

Property Tax Payments, 2002-2003 - 72 Selected Counties -

Indiana Legislative Services Agency

June 2005

The Indiana Supreme Court found Indiana's true tax value assessment rules to be unconstitutional in December 1998. Major changes in property tax payments in each county from 2002 to 2003 were caused by several factors including:

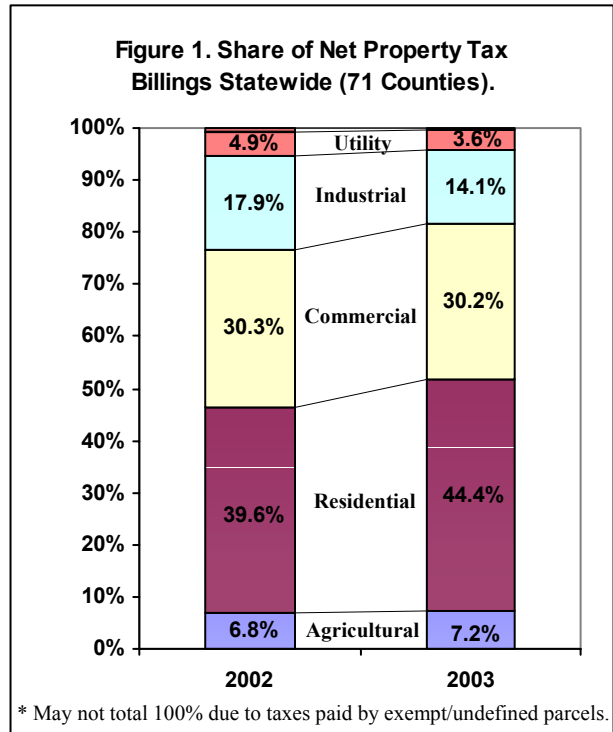
- The move from the old true tax value assessment rules to the new market-oriented rules during the 2002-2003 property tax reassessment.
- The tax restructuring provisions enacted by the General Assembly in 2002 to help mitigate some of the effects of the assessment changes.
- The new rules on business personal property assessments (for 2003 taxes only).
- Tax levy increases by local taxing units, which are influenced by spending and the availability of other revenue sources.
- Changes in property use.
- New construction or acquisitions.

State Tax Credits Increased in Indiana from \$1.1 Billion in 2002 to \$1.9 Billion in 2003.

This report summarizes the first release of data regarding the effects on property tax payments that occurred in 72 counties for which results are completed.¹ These 72 counties represent over 89%, or 2.9 million out of 3.3 million parcels in the state.

While the statewide and 72 individual county summaries are highlighted in this series of reports, the estimates are averages based on aggregations of parcel data within those geographic boundaries. Tax shifts and payment changes will likely vary within counties depending upon the particular local taxing units to which a parcel belongs (e.g., school corporations and townships).

Tax Shifts. Indiana saw a property tax shift from businesses to residential and agricultural property owners (see Figure 1). The share of net property tax paid by residential and agricultural property owners, on average, in 71 Indiana counties (excluding Lake County) increased, while tax bills paid by commercial, industrial, and utility property owners decreased (see Table 1). [Restructuring also incorporated an increase in the Utility Receipts Tax to compensate for reduced property tax payments by utilities.] The reason for these shifts



¹ This report summarizes property tax changes in 72 counties. The counties in this release include Adams, Allen, Bartholomew, Benton, Blackford, Boone, Carroll, Clark, Clay, Clinton, Daviess, Decatur, Delaware, Dubois, Elkhart, Fayette, Floyd, Fountain, Franklin, Fulton, Gibson, Grant, Greene, Hamilton, Hancock, Harrison, Hendricks, Howard, Huntington, Jay, Jefferson, Jennings, Johnson, Kosciusko, LaGrange, Lake, LaPorte, Lawrence, Madison, Marion, Marshall, Martin, Miami, Monroe, Montgomery, Morgan, Newton, Ohio, Owen, Parke, Perry, Porter, Pulaski, Putnam, Randolph, St. Joseph, Scott, Shelby, Steuben, Tippecanoe, Tipton, Vanderburgh, Vermillion, Vigo, Wabash, Warren, Warrick, Washington, Wayne, Wells, White, and Whitley. However, because Lake County tax bill changes were unusually large, including Lake County with the other 71 counties changes the results for this group of counties in ways that are unrepresentative of the total. Consequently, Lake County results are presented separately later in the paper. Results for the 20 remaining counties may be provided in a later release.

between classes of property was that the total of real plus personal property assessed values (AV) of residential and agricultural property increased more than the assessed values of business property. Gross assessed values of residential property doubled. Gross assessed values of agricultural property nearly doubled. Commercial and industrial assessments rose much less, and utility assessments were almost unchanged. These figures include the effects of new construction, demolition, and remodeling of property, as well as the effects of reassessment, tax restructuring, and levy increases.

Table 1. Changes in AV and Tax Bills by Property Class: 71 Counties, 2002-2003.

Property Class	Change In		
	Total Gross AV	Net AV	Net Tax Bill
Agriculture	91.5%	79.5%	5.7%
Residential (All)	105.5%	76.7%	11.4%
- Homestead Only	103.1%	65.4%	4.3%
Commercial	45.6%	46.2%	-0.9%
Industrial	16.8%	10.8%	-21.5%
Utility	-0.4%	0.1%	-27.9%
Avg. All Classes	69.4%	54.3%	-0.6%

* Data does not include Lake County.

Results by County. Of the 71 counties excluding Lake, 29 reflected the state pattern of tax increases and decreases by property type. In these 29 counties, tax payments by the average residential and agricultural property owner increased, while tax payments by the average business property owner decreased. In 12 other counties, agricultural, residential, and commercial property owners paid more, while industrial and utility property owners paid less. Commercial property assessments statewide increased more than other business assessments, and in some counties the increase was enough to turn a tax cut into a tax hike.

Fourteen of the 15 largest counties in the state, measured by assessed value, were in these two groups. Such counties had substantial amounts of business assessed value, which increased the size of the tax shift to residential and agricultural taxpayers. Many of these counties also had a large number of rental apartments included in their commercial assessed value. Apartments were the type of commercial property that saw the largest increases in assessed value. In some of these counties the increase in commercial assessed value was large enough to produce an overall increase in commercial taxes.

In 10 counties, all property types saw tax cuts. These were mostly rural counties, and all had below-average countywide levy increases. With little business property, there was little tax shift to residential and agricultural property. The small tax shifts plus the small levy increases were more than offset by the large increase in state property tax replacement credits (PTRC) that resulted from tax restructuring.

In 5 counties, agricultural taxes fell while residential and commercial taxes increased. In 6 more, all property types but residential saw tax decreases. In 6 others, only agriculture saw a tax increase. Many factors combined to produce these results, including the size of the local levy change; the composition of assessed value by property type; the location of property in tax districts with larger or smaller tax rate changes; the age of residential structures; the accuracy of assessment; and new construction, demolition, and remodeling of property.

Three counties had other outcomes. These outcomes usually resulted from changes in the composition of property that were large enough to offset the effects of reassessment.

Residential Property - Homeowners and Renters. Total residential tax bills for the 71 counties increased because of the 2002-2003 changes. Table 2 shows that owners of residential homesteads saw their tax bills increase by a smaller amount than the tax bills of all residential property, in total. Tax bills on agricultural homesteads were nearly unchanged. The reason for the reduced impact on homestead property was because this property was eligible for the increased homestead deduction and homestead credit. A property is eligible for the homestead deduction and credit if it is occupied by its owner and is the owner's primary residence. The

increase in the homestead deduction from \$6,000 to \$35,000 was the reason that residential net assessed value rose so much less than residential gross assessed value (see Table 1).

Property Type	Net AV	Tax Bill Change
Residential (All)	76.7%	11.4%
Homestead	65.4%	4.3%
Non-Homestead (Rentals)	119.3%	34.3%
Agricultural Homesteads	69.6%	0.1%
Commercial Apartments	79.3%	17.3%

* Data does not include Lake County.

The net assessed value of non-homestead residential property, primarily rental property, increased almost twice as much as homestead property. Net assessed value increases for rental property were large because this property did not receive the increased homestead deduction. Tax payments by owners of rental property increased significantly because of this large net assessed value increase and because rental property owners did not receive the homestead credit.

Reassessment increased the gross assessed values of commercial apartments by more than any other business property type. Since commercial apartments were not eligible for homestead deductions or credits, the tax bill increase was larger than for residential property.

Residential Property - Distribution of Tax Increases and Decreases. Table 3 shows tax changes for comparable properties, those with physical features that were unchanged from 2002 to 2003. In 71 counties excluding Lake, about 59% of residential property owners (including both homeowners and rental property owners) saw tax bill increases and 41% saw decreases in 2003. The figures were nearly reversed for homestead owners. About 58% of homestead owners saw tax decreases, and about 42% saw tax increases. The average homestead owner saw a slight property tax cut of \$4, even with increased tax levies.

	Residential - Actual -	Homestead - Actual -	Residential - NO Levy Change -	Homestead -NO Levy Change -
Increased	58.6%	42.5%	50.4%	32.1%
Decreased	41.4%	57.5%	49.6%	67.9%
Increased 100% or More	13.3%	5.3%	11.0%	4.4%
Decreased 25% or More	14.2%	18.3%	20.7%	28.1%
Average Change (\$)	\$67	-\$4	-\$18	-\$104
Average Change (%)	8.1%	-0.5%	-1.7%	-9.5%

* Data does not include Lake County.
** Percentages represent the percentage of parcels affected.

Not all of the tax bill change was due to reassessment and tax restructuring. Some was due to increases in the tax levies of local units of government. Table 3 also shows estimates of what would have happened had tax levies remained unchanged. The estimates were made by recalculating tax rates for 2003 using tax levies from 2002.

With no levy changes, about half of all residential property owners would have seen tax increases, and half would have seen tax decreases. For homesteads, about two-thirds would have seen tax decreases, and one-third tax increases. With no levy increases, and no changes in the characteristics of the property, the average homestead owner would have seen a tax cut of almost 10%. Apart from levy increases, reassessment and restructuring reduced the taxes of many more homeowners than they increased.

Residential Property – Age of Structure. A special analysis of Marion County looked at the effect of the age of residential property on assessed value and tax bill changes (see Table 4). Older homes saw larger increases in assessed value and tax bills than newer homes. The reason was that the old true tax value assessment system reduced assessments based on age, regardless of the potential selling price of a property. The move to market value thus increased the assessments of well-maintained older homes more than the assessments of newer homes. In Marion County, residential property built before 1940 saw an average assessment increase of 171% (nearly tripled), a net increase after the homestead deduction of 150%, and a tax bill increase of 76%. If the property tax levy had not increased, these properties still would have seen a 58% tax bill increase.

Residential Age	Change In			
	Total Gross AV	Net AV	Net Tax Bill	Net Tax Bill, No Levy Change
Built before 1940	170.5%	149.7%	76.0%	57.8%
Built 1940-1959	115.3%	77.8%	24.1%	12.7%
Built 1960 and after	73.7%	43.8%	0.2%	-8.4%

Newer homes, built after 1960, saw a much smaller 74% gross assessed value increase. After the homestead deduction, the net assessed value increase was a modest 44%. After application of the homestead credit, the actual tax bill of the average home was almost unchanged. Without the tax levy increase, the tax bill would have dropped by 8%.

Agricultural Property. Agriculture is the most complex property category. Agricultural real property consists of homesteads (property that would be classed as residential if it were not part of a farm parcel), business buildings, and farm land (the only large category of real property that continues to be assessed on a non-market basis). Agriculture also includes some personal property.

Table 5 shows the total net assessed value and tax bill changes for the categories of agricultural property for 71 counties. The net assessed value and tax payments on non-homestead real property increased the most. This category includes farm land and farm business buildings and reflects the 112% increase in the base rate of farm land, from \$495 to \$1,050 per acre. At the other end of the scale, total agricultural net personal property assessments increased by the smallest amount.

Property Type	Net Assessed Value	Tax Bill Change
Agriculture Total	79.5%	5.7%
Non-Homestead Real	99.6%	15.5%
Personal	13.2%	-25.4%
Total Ag Business	86.4%	9.3%
Agricultural Homesteads	69.6%	0.1%

* Data does not include Lake County.

Taxes on agricultural non-homestead real property increased while taxes on personal property decreased. The sum of these two is agricultural business taxes on land, farm buildings, and equipment. Personal property was a relatively small share of the total, so agricultural business taxes increased by about 9%. Total taxes paid on agricultural homesteads were almost unchanged. Agricultural homesteads are eligible for the homestead deduction and credit, which accounts for most of this difference. Agricultural property taxes as a whole increased by about 6%.

Business Property. Net assessed value of business property increased much less than that of residential or agricultural property, as shown for the 71 counties in Table 1. The smaller increases in net assessments occurred even though business property was not eligible for new deductions, such as the homestead deduction.

The explanation is that business real property was assessed closer to market value under the old assessment rules than was residential property. The shift to market value assessment increased business assessments less.

Commercial property saw a larger net assessed value increase than did industrial or utility property, and this large increase accounts for the small tax bill decrease on commercial property (see Table 6). Commercial apartments in particular saw big net assessed value increases (see Table 2). The small increases in industrial and utility net assessments account for the large drop in these tax bills. The overall assessed value increase across Indiana caused a drop in property tax rates. Those property owners whose assessments rose more saw tax bill increases, and those with assessments that rose less—like businesses—saw tax bill decreases.

Property Type	Net Assessed Value	Tax Bill Change
Commercial	46.2%	-0.9%
Industrial	10.8%	-21.5%
Utility	0.1%	-27.9%

* Data does not include Lake County.

Tax Bill Changes. Read left to right, Table 7 mimics a tax bill that a property owner would receive. Gross real assessed value is the value placed on a property by the assessor. Gross personal assessed value is the value of personal property, usually self-assessed by the owner. Total gross assessed value is the sum of the two. Net assessed value is gross assessed value less deductions. The gross levy is net assessed value times the tax rates of the jurisdictions in which the property is located. The gross levy less credits is the net levy, which is the tax bill that the property owner must pay.

Property Class	Gross Real AV	Gross Personal AV	Total Gross AV	Net AV	Gross Levy	Net Levy (Tax Bill)
Agriculture	98.8%	13.2%	91.5%	79.5%	26.8%	5.7%
Residential	106.1%	5.1%	105.5%	76.7%	27.4%	11.4%
Homesteads	103.1%	n/a	103.1%	65.4%	19.5%	4.3%
Commercial	62.2%	18.8%	45.6%	46.2%	9.3%	-0.9%
Industrial	32.2%	8.7%	16.8%	10.8%	-16.3%	-21.5%
Utility	39.2%	-2.5%	-0.4%	0.1%	-25.9%	-27.9%
Total	90.0%	10.7%	69.4%	54.3%	12.1%	-0.6%

* Data does not include Lake County.

Total real assessed value increased by much more than total personal assessed value. This is because real assessments—land and buildings—were subject to the new market value rules under reassessment. Personal property rules changed less, and in 2003 some of the rule changes actually decreased personal property assessments for some taxpayers. Reassessments historically have resulted in larger real property AV increases than personal property AV increases. This is one reason for the reassessment tax shifts from business to residential property. Personal property is largely business-owned, while almost all homeowner property is real.

Total gross assessed value increased much more for residential and agricultural property than for business property. Residential and agricultural assessments approximately doubled (a 100% increase). Agricultural property increases were large because part of this assessed value was homes, and because the base rate of farm land per acre more than doubled. Business gross assessments rose less because business real property was assessed closer to market value under the old assessment rules and because a large part of business assessed value is personal property. Utility assessed value is dominated by personal property, so total gross utility AV was almost unchanged.

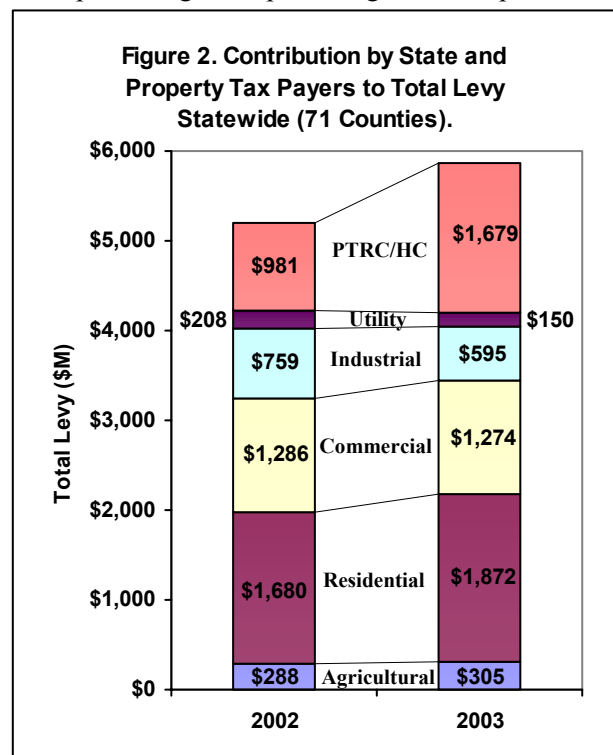
Net assessed value of residential property increased much less than gross assessed value because of the large increase in the homestead deduction, from \$6,000 to \$35,000. Agricultural homesteads were also affected by this increase in the homestead deduction, so agricultural net AV increased less than gross AV. The impact on assessed value on agricultural property was less than for residential property because agricultural business property was not eligible for the homestead deduction.

The gross levy increased by a smaller percentage than net assessed value. Levies are subject to property tax controls, though the 12% total levy increase for the 71 counties in 2003 was larger than increases in most years since the controls were imposed. Since the levies rose less than net assessed values, property tax rates declined. All property in a tax district pays the same rate, however, so those properties with relatively large net assessed value increases saw higher gross levy increases, while those with smaller net assessed value increases experienced smaller gross levy increases or gross levy decreases. Residential, agricultural, and commercial property owners saw large increases in their gross levies.

The increases in net levies—the tax bills actually paid—were much less than the gross levy increases. This is because of the large increase in property tax replacement credits (PTRC) paid by the state to local governments. The increase in PTRC was part of the tax restructuring provisions enacted by the General Assembly. All property owners saw smaller increases or larger decreases in their tax bills due to the increase in PTRC. Residential and agricultural property owners benefited most because tax restructuring restricted part of PTRC payments to real property only, and most residential and agricultural property is real. In addition, the homestead credit percentage increased as a result of restructuring. This benefited residential and agricultural homesteads, but, because of limits enforced on the use of homestead credits, total credits paid in 2003 were about the same as in 2002.

Effect of Tax Restructuring. The tax restructuring of 2002 made significant changes to property tax assessments, deductions, credits, and so to overall tax payments.

- Restructuring reversed personal property assessment rule changes that the Department of Local Government Finance (DLGF) had put in place. It restored the 30% floor on depreciable equipment assessments, returned to the lower “percent good” percentages for depreciable equipment, and restored the 35% inventory adjustment and the 10% assessment on construction work-in-process. For 2002-pay-2003, however, the 30% floor elimination and higher “percent good” percentages remained in effect.
- Restructuring eliminated the shelter allowance, a fixed amount in each county that was to be subtracted from homestead assessments. The shelter allowance was replaced with a higher homestead deduction, which increased from \$6,000 to \$35,000.
- Restructuring added a new property tax replacement credit equal to 60% of school general fund levies, and restricted the existing PTRC to levies on real property. The contribution to local levies in all 92 counties by PTRC and state homestead credit payments increased by



approximately 67%, from \$1.1 billion to \$1.9 billion. For the 71 counties, PTRC and homestead credits were increased from \$981 million to \$1,679 million (see Figure 2).

- Restructuring raised the homestead credit to 20%. The credit had been scheduled to revert to 4% in pay-2003. Restructuring also applied the homestead credit to the gross levy less PTRC, rather than the gross levy itself.

Table 8 shows estimates of how tax bills for the 71 counties would have changed for each property type had tax restructuring *not* been adopted. Tax increases for residential owners would have been particularly large. The increases in the homestead deduction and PTRC in the tax restructuring reduced the size of this tax increase. Residential property taxes still increased because the reassessment business-to-residential tax shift plus the increase in the tax levy was not fully offset by the rise in the homestead deduction and higher state PTRC payments. PTRC payments were larger, but payments of the original 20% PTRC were eliminated for personal property, which meant that restructuring had only small effects on commercial and industrial taxes. The percentage changes in the “With Restructuring” column of Table 8 correspond to the changes in the net levies in Figure 2.

Property Class	Estimated -No Restructuring-	Actual -With Restructuring-	Difference
Agriculture	22.2%	5.7%	-16.5%
Residential	46.0%	11.4%	-34.6%
Homesteads	51.2%	4.3%	-46.9%
Commercial	-0.8%	-0.9%	-0.2%
Industrial	-21.8%	-21.5%	0.3%
Utility	-37.0%	-27.9%	9.1%

* Data does not include Lake County.

Lake County. Changes in tax bills in Lake County were substantially different than changes in the other 71 counties. For this reason Lake was excluded from the 71-county totals presented here.

The average Lake County residential property owner saw a 44.4% increase in property taxes in 2003, compared to 11.4% in the other 71 counties. Were Lake added to the 71-county total, the state average residential increase would be 15.1%. Likewise, the average Lake County industrial property owner saw a 50.3% tax bill decrease in 2003. The average decrease for the other 71 counties was 21.5%. If Lake’s industrial tax change were added to the state total, the state average decrease would be 27.9%.

The main difference between Lake and the other counties was in the assessment of residential property. Where the average gross assessment of residences doubled in the other 71 counties, in Lake it nearly tripled. Lake County’s residential property was assessed further below market value than in the other counties and, so, required a much bigger increase during reassessment.

Data and Methodology.

Methodology. The analysis presented here is based on data from several sources. The data include pay-2001 or pay-2002 and pay-2003 real property parcel assessment records from county assessors and real property parcel tax records from county auditors. The analysis also used pay-2003 personal property tax returns, pay-2002 and pay-2003 county auditor abstracts, county assessor “Form 15” data, and certified tax rate and levy data from the DLGF Local Government Database.

The parcel-level data for 2001 was recomputed at 2002 tax rates to estimate 2002 tax. The pre-reassessment (2001/2002) and post-reassessment (2003) records for a parcel were matched for use in the comparable properties report.

Each parcel was assigned to a property class based on the parcel use code. The parcel-level gross AV and deductions (pay 2002 and 2003) were then summarized by class for each taxing district and scaled to match the total AV and deduction amounts reported on the county auditor abstract. These data provided the basis for the 2002 and 2003 net AV and net tax reports by property class.

Pay-2003 personal property returns over \$150,000 AV were recalculated under rules in place for pay-2002. Each return was assigned to a property class based on the reported NAICS code. The gross AV (pay-2002 and pay-2003) was then summarized by class for each taxing district and scaled to match the total AV reported on the county auditor abstract. These data provided the basis for the 2002 and 2003 net AV and net tax reports by property class.

Parcel Data Issues. The county parcel data had to be cleaned and put into a database. Assessors and auditors are required to provide parcel-level data to the Legislative Services Agency (LSA) and DLGF in a specified format. Some vendors and counties worked to adhere to the standards, while others did not. Some counties provided data only after repeated contacts by LSA.

Reading, decoding, and understanding the nature of the data included in the parcel data files has proven to be a major undertaking. The problems are many. Because of the myriad of systems and vendors, the data was received in many formats, even though there is a standard format requirement. There were no reporting or standard format requirements for the 2001/2002 data. LSA collected the pre-reassessment data in any format that was available.

The following issues are only a portion of the major obstacles faced in analyzing the parcel data. Each of these problems had to be solved in order to use the data. Each different county system stores data differently. The number of files and relation between them differ by system. Some counties include non-property tax assessments (i.e., ditch assessments) and records for non-taxable parcels in the data. Some counties populate some fields while others do not. Some counties identify deductions differently than others. Most counties do not use or report the state tax district codes. Many counties have auditor and assessor systems that use different parcel identifiers which makes matching records more difficult. Many counties upgraded or changed systems between 2001/2002 and 2003 which makes matching records more difficult. Property use codes were missing or invalid for many parcels. Each county handles and reports exempt property differently.

Personal Property Data Issues. The pay-2003 long-form personal property returns were keyed and/or scanned by an outside DLGF contractor. The files delivered by the contractor could not be read by any database program because of data quality issues and faulty record layouts. Routines had to be written to read, convert, and verify the data. Suspect records were manually checked and corrected. All short-form, consolidated, farm, and utility returns had to be manually entered by LSA.

County assessors summarize personal property assessments by major group (e.g., agricultural, individual, business, and utility) and tax district on a report to the DLGF called "Form 15." A few counties were not filing these forms. LSA requested, received, and processed the pay-2003 "Form 15" from all but one county.

List of Attached Summary Tables. Three summary tables are attached to provide additional information regarding assessed values and taxes by property class.

Summary Table 1: Comparison of 2002 and 2003 Net Property Tax Billings by Property Classification. This table summarizes net tax billings for real and personal property by property class. Additional information is provided for subclasses such as homesteads, agricultural homesteads, agricultural land, and rental properties.

Summary Table 2: Comparison of 2002 and 2003 Net Assessed Value by Property Classification. This table summarizes net assessed values for the same property classes described in Summary Table 1.

Summary Table 3: Residential Property Summary. This table summarizes the assessed value and net tax changes from 2002 to 2003 for residential property. The table includes a distribution of net tax changes for comparable residential properties and for the homestead component of residential property. The table also depicts the distribution of changes as if there were no levy increase in 2003.

Comparison of 2002 and 2003 Net Property Tax Billings*
(Scaled to Abstract Values)
By Property Classification**
Includes the Following 71 Counties:

Adams, Allen, Bartholomew, Benton, Blackford, Boone, Carroll, Clark, Clay, Clinton, Daviess, Decatur, Delaware, Dubois, Elkhart, Fayette, Floyd, Fountain, Franklin, Fulton, Gibson, Grant, Greene, Hamilton, Hancock, Harrison, Hendricks, Howard, Huntington, Jay, Jefferson, Jennings, Johnson, Kosciusko, LaGrange, LaPorte, Lawrence, Madison, Marion, Marshall, Martin, Miami, Monroe, Montgomery, Morgan, Newton, Ohio, Owen, Parke, Perry, Porter, Pulaski, Putnam, Randolph, St. Joseph, Shelby, Steuben, Tippecanoe, Tipton, Vanderburgh, Vermillion, Vigo, Wabash, Warren, Warrick, Washington, Wayne, Wells, White, Whitley

Property Classification	2002 Net Tax	2003 Net Tax	Difference***	Change***	2002	2003	Change
					% of Total Real + Pers	% of Total Real + Pers	
<u>Real + Personal</u>							
Agricultural	288,124,268	304,581,959	16,457,691	5.7%	6.8%	7.2%	0.4%
Residential	1,680,041,342	1,871,616,884	191,575,542	11.4%	39.6%	44.4%	4.8%
Commercial	1,285,718,224	1,273,521,509	-12,196,715	-0.9%	30.3%	30.2%	-0.1%
Industrial	758,555,007	595,485,857	-163,069,150	-21.5%	17.9%	14.1%	-3.7%
Utility	208,262,226	150,201,378	-58,060,848	-27.9%	4.9%	3.6%	-1.3%
Exempt	21,374,386	17,555,148	-3,819,238	-17.9%	0.5%	0.4%	-0.1%
Undefined	3,873,405	4,177,648	304,243	7.9%	0.1%	0.1%	0.0%
Total	4,245,948,858	4,217,140,383	-28,808,475	-0.7%	100.0%	100.0%	0.0%
<u>Real Property Only</u>							
Agricultural	261,306,413	284,585,376	23,278,963	8.9%	6.2%	6.7%	0.6%
Residential	1,667,558,119	1,863,786,942	196,228,823	11.8%	39.3%	44.2%	4.9%
Commercial	820,610,228	862,275,787	41,665,559	5.1%	19.3%	20.4%	1.1%
Industrial	272,586,218	229,096,189	-43,490,029	-16.0%	6.4%	5.4%	-1.0%
Utility	11,333,742	9,524,804	-1,808,938	-16.0%	0.3%	0.2%	0.0%
Exempt	21,374,386	17,555,148	-3,819,238	-17.9%	0.5%	0.4%	-0.1%
Undefined	3,873,405	4,177,648	304,243	7.9%	0.1%	0.1%	0.0%
Total	3,058,642,511	3,271,001,894	212,359,383	6.9%	72.0%	77.6%	5.5%
Agricultural Homesteads	111,690,085	111,811,272	121,187	0.1%	2.6%	2.7%	0.0%
Residential Homesteads	1,252,318,226	1,306,248,133	53,929,907	4.3%	29.5%	31.0%	1.5%
Total Homesteads	1,364,008,311	1,418,059,405	54,051,094	4.0%	32.1%	33.6%	1.5%
Non-Homestead Residential	415,239,893	557,538,813	142,298,920	34.3%	9.8%	13.2%	3.4%
Apartments (Over 4 Units)	170,260,394	199,716,819	29,456,425	17.3%	4.0%	4.7%	0.7%
<u>Personal Property Only</u>							
Agricultural	26,817,855	19,996,589	-6,821,266	-25.4%	0.6%	0.5%	-0.2%
Residential	12,483,214	7,829,937	-4,653,277	-37.3%	0.3%	0.2%	-0.1%
Commercial	465,107,995	411,245,717	-53,862,278	-11.6%	11.0%	9.8%	-1.2%
Industrial	485,968,794	366,389,658	-119,579,136	-24.6%	11.4%	8.7%	-2.8%
Utility	196,928,483	140,676,575	-56,251,908	-28.6%	4.6%	3.3%	-1.3%
Total	1,187,306,341	946,138,476	-241,167,865	-20.3%	28.0%	22.4%	-5.5%
Total Depreciables	804,310,405	635,967,431	-168,342,974	-20.9%	18.9%	15.1%	-3.9%
Total Inventory	370,512,721	302,341,111	-68,171,610	-18.4%	8.7%	7.2%	-1.6%
<u>Agricultural Only</u>							
Ag Non-Hmstd Real	149,616,327	172,774,102	23,157,775	15.5%	3.5%	4.1%	0.6%
Ag Personal	26,817,855	19,996,589	-6,821,266	-25.4%	0.6%	0.5%	-0.2%
Total Ag Business	176,434,182	192,770,691	16,336,509	9.3%	4.2%	4.6%	0.4%
Ag Homesteads	111,690,085	111,811,272	121,187	0.1%	2.6%	2.7%	0.0%

* "Tax billings" for real property refers to the net taxes charged per the parcel level data received from county auditors and assessors, scaled to values reported on the county auditor's abstract.

* "Tax billings" for personal property refers to the net taxes charged on the personal property assessed value reported on the county auditor's abstract.

** Property class was determined using a combination of county auditor parcel-level real property tax data, county assessor parcel-level real property assessment data, county auditor abstracts, Form 15 personal property assessment data, business and farmer's personal property tax returns over \$150,000 AV, and state distributable utility tax returns.

*** Net tax changes from 2002 to 2003 include effects of changes in assessment methods, local levies, real property physical characteristics, property use, personal property held or acquired, deductions, and credits.

Comparison of 2002 and 2003 Net Assessed Value*

(Scaled to Abstract Values)

By Property Classification**

Includes the Following 71 Counties:

Adams, Allen, Bartholomew, Benton, Blackford, Boone, Carroll, Clark, Clay, Clinton, Daviess, Decatur, Delaware, Dubois, Elkhart, Fayette, Floyd, Fountain, Franklin, Fulton, Gibson, Grant, Greene, Hamilton, Hancock, Harrison, Hendricks, Howard, Huntington, Jay, Jefferson, Jennings, Johnson, Kosciusko, LaGrange, LaPorte, Lawrence, Madison, Marion, Marshall, Martin, Miami, Monroe, Montgomery, Morgan, Newton, Ohio, Owen, Parke, Perry, Porter, Pulaski, Putnam, Randolph, St. Joseph, Scott, Shelby, Steuben, Tippecanoe, Tipton, Vanderburgh, Vermillion, Vigo, Wabash, Warren, Warrick, Washington, Wayne, Wells, White, Whitley

Property Classification	2002 Net AV	2003 Net AV	Difference***	Change***	2002	2003	Change
					% of Total Real + Pers	% of Total Real + Pers	
<u>Real + Personal</u>							
Agricultural	13,137,535,276	23,587,362,074	10,449,826,798	79.5%	8.5%	9.9%	1.4%
Residential	67,206,185,863	118,740,100,126	51,533,914,263	76.7%	43.3%	49.6%	6.3%
Commercial	41,338,710,301	60,446,100,305	19,107,390,004	46.2%	26.6%	25.2%	-1.4%
Industrial	25,525,168,807	28,270,702,864	2,745,534,057	10.8%	16.4%	11.8%	-4.6%
Utility	7,377,532,608	7,387,324,037	9,791,429	0.1%	4.7%	3.1%	-1.7%
Exempt	663,347,182	795,894,989	132,547,807	20.0%	0.4%	0.3%	-0.1%
Undefined	115,927,546	197,929,153	82,001,607	70.7%	0.1%	0.1%	0.0%
Total	155,364,407,583	239,425,413,548	84,061,005,965	54.1%	100.0%	100.0%	0.0%
<u>Real Property Only</u>							
Agricultural	11,944,335,769	22,236,825,234	10,292,489,465	86.2%	7.7%	9.3%	1.6%
Residential	66,726,193,241	118,235,263,957	51,509,070,716	77.2%	42.9%	49.4%	6.4%
Commercial	26,332,609,239	42,861,930,704	16,529,321,465	62.8%	16.9%	17.9%	1.0%
Industrial	9,117,780,867	11,775,828,743	2,658,047,876	29.2%	5.9%	4.9%	-1.0%
Utility	387,581,430	516,853,559	129,272,129	33.4%	0.2%	0.2%	0.0%
Exempt	663,347,182	795,894,989	132,547,807	20.0%	0.4%	0.3%	-0.1%
Undefined	115,927,546	197,929,153	82,001,607	70.7%	0.1%	0.1%	0.0%
Total	115,287,775,274	196,620,526,339	81,332,751,065	70.5%	74.2%	82.1%	7.9%
Agricultural Homesteads	5,356,821,904	9,085,146,770	3,728,324,866	69.6%	3.4%	3.8%	0.3%
Residential Homesteads	52,154,694,262	86,284,767,450	34,130,073,188	65.4%	33.6%	36.0%	2.5%
Total Homesteads	57,511,516,166	95,369,914,220	37,858,398,054	65.8%	37.0%	39.8%	2.8%
Non-Homestead Residential	14,571,498,977	31,950,496,509	17,378,997,532	119.3%	9.4%	13.3%	4.0%
Apartments (Over 4 Units)	5,422,808,954	9,721,213,598	4,298,404,644	79.3%	3.5%	4.1%	0.6%
<u>Personal Property Only</u>							
Agricultural	1,193,199,507	1,350,536,840	157,337,333	13.2%	0.8%	0.6%	-0.2%
Residential	479,992,622	504,836,169	24,843,547	5.2%	0.3%	0.2%	-0.1%
Commercial	15,006,101,061	17,584,169,603	2,578,068,542	17.2%	9.7%	7.3%	-2.3%
Industrial	16,407,387,936	16,494,874,120	87,486,184	0.5%	10.6%	6.9%	-3.7%
Utility	6,989,951,180	6,870,470,477	-119,480,703	-1.7%	4.5%	2.9%	-1.6%
Total	40,076,632,306	42,804,887,209	2,728,254,903	6.8%	25.8%	17.9%	-7.9%
Total Depreciables	27,260,459,596	28,961,835,774	1,701,376,178	6.2%	17.5%	12.1%	-5.4%
Total Inventory	12,336,180,081	13,338,215,264	1,002,035,183	8.1%	7.9%	5.6%	-2.4%
<u>Agricultural Only</u>							
Ag Non-Hmstd Real	6,587,513,870	13,151,678,470	6,564,164,600	99.6%	4.2%	5.5%	1.3%
Ag Personal	1,193,199,507	1,350,536,840	157,337,333	13.2%	0.8%	0.6%	-0.2%
Total Ag Business	7,780,713,377	14,502,215,310	6,721,501,933	86.4%	5.0%	6.1%	1.0%
Ag Homesteads	5,356,821,904	9,085,146,770	3,728,324,866	69.6%	3.4%	3.8%	0.3%

* "Net Assessed Value" for real property refers to the gross AV less deductions per the parcel level data received from county auditors and assessors, scaled to values reported on the county auditor's abstract.

** "Net Assessed Value" for personal property refers to the gross personal property assessed value reported on the county auditor's abstract less the deductions reported on the abstract.

*** Property class was determined using a combination of county auditor parcel-level real property tax data, county assessor parcel-level real property assessment data, county auditor abstracts, Form 15 personal property assessment data, business and farmer's personal property tax returns over \$150,000 AV, and state distributable utility tax returns.

*** Net AV changes from 2002 to 2003 include effects of changes in assessment methods, real property physical characteristics, property use, personal property held or acquired, and deductions.

**Summary of 71 Selected Counties
Residential Property Summary
2003 Reassessment**

Includes the Following 71 Counties:

Adams, Allen, Bartholomew, Benton, Blackford, Boone, Carroll, Clark, Clay, Clinton, Daviess, Decatur, Delaware, Dubois, Elkhart, Fayette, Floyd, Fountain, Franklin, Fulton, Gibson, Grant, Greene, Hamilton, Hancock, Harrison, Hendricks, Howard, Huntington, Jay, Jefferson, Jennings, Johnson, Kosciusko, LaGrange, LaPorte, Lawrence, Madison, Marion, Marshall, Martin, Miami, Monroe, Montgomery, Morgan, Newton, Ohio, Owen, Parke, Perry, Porter, Pulaski, Putnam, Randolph, St. Joseph, Scott, Shelby, Steuben, Tippecanoe, Tipton, Vanderburgh, Vermillion, Vigo, Wabash, Warren, Warrick, Washington, Wayne, Wells, White, Whitley

Distribution of Net Tax Changes on Comparable Residential Property

% Change	2002 to 2003 Actual Bills All Residential Property		2002 to 2003 Actual Bills Homesteads Only		2002 to 2003 Recomputed Bills With NO Certified Levy Change All Residential Property		2002 to 2003 Recomputed Bills With NO Certified Levy Change Homesteads	
Over 300%	64,929	3.5%	15,719	1.4%	56,771	3.1%	13,893	1.2%
200% to 300%	42,455	2.3%	9,356	0.8%	34,207	1.8%	7,549	0.7%
100% to 200%	140,083	7.5%	35,018	3.1%	114,174	6.1%	27,683	2.5%
50% to 100%	207,627	11.2%	66,692	5.9%	173,681	9.3%	50,628	4.5%
25% to 50%	208,358	11.2%	95,428	8.5%	177,731	9.6%	69,261	6.1%
10% to 25%	191,328	10.3%	119,224	10.6%	166,316	8.9%	86,522	7.7%
5% to 10%	78,506	4.2%	57,679	5.1%	69,847	3.8%	42,988	3.8%
0 to 5%	156,096	8.4%	79,464	7.0%	145,028	7.8%	63,544	5.6%
0 to -5%	97,913	5.3%	80,656	7.2%	88,072	4.7%	65,039	5.8%
-5% to -10%	105,109	5.7%	90,080	8.0%	99,618	5.4%	79,412	7.0%
-10% to -25%	301,868	16.2%	271,967	24.1%	348,682	18.7%	304,940	27.1%
-25% to -50%	216,168	11.6%	179,900	16.0%	319,830	17.2%	277,897	24.7%
Below -50%	49,225	2.6%	26,081	2.3%	65,708	3.5%	37,908	3.4%
	1,859,665	100.0%	1,127,264	100.0%	1,859,665	100.0%	1,127,264	100.0%
Parcels With Increases	1,089,382	58.6%	478,580	42.5%	937,755	50.4%	362,068	32.1%
Parcels With Reductions	770,283	41.4%	648,684	57.5%	921,910	49.6%	765,196	67.9%
Average \$ Change		\$67		-\$4		-\$18		-\$104
Average % Change		8.1%		-0.5%		-1.7%		-9.5%

"Comparable Properties" = Properties with a record in both years that have improvements in both years OR no improvements in both years.

Data Source: 2001, 2002, and 2003 County Parcel Tax Data - County Auditors and County Assessors

Prepared by Legislative Services Agency - June 2005

Property Tax Payments, 2002-2003 - Predictions and Results -

Indiana Legislative Services Agency

June 2005

A Comparison of Predictions and Results for Reassessment and Restructuring, 2002-2003.

The General Assembly initiated a study of the effect of market value assessment on Indiana taxpayers in 1993. This study was completed in 1999. The data, models, and results were transferred to the Legislative Services Agency (LSA), and—with substantial modification and updating—served as the basis for the analysis of the 2002-2003 reassessment and tax restructuring.

Effects of Reassessment. The market value study and LSA's subsequent analyses predicted that residential and agricultural assessments would increase substantially more than commercial, industrial, and utility assessments. Residential assessments were expected to double. If no other policy changes were made, this would cause a large shift in property taxes from businesses to homeowners. Residential taxes were predicted to increase by 33%, in addition to the usual levy increases.

Table 1 shows that these predictions were borne out. The table reports an estimate for 72 counties of what would have happened in 2003 had reassessment gone forward with no tax restructuring. As predicted, residential assessments increased by just more than 100% — they more than doubled. Agricultural assessments nearly doubled. Commercial and industrial assessed values increased by much smaller amounts, and utility assessments were almost unchanged.

The tax bill changes shown in Table 1 include a 10.6% increase in the statewide property tax levy. Without this levy increase, residential tax bills would have increased about 35%, very near the predicted 33% increase. The increase in agricultural taxes also would have been substantial, as predicted. Without the levy increase, commercial taxes would have fallen more. Even with the levy increase, industrial and utility taxes fell substantially.

	Gross AV	Tax Bills
Agriculture	91.7%	22.1%
Residential	105.5%	46.0%
Commercial	45.7%	-0.7%
Industrial	16.8%	-21.8%
Utility	-0.3%	-36.9%

The conditions for a huge tax shift from businesses to residential property owners came to pass, as predicted. The General Assembly anticipated this tax shift and passed a tax restructuring bill providing tax relief to property taxpayers, especially homeowners. As a result, the shift of taxes to homeowners was much smaller than it would have been.

Predictions and Results. LSA's analyses of reassessment and restructuring assumed no change in the tax levy, and no new construction, acquisition, demolition, or property use changes. The intent was to isolate the effects of the court-ordered reassessment and the restructuring passed by the General Assembly, apart from the changes in assessments and levies that happen every year. This means, though, that the predictions cannot directly be compared to the assessment and tax bill changes of 2002-2003.

Instead, actual changes in real assessments were tabulated for parcels that were comparable in 2002 and 2003. These parcels saw no new construction, no demolition, and no changes in property use. The assessment changes for these parcels, then, were due solely to changes in assessment rules. The effects of these changes are what LSA’s model tried to predict. Data on comparable property assessments were tabulated for 72 counties.

These data also allowed an estimate of how residential tax bills would have changed had tax levies not increased. Tax rates for 2003 for each tax district were recalculated assuming no change in unit and fund levies. These recalculated 2003 tax rates were then multiplied by 2003 residential assessments for comparable properties. The tax bills with no levy change were compared to 2002 tax bills. These results show how reassessment and restructuring changed residential tax bills had levies remained unchanged, though the tax rates include the effects of new construction, demolition, and property use change. They provide the closest comparison to LSA’s predictions.

Table 2 compares predictions and results using two measures. The first is simply the difference between the actual results and the predictions. The second is the correlation between the predictions and results for 72 counties. Note that the assessment results in Table 2 differ from Table 1 because the effects of new construction, demolition, and property use changes are not included in the assessment changes in Table 2. The tax bill results differ because Table 1 includes the actual levy increase, while Table 2 does not.

Table 2. Assessment and Tax Bill Predictions and Results, Comparable Properties, No Levy Change.							
	Gross Real Assessed Value Change						Residential Tax Bill
	Resid	Agric	Com	Industry	Utility	Total	
<i>Predictions, 72 Counties</i>							
Statewide Average	109.0%	84.4%	54.6%	19.4%	27.4%	90.3%	-5.3%
<i>Results, 72 Counties, Comparable Properties, No Levy Increase</i>							
Statewide Average	106.8%	106.0%	58.2%	20.9%	40.1%	85.5%	3.1%
<i>Comparison, 72 Counties</i>							
Statewide Avg. Error	-2.2%	21.6%	3.6%	1.4%	12.7%	-4.7%	8.4%
County Correlation	0.48	0.44	0.05	0.02	-0.11	0.29	0.53

The LSA property tax model successfully predicted changes in gross real assessed value for residential, commercial, and industrial property. The model predicted that reassessment rule changes would increase residential property assessments by 109%. The actual increase was 107%. Likewise, the model predicted commercial and industrial changes of 55% and 19%, respectively. The actual changes were 58% and 21%.

The utility real property prediction was not so accurate. This is not a serious concern, however, because utilities own very little real property. Almost all utility property is personal property.

The even larger prediction error for agricultural property is of greater concern. The model predicted that agricultural assessments would increase by 84%, while the actual increase was 106%. As a result, the increase in agricultural property taxes was greater than predicted.

The prediction of residential tax bill changes also shows an error. Apart from changes in levies, the model predicted that reassessment and restructuring would produce a 5% decline in residential tax bills. Tax bills without levy changes actually would have increased by 3%. Tax bill changes were under-predicted by eight percentage points.

From two points of view, however, the prediction of residential tax bill changes was accurate.

- The model predicted that reassessment would increase residential property taxes by 33%. Restructuring was predicted to change this increase to a 5% tax cut. Restructuring, then, reduced the residential tax hike by 38 percentage points. Actually, reassessment would have increased residential property taxes 35% without the levy increase. Restructuring reduced this to 3%, a 32 percentage point drop. LSA's model predicted that restructuring would have a 38-point effect on residential property; it actually had a 32-point effect. This was a reasonably accurate prediction.
- Much of the tax restructuring effort was directed at homeowners. Only homeowners benefited from the increase in the homestead deduction and the homestead credit. For comparable properties, with no levy increase, the average homestead tax bill fell by 6.2%. The model predicted a 5.3% decline for all residential property. These two figures are not directly comparable. The model would have predicted a bigger drop for homesteads, had such a prediction been made. Still, to the extent that the 5.3% tax cut prediction for residential property was interpreted as a tax cut for homeowners, the prediction was accurate.

The correlation coefficients in Table 2 measure the accuracy of the county-by-county predictions. A correlation coefficient can vary from -1 to +1. A large positive correlation means that predictions were substantially correct. Counties that were predicted to see big residential tax hikes actually saw them; those predicted to have small increases had small increases. A correlation near zero would mean that predictions did not correspond to results at all. A large negative correlation would mean that counties that were predicted to have the biggest tax increases actually had the biggest tax decreases—the results were the opposite of what was predicted.

The correlations are moderately positive for residential assessments, agricultural assessments, total assessments, and residential tax bills. Generally, the counties that were expected to see bigger assessment or tax bill changes actually saw them, and those that were expected to see smaller changes actually saw them.

The correlations are near zero for commercial, industrial, and utility assessments. The model failed to predict the county pattern of small and large assessment changes for these property types.

LSA's model successfully predicted the effects of market value reassessment before restructuring; statewide changes in residential, commercial, and industrial gross real assessed values; generally which counties would see larger or smaller changes in residential, agricultural, and total real assessments; generally which counties would see larger or smaller changes in residential tax bills; and generally the net effect of tax restructuring on residential tax bills.

The model did not successfully predict statewide changes in agricultural or utility gross real assessments; the direction of the statewide average change in residential tax bills due to reassessment and restructuring; nor county-by-county changes in commercial, industrial, or utility gross real assessments.

Assessment Sources of Prediction Error. Where were assessment predictions inaccurate, what caused this inaccuracy, and how did it influence the tax bill predictions?

Sample Size. Predicting the results of reassessment required information on how the market value assessment rules would change the assessed values of various property types. In 1993 the General Assembly required that the prices of real estate transactions be recorded on sales disclosure forms. These data were made available to the market value study. Disclosure form data presented enormous difficulties due to failure to file forms correctly, but a large enough sample was usable. The disclosure

form sales prices were taken as market values and compared to the existing true tax value assessments from the 1995-1996 reassessment. The result was a set of “multipliers,” showing on average how much existing assessed values would have to increase under a market value assessment standard. Multipliers were calculated for residential, agricultural, and business real property.

As might be expected, however, the number of residential properties that sold was far greater than the number of commercial or industrial properties that sold. Inevitably, the sample sizes used to estimate the multipliers for residential property were far greater than for other property types. In fact, more than 30,000 residential parcels were available statewide to calculate residential multipliers. Only 50 industrial parcels were available. Many counties had no industrial sales at all, and none had enough to produce an assessment multiplier for an individual county. As a result, all of the county industrial multipliers were estimated from statewide averages for urban, suburban, or rural counties. The same method was used for commercial multipliers in counties with too few commercial sales.

These multipliers were supplemented with an alternate method. Indiana assessors visited Sandusky County in Ohio—a market value state—and assessed properties there using Indiana true tax value assessment rules. Multipliers were calculated by comparing Ohio and Indiana assessed values for identical properties. Several hundred residential properties were assessed. Because of their complexity, however, only nine industrial parcels were assessed.

Thus, the sample sizes for calculating residential multipliers were much larger than those used for commercial and industrial multipliers.

Sample sizes were adequate for statewide averages. The average statewide multipliers predicted the changes in gross assessed value accurately for residential, commercial, and industrial property (see the statewide averages in Table 2). On a county-by-county basis, however, the residential multipliers predicted accurately (see the correlations in Table 2), while the commercial and industrial multipliers did not.

Small sample sizes explain the failure of the model to accurately predict the county-by-county changes in gross assessed value for commercial, industrial, and utility property. Sample sizes were big enough to produce accurate statewide predictions.

When it commissioned the market value study, the General Assembly asked for analyses of ten representative counties. County data became available for 47 counties, however. Assessment multipliers for the other 45 were estimated from the results for these counties.

The out-of-sample county estimates were made by classifying each county as large urban, small urban, suburban, or rural. Average assessment multipliers for each property type were calculated for each county type using the sample counties. These average multipliers were then used in the out-of-sample counties of each type.

Table 3 shows that the predicted statewide change is closer to the actual result for the sample counties for agricultural, commercial, and industrial assessments and slightly closer for the residential tax bill (i.e., the average taxpayer error was closer to zero for the sample counties). The out-of-county sample actually produced better statewide average predictions for residential, utility, and total assessments. Results from sample counties are not consistently better than the results for out-of-sample counties in predicting statewide average changes.

Table 3. Prediction Errors and County Correlations for Sample and Out-of-Sample Counties.

	Gross Assessed Value Change						Residential Tax Bill
	Resid	Agric	Com	Industry	Utility	Total	
Sample Counties							
Statewide Avg. Error	-4.2%	19.8%	-2.2%	-5.5%	18.4%	-7.1%	6.7%
Correlation	0.72	0.53	0.22	0.11	-0.16	0.53	0.61
Out-of-Sample Counties							
Statewide Avg. Error	0.6%	24.2%	16.4%	10.2%	16.6%	-1.1%	7.5%
Correlation	-0.07	0.24	0.03	0.02	-0.12	0.08	0.42

In-sample county-by-county results, measured by the correlation coefficients, are more positive for every category except real utility assessments. The correlation coefficients for the sample county residential, agricultural, and total assessment change are strongly positive, as is the correlation for the residential tax bill change. The commercial and industrial assessment correlations are slightly positive. Out-of-sample correlations are positive only for agricultural assessments and the residential tax bill change.

The slightly better out-of-sample performance for agriculture may be because firms in this industry vary less in their characteristics than do commercial or industrial firms. Knowing the agricultural multiplier in one rural county was something of a guide to the multiplier in other rural counties.

The correlation coefficient for the residential tax bill is positive for the out-of-sample counties. In part this must be due to the fact that average assessment multipliers captured the essential business to residential shift that was characteristic of the whole state. Also, factors in addition to the assessment changes enter into the calculation of the tax bill change. The shares of property type in each county and the changes in calculations of tax relief, for example, affected the tax bill change. These factors can be accurately predicted from assessment and budget data available for every county.

A county's predictions are more accurate when sample data is collected from that county, but statewide averages can be accurate with data from a partial sample of counties. County predictions of tax bill changes can be somewhat accurate even without county data on assessment changes.

Actual Multipliers. Suppose LSA had known the actual county-by-county assessment changes for comparable properties for all property types in advance--how would the accuracy of the prediction results have changed?

This question is answered with an experiment. The experiment inserts the actual multipliers for comparable properties—measured after the fact—into the 2002-2003 prediction model for 72 counties (known as the “Utopia” model).

The results are shown in Table 4, and they are unexpected. The average prediction error for residential tax bills *increases* from 8.4% to 10.9% when the actual multipliers for comparable property are used. The county-by-county correlation drops from 0.52 to 0.48 when the actual comparable multipliers are used.

Table 4. Effect of Different Assessment Multipliers on Tax Bill Statewide Error and County Correlations.

Multiplier Simulation	Average Error	Correlation
Predictions	8.4%	0.52
Comparable Real	10.9%	0.48
Actual Real	9.2%	0.67
Actual Real & Personal	7.0%	0.67

These results use the actual multipliers for *comparable* properties. But the actual multipliers that produced the residential tax bill changes included new construction, demolition, and land use changes. Probably by coincidence, the predicted multipliers were closer to the actual multipliers with property changes than were the actual multipliers on comparable properties.

To test this unexpected result, the experiment was redone using the actual multipliers with changes in property characteristics. Table 4 shows that the results are similar to the results for sample size. There is no improvement in the average statewide prediction error for the residential tax bills when just the actual real multipliers are used, and there is modest improvement when the actual real and personal multipliers are used. The county-by-county correlations, however, improve significantly when actual multipliers are used.

Apparently, the multipliers actually used in the predictions were about as accurate as they could have been. Knowing the actual multipliers, *for comparable properties*, does not improve the prediction results. To find prediction improvements in the multipliers, it is necessary to know the effects of new construction, demolition, and property use changes on assessments in each county. Even then, the improvement is in the county-by-county results, not in the statewide average.

Multipliers that reflect the actual changes in property characteristics, such as construction, demolition, and property use changes, improve the predictions on the county level, but not the statewide average predictions.

Farm Land as a Share of Agricultural Business Real Property. Farm land is assessed on a use value basis, by multiplying a base rate per acre by a soil productivity index, and adjusting for factors like flooding or forest cover. In the 2003 reassessment, the base rate of farm land increased 112%, from \$495 to \$1,050 per acre. This was an advantage for prediction purposes, because the assessed value of every acre of farm land in the state would be strongly influenced by this 112% increase.

Predicting with this base rate change required information about the existing assessed value of farm land. Unfortunately, this information was not available. In the assessment data, farm land assessments are aggregated with other agricultural non-homestead real property—farm structures, non-tilled land, and non-homestead residential property like out-buildings or even swimming pools. The farm land share of the agricultural non-homestead real property assessment was going to increase by 112%. To predict the change in agricultural assessments, it was necessary to estimate what this share was, and to predict how non-land farm business real property assessments would change.

The increase in agricultural gross assessed value was under-predicted by 22 percentage points (see Table 2). Evidently, either the share of farm land in the total, the increases in the non-land portion, or both were not accurate. Using Census of Agriculture data, it was estimated that 55% of agricultural business real property was farm land. This probably is an underestimate. Non-land business real assessments were assumed to increase at the same rate as industrial property. This may have been an underestimate of the assessment increase.

Underestimates of the share of farm land in agricultural business real property and under-prediction of the increases in non-land assessments explain the under-prediction of the increase in agricultural gross real assessed value.

Non-Assessment Sources of Prediction Error. The results, so far, show that the errors in average statewide tax bill changes did not result primarily from errors in predictions of gross assessed value changes. The prediction error for residential tax bills with no levy increase was 8.4%—the model predicted a tax bill change that was 8.4 percentage points less than the actual change.

It appears that there is no single cause of this error. The prediction error apparently was the sum of several small causes.

Industrial Deductions. Industrial deductions increased substantially more than predicted. The prediction model assumed that these deductions would increase proportionally with business gross assessed value, since so many of the business deductions and abatements are calculated as a percentage of gross AV. This is what happened for commercial property.

For industrial property, the share of deductions in gross AV increased from 12% in 2002 to 17% in 2003. It may be that a large share of new business construction and personal property acquisitions was abated in 2003.

Homestead Credits. The tax reduction effect of the homestead credit was overestimated by about \$40 million. Homestead credits were expected to increase; in fact, they remained almost unchanged between 2002 and 2003.

The changes to the homestead credit were complex. The rate increased from 10% in 2002 to 20% in 2003 (it had been scheduled to drop to 4% in 2003). The rate was applied to the gross levy in 2002. It was applied to the gross levy less property tax replacement credits in 2003. And, the “17-year error” was corrected in 2003, meaning that the credit applied to a fraction of the total levy, rather than to the whole.

Modeling the Fixed Levy. Predictions were made assuming a fixed levy, that is, that levies in 2003 were the same as 2002. This was done to isolate the effects of reassessment and restructuring, apart from property tax changes that would take place in any case.

The fixed levy assumption can create prediction errors in two ways.

First, the statewide average tax increase is a weighted average of the county increases, with the weights equal to the net levies. That means that levies from big counties like Lake and Marion have a bigger effect on the state average than do levies from small counties like Ohio or Warren. Counties with larger increases in tax levies would have greater weights in 2003 than in 2002. This means that even if tax changes in all counties are predicted correctly, the failure to capture the change in weights will mean an underestimate of the statewide net tax increase.

Second, the prediction model held *tax district* levies constant as a way of holding county levies constant. However, when assessments change by different amounts across districts, a constant county levy will mean shifts in the share of the total levy paid by each district. If agricultural and residential assessments rose more than business assessments, the levies of agricultural- and residential-dominated districts would rise, and levies of commercial- and industrial-dominated districts would fall. These shifts intensify the results—property types with big assessment increases also see higher levies; property types with small assessment increases also see lower levies. Fixing the district levies underestimates the tax shifts that result from differential assessment changes.

A better way to hold levies constant is to hold the *government unit* levies constant, and allocate these levies to districts based on changing assessments. LSA's new "Nirvana" property tax model does this. Modeling levies this way requires a great deal more data than the older "Utopia" model's constant-district method. The size of the Utopia spreadsheets was about 45 megabytes. The new Nirvana spreadsheets take 180 megabytes.

The version of the MS Excel software available in 2002 placed an upper limit of about 55 megabytes on spreadsheet size. Constant levies could not have been modeled using the government unit method in 2002. The upper limit of the updated version of Excel now in use has not been reached. Further, the computers in use in 2002 could not have calculated results from such a large spreadsheet quickly. Newer, faster computers purchased since 2002 do the job well.

Towards Improved Predictions. The experience of predicting property tax changes during the 2002-2003 reassessment and restructuring provides some guidance for improving predictions in the future.

- The General Assembly initiated the market value study in 1993. Since then, many additional efforts have been made to gather parcel-level data from counties. Without this study and these new data, predicting the results of the shift to market value would have been difficult. The effort to gather and analyze new data was repaid—better data made for better predictions.
- Accurate statewide predictions can be made with relatively small samples and a subset of counties. For accurate county-by-county predictions, larger samples from all counties are needed. The market value study used only 47 counties because data were either not available or not usable from the others. For data from 2003 and after, counties are providing LSA with data in a standard format. This should ease data collection problems in the future. However, many counties still identify their deductions and credits with non-standard codes, so using county data is still a challenge. Greater uniformity in county data formats and coding should improve county-by-county predictions.
- Agricultural assessment changes were under-predicted because the share of farm land in agricultural business property was underestimated. Data on farm land assessments have become available for some counties. An analysis of these data plus the experience of the 2002-2003 predictions will allow the farm land share to be more accurately estimated in the future.
- LSA is unlikely to be able to predict county levy changes; changes in property construction, demolition, and property use; or changes in commercial and industrial deductions for new property. New debt-financed construction projects, new firm locations, large new abatements, corrections of past levy errors, and the like are simply unpredictable without a detailed knowledge of local events. Even with large samples from every county, these unique events will mean that tax bill predictions cannot be completely accurate.
- Faster computers and improved software can help improve predictions. The new "Nirvana" property tax model mimics the Indiana tax bill process, building district tax payments by property type from unit-fund levies and district assessments. Older computers could not have handled the enormous data requirements of this model.