library District appropriations for all funds except county roads are summed. The total is divided by total Indiana population to yield a statewide average per person.

County Service Costs are calculated by multiplying the statewide average county, township and library per person appropriations by the population of each county. This gives the cost of providing services at the statewide average cost to the people of each county.

Cities, Towns and Special Districts. City and town appropriations in all funds other than road funds are summed. Road funds are treated separately. Special district appropriations are included with cities and towns, since most special districts are associated with cities and towns.

Total city, town and special district non-road appropriations are divided by city and town population to yield a state average. City, town and special district service costs are calculated by multiplying the state average appropriation by city and town population in each county. Cross county unit populations are allocated among counties based on shares in gross assessed value.

School Corporations. Total school appropriations are summed for all public school corporations in Indiana. This figure is divided by public school enrollment to yield a statewide average per pupil.

School Service Costs are calculated per county by multiplying the statewide average per pupil by county public school enrollment. Cross-county school corporation enrollment is divided among counties using shares in gross assessed value.

Roads. Most county, city and town appropriations for roads are included in the motor vehicle highway and local road and street funds. These funds receive the state formula aid, but may also include property tax and other revenues. In addition, units may use property tax cumulative funds for bridges. Some units have additional road related funds, for thoroughfares or toll road receipts. These appropriations are summed separately for counties and cities and towns.

County and city/town appropriations are divided by county and city/town road mileage, respectively. Cross county city/town appropriations and road miles are divided among counties based on shares in gross assessed value.

Road Service Costs for each county are calculated by multiplying average county road appropriations per mile by each county's road miles, plus average city/town road appropriations per mile by the city/town road miles in each county. The sum is the service cost of a county's road miles, at state average appropriations.

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